



VOLUME
XCI::

JULY-DEC
1906

THE BUILDER

AN : ILLUSTRATED : WEEKLY
MAGAZINE : FOR : THE
ARCHITECT : ENGINEER : ARCHÆ-
OLOGIST : CONSTRUCTOR : SANI-
TARY-REFORMER : & : ART-LOVER

CONDUCTED BY

H. H. STATHAM,

FELLOW OF THE ROYAL INSTITUTE OF BRITISH ARCHITECTS.

“EVERY man's proper mansion-house, and home, being the theater of his hospitality, the seat of self-fruition, the comfortablest part of his own life, the noblest of his sonne's inheritance, a kind of private principedome, nay, to the possessors thereof, an epitome of the whole world, may well deserve, by these attributes, according to the degree of the master, to be decently and delightfully adorned.”

“Architecture can want no commendation, where there are noble men, or noble mindes.”—SIR HENRY WOTTON.

“OUR English word To BUILD is the Anglo-Saxon Bylsan, to confirm, to establish, to make firm and sure and fast, to consolidate, to strengthen; and is applicable to all other things as well as to dwelling-places.”—DIVERSIONS OF PURLEY.

“ALWAYS be ready to speak your mind, and a base man will avoid you.”—WILLIAM BLAKE.

OFFICE: CATHING: ST: STRAND: LONDON: WC

THE BINDER

Printed at
Windsor House Printing Works,
Bream's Buildings, E.C.

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ACLISE is said—though we never saw the picture—to have painted the Garden of Eden with a sculptured fountain in the midst of it. This was certainly anti-

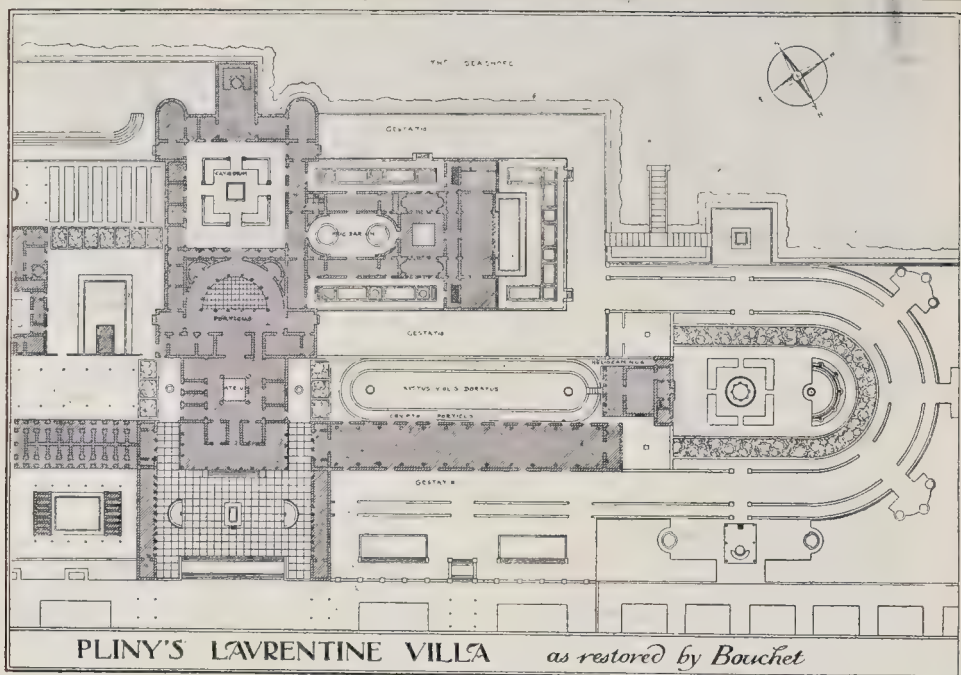
cipating matters a little, and was quite out of line with Milton's conception of Eden.

"Wild without rule or art, enormous bliss": where "enormous," be it noted, is to be taken in a double sense, not only as indicating the quantity but the quality of the bliss, according to Milton's frequent custom of combining in his meaning both the original Latin sense and the acquired English sense of a word; "enormous" literally meaning "out of rule." And assuredly one can hardly imagine the Garden of Eden set out in parterres. Yet one may fancy that, had

our first parents not so soon lost their "happy rural seat of various view," it would not have been long before they and their immediate successors would have commenced ornamental gardening therein; so ancient and inherent seems the desire to elaborate gardens into an artistic creation. Bacon, indeed, says that "a man shall ever see that, when ages grow to civility and elegance, men come to build stately, sooner than to garden finely; as if gardening were the greater perfection"; but one may rather doubt whether historical record, so far as it exists, would bear this out. The gardens of Babylon live in tradition even more prominently than the build ings. In one sense, and in individual cases, it may be said that the building must be made before the garden, since the garden is its setting, its decorative frame-work, "without which" (to quote Bacon again) "buildings and palaces are but gross handiworks." And in this connexion both building and garden gain something. An ornamental garden

almost pre-supposes a building as its central point and *raison d'être*—something for it to lead up to: so much so that, if a garden of this type is not connected with a building, it seems to require some artificial architectural erections, such as fountains and loggias, to emphasise its central points or form a climax to its vistas.

Of this kind of quasi-architectural garden Italy has been the special home; apparently not only in the period of the Renaissance, of which we have the most direct and existing evidence, but in the time of Imperial Rome also. In both periods there were the same advantages of sunshine and climate—and these are essential, for nothing looks more melancholy and starved, more redolent of ambitious failure, than a trim and sculptural Italian garden in a bleak northern climate. There may be a few days in an English summer in which it will be in very fact a "pleasance"; but they are very few. And in both the Imperial and Renaissance epochs there



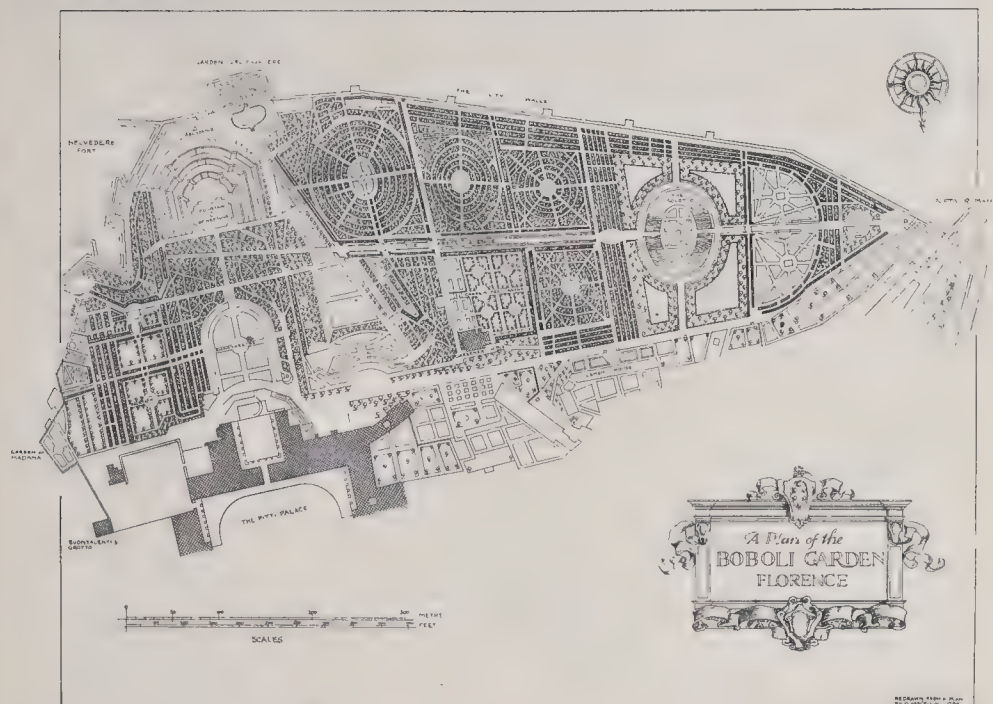
were the opportunities arising from the existence of wealthy private owners of houses, with a taste for stateliness in gardens. The Italian garden is, it must be admitted, an essentially aristocratic form of art; it is not for the poor or the public; and that the public can enjoy it now in such instances as that of the Boboli Gardens, and Versailles, and (in a lesser way) Hampton Court, is a privilege they owe to the original magnificence of a sovereign or a nobleman who laid out a place for his own private enjoyment. And in fact gardens of this type are sadly spoiled by a crowd. You may turn a joyous crowd into the irregular spaces of an English timbered park, as in the scene so well described at the close of Tennyson's "Princess," and they will harmonise well enough with the environment: but the Italian garden is of all others the haunt of "retired leisure," of stateliness and repose. This is possible in England (or was once); but the bright climate necessary to go with the Italian style of garden is wanting.

The subject is a fascinating one, nevertheless, and we may therefore be grateful to Mr. Triggs for having illustrated and described it for us in a book of monumental aspect and proportions.* The book (which is dedicated to Queen Margherita) deals of course with Italian gardens of the Renaissance, seeing that of the Roman garden we have only a few descriptions, and no visible evidence; but the author gives a historical sketch in his Introductory Chapter, of course dwelling especially on Pliny's descrip-

tion of his own gardens, which is the fullest Roman description extant; and one cannot but notice how very similar in many points this must have been to an Italian Renaissance garden. The clipping of trees into fantastic shapes (a device of doubtful taste) was obviously a practice with the Romans as well as with the later Italians, as Pliny refers specially to it. We suspect, as already observed, that this is a weakness inherent in human nature; and Andreini, the author of the curious illustrated religious poem of the Renaissance, "L'Adamo," evidently thought so too, since he does not scruple to show the gates of Paradise as formed with columns with spiral wreaths of flowers and a clipped bush for a finial; the four rivers which watered Paradise flowing in four straight artificial parallel channels from the boundary to the foreground, in one of his quaint illustrations. The plan of Pliny's garden as restored by Bouchet, which we have reduced from Mr. Triggs's pages, though it shows much the same general spirit as the Renaissance garden, is rather more decisively architectural, both in its reference to the buildings and in the rectangular nature of its lines. Few of the Renaissance gardens seem to have been carried out with this strict architectural formality throughout; there is generally an axial design in direct relation to the mansion, and outlying portions which, while still preserving a certain symmetry of parts, are not axial in their lines, but go off into triangles and other more or less geometrical shapes, in some cases suggested by the shore line when the garden happens to adjoin the coast. The most formal garden plan in Mr. Triggs's book is that of the Villa Imperiali at Sampierdarena, in which a

long and comparatively narrow piece of ground is divided up in a completely symmetrical manner on each side of the centre line through the axis of the house which stands at one end of the land; at the further end some feature of the natural boundary of the estate cuts off an angle of the parallelogram, but the symmetrical garden design is narrowed at this point so as to prevent its rectangular lines from being interfered with. This, we learn from the author, is the only one of the old gardens in the neighbourhood of Genoa which is still in fair preservation, the municipality having turned the Casino into a girls' school and the grounds into a public garden. The longitudinal section given in the book shows that the terraced garden, instead of falling from the house, rises from it by steps, the further part of the garden being the highest, and the house at the lowest level; an arrangement also found on record in some English terraced gardens, but neither admirable in an architectural or a hygienic sense. The kind of plan more typical of the Italian Renaissance garden is that of the Boboli Gardens, of which we give a reduced reproduction; for though almost everyone knows the aspect of the Boboli Gardens, there may not be many who have seen the plan; and it is one of the characteristics of this elaborate type of garden plan that its actual design, though evident when drawn on paper, is often not easily recognisable on the ground itself. The Boboli plan illustrates the system, before alluded to, of laying out a portion of the garden in direct axial symmetry with the mansion; and going off at other angles into a more or less geometrical arrangement which may or may not be laid out on an axial system. In this instance, in spite

* "The Art of Garden Design in Italy." By H. Inigo Triggs, A.R.I.B.A. Illustrated by photographic plates, plans, and numerous sketches. London: Longmans, Green, & Co. 1906.



of the irregular line of the boundaries westward, there is a more definite aim at axial symmetry, in the outlying portion, than we find in most of the other examples.

Falda's "Li Giardini di Roma" (1655), which is referred to in Mr. Triggs's Historical Introduction, is of considerable interest, in spite of the coarse character of the engraved plans and birds'-eye views, as it shows records of gardens which have disappeared or been altered by now. Some of the plans engraved in it do not give us a very high idea of the invention or imagination of the XVIIth-century garden architect. The Borghese Garden is shown as a simple collection of little rectangular groves. The Quirinal Pontifical Garden, with its little squares surrounded by breast-high box hedges, looks like a chess-board. In the Duke of Tuscany's garden on the Pincian, which is divided into large squares containing pattern gardens with fountains in the centre of many of them, there is some attempt at variety in the placing of the larger trees, which are mostly arranged along one side only of a square compartment of garden (possibly on the side which most required a screen from the wind). One open square formed by cutting out the angles of the four meeting alleys, promises a fine bit of garden effect from the arrangement of an obelisk in the centre of the space and a tall pyramid cypress at each of the four angles. But some of these gardens must have been terribly formal in effect. In the view of the Villa Pamphili in Falda's plate the geometrically-planned hedges in front of the house look like so many high walls shutting in the walks. The view of the Duke of Parma's villa on the Palatine

shows a fine architectural effect, the lower approach being up a stepped incline, rather than a flight of steps, up to a terrace with an architectural facing, and a similar broad and low stepped ascent, between two of the architectural pavilions, up to a higher terrace, also with its architectural pavilions. There are fine possibilities in such a scheme.

The numerous examples selected by Mr. Triggs for illustration are nearly all fine in their method of laying out, and lead to the conclusion that Falda hardly selected the best types for illustration in his book. Nothing could be finer in its way than the view (Plate 49) of the water garden of the Villa Gamberaia near Florence (so-called because it terminates in a semi-circular architecturally-treated pond), with its dignified plan of walks; the fountain as a centre object; the heavy masses of clipped bushes and hedges flanking the sides of the garden, and contrasting so effectively with its more delicate detail; and the terrace at the end, over which the stretch of distant country is seen—the world, as it were, shut out by the boundaries of this little paradise. The masses of solemn cypress trees which are part of the glory of many Italian gardens, so finely illustrated in a recent series of articles in the *Century* which we noted at the time (and to which the author makes an appreciative reference in his preface), do not appear much in these illustrations, except in one view from Villa d'Este (Plate 9), and in the view of the grand cypress alley at Villa Giusti, Verona (Plate 24), giving a long narrow vista between this great wall of trees, terminating in a lofty flight of steps. The author

says of this garden, "the maze and the parterres have all disappeared; but the central cypress walk, with its gigantic spire-like trees towering high above, is worth going far to see; above rise terraces, each presenting a view more beautiful than the last, of Verona, with its palaces, churches, and tall campanile standing out against the soft distance of plain and the blue hills beyond"; and he adds a regret, in which we entirely sympathise, that so beautiful a spot should have suffered so much from neglect, and a suggestion whether it might not still be possible to restore it to something of its former grandeur.

In turning over the plates one cannot but be struck, in many instances, with the gracefulness and suitability of the architectural accompaniments to the gardens—the treatment of terrace fronts and of niches and their architectural setting; so completely the style of decorative architecture suitable to a garden. The well-known coupled columns of the Boboli entrance are among examples of this; for an illustration, however, we have selected the plate showing the fountain at Villa Petraja, with its charming terminal figure of a nymph wringing out her hair. This is the villa referred to in Browning's fine poem, "The Statue and the Bust"—

"What if we break from the Arno bowers,
And try if Petraja, cool and green,
Cure last night's fault with this morning's
flowers?"

The plates, 128 in number, are from photographs by Mrs. Aubrey Le Blond, very beautifully reproduced by the colotype process. In addition to these, there are a number of complete plans of gardens, as well as many separate sketches of sculpture, fountains, and

other details; the whole forming one of the most sumptuous illustrative works of the day. But there is one point in which we suspect the evidence of the plates as to the real Italian garden of the Renaissance is hardly to be trusted. Being from photographs, they necessarily represent the gardens as they now exist; and in some of them there is a rank and disorderly growth of shrubs and flowers, giving a ragged look to the lines of the garden design, which can hardly, we think, have been allowed to exist at the time when they were new and were fully kept up. An Italian garden is essentially an artificial artistic creation, and this kind of riot of vegetable growths is at variance with its proper character, and must be accepted as representing the existing and not the original condition of these stately and palatial pleasure-grounds.

NOTES.

The Salisbury Railway Disaster. AS IN the case of most serious railway accidents during recent years, the deplorable wreck of the American boat-train at Salisbury station was the result of derailment. The disasters at Aylesbury and Witham stations have already demonstrated the liability of fast trains to leave the rails at places where points and curves have to be passed, and we have now one more proof of this risk, which is ever present even if only occasionally productive of serious consequences. Official inquiry may reveal the exact circumstances which caused the train to leave the metals at Salisbury, but it will scarcely allay the distrust with which the public regard the practice of running express trains at high speed through stations and other parts of the lines where curves, points, and crossings are unavoidable details. We are glad to notice that on the occasion to which we refer there was an absence of fire, the outbreak of which usually contributes so largely to the terrors of a railway disaster. This satisfactory feature was due to the prompt use of the hose in extinguishing the flames arising from the boiler-furnace, and to the foresight of an official in shutting off the gas supply.

Another Runaway Tramcar. THE accident which took place at New Bank, Halifax, on Sunday last, serves as a further but scarcely necessary illustration of the dangers attending the operation of electric tramways in hilly districts. On the Halifax system the magnetic and hand brakes are supplemented by an emergency slipper brake acting on the rails, and consequently available for application even if the hand brake is rendered useless by skidding wheels, or the magnetic brake has become inoperative owing to interruption of the supply of electricity from trolley wires or other conductors. At Halifax, in spite of the fact that the driver applied all three brakes, the car got completely out of control and, fouling the points of a switch, overturned at the bottom of the hill, killing two passengers and injuring many others. The driver attributes the accident to the greasy condition of the rails; and while this may have been the chief contributing cause, it is evident

that tramway brakes have not yet been brought to such a state of development as to satisfactorily safeguard the lives and persons of the public. One particularly undesirable feature is the manner in which hand and magnetic brakes are at present fitted to the self-same wheels of the cars, so that if one type of brake fails the other is rendered quite useless, as occurred at Highgate, and possibly at Halifax also.

Electricity Supply for London. THE rejection of the London County Council Electric Supply Bill by the House of Commons Select Committee last week was generally anticipated by those who had followed the evidence given by witnesses for and against the Bill. Apparently it was got up too hurriedly, and several of the opposing experts pointed out that in many ways it could be improved. The Special Report issued by the Committee will meet with general approval. They are of opinion that the London County Council should be the central authority. The Bill which has just been rejected was solely permissive, no obligation being imposed on the Council to give a supply to any of the local authorities. The Committee think that the local authority should have a right to demand a supply "in bulk." They also consider that the provision of cheap electric power for London is of pressing importance, and urge the County Council to come to an immediate decision. With the exception of the scheme brought forward by Prof. Arnold Lupton, M.P., the mining engineer, there was nothing very novel in the evidence of the experts. Prof. Lupton's scheme was for transmitting power directly from the coal-fields to London by electricity. Gas engines actuated by producer-gas were to be used. It was stated that they would only use half as much coal as the best steam engines, and that the by-products could be sold for half a crown a ton. The power was to be transmitted to London at 60 kilovolts pressure—presumably by overhead wires. In our opinion this was the weak point of his scheme, and the Committee naturally did not regard with favour steel standards carrying wires at this pressure along over a hundred miles of public roads. It was interesting, however, and it is well to bear in mind that the steam turbine is not the only type of prime mover that can be used in a power-station.

Landlord and Tenant. WE have on many occasions drawn the attention of our readers to the effect that general words contained in their leases, and which are too often accepted as mere common form, may have on the liabilities which will be incurred by the holders of such leases. The latest case is that of *Greaves v. Whitmarsh, Watson, & Co., Ltd.* The lease, which was for twenty-one years, at a rental of 105*l.* 16*s.*, contained covenants by the lessees to pay "all rates, taxes, and outgoings now payable or hereafter to become payable in respect of the said premises." The word "outgoings" was held to include the expenses of paving, levelling, and making good a road, not a highway repairable by the inhabitants at large, under sect. 150 of the Public Health

Act, 1875. In previous decisions the word "impositions" has been held to carry a liability to abate a nuisance, and the word "outgoings" the expenses of drainage at the requisition of a district council, and we could give many other examples. Nowadays the owners of house property are affected by the provisions of innumerable statutes which impose various liabilities upon them or upon their property. As the landlord prepares his leases, his legal advisers have endeavoured to introduce words in these documents which shall hand on these liabilities to the tenants, and therefore would-be tenants should take legal advice as to the effect of the leases they are about to sign.

Landlords' Liabilities. THE case of *Cavalier v. Pope* (reported in the *Builder*, page 738), as decided in the House of Lords, will strike the layman as affording a curious example of the law. A man had taken a house on a weekly tenancy, the house being unfurnished; the house was in a bad state of repair, and the lessee threatened to quit unless repairs were executed, and the landlord's agent undertook to do the repairs. Nothing was done, and the lessee's wife was injured through her chair going through the kitchen floor. Both husband and wife joined in an action for damages against the landlord, and both recovered damages before the jury, but the Court of Appeal held that no action could be maintained by the wife, and the House of Lords affirmed this judgment. The wife was not a party to the contract, and therefore could not sue on that; the landlord had not retained what is called control of the premises—that is to say, he had no right left in him by the lease to admit or exclude anyone from the house, and both the plaintiffs were well aware of its dangerous condition, and thus apart from contract there was no principle of law that the wife could invoke. All the same, although the decision is satisfactory to the lawyers as being founded on "well-established cases," laymen will look askance at it and will wish that Lord Justice Mathews' view could have been supported, that the wife having been induced to remain on in the house relying on the assurance made on behalf of the landlord that the premises should be put into repair, was entitled to damages for his failure to carry out his promise.

Municipal Trading. THE *Times*, in the *Engineering Supplement* for June 27, drew attention to the annual report of the Electricity Department of the Sheffield Corporation, which shows a debit balance, and proceeded to comment on the recommendation of the Engineer that to hasten financial success all municipally-controlled buildings should be lighted by electricity, and that there should be an extension of electric lighting in the thoroughfares. The *Times* pointed out that the economic advantages of gas and electricity should be tried strictly on their merits and not be influenced by a mere revenue return. If municipalities were to bolster up their undertakings in the manner indicated above it is obvious that the ratepayers in the end will have to suffer, whether the works cause a deficit or whether the

deficit is covered by protective measures. The authorities should study the financial end of that community in which the inhabitants lived by taking in each other's washing.

LORD CROMER'S Annual Report on Egypt in 1905
 records satisfactory progress in the construction of the new masonry apron for protecting the rock below the sluices of the Assouan dam. Various large holes and depressions caused by the outflow of water have been filled with solid granite masonry in cement mortar up to the level of the sluice sills, and elsewhere the rock has been faced by granite blocks let in to a depth of about 13 in., the apron thus formed sloping down by an easy gradient to the rock surface at a line about 197 ft. from the downstream face of the dam. Since August last, water has been flowing at high velocity down the slope, and, except at one place where the face jointing was badly executed, the work has given every promise of durability. It is expected that the remainder of the apron will be completed during the course of this year, and then the way will be open for the proposed raising of the dam, should that be finally recommended by the technical adviser to the Government. Lord Cromer states that investigation of the novel point raised by some mathematicians concerning the stresses of masonry dams is still in progress, and that no definite opinion has yet been formed. This question was fully discussed in our issue of July 8, 1905, and while we doubt whether the new theory has any application to the Assouan and similar dams, there is reason for commending the prudence of the Egyptian authorities in undertaking a careful examination of the whole subject.

THE Pennsylvania Railway Station New York.
NOTWITHSTANDING the magnitude of the building designed as the above-ground portion of the new terminus of the Pennsylvania Railway the underground part of the station will be far greater. The superstructure will be represented by a building with façades extending 780 ft. in one direction and 430 ft. in the other, while the substructure will occupy a site measuring 2,050 ft. by 500 ft., excavated to the average depth of 50 ft., and involving the removal of 2 million cubic yards of material. The site of the station, on which more than 400 buildings once stood, is now completely cleared and most of the excavation has been performed. One of the first operations taken in hand was the building of a concrete retaining wall entirely round the site. This wall is carried down to rock level, and for a considerable proportion of its extent is of the same depth as the excavation. The thickness of the wall is 5 ft. at the top and 30 ft. at the base in the deepest parts. All material excavated is removed by locomotives through a covered cutting and along an elevated railway to a wharf built on the North River, whence it is conveyed by barges to the New Jersey shore and used for filling in the site of the new goods station in course of construction by the Pennsylvania Railway Company. Among the various problems encountered,

that of maintaining the thoroughfares crossing the site of the station was one of the most serious. For instance, to provide for the conduct of traffic along Eighth Avenue it was necessary to build a massive trestle viaduct 500 ft. long to support the whole width of the roadway and footwalks, and of sufficient strength to carry also the permanent way and conduit of the electric tramway along the same highway. The value of a site in the middle of New York covering nearly 23 acres is a sufficiently heavy item; and, taking into account excavation, building, and other work, the total cost of the new terminus will be so great that nothing but the extremely congested condition of traffic in the city could justify the expenditure involved.

Slag Concrete.
ONE result of the extensive use now made of concrete, and perhaps also of the desire to reduce its cost, is the tendency to employ blast furnace slag as an aggregate in substitution for gravel or stone. We must point out, however, that slags differ considerably in quality, some varieties being quite unsuitable for concrete making, and especially for use in reinforced concrete. Blast furnace slags are liable to disintegrate owing to hydration of the lime, which is generally present to the extent of about 50 per cent., and they almost invariably contain calcium sulphide—a most active enemy of Portland cement—in proportions ranging from about 1·8 to nearly 4 per cent. This compound of sulphur is also objectionable for the reason that in contact with iron or steel it has a strongly-corrosive effect. The only qualities of slag that should be employed as aggregate in concrete work are those which are thoroughly vitrified and are entirely or practically free from sulphur. Slag produced in steelworks using the "acid" process usually complies with these essential conditions. The predominance of silica gives an assurance that the alkaline and other substances present will be combined in the form of a crude glass, thus insuring the permanence of the slag, while the absence of sulphur removes any risk of injury to the cement and the steel entering into the composition of reinforced concrete. No doubt some varieties even of blast furnace slag may be safely used for certain classes of work, but none should be adopted unless shown by analysis and inspection to be of entirely suitable chemical composition and of uniform quality and strength.

Pictures at the Guildhall.
AMID the multiplicity of exhibitions open at this season of the year we had not found space to say anything specially about the loan exhibition of Flemish pictures at the Guildhall, which however should by no means be overlooked by those who take a serious interest in painting. Gallery I. affords the opportunity of studying some remarkable examples of the Van Eyck's and their successors, including Sir F. Cook's Hubert van Eyck of "The Three Maries at the Tomb" (1), once in the possession of Philippe de Commines, and said by some experts to be the only important work that can with certainty be attributed to Hubert, though on the author-

ship of pictures by the elder Van Eyck there are endless differences of opinion. Of John van Eyck the most remarkable examples are the Duke of Devonshire's "Enthronement of Thomas à Becket" (5)—in which, by the way, the architecture is not (as described in the catalogue) "of the latest Norman style," being in fact of no historically-known style at all—and M. Helleputte's remarkable triptych (7), wonderful both in its elaboration of detail and its extraordinary brilliancy of preservation, if it be really unrestored in any way. Van Eyck seems to have worked for eternity in his painting. Among the other works in the same room are some fine examples of Memling, the more naturalistic successor of Van Eyck, with less brilliancy of detail but more humanity of expression. Gerard David's "Virgin and Child Resting on the Way to Egypt" (47) is remarkable (for its date) for the picturesque combination of landscape effect with the figures; and in the works of Van Eyck and Memling the detail of the landscape backgrounds, though very naive from the modern point of view, is of great interest as showing an early and conscientious endeavour to give the facts of scenery in a careful and elaborate manner. Among the later works is one of Rubens's finest things, the "Lioness at Play" (94), formerly seen at one of the Burlington House exhibitions, and Vandyck's superb portrait of "The Earl of Peterborough" (84). The interest of the modern pictures is very unequal; a good many of them are mere commonplaces of good execution with little individuality. Alfred Stevens shows best in this portion of the exhibition; two of his interiors, "The Model" (210) and "The Visit" (203) are remarkable in their way; among the few fine modern works are Van Camp's "La Faunesse" (194) and Louis Artan's bold study of sea (188). Gallait's revolting and theatrical painting of Egmont and Hoorn lying in state (a smaller edition of the original work) we could well have spared, as also the hard mechanical pictures of Baron Leys, who was once supposed to be a great painter.

THE Society of Arts gave their Conversazione at the Botanic Gardens, which has become an annual event, on Tuesday evening. A fine though not very warm evening (for July) rendered the gathering a complete success; the Gardens and trees were lighted up in the usual effective manner, and there was a crowded attendance. Guests were received from 9 to 10 by Sir Owen Roberts and members of the Council, at the entrance to the conservatory. The band of the Royal Artillery played during the evening in the conservatory, and that of the Scots Guards in the Gardens. Scenes from "Twelfth Night" and "The Merry Wives of Windsor" were given in the glade in the garden usually allotted to this class of performance, which attracted more spectators than there were seats for, to some of whom (judging from remarks overheard) it would appear that "Twelfth Night" was a play hitherto unknown; but no doubt that added to its interest. The real attraction on these evenings, however, is the beautiful effect of the

garden with its thousands of lights among the trees, which is always worth seeing.

In spite of the absurd tone of depreciation of Handel and of the Handel Festivals which musical critics and fashionable London amateurs have set up of late, it is satisfactory to find that the Handel Festival of last week was one of the best attended on record, and one of the most successful in a musical sense, owing in great measure to the admirable conducting of Mr. Cowen, who has succeeded in dominating and keeping together the immense mass of singers in a manner which has not been so fully achieved since the days of Costa. Nothing could have been finer than the execution of some of the *Messiah* choruses, and the final "Amen" chorus reached, one may say, the highest attainable sublimity of choral singing. On the "Selection" day some very remarkable and little known compositions were produced for the first time; it is a pity there has not been more enterprise exercised in this direction before, for the operas of Handel, as well as the many oratorios which are systematically neglected for the sake of a few popular favourites, are a perfect mine of fine and nearly unknown things. The Handel Festival might no doubt be made artistically better than it is, if the numbers of the band were somewhat increased and those of the chorus proportionately diminished; as it is, the balance between band and chorus is not right. It could easily be done; it is only a question of expense.

THE WARWICK PAGEANT.

On Monday the small town of Warwick had made itself gay with flags. Coming events were anticipated by the spectacle of a lady in a mediæval costume riding comely up the middle of the principal street, without exciting any comment. The pageant took place in the beautiful grounds of the castle, the scene of action being reached by a walk under a lane of over-arching trees, and past lawns haunted by peacocks. The great stand for the spectators, facing the wide lawn which was the scene of action, was admirably constructed both for seeing and hearing—indeed, the ease with which the voices for the most part could be heard in the wide open-air space was surprising; the stand, all built of timber, was roofed over, a construction which no doubt made it an assistance in an acoustic sense. The band, which was to play incidental music occasionally and accompany the singing, was placed in a roofed over compartment on the ground level at the centre of the stand, so as to be invisible and not too inconveniently audible to the spectators, while plainly audible to the actors. The stage, so to call it, was a wide expanse of level lawn or meadow, with plantations on each hand which afforded admirable and presumably roomy green-rooms where the performers could be mustered and marshalled, and whence each group of them could issue into sight when called upon. On the left, at the further extremity, the meadow was bounded by the stream of the Avon, which also lent its part to the pageantry. A picturesque distant wooded landscape furnished the background of the picture. As a scene, nothing could be better fitted for an entertainment of the kind promised.

We have not space to go through the performance in detail; we must be content to give an impression. The system pursued was to give presentations of a series of critical episodes from English history which were more or less directly connected with Warwick and its neighbourhood, punctuated by a narrative chorus who, between each episode,

advanced into the open from their seats at the front of the auditorium, and sang a verse or two describing the situation and foreshadowing the next episode. The chorus were clad as Druids (the first episode commencing in the Druidical epoch), an assumption of character which was not out of keeping for a chorus who acted in some sort as diviners, possessed of mysterious knowledge; able to foretell the future. The introduction of this narrative Chorus was an excellent idea. We had not been quite able to realise beforehand how the episodes were to be kept distinct without a series of awkward breaks in the performance. The narrative Chorus solved the difficulty entirely. As the performers of one episode were clearing off the stage the chorus came forward and sang their interstitial verse, and as they were concluding and commenced to retire the performers of the next episode were entering from another quarter of the side scenes. The whole thing was a masterpiece of what one may call stage management. There were 2,000 performers employed in all, not all together except at the final march past, but coming on in large parties one after another from different quarters and in different costumes; and from first to last there was not a delay or a hitch in the working of the machinery, nor, as far as we could realise, a single mistake beyond a momentary lapse of memory for a few bars in one of the choruses, but the singers quickly picked up their parts again from the band, and probably no one who was not following the printed music would have been aware of even this slip. The movements and entries of the different parties in the acting were well understood, controlled and signalled by Mr. Parker by a temporary electric telegraph system; it could hardly have been done except by some such means; at all events it was a most remarkable achievement of management; every group seemed to appear just as it was expected, apparently of their own instinct and without the audience being aware of any signal. It was certainly an instance, in a sense, of *ars est celare artem*.

The Historical Episodes commenced with Caractacus (or Caradoc as he was called in the book), and included various typical scenes and events in English history, and some also (as was natural) of more specially local interest, such as Henry the VIIIth's charter to the town and Master Oken's gifts to it (we know not of Master Oken, but presume he was a local benefactor in his day). The entrance of the boys of the King's School in the Charter scene was a very interesting episode. Among the most effective was the interview of Lewis XI., Warwick the King-maker, and Queen Margaret, somewhat rashly attributed to Shakespeare; it shortened from a scene in the Third Part of Henry VI., which indeed goes currently by Shakespeare's name, but we may doubt if he had much or any hand in it. The apparition of the Queen riding in, in her picturesque mediæval dress, was most effective. But the finest scene was certainly that of the entrance of Queen Elizabeth in her State coach, and the dances before her, and her final exit on a gorgeous State barge rowed up the Avon, and which disappeared behind the distant trees bordering the river, as the succeeding scene was getting made up. The whole of this scene, as a piece of effect, was really splendid. The temptation to bring Shakespeare, the adult Shakespeare, at least, on the scene, had been wisely resisted: it would have been too risky an experiment; he was introduced only as a little boy in green who was kissed by the Queen. The lady who acted Queen Elizabeth contrived to maintain a very fitting dignity of demeanour, which could not quite be said of all the representatives of eminent historical personages.

The costumes had been very carefully studied, and many charming effects of colour were to be seen, which were all the more effective because they did not in general give the impression of having been specially combined as colour effects, but were the result of such combinations as would naturally occur in times when people were not afraid of wearing bright colours, and when each trade and rank had its own distinctive costume—the state of things which Ruskin so earnestly but hopelessly desired to see re-established. English life has ceased to be picturesque; perhaps one use of such

pageants is to remind us that we were once picturesque. The prettiest effect of all was perhaps the dance in the last scene of the girls of the High School, in orange skirts with green streamers down them.

The words of the piece, mostly by Mr. Rhodes, served well enough to hang the pageantry on, but more may be said of his occasional verses, which have a fine ring in them, especially the triumph song at the end. The music, composed by Mr. Allan R. Blackall, merits special commendation; it is interesting and original throughout, and far removed from the usual commonplaces of theatrical music.

If we were to say what is the total impression produced on us, it is that the real value of the pageant did not appear till one had seen it through nearly to the close. In some of the earlier scenes we felt, to say truth, that there was occasionally a suspicion of the ludicrous in the rather stately vociferation of speeches of early kings and chiefs in outlandish costumes. It is when you come to the end and look back upon it, and on the manner in which the events and costumes of different ages have passed before the eyes, that one begins to have an impression of having seen a good deal of history in the course of the afternoon; of having had a panorama of the generations unrolled before one. As to its effect upon the inhabitants of a town, its connexion with which such a pageant is held, in quickening their interest in and realisation of their local history, we can feel no doubt whatever of that; and on that ground alone it is worth doing.

It is proposed to hold a pageant under Mr. Parker's direction next year at Bury St. Edmunds; a town which certainly has history enough behind it, and will furnish a very picturesque setting for such a performance.

HOVE PUBLIC LIBRARY SECOND COMPETITION.

It is not our intention here to rehearse the history of the first competition for this library; suffice it to say that the authors of ten of the more successful designs in that abortive competition were invited to submit further designs to amended conditions, and the drawings now on view at the Hove Town Hall are the result. The assessor was again Mr. John Belcher, and the award, as regards first place, may be considered thoroughly sound, for Messrs. Percy Robinson and W. Alban Jones, of Leeds, have produced a good working plan in which the difficulties of lighting have been successfully met, and, at the same time, the requisite "air space" in rear of the building, as per local by-laws, duly provided. The semi-circular lending library ("open-access"), 33 ft. radius, in the rear of the site, with the delivery desk at the centre point and on the axial line of the entrance and hall, is the key to the success of this plan. The radiating book-shelves are planned without waste, and the clearstory lighting is excellent. The entrance is cramped, but the played angles to news and magazine room help matters; these plays are, however, made too much of in the name of symmetry, and only end in being wasteful. The supervision of the magazine-room is capable of improvement by the introduction of a further glazed screen to the staircase wall.

The filing and staff rooms, etc., are under the semi-circular lending library, this part alone going down as a basement. On the first floor the staircase landing is roomy, and, with a recessed bay, 17 ft. 6 in. wide, forms the museum, and is supervised by the attendant who is accommodated between the reference library and the "special collection," which latter requirement has received more attention here than in the other designs, reading as well as book accommodation being provided. The elevations, although not drawn with any particular brilliance, may be expected to build well, after the doorway, windows, and turret have received further attention in detail. The cube is stated at 177,670 ft., and the estimate is given at £9,333.

As regards the second premiated design, by Messrs. Hardwick & Castle, of Kingston-on-Thames, we cannot follow the award, unless it be on the merits of the elevation, regardless of plan and section, and on the excellence of the draughtsmanship. The ground plan is practically a square, with entrance porch

hall, and stairs against left flank of site; the news-room, 54 ft. by 29 ft. 9 in., completing the frontage, with lending library, 70 ft. 6 in. by 34 ft., behind. The delivery desk is in the corner, and supervision is thus reduced to a minimum. This room, 70 ft. long, is but 14 ft. high, and has the window heads 3 ft. 6 in. below ceiling level. The stairs are cramped in plan and head room, and the entrance to men's lavatory could not be more bald. The cube is given at 246,000 ft. The third premiated design, by Mr. Lionel U. Grace, is characterised by its strong architectural treatment throughout; the domed treatment of reference library on first floor is excellent in section and lighting, although the rendering of the elevation rather suggests splayed octagonal projections flanking the central doorway than the flat panels they actually are. No. 7A, by Mr. J. B. Fulton, has the best supervision of any plan shown, and the newspaper desks do not, as in nearly every other design, obstruct the line of sight for control from the delivery desk. On the first floor the librarian's room is unnecessarily large, at the expense of the reference departments, but the plan is good throughout, and the elevation, well drawn as it is, would look as good in execution. The cube compares favourably with others, and altogether it would seem to us (we have not had the advantage of access to the conditions of the competition) to stand far in advance of the second premiated design. Messrs. Cox, Trimmell, & Davison, No. 4A, have laid down their plan on good broad lines, with a handsome entrance corridor, but it somehow does not carry conviction as a good working library. The elevation is pleasing, and would be more so in perspective, with its dominating high-pitched roof and bold fleche. Mr. C. Harold Norton, No. 3A, has allowed the exigencies of library planning to go to the wall in favour of an architectural exercise in the inadaptability of the Doric order to a problem of this nature. But all the columns, niches, and vaulted halls in the world do not make amends for the lighting of news-rooms,

30 odd feet deep, from wall faces 4 ft. or 5 ft. away from party-walls.

The remaining designs do not call for special mention, although, as the assessor remarks, "all show evidence of having been carefully thought out."

EXHIBITION OF OLD GLASS AT PARSON'S GREEN.

ON Wednesday Messrs Lowndes & Drury, with whom is associated Mr. Hugh Arnold, had on view a selection of XVth-century glass at their new studios, "The Glass-House," Lettice-street, Parson's Green. The greater part of the glass was from Hessel Church, near Bury St. Edmunds, now being reinstated, consisting of six complete window lights with cinquefoil terminations, about 9 ft. by 11 ft. total area, and some other fragments from the church. As far as possible the various designs have been preserved intact, the missing bits being replaced in plain green glass, and the general arrangement is satisfactory. The colour schemes, though simple, are effective, and contrast with fine shaded work on a warm neutral ground, the prevailing colours being blue, ruby-red, purple or "murrey," rich green (used sparingly), and the bright yellow obtained from silver, so conspicuous in XVth century and later glass.

The most perfect subject-pieces are the Resurrection in the upper tier and the St. Paul in the lower, the former being particularly fine. Christ rises from the tomb which, viewed from above, runs diagonally across the field, and bends towards the sleeping soldiers grouped about, the whole being a true piece of glass-design in the real sense of that word. The St. Paul is remarkable for the fine colour in the rich "murrey-coloured" robe of the Apostle. The head is also a fine piece of work of the dignified bearded type familiar in German portraits of the period. Other subjects more or less complete are the Annunciation, the Flagel-

lation, and St. Nicholas with children, besides winged and feathered angels and other subjects less easy to identify.

In a neighbouring room were shown seven-teen medallions of about the same date as the Suffolk work from Merton College, Oxford, representing decorative subjects and coats-of-arms, among the latter those of Walter de Merton, Gilbert de Clare, Cardinal Beaufort, and a Fitzjames of Rochester.

The new studios and workshops are conveniently arranged in a commodious building which looks what it really is, the workshops on the ground floor, and the studios—in several compartments with large lights—on the upper floor.

THE INTERNATIONAL CONGRESS OF ARCHITECTS.

It is to be hoped that the International Congress of Architects, which is to be held in London from July 16 to 21, will be largely attended by English architects. It is the first Congress of the kind that has been held in this country, and it will not be to the credit of the architectural profession in England if they do not support it in large numbers. At the closing meeting of the Bureau of the sixth International Congress (Madrid, 1904), the Royal Institute of British Architects was entrusted with the task of organising the seventh Congress in London; and we can testify that no efforts have been wanting on their part or that of their able Secretary (Mr. W. J. Locke) to render the Congress a success.

There will be about 500 foreign delegates attending the Congress. The Princess Louise has promised to attend the opening ceremony at the Guildhall on the 16th, when the Duke of Argyll will take the chair. The following table gives the provisional arrangements as made so far, and which will probably be carried out without any material alteration:—

SEVENTH INTERNATIONAL CONGRESS OF ARCHITECTS, LONDON, 1906.—PROVISIONAL TIME-TABLE.

	MORNING.	AFTERNOON.	EVENING.
Monday, July 16.	10—11.30. Informal Reception by President at the Grafton Galleries. 11.30. Meeting of International Permanent Committee. Appointment of Chairmen and Hon. Secretaries for various Sitzings of Congress.	3. Inaugural Ceremony at the Guildhall.	Royal Academy Soirée.
Tuesday, July 17.	10—1. GRAFTON GALLERIES. INSTITUTE MEETING ROOM. SUBJECT 3. "Steel and Reinforced Concrete Construction." SUBJECT 1. "The Execution of Important Government Municipal and Architectural Work by Salaried Officials."	VISITS (Simultaneous). 2.30. (A) Hatfield. 2.30. (B) Hampton Court.	Lord Mayor's Conversazione.
Wednesday, July 18.	10—1. GRAFTON GALLERIES. INSTITUTE MEETING ROOM. SUBJECT 6. "How far should the Architect Receive the Theoretical and Practical Training of the Craftsman?" SUBJECT 10. "The Organisation of Public International Architectural Competitions." SUBJECT 2. "Architectural Copyright and the Ownership of Drawings."	VISITS. 2.30—3.30. (C) Buckingham Palace Gardens. Westminster Abbey. 4.30. (Simultaneous). (D) Messrs. Holloway's Works. (E) Messrs. Doulton's Potteries. Also Reception at Lyceum Club.	8.30. GRAFTON GALLERIES. INSTITUTE MEETING ROOM. SUBJECT 7. "The Planning and Laying-out of Streets and Open Spaces." SUBJECT 9. "The Responsibilities of a Government in the Conservation of National Monuments."
Thursday, July 19.	10—1. GRAFTON GALLERIES. INSTITUTE MEETING ROOM. SUBJECT 4. "The Education of the Public in Architecture." SUBJECT 2. (Continued if necessary). SUBJECT 8. "To what extent and in what sense should the Architect have Control over other Artists or Craftsmen in the Completion of a National or Public Building?"	VISITS. 2.30 (Simultaneous). (F) Windsor Castle. (G) The Temple. (H) St. Paul's Cathedral. (I) Institute of Chartered Accountants. (J) St. Bartholomew's, Smithfield.	Kensington Palace. Dorchester House. Royal Institute of British Architects' Garden Party at Royal Botanic Society's Gardens.
Friday, July 20.	Morning. (L) The Tower of London.	ALL-DAY VISITS (Simultaneous). (J) Oxford. (K) Cambridge. Afternoon. (M) The Victoria and Albert Museum and Royal College of Science.	8.30. (Simultaneous). (a) GRAFTON GALLERIES. Professor Meydenbauer on "Messbildverfahren." (b) Evening at the Art Workers' Guild.
Saturday, July 21.	10. Meeting of International Permanent Committee. 11.30. GRAFTON GALLERIES. 11.30 VISIT. SUBJECT 5. "A Statutory Qualification for Architects."	VISITS. 2.30 (Simultaneous). (O) Greenwich Hospital. (P) Houses of Parliament. Westminster Cathedral.	7.30. Farewell Banquet at the Hotel Cecil.



NOTES ON OLD LONDON:

STRAND (NORTH SIDE), CATHERINE-STREET, COVENT GARDEN, BOW-STREET, DRURY-LANE, AND AROUND, 1801-1900.

Strand (north side).—What is here written supplements the article in the *Builder* of July 9, 1904, in respect of West Strand. Turning, then, eastwards from Agar-street one passes the bold façades of No. 429 (to be pulled down shortly), designed, 1832, by C. R. Cockerell for the Westminster Fire Insurance Office (1717), since removed to King-street. Occupied some fifty years ago by the inglorious (old) Royal British Bank, and since by the Briton Insurance Company, the premises were bought in 1886 by the British Medical Association, for whom Messrs. Arding, Bond, & Buzzard reconstructed the entire interior, adding a new roof and lowering the basement floor to receive the machinery for printing the *British Medical Journal*. In the first number of the *Times* by its present name, January 1, 1788, attention is directed to the narrow outlet, until 1766 Half Moon street, or passage, and afterwards widened from Bedford-street to the Strand. Exchange-court, named after the New Exchange, or Britain's Bourse, opposite, where is now the building recently vacated by Messrs. Coutts & Co., has been the headquarters of the Corps of Commissioners since its foundation in 1859 by the late Captain Sir Edward Walter, K.C.B., with a squad of eight discharged soldiers: the corps now numbers 3,222 men in London and the provinces. The Marchioness of Westminster's gift of 8,000l. enabled Sir Edward Walter to buy the premises in the court; in 1887 he acquired and rebuilt the Thatched House Tavern, a quaint old house, and reputedly a dairy of Nell Gwynne, who gave a name also to a tavern in the adjacent Bull Inn-court. John Scott opened the Adelphi Theatre as the Sanspareil on November 17, 1805; in 1821 he sold it to Rodwell and Jones, who renamed it the Adelphi. In 1825 Terry and Yates became lessees: Sir Walter Scott and Ballantine were concerned in their venture, Scott losing 1,750l. Having been for some while under the management of Charles Mathews the elder, and Yates, the house was remodelled, and Samuel Beazley (*ob.* 1851) built a new front in 1840. T. H. Wyatt, assisted by his former pupil, Mr. S. Salter, rebuilt the theatre (December 11 (plan), and 25 (interior), 1858*) for Benjamin Webster and Miss Céléste. The new house, containing 1,400 seats, measured 31 ft. to 44 ft. across between the boxes, 40 ft. to 46 ft. from boxes to curtain, 44 ft. 9 in. from pit to ceiling; proscenium opening 35 ft. wide by 38 ft. high, and stage 55 ft. deep by 67 ft. wide between the walls. The plan shows the enlarged site and auditorium of Wyatt's house, taking in most of the west side of

Bull Inn-court. The narrow front and entrance remained until Spencer Chadwick built the Adelphi Restaurant, about twenty years ago, for Messrs. A. & S. Gatti on the site of No. 410 the Hampshire Hog public-house, and No. 409. Mr. W. Barnard Pinhey carried out some further improvements, and in 1900-1 Messrs. Ernest Runtz & Co. reconstructed the whole house, which until January, 1902, was named the Century. A bronze tablet (February 9, 1901), cast by Mr. Parlanti from Mr. H. C. Fehr's model after a sketch by Mr. C. Fitzroy Doll, distinguishes No. 27, Southampton-street, whither Garrick removed from King-street, Covent Garden in 1750, soon after his marriage, and which he quitted for the Adelphi in 1772. From that house Dr. Johnson was sent touching the posts as he walked down Tavistock-street on his way to dine with Garrick. The anecdote, carried perhaps from one house to the other, is told, too, of Henrietta-street and Thomas Sheridan's house in Bedford-street. In the King's Library, British Museum, is a curious view of the interior of the laboratory at No. 31 of Godfrey & Cooke, established in 1680, who claimed to represent the earliest subsisting druggists' and chemists' business in London. Their successors, Messrs. Wm. Dart & Co., occupied No. 30, at the corner (south) of Maiden-lane, the shop front being by George Maddox (*ob.* 1843); Nos. 28-9 have been rebuilt as Hospital-buildings by Mr. J. T. Woodard, and Nos. 30-1 by Mr. J. Randall Vining, 1893-4; Tavistock chambers (No. 14) are by Mr. Charles Gray. C. J. Phipps built the Vaudeville Theatre at Nos. 40-5, Strand in 1869-70; in 1890-1 for a reconstruction of the theatre the two houses gave way to a new façade; Mr. Walter Emden built the Café Vaudeville, Nos. 399-400, which, together with Nos. 1-3, Fairfax-court, and Nos. 1-5, Lumley-court, he rebuilt as Romano's Restaurant in 1894-5. Newcourt's plan, surveyed in 1643-7, plots "Extr' Hous" projecting into the Strand.

Sir William Cecil, created Lord Burghley, 1571, and afterwards Lord High Treasurer, built his town house on the site of St. Martin's parsonage-house and its close, which, on Sir Thomas Palmer's attainder in 1 Mary I., passed to the Crown. Queen Elizabeth he stowed the property upon Burghley, who entertained her there on July 19, 1591. On the east side the gardens abutted upon the garden wall of Wimbledon House, Lord Burghley leased from his neighbour, Francis Earl of Bedford, more land westwards—afterwards built over as Marygold, Dunnet's or Benne's, and Denmark courts, and there he lived in high state. The lease, September 7, 1570, contains an early citation of the now time-honoured "corruption" "Covent-garden." His son and successor, Thomas, was created Earl of Exeter on May 4, 1605. After the Great Fire the Doctors of Civil Law used Exeter House during six years for their Court of Arches, Admiralty Court, and Will

Office of the Prerogative Court of Canterbury. Dr. Barbon, a speculative builder, erected Exeter 'Change as a bazaar in 1690, after the dismantling of Exeter House, which lay to the west. He used some of the materials, comprising, it seems, the two Corinthian columns at the east door, drawn in G. Cooke's view of 1823, which depicts also a range of one-storied shops along the south side and the old Lyceum (see lithograph plate in this issue.) The 'Change obtruded into the Strand between Nos. 352 and the corner (east) of Burleigh-street. The shops, forming two walks on the ground floor which was the footway of the Strand, and two walks on the first floor, were rented by milliners, hosiers, sempsters, upholsters, etc., and, latterly, by cutlers. Thomas Clark, a cutler, amassed a large fortune there, and at his death, in 1816, rented all the ground floor. The Land Bank occupied the first floor for a while; in an upper room the body of Gay, the poet, lay in state; in 1761 the large room served for auctions. Then Pidcock, Polito, and Edward Cross (1814) in turn occupied the upper floor as a menagerie; the elephant Chumelah, maddened by close confinement and an inflamed task, was shot on March 1, 1826, by a file of soldiers from Somerset House—see Hone's "Every Day Book," ii., 1841, with woodcuts; the skeleton is in the Royal College of Surgeons' Museum. Cross transported his collection to the Mews, Charing Cross, in 1826, and in 1829 the 'Change was pulled down. In "Curiosities of London," 1858, Timbs quotes J. H. Burn's statement that at the demolition he saw cut in the architrave of the east window "Exeter 'Change, 1670"—a date earlier than that commonly cited for the establishment of the bazaar. The Act 7 George IV., c. 77, provided for a widening of the Strand between the (old) Lyceum and Southampton-street, with the absorption of Marygold and Dunnet's courts and conversion of Denmark-court into the south arm of Exeter-street. Bowen's map of 1738 plots the 'Change, and, apparently for the first time, the extension westwards of Exeter-street. J. P. Gandy Deering (*ob.* 1850) built Exeter Hall, 1829-30, on the site of the north garden of Exeter House; Walker built the organ in 1840. S. Daikes lengthened it by nearly 40 ft. in 1850, and inserted a coved ceiling for the flat panelled one; Mr. A. B. Pite made further improvements in 1889-90. The adjoining buildings in the Strand are by Sir R. Smirke. The Synagogue, founded in Denmark-court in 1797, was rebuilt, 1825, in St. Alban's-street, Haymarket, by H. R. Abraham. St. Michael's, at the corner (south) of Burleigh and Exeter streets, by James Savage, 1833, built as a chapel-of-ease to St. Martin-in-the-Fields, was closed on September 10, 1905; the proceeds, 20,500l., of the sale of the site, 4,450 sq. ft., and materials were applied in part to a new ecclesiastical district at Sutton-court. This, with the parish, formed in 1848, was united to that of St. Paul, Covent Garden.

Lyceum Theatre.—James Payne built the Lyceum, next to Wimbledon House, in 1765 as an academy and show-room for the Incorporated Society of Artists, from whom Garrick bought the lease to prevent its conversion into a play-house. Lingham, of the Strand, a breeches maker, bought the premises in 1790 for musical performances; in 1794-5 he leased some adjoining land to Dr. Arnold, the composer, who built a theatre. But the Covent Garden and Drury-lane managers thwarted his enterprise, and the house was rented for picture exhibitions, and musical, equestrian, and other entertainments and shows—one of the latter being Mme. Tussaud's waxworks, 1802, for the first time in London. Winsor made some experiments in gas-lighting in 1803-4. Samuel, son of Dr. Arnold, enlarged the building, 1809, for his English Opera and Ballet House, which in 1816 gave way to a new theatre, erected at an outlay of, it is said, 80,000l., after S. Beazley's designs (see lithograph), and burned on February 16, 1830. The Strand facade had an octastyle Ionic portico with a balcony above, of stone. The ground being taken for the approach, 1829-30, to Waterloo Bridge, Grissell & Peto erected on the present site, at a cost of 35,000l., after Beazley's designs, a new house, which S. J. Arnold opened for English opera on July 14,

*Dates within square brackets relate to illustrations in the *Builder*.



Fig. 1. From R. Horwood's Survey of May, 1799.

NOTE.—The "Angel Inn," St. Clement Dares, was after 1854 "Dares Inn." The + marks the site of Crookford's shell-fish shop, without Temple Bar.

1834. Beazley planned the wardrobes, dressing-rooms, green-room, and offices outside the main walls: see his letter in the *Times*, July, 1834. The house was remarkable for the design and proportions of the saloon. Beazley built a new green-room in 1838, and rooms, entered from Exeter-street, for the recently revived "Sublime Society of Beef-steaks," founded in 1735 by Rich and Lambert at Covent Garden Theatre, who migrated thence in 1806 to the Lyceum of S. J. Arnold's and, after a sojourn, 1830-8, at the Bedford Head, Southampton-street, returned to the new Lyceum. The original Society's effects, with the silver gridiron, badge, and a hunting-knife reputedly by Cellini, were dispersed at Christie's on April 7, 1869, when the late D. Foster bought the chairs, after the Glastonbury pattern, for the board-room of Messrs. M. B. Foster & Co., of Marylebone-road, N.W. Seven of the oaken chairs were sold at Christie's on last June 8. In 1861 C. J. Phipps altered the interior, made new entrance and exit doors, and enlarged the house for the Daly American Company by taking in two restaurants on either side of Beazley's portico. During more than thirty years the fortunes of the Lyceum have been identified with the careers of the late Sir Henry Irving (ob. 1905) and of Miss Ellen Terry. In March, 1899, a company was formed to purchase for 275,000l. the freehold property, 23,500 ft. superficial, valued at 260,000l., together with the rentals of six premises in Exeter and Wellington streets and Sir Henry Irving's leasehold interest. Mr. Bertie Crewe was appointed architect to rebuild the premises as a music-hall in March, 1904.

Wellington-street.—No. 16, having a bowed front, by the (old) Gaiety stage-door, was Messrs. Bradbury & Evans'; in the first-floor rooms Charles Dickens, with W. H. Wells as sub-editor, conducted *Household Words* and its successor (1859) *All the Year Round*, 1850-60. On the transfer of the latter periodical to No. 26, at the corner, south, of York-street, where W. Clarkson began business as a theatrical wig-maker in 1833, No. 16 became the offices of the *Army and Navy Gazette*, and then, in August, 1891, was converted for purposes of the Gaiety. No. 20 was the offices of the *Athenaeum*, and also, since October, 1872, of *Notes and Queries*.

No. 346, Strand, was built as an extension of the offices in Wellington-street of the *Morning Post* by Mr. H. O. Cresswell [February 18, 1893, with two plans], on the site of premises built in 1838 by S. Beazley, which had been the offices of the *Field and Queen*. No. 346 supplanted A. Walker & Co.'s shop, formerly D'Oyley's, at Wimbledon House, erected for Sir Edward Cecil, first Viscount Wimbledon, son of Thomas Earl of Exeter, and taken down in 1782: Timbs says it was burned in 1628. D'Oyley gave his name to a popular small-wares fabric, a union of silk and wool, and reputedly to the little dessert and finger-glass napkins commonly so called. Yet the name may be derived from the low German *düwille* or old high German *dwahilla*; the English *towel*. Gay cites "thy D'Oily habit" in "Trivia," i.; similar allusions are made by Dryden, Budge, and Steele, and in Moser's "Vestiges."

No. 345, the banking house of Sir W. Stirling & Co., successors on that site to Richard Hamersley, goldsmith, at the sign of the Sun and Marigold,* yielded in 1863-4 to the Strand Music-hall, conspicuous for what E. Bassett Keeling (ob. 1886) claimed to be the "Continental Gothic" of its brick façade, and erected under the superintendence of himself and H. H. Collins (ob. 1905) as joint architects. The design constituted a novel departure from the style of façades in London, and for a while was often imitated. Phipps, following the model of the *Théâtre Lyrique* in Paris, reconstructed the interior for Lionel Lawson, slightly modified Keeling's elevation on the ground floor for the box and stall entrances, and took in some adjoining property on the east and north sides for the restaurant. The auditorium had room for 2,000 persons; the proscenium opening measured 30 ft. by 29 ft., the stage 64 ft. (between the walls) by 41 ft. depth from the curtain. John Hollingshead opened

the Gaiety in December, 1868; his management ceased in 1888, and the long series of burlesques ended on Saturday, July 4, 1903. During the demolition in the following autumn was found the painting, by Stacy Marks, R.A., 1868, of a group of merry-makers executed for the frieze, 30 ft. by 4 ft. 6 in., above the proscenium arch. For the Strand Music-hall was demolished the New Exeter Change, or Wellington-arcade, leading out of Wellington-street into Catherine-street, built in 1842-3 by Sydney Smirke, R.A., for the Marquis of Exeter. The foot-passage, 60 ft. by 12 ft., and 20 ft. high, had three middle rectangular bays with skylights, and polygonal vestibules with ceilings at the two ends which skillfully masked the obliquity of its direction: see a plan in the *Civil Engineer*, vii., 305. The second Marquis of Exeter (ob. 1867) directed in his will that all his London property, embracing the New Exeter Change, Exeter-street, and around, should be sold to pay his debts incurred upon the turf.

Catherine-street.—The Builder (1842) removed in 1874 from its first office at No. 1, York-street (Fig. 2), to No. 46, Catherine-street, formerly Bridges, street, by Habershon & Brock. The sign [April 2, 1887], since removed, was forged by Alfred Newman after the present editor Mr. H. H. Statham's designs based upon the foliage of the tropical *livuala horrida*, drawn from the life. For a setting back of the building line Mr. Statham designed the new front of Bracknell red brick and selected white Portland stone; the carving is by Messrs. Daymond [November 1, 1902, elevations, sections, and details]. On August 8, 1905, appeared the last number of the *Echo*, the first London evening paper sold for a halfpenny, which Messrs. Cassell, Petter, & Galpin established, with Sir Arthur Arnold as editor, on December 8, 1868, at No. 22. In that house, by sign of the Golden Harp and Hautboy, changed in about 1698 to the Harp and Hautboy, John Walsh began business, and there he and his son first engraved, printed, and published all Handel's music. To Walsh, who died in 1736 leaving a large fortune, succeeded his son John, who engraved his own music-plates. John Walsh advertised the Harp and Hautboy in the *Craftsman* of September 20, 1729; in that journal of June 30, 1733, he styles himself "music printer and instrument maker to His Majesty." P. Randall, too, was there in 1709: see the *Tatler* of December 1 of that year. The son carried on until 1766 a business which at his death had become one of the largest in the world, and embraced the making of musical instruments. In his day, it seems, the front was decorated with harps, etc., moulded in plaster. The business eventually passed to the founder of Novello, Ever, & Co., and the premises were converted about sixty years ago into a "penny gaff" and dancing saloon. At No. 22, vacated by the *Echo* in January, 1900, were first published the compositions of Purcell, Arne, Croft, Boyce, and others.

No. 342, Strand, at the corner, east, of Catherine-street, marked the position of the old Red Lion, latterly at No. 339, a haunt of the journalists' Crackpot Club. The tavern is named in a list of messages and holdings scheduled for an Act, 1650, for selling "the honours, manors, and lands belonging to the late King, Queen, and Prince," and paying the Army with the proceeds. Ludlow says that by a resolution of the House of Commons, Somerset House, with its appurtenances (the chapel excepted), was sold for 10,000l. The *Mirror*, April 4, 1829, gives a wood-cut of the inn; Mr. R. W. Paul's drawing of the sculptured panel of a lion rampant with the City coat-arms, from the first floor, is in the *Builder*, January 7, 1905. Whilst Aldwych and Kingsway (1899-1905) do not come within the present purview it may be observed that between Catherine-street and Drury-court (Nos. 342-309) lay, in the order stated, Helmet, Angel, New Church, and Windsor courts, and Denham-yard; and that the clearing of the ground for those improvements was begun in the purlieus of Helmet-court and continued eastwards in 1900-1 with the demolition of Nos. 304-266 as far as St. Clement Danes. In the block eastwards from Newcastle-street, originally Maypole-alley, were the covered passage (opposite Surrey-street) lead-

ing to Lyon's Inn, and No. 298 the United, since renamed by its former sign of the Spotted Dog, tavern. An Act of 1782 provided for the rebuilding of the original Maypole, or Magpie, alley, after a fire on October 9, 1781, which burned some thirty houses on the north side of St. Mary's church. Lyon's Inn, between the west ends of Holywell and Wych streets, was originally a hostelry by sign of the Lion, converted into an Inn of Chancery attached to the Inner Temple, temp. Henry VIII. The members sold their property in 1863 to the Strand Hotel Company, who bought some adjacent houses for a large hotel and shops, after designs by F. H. Fowler; the shops were built in the two streets; in 1867 the incomplete buildings were offered for sale. The Globe Theatre, Newcastle-street, opened on November 28, 1868, and having a capacity of 1,500, was erected on the area of Lyon's Inn quadrangle by S. Simpson, under the proprietor, Sifton Parry's directions [December 5, 1868]. On the site of the projected Strand Hotel and of the rest of the Inn, to the east, F. H. Fowler built the Opera Comique in 1869-70, using iron for all the construction; the house, in Wych-street, had its chief entrance at No. 299, Strand; Messrs. Fowler & Hall altered and improved it for Miss Nellie Farren (Mrs. Robert Soutar) in 1895; the London County Council acquired the property in December, 1899, upon a special jury's award of 40,000l., the total claim being for 60,688l. The Globe, opened on November 28, 1868, with H. J. Byron's "Cyril's Success," often changed hands during the first ten or eleven years; then, with Mr. Branderham Thomas's "Charley's Aunt," it achieved the distinction of bringing out the most profitable play ever produced upon the English stage; the materials were sold on May 12, 1903. The Globe formed one of the earliest West-end play-houses that sprang up so rapidly after the overthrow of the old monopoly. In 1866 the only theatres in the Strand were the Adelphi, the Lyceum, and the Strand, when no new theatre had been licensed in central London since the opening of the Princess's in Oxford-street twenty-five years previously. The Report, 1866, of the Parliamentary Commission on Theatres practically dissolved the monopoly, and the Lord Chamberlain issued licenses without inquiry into "the wants of the neighbourhood," provided that the regulations for public safety and convenience were duly observed. The Ordnance Survey, 1874, marks "Site of Holy Well" at the middle point of the east wall of the Opera Comique between Wych and Holywell streets. There were more claimants than one to that title in this quarter. In "Things I have Seen," 1894-5, Sala says that in 1852 he saw cleared out, behind the Old Dog (sic), No. 24, Holywell-street, an old well containing a lot of things, amongst them being a written memorandum "Dr. Goldsmith's 15th. 10d." Another well yielding abundance of water in 1895 was at the rear of No. 274, Strand. But in the Cracro Collection is a coloured copy endorsed "Ld. Burlington" of a valuable plan by J. Long, 1592, "The plott for all Thicketts fields" (New-square and around) to a scale of 20 yds. in the inch. As Long plots "Sheyre Lane"; "Mr. Boswells court and his howse," with "Clements well" next south; and "Lyncolnes Inne grange," he enables one to fix the position of the well, but some distance eastwards. For Boswell-court gave place to the Law Courts, and the Grange in 1832 to King's College Hospital. The well, in fact, lay on the east side, lower end, of Clements-lane. In 1885 were found just 20 yds. due west from the engine-room door, Royal Courts of Justice, and due north of St. Clement Danes church, the remains of the well, bricked around, and containing water some 30 ft. below ground level. The ground then lay waste, the well was filled with rubbish, nor was anything done to indicate the site of the "fair fountain" mentioned by the monk, Fitzstephen, in his account of London appended to the life he wrote of his master, Thomas à Becket, and translated by Stow. Stow describes the well as "fair curbed with hard stone, kept clean for common use, and always full." The improvements, 1790-1815, around the parish church, are due to Alderman Pickett, silver-smith, who obtained an Act, 35 George III. c. 126, for, with other things, the clearance

*Confer "The Signs of the Old Houses in the Strand in the XVIIth and XVIIIth Centuries," by Mr. F. G. Hilton Price, Dr. S.A., *Middlesex and Hertfordshire Notes and Queries*, 1896, 8.



Fig. 2. Based upon the Ordnance Survey of 1873 (Revised in 1893-4-5).

NOTE.—No. 1, York-street, Covent Garden, Builder's Office, 1842-1874. * Builder's Office since 1874 (Bridges-street, now Catherine-street).



Fig. 3. "Plan of the City's Intended Improvements, 1802: Surveyor's Office, Guildhall."

of Butcher-row (Fig. 3: and lithograph), a block in the roadway between the church and Ship-yard, half the distance to Temple Bar. The scheme contemplated the removal of the Bar (taken down in January, 1878), and the rebuilding of the church axially with the Strand; the south portico, having six Ionic columns, was taken down. The row took its name from the shambles along the north side of the block for a flesh-market granted in 21 Edward I. The shambles gave way to some XVIIth century half-timbered and gabled houses; the "Gunpowder Plot" house at the corner, east, of Clement's-lane, pulled down in 1798, George H. Birch copied for his "Old London" in the International Exhibition, 1884; Count Beaumont's house, 1581, pulled down in 1817, was the early home of Dr. Andrew Reed, the philanthropist. Gay forcibly describes in "Trivia," iii., the humours and, indeed, the dangers of "The Pass," or "Straits of St. Clements." The parish almshouses with vestry above were at the bow of the row. The demolition embraced Ship-yard, Crown court and place, and the two smaller blocks near the east ends of Holywell and Wych streets. Dancet the younger took down the (old) Nos. 194-219, Strand, between Arundel and Essex streets, with No. 1, Essex-street, making the curve; he similarly treated the north side, where he built Fickett-place, 1815, and the Fore Gate leading into Clement's Inn and Old Boswell-court from Pickett-street. Nos. 200-7, Strand, advanced within the line of the present church railing. At No. 238, next to Temple Bar, was a good specimen of a XVth century bulk-shop of wood and plaster with pents, the deal beams having oak joints, drawn by Archer for his "Vestiges." It had been kept by a long succession of fishmongers, the last being Crockford, who left it in 1827 to open the gaming-house in St. James's-street. But he preserved it in its ancient form until his death: in 1846 the house was rebuilt. Of the bulk-shops in this locality the last yet remains at the corner of Houghton street, opposite the (old) vestry hall, Clare Market; the quaintest of all, the poultryer's little shop on the south side of Gilbert's-passage leading out of Portugal-street into Gilbert (since Twining) street, survived until the winter of 1885.

Covent Garden.—When in or about 1631

Inigo Jones laid out for Francis, fourth Earl of Bedford, a place, or piazza, where had been the home farm or "frère pys" garden of St. Peter's Convent at Westminster, both the conception and name were unfamiliar in London. In Newcourt's map of London, surveyed in 1643-7, the square is lettered "Piazto": the inhabitants transferred that name to the vaulted stone arcades along the northern and eastern sides, calling them the Great Piazza and the Little Piazza respectively. Inigo Jones's church of St. Paul, 1631-8, with its two gateways and the two corner houses, completed the western side. Along the south stood a grove of trees against the garden wall of Bedford House, Strand, which was taken down in 1704; Tavistock-row, pulled down in 1885, and Tavistock-street replaced the garden of Bedford House on that side. In the square, and a little south from the axial line of the church, was raised, in December, 1668, a Corinthian pillar, upon a stepped pedestal carrying a cube with sun-dials (1730) upon three of its faces and a gilded sphere, which remained until June, 1790. John Kemble preserved the gilt ball in the garden of his house (now taken down), No. 13, Caroline-street, Bedford-square. In a print of 1747, "The Covent Garden Morning Frolic" and another contemporary view, the steps of the column appear as covered over with a kind of pent, or shed, having a pyramidal tiled roof rising to more than half-way up the shaft. The attics, having dormer windows in the tiled and projecting roofs of the red-brick houses, were altered into third floors some eighty years ago. An early view of the square is given in R. Vanden Hoejen's equestrian portrait of Charles II. (1655). *Notes and Queries*, December 30, 1879, contains a detailed description of the Duke of Bedford's large painting of Covent Garden, signed "B. Nebot in 1735," which once belonged to Charles Richardson, proprietor of Richardson's coffee-house (pulled down in 1867) in the Piazza, and has been ascribed to Hogarth. B. Lens's mezzoprint of the fireworks on September 10, 1690, has a very rare view of Bedford House and its garden wall. Another little-known view is the notable picture, of about 1750, and attributed to Canaletto, which was bought for 210*l.* at the sale at Christie's on June 30, 1888, of Lord Hardwicke's collection. That painting delineates, as seen by one looking towards King-street, the open area with the sheds and

coffee-houses outside the southern railings at the east end, one of the latter being Mrs. Butler's notorious "Finish," and another Tom and Moll King's night-house, well-known, says Arthur Murphy, to all gentlemen to whom beds are unknown. In the background are seen the church, the steps and platform of its portico as yet unlevelled, and the steeple of St. Martin-in-the-Fields. The detached house at the south-eastern corner of King-street is the Swan, which, in Hogarth's "Morning," is denoted by the sign of a jug, instead of a brazen pot, upon a post. Hogarth published his print on March 25, 1738; he places King's in front of the church portico, where the hustings for the Westminster elections were erected; moreover, the whole view is reversed so that Orford (Lord Archer's) house and the Swan appear on the square's south side. Spooner rectifies the error in his mezzotint. About that time wig and stick stalls blocked some bays of the arcades: T. Sandby's water-colour drawing of the Piazzas in the "Crowle" Pennant, engraved by E. Rooker in 1769, delineates posts under the arches, sedan chairs against the piers, and the railings of the roadways: compare also Malton's aquatint of Little Piazza, 1796. The *Annual Register*, 1769, records that a fire which broke out at Bradley's distilling-house in Great Russell-street (south side) on March 17 consumed all the houses up to the piazza, destroying

"Mr. Lovegrove's bagnio, Mr. Rigg's hummum and great part of the Bedford Arms tavern; all under the piazzas (sic). The whole front of the said piazza fell down."

An etching of "Little Piazza in flames done by a neighbour" is in the Craze collection. That block of Little Piazza was not rebuilt in its pristine form, and in 1886 the present Hummums Hotel, embracing "Rockley's Bar," was built by Peto Brothers from Messrs. Wylson & Long's designs after the Italian style simply treated, on the site of Small's, since Rigg's, bagnio, and cupping-house, cited in Hutton's "New View" 1708, and the scene of the alleged appearance of Parson Ford's ghost, related by Dr. Johnson to Boswell. The bagnio succeeded the Three Chairs Tavern, formerly Mrs. Dubois'. The Hummums—from the Arabic hammam, a bath—claimed to be one of the earliest hotels after its kind in the town; but the oldest

"The baser signification of 'bagnio' did not apply in that instance. The rustic arcade in stone of the ground floor reminds one of the Piazza."

*To be concluded next week.

only where progress had been and was still being made, but where research and experiment would produce important and beneficial improvements. The vital questions of quicker and easier modes of transit, the relief of streets congested with traffic, housing, road maintenance and cleansing, the abolition of dust from the roads, the disposal of refuse, the purification of trade effluents, and the prevention of river pollution were still to be solved. The work remaining to be done provided scope for ingenuity and objects worthy of the engineer's best and most determined efforts, and it demanded the services of highly-trained men and the employment of scientific methods. They would look in vain for any contribution to the solution of the problems which were engaging their thoughts from those who were content to follow beaten tracks and employ old methods, and it was even more hopeless to expect new ideas to spring from uneducated, untrained, and inexperienced persons, to whom some authorities thought municipal work might be entrusted. Science owed nothing to ignorant haphazard guesses, and engineering science would not be advanced by hazardous plunges in the realm of matter or aimless adventures with materials. Success was at the end of lines of intelligent thought and observation, and of experiments directed by a knowledge of scientific principles, and the need of the present time was a higher knowledge, a keener perception of cause and effect, and a more versatile application of experience in order to deal with new conditions.

When to the difficulties in dealing with these intricate questions were added the responsibilities and duties cast on the engineer by new legislation and the ever-increasing demand for higher efficiency and the cutting down of cost in every branch of his work, the necessity for maintaining a high standard of professional qualification for those engaged in the municipal service would be apparent. The magnitude of the works which had to be carried out and the great variety and number of subjects to be dealt with necessitated an extensive experience and knowledge on the part of the engineer. This was generally recognised by those who appointed him, although it was to be deplored that there were a few authorities which had no higher perception of the qualifications that were necessary for the proper discharge of the duties of an engineer than to appoint a builder who gives part of his time, an auctioneer's clerk, a builder's foreman, a farmer, or a labourer. That it should be possible to entrust important work requiring special knowledge and experience to those who had not the least cognisance of its nature was one of the blot on the system of local administration, and it was to be greatly regretted that the Local Government Board should limit its activity to seeing that a medical officer or a sanitary inspector was not appointed unless possessing proper qualifications, and make no attempt to secure efficiency in the performance of duties which affected not only the life and health of the community, but its expenditure also.

Though a local authority may appoint as their engineer a person who had had neither training nor practice in the work he was expected to control without so much as a rebuke or a protest from the Local Government Board, the appointment could not be acknowledged as a qualification for admission to the Association of Municipal and County Engineers. That Association must set up and maintain a standard which would be a guarantee that those who attained it were engineers by virtue of education, training, and practice. It was due to themselves and their profession that they resolutely refuse to acknowledge the irregular and rough-and-ready methods by which some imagined that a sufficient acquaintance with technicalities could somehow be picked up which might be accepted as a qualification in engineering. He claimed for engineering equal rank with the learned professions of law and medicine. Like them, its practice requires considerable mental qualities, prolonged and persistent thought and observation, and years of patient study of special subjects. Its scope was as extensive, the subjects with which it dealt were as varied, and demanded intellectual attainments as high as those professions which, from the skill and learning required for their successful practice, had

rightly been considered to hold a foremost place among human callings. It was an indignity to any calling for the incompetent, the unskilful, or the unqualified to seek to edge their way into it, in most cases it was a public danger, and the Legislature had in some instances wisely made provision for the punishment of those who usurped powers that they had neither the right nor the qualification to exercise. It was, perhaps, unfortunate that their profession enjoyed no similar protection. The idea was passing away, though it still lurks where public life was feeble or corrupt, that the municipal service was a professional backwater, easy of access to whomsoever was desirous of a pleasant occupation with little demand for capacity or experience. A consideration of the duties of an engineer—the works he had to design and construct, the services he had to organise and keep going, and the administrative and advisory work to be done—or a survey of the numerous sciences and subjects included in the examination which must be passed before even the graduate stage of his career could be reached must surely be indisputable evidence that this service demanded an experience as extensive and qualifications as high as those which were considered the essential equipment of one who undertakes the engineering work pertaining to any of the services connected with the State or with great public companies.

The Council of the Association had shown that it recognised the necessity for raising the standard of qualification for admittance to every grade of the Association, and that, as the duties of the engineer become more responsible and the matters with which he was called upon to deal more intricate and important, there was a corresponding need for a more thorough and extensive knowledge of every subject relating thereto. The long-standing reproach that candidates for the Association's testamur were not required to produce evidence of their having received a fairly liberal education had at length been removed. The requirements of the syllabus with respect to this matter were certainly not too high, and they could hardly have the effect of excluding anyone who had been educated at a school of any standing, whilst it might be claimed that the Association had done its duty to the profession by establishing a principle which all professions had long deemed essential, viz., that a liberal education must precede a professional training. In the beginning and at the very foundation there should be a sound education in history, including grammar, composition, English, geography, and literature, and in arithmetic, algebra, geometry, and drawing. Subsequently there should be the study of trigonometry and mechanics, and some knowledge of chemistry, heat, and geology should be obtained. French and Latin were, in his opinion, most desirable additions to the subjects enumerated. Having prepared himself by education and training, it seemed reasonable that an engineer who entered the public service should have an assured prospect of a career which would bring an adequate return for the labour and expense which had been devoted to qualifying him for the duties he had to discharge. This would be provided by the fulfilment of three conditions:—

(1) *That an appointment should only be terminable with the sanction of the Local Government Board.* Too often the vigorous and faithful doing of duty brought the engineer into conflict with those who desire to evade by laws, regulations, and Acts of Parliament and provoked bitter and malignant hostility, which was followed by the desertion of those who should support an officer who conscientiously carried out the work for which he has been appointed. Against a weak and corrupt council a righteous officer should be protected; but so long as that protection is denied, persecution and capricious dismissals would continue. The medical officer of health and the sanitary inspector could not be deprived of their positions without the consent of the Local Government Board, and there could be no reason for the engineer being without a similar protection.

(2) *That fair conditions should be attached to the appointment, and a just remuneration given for the work and responsibility undertaken.* It should not be possible to impose on an officer duties and responsibilities which

were not contemplated when he was appointed, nor to take advantage of his agreement to devote the whole of his time to the duties of his position by making demands for additional services which necessitated his working early and late for so long as he was physically and mentally capable of enduring the strain. This filching of the leisure which should succeed a fair day's work was as unjust as it was economically unwise. The salary of an officer should be a just equivalent for his skill and experience and for the duties and responsibilities which he was called upon to undertake, and it should be such as would attract an engineer with the qualifications and a reputation which were proportionate to the importance of the position to be filled.

(3) *That when incapacitated by age, accident, or ill-health, an officer should be granted a just superannuation allowance.* This principle was an acknowledged right in the State services, it had been adopted by poor law boards and by several corporations, and should be applied to all public servants, whether employed by the State, the municipality, or other popularly-elected body.

Municipal work suffered much from their inability to compare it with similar work in cities and rural districts abroad. Statements were plentiful enough from unreliable and irresponsible sources, for the tripper and the holiday tourist were ever ready to publish hastily-gathered information and the results of casual observations respecting the superior work and more enlightened methods of the foreigner and to disparage nearly everything done by British municipalities. But these contributed nothing of practical value, nor did they demonstrate how work might be done here so that our towns might become as delightful as those whose perfections were extolled. That there was much to be learned by a study of the works and methods of other municipalities could not be doubted, and there would be very great benefit from the reports of commissioners who had enquired into and studied municipal works and organisations abroad and compared them with those of this country. Perhaps the Local Government Board might extend its operations and appoint commissioners having experience of the work of municipal engineers to investigate and report upon similar work abroad, for the information of municipal authorities at home.

Sludge Treatment.

Mr. J. D. Watson, Engineer to the Birmingham Tame and Rea Drainage Board, read a paper on "Sludge Treatment in Relation to Sewage Disposal." It was possible, he said, to treat some sewages in their crude state without abstracting the grosser solids, but where there was a large quantity collected from a large area—particularly if manufacturing waste constituted a prominent feature of the sewage—it might be taken that means for abstracting the solids must form an essential feature of every purification scheme.

After not a few trials—and a few failures—the author had come to the conclusion that the grit chamber should be, where possible, in the form of an inverted pyramid, and that it should be fitted with a mechanical arrangement for dredging out the solids capable of being set in motion at the discretion of the attendant.

The nature of the sewage dealt with had a considerable influence on the deposition of sludge, i.e., at Birmingham there was a large proportion of macadamised roads and streets, with the result that organic solids, like road grit, precipitated quickly and assisted the deposition of lighter substances in their downward course.

Having arrived at the conclusion, notwithstanding the experience of others with other sewages, that the Birmingham sludge could not be gasified in a septic tank to a much greater extent than 10 per cent. of its bulk, and having discovered that the sludge, or residuum, formed in the bottom of the septic tanks was without objectionable smell, the author came to the conclusion that the real solution of the sludge difficulty was probably to be found in utilising the septic tanks as manufactories of septic sludge, if that phrase might be used to denote the residuum of the fermentation process, more particularly as the only sacrifice involved in the change

was the more frequent emptying of the tanks. Instead of cleansing once every two years as formerly, last year they were emptied on an average once per seven weeks.

The desiderated system, although incomplete, had now been in operation for more than a year, and the following brief description of the working would help to elucidate the method adopted.

The sewage entered the roughing tanks through the detritus chambers, where it travelled at the rate of 1-20 ft. per minute, leaving behind in the detritus chamber the larger proportion of its organic matter, i.e., fine sand, gravel, particles of coal, cinders, wood, leather, animals' hairs, etc., and in the septic tank, which was reached by passing over a submerged weir and under a scum-board, the finer particles of suspended matter that escaped the detritus chamber, and which included a larger proportion of organic matter, such as animal fat, paper, fragments of food, vegetables, and much fecal matter, were deposited.

A floating scum-board separated what looked like placid liquid charged with fine sand and a water resembling black ink, fermenting so actively that it might be heard as well as seen, a condition which was attained only after the greatest difficulty owing to the paucity of micro-organisms in the sewage.

The large septic tank maintained its activity, notwithstanding the fact that a scum was positively discouraged. The object of this was to allow the suspended matter which inflated by the gases rising from the tank liquor to pass freely to the septic tanks proper.

The detritus tank was emptied once a week. The supernatant water was pumped off, and the slimy part of the sludge was pumped into the channels which feed the twenty septic tanks with sewage, thus mixing sludge and sewage together. That part of the sludge which was too highly charged with sand and grit was sent direct to the sludge trenches, and the still more solid stuff was lifted out by steam grab and buried at once.

Sewage Disposal.

Mr. W. J. Dibdin, F.I.C., F.C.S., read a paper on "Sewage Disposal, with Special Reference to Improvements in Primary Contact-beds." He said the experiments made by Dr. Dupré and himself in 1884 on the aeration of the London sewage, and given in the author's evidence before Lord Bramwell's Royal Commission, clearly showed the fallacy of any attempt to purify sewage by aeration alone. Contact action by quiet contact or by slow trickling over surfaces in conjunction with aerobic biological action was necessary to effect purification.

The various processes proposed for the treatment of inland sewage were:—(1) Broad irrigation, i.e., natural contact and aerobic action; cause of failure, limited area of land, causing anaerobic accumulations leading to "sickenings"—too frequently, farming operations, instead of "sewage treatment." (2) Chemical treatment and sludge pressing; cause of failure, expense of chemicals, leading to undue economy, nuisance from sludge accumulations, and necessity for discharge of chemical effluent on land. (3) Artificial biological methods, by either aerobic treatment throughout or by preliminary anaerobic treatment, followed by aerobic treatment of tank effluent; cause of failure, in case of aerobic action, limited bed capacity, leading to anaerobic action as in the case of broad irrigation. In the case of anaerobic treatment, putrefactive action leading to accumulation of foul gases and deposits and insufficient after-treatment. It might be concluded:—(1) That the system of broad irrigation and its ally, intermittent land filtration, would always be successful in dealing with both the solids and the liquid matters when the land was sufficient in quantity and quality and was properly worked so as to secure aerobic action throughout; but the cost and difficulty of obtaining suitable land, and in many cases the cost of working, were matters of serious consideration. (2) That chemical treatment and sludge-pressing might be considered matters of ancient history. (3) That anaerobic methods, unless in very special cases, were not only unnecessary but undesirable in regard to the nuisance caused by noxious emanations, etc. (4) That aerobic processes

were essentially founded upon single natural laws, whereby the whole of the waste organic matter of the world was continually undergoing regeneration. Having thus shortly traced the position of the question, they might consider the variants in the aerobic equation. The question resolved itself into two major problems:—(1) The disposition of the solids in suspensions, (2) the disposition of the organic solids in solution. The matters in solution presented no real difficulty, as they might be more or less efficiently dealt with by either irrigation, contact-beds, sprinklers, large streams, or tidal rivers, according to local circumstances. The river Thames might be taken as a type of the latter method in connection with the disposal of the effluent obtained by the treatment of the whole of the sewage in London, whereby aerobic disposition of the impurities in the effluent was effected without nuisance, as suggested in his evidence before the Royal Commission in 1884. It was, therefore, evident that the crux of the sewage question was the disposition of the solid matters, which, in their accumulated condition, formed sludge. It might be pointed out that the sludge from the London sewage was disposed of aerobically by dilution in the aerated water of the estuary of the Thames. The distribution of sludge on land, as already indicated in reference to broad irrigation, was now recognised as objectionable. The "hope" that it would be destroyed completely in tanks by anaerobic action no longer "springs eternal in the human breast," but the accumulations which had to be removed from time to time were anything but pleasant to the sewage works manager, his assistants, and the neighbourhood generally. The aerobic contact-bed accomplished the reduction of the solid matters inoffensively and satisfactorily, but in the case of clinker-beds, at the cost of renewing the filling material at intervals. The success of the method, from the sanitary point of view, justified a further search for a method which would accomplish the same result and at the same time secure continuity of working and facilities for cleaning the beds without the necessity of removing the material. With this intention, he had employed superposed surfaces, supported by distance-pieces, and found that waste slate debris, obtainable at an extremely low price, was admirably suited to the purpose. The principle involved was simple. If they imagined the possibility of hollowing out a piece of clinker, and thereby utilising the otherwise waste space in the interior, it was obvious that they would obtain double surface action, and the hollow interior would hold water, thereby increasing the water capacity. This method was found to answer. After a twelve months' trial on a working scale, the Corporation of Devizes determined to fill the primary contact-beds at the reorganised sewage works with slate debris, supported on suitable slate blocks, the distance between the slates about 2 in. The advantages of the system were that the extra space available doubled the "water capacity," or working power of the bed, and at any time the accumulation of mineral matter, etc., might be flushed from the slates, and the bed restored to its original condition as new. The detritus washed off the slates was found to dry inoffensively when exposed to the atmosphere and to assume a condition resembling ordinary mould. The beds at Devizes had treated the whole of the sewage of that town since September last. The sewage of Devizes was exceptional in nature in consequence of the large amount of slaughtering which takes place there in the bacon-curing and other trades, and it was decided to deal with this highly complex sewage rather than interfere with the various trade interests concerned. The experience gained in respect to the actual working capacity of the beds was very definite. When the experimental slate-bed was constructed at Devizes it was calculated that the actual water content would be 82 per cent. of the total cubic content. By improvements in the arrangement of the slate-filling, this was now increased to about 87 per cent. After fourteen months' work at about two fillings per day on the average, the water content was measured and found to have decreased to 50 per cent. Although it was not necessary to cleanse the tank, so far as the working was concerned, it was considered desirable to ascertain to what facility this

could be done in regard to the nature of the deposit on the surface of the slate. Accordingly the bed was flushed out by the double valve being opened to full bore and the contents allowed to rush out instead of flowing quietly as usual. The capacity was then measured, and found to have risen to 64 per cent. Some of the slates were then removed in order to permit sideways flushing through the respective layers of slate by means of a hose, after which the capacity was found to have increased to 82 per cent., exactly equal to the original capacity of the new bed as calculated from the quantity of slate used. The Corporation of Trowbridge having inspected the works at Devizes decided to institute a series of independent experiments with the view of ascertaining how far the system of slate layers was applicable to the treatment of the effluent from the septic tank, into which they propose to pump all the sewage, more particularly for the purpose of securing a good "mixing action" in consequence of the large proportion of manufacturing waste liquors arriving at the works. They accordingly prepared experimental beds filled with (1) slate, (2) limestone, (3) broken brick, (4) empty, (5) Westbury slag, (6) clinker. The sewage, after twenty-four hours' rest in the septic tank, was passed on to the contact-beds, and samples of the sewage and various effluents forwarded to Mr. Charles J. Waterfall, F.I.C., of Bristol, for analysis. The results of the last three series only, since the tanks and beds had been in good working order:—Slate, 52 per cent. purification, 82 corrected ditto; limestone, 47 per cent. purification, 48 corrected ditto; brick, 35 per cent. purification, 38 corrected ditto; slag, 32 per cent. purification, 32 corrected ditto; clinker, 45 per cent. purification, 50 corrected ditto.

Lieut.-Colonel Jones, V.C., said it was nearly twenty years since Mr. Dibdin established his position as an expert on sewage. He then did good by denouncing chemical precipitation as he now denounced the septic tank nuisance, which during late years had been the popular nostrum—a nostrum which had been tolerated too long. He feared it lay beyond the reference to the Royal Commission; but the important thing to them was to know the cheapest and best means of getting rid of sludge.

Mr. H. B. Raikes (Birmingham) said the form of the tanks at Birmingham would facilitate the removal of the sludge by gravitation, but would have the effect of increasing the percentage of moisture in the sludge.

Mr. C. H. Cooper (Wimbledon) said it was quite refreshing to hear Mr. Dibdin coming round to land treatment. In their case at Wimbledon sludge-pressing was not a matter of ancient history; it had, unfortunately, to be a matter of to-day. If he were to put it on the land, as they did at Birmingham, he would soon have an injunction applied for against them.

Mr. A. E. Collins said he had been visiting a large number of works in various parts of the country with his Sewage Treatment Committee, and they came to the conclusion that the Birmingham works were the best managed from the point of view of efficiency and economy.

Mr. R. A. MacBrair (Lincoln) said they had abandoned sewage-pressing, and ran their sludge into lagoons, digging it into the ground. In this way they saved 1,000l. a year.

Mr. J. Lemon (Southampton) said the theory that the bacterial method freed them from all difficulties of sludge was exploded to a very great extent by Mr. Dibdin's paper. Mr. Dibdin put his scheme at Devizes forward as a decided advance towards a solution, and he was justified if the results given in the paper were borne out in practice.

Mr. C. Jones (Ealing) disputed Mr. Dibdin's statement that the time had gone by for sludge-pressing. He had no land on which to put the sludge, and he pressed and burnt it. He had great faith in the refining furnace. The sludge went into the furnace, came out as clinker, and was made up in slabs to pave the footways.

Mr. A. M. Fowler (Manchester) stated that at Brighouse he was filtering all the sewage sludge, which passed through an ordinary filter, and the deposit on the top dried and cracked and was taken off.

Mr. J. S. Pickering (Cheltenham) said

they owed a good deal of the progress made in the bacteria treatment to Mr. Dibdin. If Mr. Dibdin's system at Devizes could be applied on a large scale they would have arrived at a satisfactory solution of the aerobic treatment. He did not think it was possible to construct and cleanse beds on a large scale by the method described, but it was for engineers to assist Mr. Dibdin in finding out how they could be washed.

Illustrations.

NORWICH UNION LIFE INSURANCE SOCIETY:

NEW HEAD OFFICES.

THE view of this building which we illustrate this week is from a photograph of the exterior as completed. We also give plans of the two principal floors showing the interior arrangements. The ground-floor principal rooms have been used for business purposes for a year or more, but the board-room and some of the more important rooms on the first floor, of a decorative character, are only just completed, and to celebrate the completion an inaugural banquet and luncheon were given a short time back.

The exterior of this building has been erected of Cliphsham stone, and the two statues have been carried out in Portland stone. One represents Bishop Talbot (who established the old Amicable Office taken over by the Norwich Union some time back), to whom was granted the first charter for a life insurance office in the reign of Queen Anne; the other statue represents Sir Samuel Bigold, the chief personality in the foundation of the Norwich Union Life Office itself. These statues are the work of Mons. Chavalliaud, of the studios of Messrs. Farmer & Brindley.

The requirements with regard to the interior included a large general office as well as other smaller offices. This general office has been made the chief feature of interest inside the building, and occupies the two floors in height, and is covered partly with a flat coffered ceiling and partly with a dome,

a portion of the dome being formed of glass for lighting the whole of the interior of this office. The necessity for providing ready facility for getting from the central domed hall to the other rooms grouped round it suggested an open colonnade on the ground floor, and this has been contrived so that it is sufficiently retired, and yet kept as an integral and visible part of the hall. Above this colonnade, on the first floor, arcaded corridors are arranged going quite round the central hall, and this gives access to other official rooms, including the board-room and the committee-rooms at this level. This floor has been contrived to come at the level of the main entablature, and the necessary height for protection has been gained by solid shaped and carved balustrading in each archway. The columns that are seen are all monoliths, and are of Cipollino and Verde Antico marble, the caps and bases of columns and pilasters being in white statuary. The other marbles used are porphyry-coloured Rosso Antico and Skyros, together with alabaster and white statuary.

Messrs. Farmer & Brindley, of Westminster Bridge-road, London, have executed the whole of the marble work, inclusive of the marble staircase, and are also responsible for the stone and marble carving throughout the building. The general contractor is Mr. G. E. Hawes, of Norwich, and for the stonework Mr. E. W. D. Potter, of Norwich. The board-room is of a decorative character, having its walls panelled a considerable height in mahogany, and the lunettes above the mahogany are filled with decorative figure paintings, and also the panels in the ceiling have figure subjects, together with the ceiling over the grand staircase, and these have been executed by Mr. George Murray, of London. Mr. W. J. Neatby, of London, carried out the decorative frieze in the directors' luncheon-room, and Mr. A. Stanley Young executed the sculptured bronze panels on either side of the vestibule. The electric light installation has been by Messrs. Drake & Gorham, of London, and the electric light fittings have been executed by the Artificers' Guild, of Maddox-street. Mr. Sidney Pullen has done the general decorative painting throughout. The

ornamental plaster work is by Mr. W. G. Crotch, of Norwich. Mr. E. Bilby was clerk of works. The whole of the works, inclusive of the decoration, furniture, carpets, etc., together with the laying-out of the gardens, have been carried out from the designs and under the superintendence of the architects, Messrs. George J. Skipper & F. W. Skipper, of Norwich.

THE WESTERN FACADE OF THE DUOMO, BORGO SAN DONNINO.

BORGO SAN DONNINO is a small town between Piacenza and Parma, on the line to Bologna, little frequented by tourists. The Duomo is a fine Lombard Romanesque Church much spoiled by restoration.

The western façade, shown in our illustration, has been spared to a greater extent than elsewhere, and still forms a very interesting front. It contains a good deal of sculpture; the small horsemen in particular are beautifully carved. The illustration is from a drawing by Mr. W. Curtis Green.

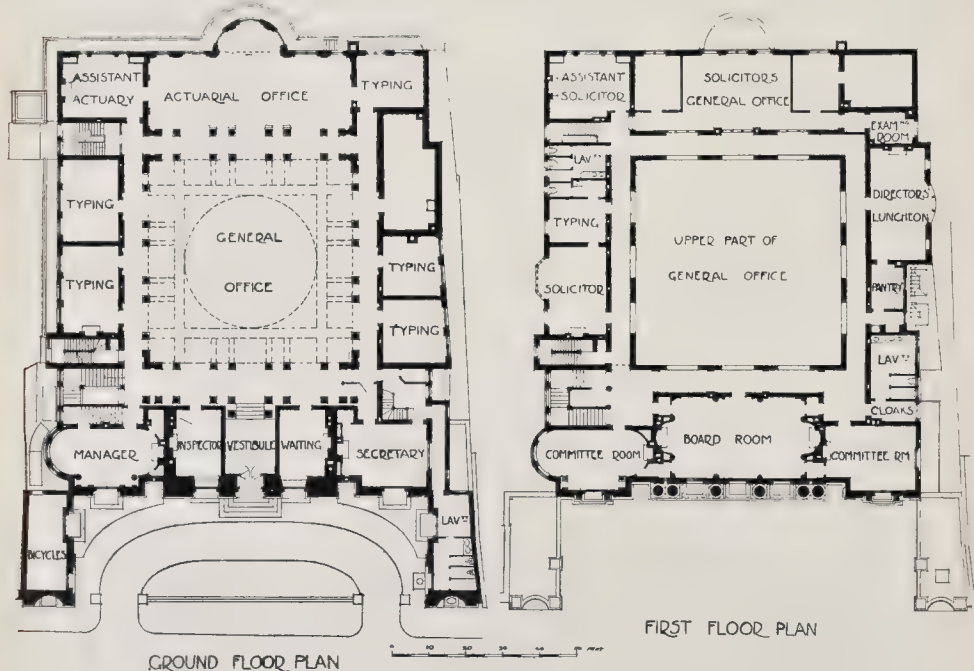
FOUNTAIN, VILLA DELLA PETRAJA.

THIS illustration is reproduced from a plate in Mr. Inigo Triggs's book on Italian Gardens, in connexion with the article on the subject in our present issue.

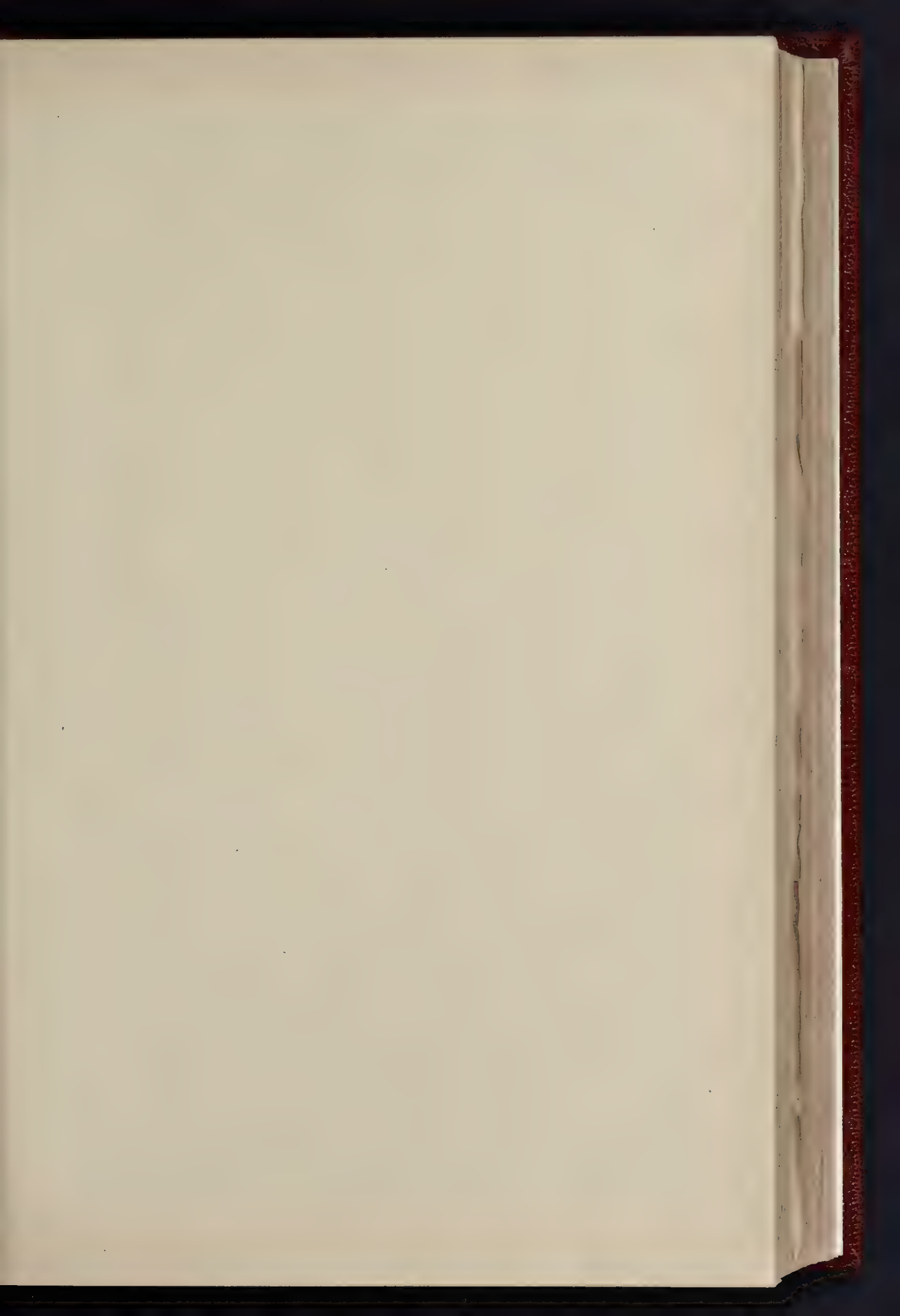
OLD BUILDINGS IN THE NEIGHBOURHOOD OF THE STRAND AND COVENT GARDEN.

THESE views are reproduced from engravings and drawings in the Crace collection, in illustration of the article on this part of old London which appears in the present issue, and in which they are referred to.

From the theatre illustrations it will be seen that the rebuilding of Drury-lane and Covent Garden theatres, after their respective fires, was in neither case an improvement as far as regards the exterior architectural appearance. Smirke's Covent Garden is a more artistic building than Edward Barry's; and the old façade of Drury Lane is a far more dignified front than that which succeeded it. The present building is shown as originally built, without any portico, a



Offices of the Norwich Union Life Insurance Society. Plans.

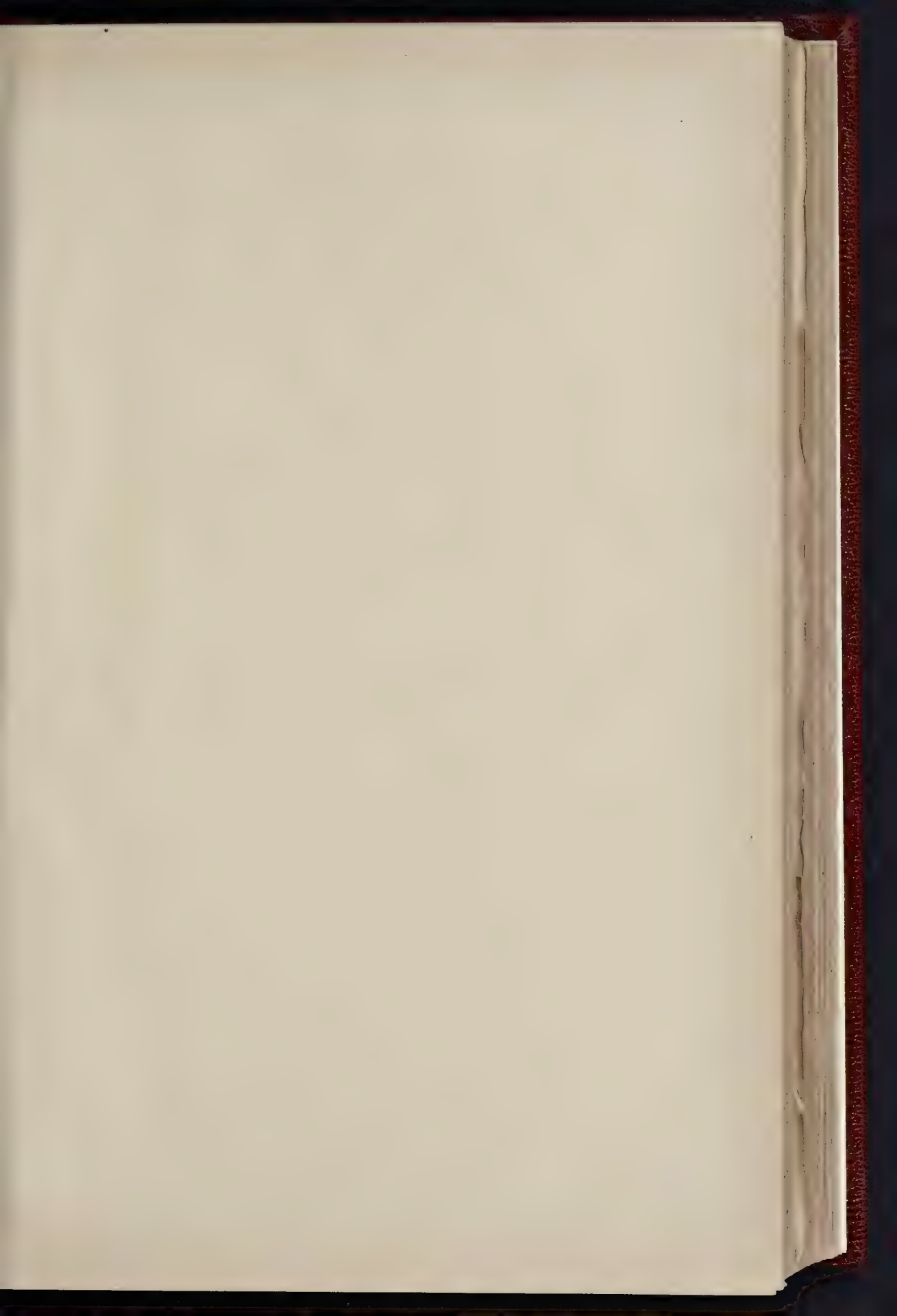




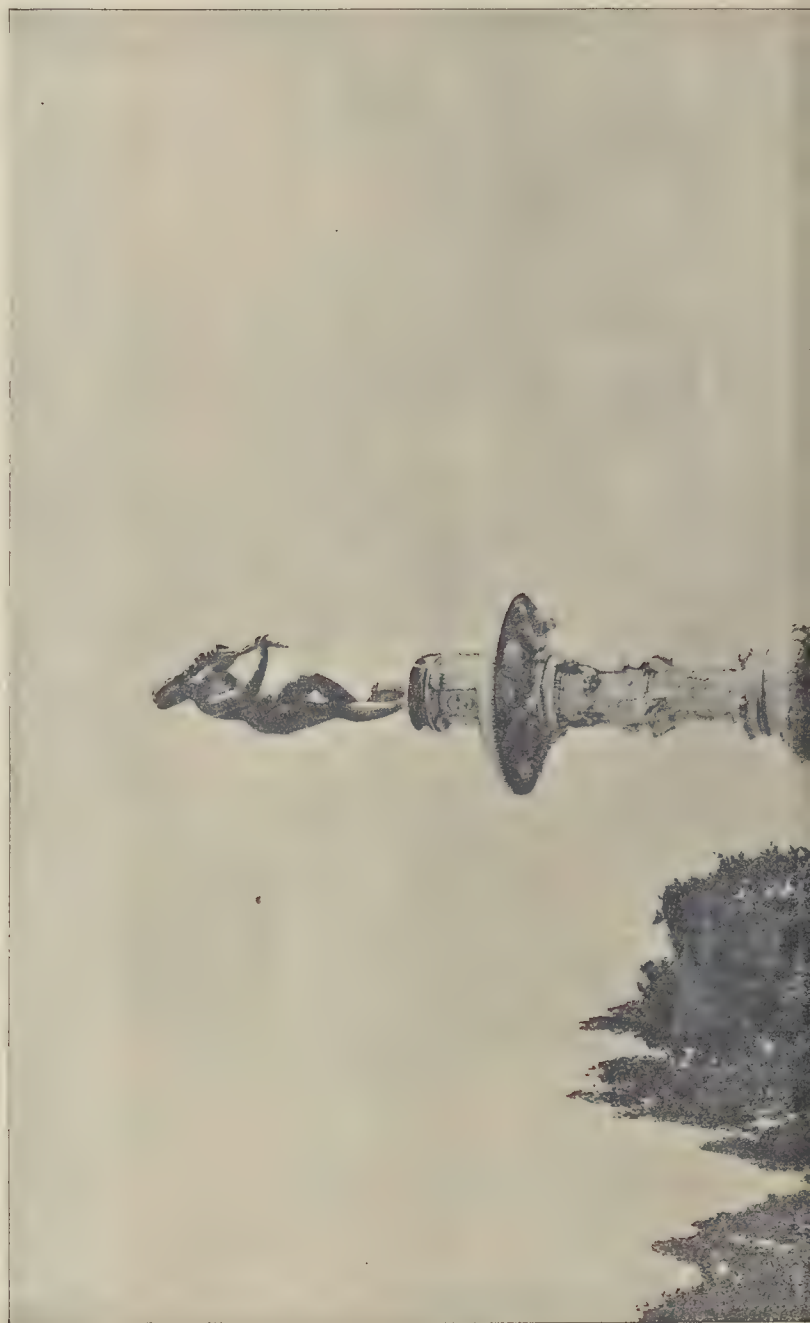
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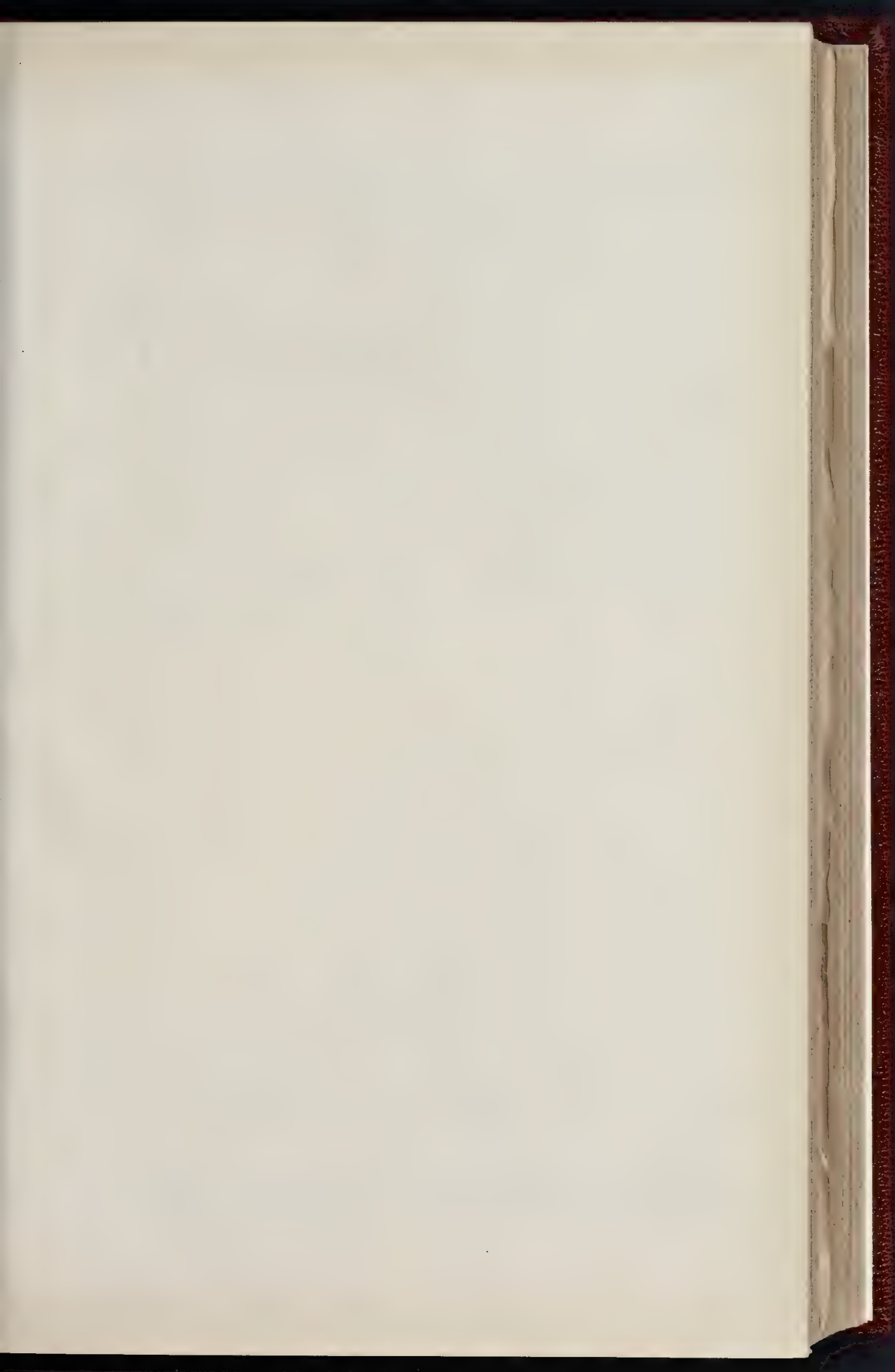
THE BUILDER, JULY 7 1906



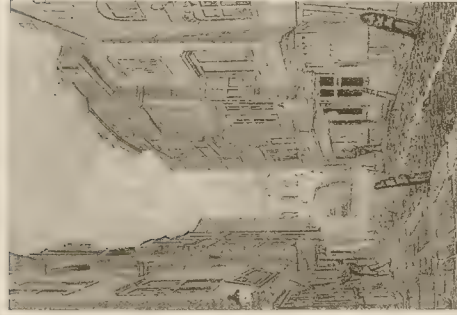


FOUNTAIN, VILLA DELLA PETRAJA, FLORENCE.

[REPRODUCED FROM MR. INIGO TRIGGS'S "GARDEN DESIGN IN ITALY,"



BORGO SAN DONINO. AREA INTERA



Covent Garden Theatre, but as it was destroyed.



The old Theatre Royal, Covent Garden, as it was in 1869.



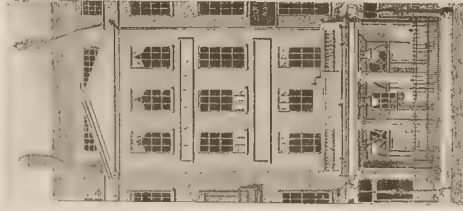
Covent Garden Theatre, but as it was destroyed.



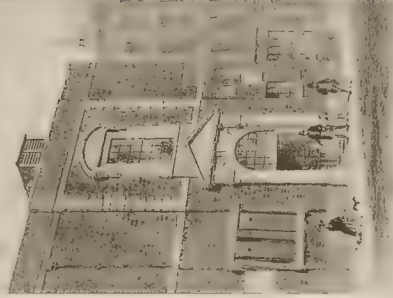
The New Theatre Royal, Covent Garden, designed by Robert Satterthwaite, Junr.



Old Theatre Royal, Covent Garden, as it was destroyed.



Front of the old Theatre Royal.



The West Entrance to Covent Garden.



Covent Garden Theatre, as it was destroyed.



Covent Garden.

deficiency satirically noted in "Rejected Addresses" —

"Oh, Mr. Whitbread, lie upon you, sir.

I think you might have built a colonnade."

an omission which was evidently complained of and ultimately remedied.

THE PROPOSED FREE LIBRARY AT NORTHAMPTON.

It appears that the Northampton Town Council are proposing to have their new Library, the gift of Mr. Carnegie, hurried through and carried out by their Borough Engineer; a course which is not likely to produce satisfactory results. The following petition has been presented to the Town Council, signed by seventeen architects in Northampton:—

"Northampton, July 2, 1906.

To His Worship the Mayor and Members of the Town Council of Northampton.

GENTLEMEN.—We, the undersigned architects practising in Northampton, consider that, through the generous gift of the proposed library building affords a fine opportunity of adding to the architectural features of the town, and we respectfully beg to suggest that to obtain the very best ideas, both as regards convenience of plan and excellence of design, the whole of the architects practising in Northampton should be invited to submit competitive designs.

We therefore respectfully petition that the designing of the library be made the subject of a competition amongst the local architects."

We hope that this appeal will be assented to by the Town Council.

THE ARCHITECTURAL ASSOCIATION EDUCATION SCHEME.

The current issue of *Architectural Association Notes* contains an exposition of the nature of and reason for the recent change in the system of the teaching classes in connexion with the Architectural Association. We have not space to go into the subject in detail, but it has now been recognised that the Day School and the Evening Continuation School (subsequently established) did not sufficiently economise and systematise the teaching, but led to a certain amount of overlapping.

"The difficulties of the situation have been further increased by the facilities recently offered by the R.I.B.A. to exempt those students who passed successfully through the four years' course from the testimonies of study and intermediate examination, and made it imperative that the whole course should be fully brought up to the standard indicated by the Board of Architectural Education, in order that the highest proportion of students should be able to qualify for the certificate of the Board. At the same time, it was necessary that the claims of other students should be more carefully met in the altered circumstances, and every facility given them also to equip themselves thoroughly and efficiently for their work in life, and incidentally for the tests imposed by the Institute examinations; in either case, it was important that there should be no overlapping in the instruction given, or loss of power, in the whole scheme of the Association's training."

Accordingly the teaching system of the Association is now co-ordinated into a "School of Architecture," in which the courses of study include Day School, first and second years; Evening School, first and second years; both preparatory to the Evening School third and fourth years. The system is, therefore, that two complete courses will henceforth be open to students wishing to be trained as architects: (a) The Day School, first and second years. The Evening School, third and fourth years, followed by an advanced or extra year if desired. (b) The Evening School first to fourth year followed by the advanced or extra year if desired.

The Council of the Association are further considering the possibility of adding, for those who may wish to carry their studies further than is required by the Institute examinations, a syllabus of more advanced training.

"SOME ENTRANCE PORCHES."—In regard to the note on this work under the head of "Illustrations" in our last issue, Messrs. Seth-Smith & Munro write to say that they inadvertently gave the wrong name of the builders in their note on the work; it should have been "Messrs. L. H. & R. Roberts" instead of "Messrs. J. Smith & Sons."

THE STUDENT'S COLUMN.—The commencement of the Student's Column is unavoidably postponed for this week. The subject will be "Roofs: Constructionally Considered."

THE ARCHITECTURAL ASSOCIATION SUMMER VISITS:

V.—IPSWICH.

IPSWICH was chosen for the fifth summer visit on Saturday, June 30. The town offers a large field for archaeological research, covering a wide period from early mediæval times to the close of the XVIIIth century; but it cannot be said that the work of the Victorian era, or even the more modern buildings, are such as to excite the enthusiasm of the architectural student. As we gave a historical account of the old buildings in our issue of September 14, 1895, we do not now propose to make more than a general reference to the places visited by the Architectural Association upon the present occasion.

The church of St. Margaret possesses a beautiful, yet typical of Suffolk, specimen of a double hammer-beam, open-timber roof, which was coloured in its original state and later in the time of William and Mary. St. Mary-at-Quay has a similar roof, and both fabrics contain choice sculptured stone fonts. The latter church is enhanced by a fine Jacobean oak pulpit.

Ipswich is rich in the remains of early domestic work. There are many excellent oak gateways having half-timber stories above them; the cornices and other parts are invariably carved. Much of the better work is found in the old inns, the "Neptune" and the "Half Moon," for example, each of which contained fine panelling, chimney-pieces, and heavily-moulded timbers. But the chief feature of this period is the corner post of the houses which supports the diagonal timber carrying the joists of the overhanging floor. These posts are very numerous, of varying sizes and forms, and are all, with few exceptions, elaborately carved. A charming house in Northgate-street, with sunk and moulded constructional timbers and the brick and timber structure, known as Pykenham's Gateway, were important objects of examination.

The interest of the occasion, however, was centred in the famous "Sparrow's House," and, by the courtesy of the proprietor, the visitors were enabled to examine it throughout. We gave some illustrations, together with a description of the buildings, on January 30, 1892. The exterior is mostly pargetted, and the striking yet pleasing effect of the oriel windows, the wide overhanging cornice, the carved oak pilasters and corner-post, will ever remain one of the finest specimens of English domestic work. The interior is no less interesting by reason of its varying levels, the proportions of the rooms, the charming courtyard with its colonnade, and the exquisite examples of decorative plaster-work of the XVIth and succeeding centuries. The attic roof, which was of the hammer-beam type, is still preserved, and it is a noteworthy fact that this house still maintains much of its Elizabethan character, and is used daily for business purposes. Another house with similar features, but simpler in treatment, was visited in Fore-street.

East Anglia had considerable business importance at this time, and a fine example of a merchant's house is seen in Christchurch Mansion. This dwelling, commenced in 1548, is, with the exception of some stone-mullioned windows, built entirely of brick. Various types of gables are introduced, which suggest a Dutch influence in their design. Additions were made at various times, and the whole interior was remodelled and the plan somewhat changed in the XVIIIth century, so that the spirit of the later Renaissance predominates. Much good work of the same period is to be found in many houses, consisting of staircases, doorways, ceilings, etc. A somewhat remarkable building of Georgian date is the Unitarian Chapel. Here are excellent doorways, windows with leaded glass, and interior fittings typical of the style.

PUBLIC LIBRARY, STIRCHLEY.—The new public library for Stirchley, which has been erected and furnished at a cost of 3,000l., was opened on the 2nd inst. It has been erected of Brent brick, with Hollington stone dressings. Mr. J. P. Osborne, of Birmingham, was the architect. There is a central hall, to the left of which is still magazine and newspaper room; on the right are the reference and lending departments. The accommodation on the first floor includes a large room which can be used for meetings and lectures.

THE LONDON COUNTY COUNCIL.

The usual weekly meeting of the London County Council was held on Tuesday in the County Hall, Spring-gardens, S.W., Alderman Evan Spicer, Chairman, presiding.

Loans.—On the recommendation of the Finance Committee, it was agreed to lend Battersea Borough Council 1,500l. for street improvement; Bermondsey Borough Council 2,655l. for electric lighting; Camberwell Borough Council 500l. for lighting of baths; Chelsea Borough Council 16,000l. for public baths and wash-houses; Finsbury Borough Council 15,200l. for purchase of wharf; Camberwell Borough Council 2,300l. for underground convenience; Hackney Guardians 8,500l. for poor law purposes; Lewisham Borough Council 2,075l. for public baths; Poplar Borough Council 5,786l. for electric lighting; Shoreditch Borough Council 1,930l. for baths and wash-houses; Stepney Borough Council 10,500l. for electric lighting mains; Wandsworth Borough Council 6,000l. for public baths; Wandsworth Guardians 4,570l. for poor law purposes; and Woolwich Borough Council 1,290l. to cover costs of Act. Sanction was also given to Paddington Borough Council to borrow 8,000l. for paving.

Houses Adopted as Tenements.—The Public Health Committee reported as follows:—

"The Council on June 21, 1904, decided to apply for powers enabling sanitary authorities to require owners to make reasonable provision for the supply of water to the tenants of each floor in tenement houses, the arguments in support of such application being contained in a report presented by us on June 14, 1904. On December 6, 1904, however, the Parliamentary Committee reported that the solicitor expressed the opinion that it was not clear that the existing law was insufficient to meet the case, and that the Committee thought that the Metropolitan Water Board should be asked whether they would acquiesce in or obtain the removal of existing restrictions in their Acts with regard to the height of supply. The Council, on the recommendation of the Committee, rescinded its resolution of June 21, 1904."

On January 31, 1905, we reported that the magistrate at Woolwich Police-court, as the result of proceedings by the Woolwich Metropolitan Borough Council, had decided that the supply of water from a tap in the yard of a tenement house was not a proper and sufficient supply within the meaning of sect. 48 of the Public Health (London) Act, 1891, and had made an order to abate the nuisance. A magistrate sitting at another court, however, subsequently expressed a contrary opinion, so that the law appears to require amendment, before an adequate water supply can be required to be supplied to tenement houses. On March 14, 1905, we reported that the Metropolitan Water Board were willing to co-operate, as far as possible, in the direction desired with regard to water supply to tenement houses subject to certain reservations, and we think that the Council should seek power in the desired direction. The provision of accommodation for cooking and the storage of food is also in many instances unsatisfactory, and requires supervision by the local authorities."

Sorting and Sifting by Hand of House Refuse.—The same Committee reported that on June 23, 1905, they reported on the nuisance caused in London through accumulations of house refuse, deposited on premises for the purposes of being sorted by hand or machinery, which were allowed to remain for considerable periods, and they stated that at certain yards the sorting of refuse was done by women under most objectionable conditions. The Council, on the Committee's recommendation, included in its General Powers Bill of 1904 a clause to prohibit the sorting and sifting of house refuse by hand in London, but the clause was rejected by a Select Committee of the House of Commons. They think that the clause should be reintroduced. The Committee recommended accordingly, and the Council agreed.

Schools.—The following recommendation of the Education Committee was received:— "That the estimate of expenditure on capital account of 233,192l. and 321l. respectively, submitted by the Finance Committee in respect of taking out and lithographing quantities in connexion with the Mitcham-lane (Wandsworth) school, the St. John's, Halsey-street (Limehouse) school improvements, and the schools for physically and mentally defective children at Osborn-place (Whitechapel), be approved."

Rebuilding of Regent-street.—The Building Act Committee reported as follows:—

"We have had under consideration an application made by Mr. John Murray, on behalf of the Commissioners of His Majesty's Woods and Forests for consent to a proposed rearrangement of the building lines on both sides of Regent-street between the northern end of the Quadrant and Oxford-circus. The scheme, which involves the ultimate rebuilding of nearly the whole of the houses and shops on both sides of the street and the widening of the street, which at present varies from 80 to 85 ft. between the shop fronts, to a uniform width of 85 ft."

throughout, is one of great importance. It was originally proposed to alter the existing frontage lines in some of the side streets leading out of Regent-street, and also in Oxford-circus, but the applicant has, on our request, agreed to adhere to the existing frontage lines, with the exception of certain specified projections, which may be allowed under the provisions of sect. 73 of the London Building Act, 1894, and wherever possible to round off the corners at the ground-floor level at the junctions of the side streets with Regent-street. The applicant has also undertaken to recommend the Commissioners to consider favourably any suggestion which may be made by the Westminster City Council with a view to facilitating any future widening of Arcyl-place, Chapel-court, and Beak-street. The following statement shows the general effect of the scheme in Regent-street:—

Area of land to be left open to the public.	square feet.
Land now occupied by buildings of more than one story	1,436
Land now occupied by one-story projections	2,034
Land now occupied by forecourts, of which 386 sq. ft. is either enclosed by railings or raised above the foot-way	4,893
Total	8,363

Area of land to be covered by buildings of more than one story.

Land now occupied by one-story projections forming part of public way	6,907
Land now occupied by forecourts	43
Total	6,950

The consent of the local authority will be necessary to the proposal to build upon the small areas now forming part of the public way in Regent-street and in the side streets, but inasmuch as the scheme has been generally approved by the Westminster City Council, it will probably not be difficult for the applicant to obtain this.

It will be observed that a considerable area of ground at present covered by one-story projections will be built upon to the height of the main buildings, but on the other hand it should be noted that one of the results of the scheme will be the reduction of the area at present occupied by buildings by about 3,400 ft. Having regard to this fact and to the importance of the proposed widening and rectification of the lines of the street, we think that the Council should consent to the application, and we recommend:—That the Council, in the exercise of its powers under sect. 22 of the London Building Act, 1894, but in no way otherwise than under such section, do consent to the erection of main buildings on the eastern and western sides of Regent-street, between the Quadrant and Oxford-circus:—

... submitted with the application of Mr. J. Murray, on behalf of the Commissioners of His Majesty's Woods and Forests, such consent being subject to the following conditions:—That no projection other than cornices as permitted by sect. 73 of the London Building Act, 1894, be erected or made in advance of the buildings on either side of Regent-street and Oxford-circus; that as and when any of the proposed buildings are erected the whole of the land in front of such buildings in Regent-street and any of the side streets be left open for the use of the public, and that no pier, pilaster, or other projection be placed on such land; that the existing lines of main frontage in all the side streets be adhered to in the erection of the proposed buildings; that no projection other than two-story shop fronts be permitted by sect. 73 of the London Building Act, 1894, at the corners of the proposed buildings at the corners of the side streets be rounded off to a quadrant with a radius of not less than 5 ft.; that no buildings be erected upon any portion of the public way without the consent of the local authority having been first obtained therefor; and that the buildings be erected in exact accordance with the application for the consent, and with the plan and particulars which accompanied such application.

Alleged Use of Bad Mortar.—They also reported as follows:—

"In November, 1905, our attention was drawn to the quality of mortar which was being used in the erection of certain houses on the Belmont-hill estate, Lee. As the result of examination of samples, we were informed that the mortar was deficient in lime, the proportion of lime to other materials being less than 1 to 3 as required by the by-laws made by the Council under sect. 16 of the Metropolitan Management and Building Acts Amendment Act, 1878, and we therefore gave instructions for proceedings to be taken. Summonses were accordingly taken out against the builders, and the case was heard by Mr. Baggeley, one of the magistrates, at the Greenwich Police-court, on January 30, February 26, and March 14, 1906. The magistrate gave his decision on March 28, 1906, when he dismissed the summons and directed the Council to pay 50s. to the defendants for costs. At the same time, he intimated that he would be willing to state a special case for the opinion of the High Court, and, in view of the importance of the case, we directed that he should be asked to do so, and this has been done. We recommend that the solicitor do take all necessary steps to obtain the decision of the High Court upon the case stated in the matter of the proceedings between the Council and Messrs. H. and G. Taylor with reference to the alleged use of bad mortar in the erection of houses on the Belmont-hill estate, Lee."

The recommendation was agreed to.
Construction of Lewisham to Lee-green Tramways.—The Highways Committee recommended, and it was agreed:—

"That expenditure, on capital account, not

exceeding 5,000l., be sanctioned in connexion with the removal, lowering, or diversion of mains, pipes, wires, etc., necessary for the construction of the authorised tramways from High-street, Lewisham, via Lee Hill-road, to Lee-green; that the Highways Committee be authorised to make arrangements with the Metropolitan Water Board and the several companies concerned to execute the works at the cost of the Council."

Greenwich Generating-station and the Royal Observatory.—The Committee recommended:—

"That the Lords Commissioners of the Admiralty be informed that the Council will be glad to co-operate in the appointment of a small committee to inquire as to whether the working of the Greenwich electricity generating-station will have any injurious effect upon the Royal Observatory; and that the Highways Committee be authorised to take any necessary steps in connexion with the matter."

Inspection by the Public of the Greenwich Electricity Generating-station.—They also recommended:—

"That the Highways Committee be authorised to arrange for representatives of scientific or technical societies and public bodies, and members of the general public in parties of reasonable number, to visit the Greenwich electricity generating-station at such times as may not interfere in any way with the working of the station."

The recommendations were agreed to.

Housing.—The Housing of the Working Classes Committee recommended, and it was agreed, that the supplemental estimate of expenditure on capital account of 1,440l. 14s. 10d., submitted by the Finance Committee in respect of the additional cost of the construction of the foundations of Malory-buildings, St. John-street, Clerkenwell, and of the cost of the execution of the precautionary work, be approved.

Having transacted other business, the Council adjourned.

APPLICATIONS UNDER THE LONDON BUILDING ACT, 1894.

THE London County Council at their meeting on Tuesday dealt with the following applications under the London Building Act, 1894. The names of applicants are given between parentheses:—

Lines of Frontage and Projections.

Greenwich.—That the application of Messrs. Crickmay & Heath for an extension of the periods within which the erection of detached houses on the east side of Mycenae-road, Westcombe-park-road, Greenwich, was required to be commenced and completed be granted.—Consent.

Hampstead.—A wood and glass conservatory over the entrance porch at No. 1, College-terrace, Fitzjohn's-avenue, Hampstead, without the walls under such conservatory being thickened in accordance with the provisions of the 1st schedule of the London Building Act, 1894 (Messrs. R. Smith & Son for Dr. H. Roger Smith).—Consent.

Lewisham.—A two-story building in front of No. 2, Loampit-vale, Lewisham (Messrs. Stocker & Roberts for Mr. A. C. Coates).—Consent.

Lewisham.—A wooden porch in front of No. 50, St. German's-road, Forest Hill (Mr. S. C. Heine for Mr. J. Taylor).—Consent.

St. George, Hanover-square.—A deviation from the plan approved for the erection of a projecting stone porch and balcony at No. 51, Upper Brook-street, St. George, Hanover-square, so far as relates to the erection of glass screens at the sides and iron gates in front of the porch (Mr. R. G. Hammond for Mr. J. Garlick).—Consent.

Wandsworth.—Porches in front of houses in Stapleton-road, Wheatlands-road and Tooting Bec-road, Wandsworth (Mr. W. C. Poole for Mr. F. Eaton).—Consent.

Kensington, South.—The retention of a showcase in front of No. 18, Beauchamp-place, Brompton-road, Kensington (Messrs. Pauline & Co.).—Consent.

Kensington, South.—Additions to No. 24, Cottessmore-gardens, Kensington, to abut upon Stanford-road (Mr. F. E. Williams for Mr. F. Arnold Baker).—Consent.

Lewisham.—The retention of a conservatory addition at the rear of No. 179, Hither-green-lane, Lewisham, to abut upon Ennersdale-road (Mr. F. N. Shillingford).—Consent.

Lewisham.—A bakehouse at the rear of No. 1, Central Market, Stanstead-road, Catford, to abut upon Fern-road (Messrs. Norfolk & Prior for Mr. E. W. Hodge).—Consent.

City of London.—An oval window at No. 60, Fenchurch-street, City, to abut upon Fenchurch-street and London-street (Mr. J. S. Gibson for Mr. J. Carmichael).—Refused.

Wandsworth.—A two-story building with stable at rear on the south-western side of Moysers-road, Streatham, with the flanks in advance of the line of buildings in Nimrod-road (Mr. H. R. Thorp).—Refused.

Westminster (Detached).—A one-story shop in

front of No. 2, High-street, Kensington (Mr. A. Mitchell-Husbands for Mr. F. W. Bateman).—Refused.

Hammersmith.—A projecting shelter at the Hammersmith District Railway Station, The Broadway, Hammersmith (Mr. J. Carter for the Metropolitan District Railway Company).—Refused.

Wandsworth.—The retention of four one-story shops in front of Nos. 65, 67, 69, and 71, Westcoote-road, Streatham (Mr. J. Harding).—Refused.

Dulwich.—An open wooden porch at "The Limes," Dulwich Wood-park, Dulwich (Mr. W. Griffiths for Messrs. J. Bowyer & Co.).—Consent.

Width of Way and Lines of Frontage.

Southwark, West.—A clock tower in the centre of St. George's-circus, Southwark (Mr. J. F. Groll for Messrs. W. B. & F. Faulkner).—Consent.

Strand.—Three oval windows to Nos. 13, 13A, 14, and 15, York-buildings, Adelphi (Messrs. Thompson & Walford for the Clinical Research Association, Limited).—Consent.

Hammersmith.—A new out-patients' department and nurses' home at the West London Hospital, Hammersmith-road, with the external walls at less than the prescribed distance from the centre of the roadway of Elm-grove (Mr. W. Harvey for Committee of the West London Hospital).—Refused.

Formation of Streets.

Norwood.—That an order be issued to Mr. C. J. Bentley, sanctioning the formation or laying out of a new street for carriage traffic to lead from Chatsworth-road to Idmiston-road, Norwood (for himself and trustees of the late Charles Blake).—Consent.

Norwood.—That an order be issued to Mr. C. J. Bentley, sanctioning the formation or laying out of a new street for carriage traffic to lead from Idmiston-road to Lancaster-road, Norwood (for himself and the trustees of the late Charles Blake).—Consent.

Space at Rear.

Lewisham.—A modification of the provisions of section 41 with regard to open spaces about buildings, so far as relates to the proposed erection of Nos. 12 and 14, Manwood-road, Brockley, with irregular open spaces at the rear (Mr. H. Lillywhite).—Consent.

Height of Buildings.

Holborn.—Buildings abutting upon a proposed street for foot traffic only, to lead from Southampton-row to Vernon-place, Holborn, the said buildings to exceed in height the width of such proposed street (Mr. R. J. Worley for the Selected London Properties Company).—Consent.

The applications marked + are contrary to the views of the local authorities.

WESTMINSTER CITY COUNCIL.

THE usual fortnightly meeting of this Council was held on Thursday last week at the City Hall, Charing Cross-road, W.C.

Empty Property.—Proposal to Half-rate.—The General Purposes Committee submitted a report dealing with a proposal to half-rate empty property. The Committee pointed out that without legislation it was impossible to do anything in the matter, and they did not consider it desirable that the Council should propose a special Bill in Parliament for the purpose. The Committee's recommendation that no action be taken in the matter was agreed to.

Inspector of Sewers.—The same Committee reported on the desirability of filling the position of Chief Sewers and General Assistant Highways Department, which is at present vacant. The Committee suggested that the post should in future be designated "Inspector of Sewers," and that the salary to be attached to the position should be 150l. per annum. These suggestions were agreed to, and the Council approved of the Committee's action in inviting applications for the position.

Proposed Archway, Charles-street, S.W.—The Works Committee reported having received from Sir Henry Tanner, on behalf of H.M. Office of Works, a plan and elevation of an archway proposed to be constructed across Charles-street, to connect the present offices of the Local Government Board in the new Government Offices in course of construction on the south side of Charles-street. The plan was approved. A further plan, showing the formation of a truck space under the footway of Charles-street, was also approved.

"Morning Post" Offices.—Drainage.—The Committee also brought up a report in regard to the drainage of these premises. It appeared from this that early in May last Messrs. Mervès & Davis applied to the Council to be excused from compliance with sects. 75 & 76 of the Metropolitan Management Act, 1855, the basement of the premises having been excavated to such a depth that it could not be drained into the nearest sewer. On the ground that it was practicable to drain the basement of the premises into a deep sewer in Sewery-street, the Committee

stated that they had refused the request. They had, the report continued, received a letter from the firm in question, stating that it was their intention to appeal to the London County Council against the decision of the City Council.

Pulling Down Building Without Erecting Hoarding.—The Committee reported having ordered proceedings to be taken in two cases—one at Buckingham-gate and the other at York-street, where the pulling down of buildings had been commenced without the required hoardings having been erected.

Kites as Sky Signs.—The City Solicitors were stated to have been instructed to take action in two cases where advertising kites had been flown from buildings in the City, the Works Committee reporting that the kites were sky signs within the meaning of the London Building Act, 1894.

"Millbank."—A suggestion by the Local Government Committee of the London County Council that the name "Millbank" should be applied to the widened Millbank street running south from the end of Abingdon-street, and a portion of Grosvenor-road between Horseferry-road and Vauxhall Bridge was agreed to.

Incent-place, Regency-street.—The City Solicitors were instructed to take the necessary proceedings to prevent the alleged illegal stopping up of this thoroughfare.

Combined Drainage.—The Works Committee considered the following report:—

"We have considered a letter from the Fulham Conference of Metropolitan Borough Councils on the subject of combined drainage, and have forwarded copy of resolutions passed by the Conference at their meeting on May 21, stating that 22 out of the 28 Metropolitan Borough Councils were represented at the Conference, and that, having regard to the fact that the subject is of such paramount interest to the whole of London, the subject was expedient for the remaining five Councils, one of which is the City Council, would, nevertheless, see their way to join in the proposed deputation to the President of the Local Government Board, and in the presentment of a joint memorial as suggested.

The resolutions above referred to (a) urge the President of the Local Government Board to give the subject of Combined Drainage the serious consideration, with a view to a Bill being introduced to amend the law; (b) that a deputation be appointed to present the foregoing resolution to the President of the Local Government Board; (c) that the whole of the delegates appointed to the Conference form the deputation; (d) that the resolution be embodied in a joint memorial, and that the Borough Councils represented at the deputation be asked to affix their seals thereto; and (e) that the Memorial be referred to the Mayor and Town Clerk of Fulham to settle. When considering the invitation to appoint delegates to the above-mentioned Conference, the Council, with the favour of the object of the Conference, did not see their way to appoint delegates. We recommend that the Council do concur in the views expressed in the above-mentioned resolutions; do appoint Councillor G. Williams Smith to represent them at the proposed deputation to the President of the Local Government Board, and do authorize the Town Clerk to affix the Council's Common Seal to the memorial when prepared."

This was agreed to.

Piccadilly Widening.—The Improvements Committee reported having received a letter from the London County Council stating that that body had accepted the offer of the City Council to execute certain paving works connected with the widening of Piccadilly between Piccadilly-circus and Sackville-street, and between St. James's street and Duke-street, on the understanding (1) that the actual cost of the work should be paid by the County Council upon such cost, and the satisfactory completion of the work being certified by their officers, and (2) that the cost of the said works should form part of the cost of the Improvements towards which the City Council had agreed to contribute. The Committee, in their report upon the matter, remarked that it would be observed that the County Council only agreed to pay the actual cost, which presumably did not include the usual percentage for office and supervision charges, and recommended that the attention of the County Council should be called to the matter. This was agreed to. The Committee further reported having received a letter from the London County Council suggesting that the City Council should now take into consideration the question of the proposed widening of Piccadilly immediately to the west of St. James's-street. The Committee recommended that this should be done, and the Town Clerk and the solicitors were instructed to serve notices upon the owners, etc., of the premises which would be required for the improvement.

London County Council Bill.—The Law and Parliamentary Committee reported that they had succeeded in coming to a satisfactory arrangement with the London County Council in regard to protective clauses in this Bill.

Drainage By-law.—The Public Health Committee reported having received a copy of the

following resolution passed at the Conference of Metropolitan Borough Councils held at Greenwich Town Hall on June 8:—

"That in the opinion of this Conference the ventilation of the new main sewers in course of construction by the London County Council would be materially improved if the London County Council would abolish By-law No. 5 made on October 30, 1900, which provides that:—

"Every person who shall erect a new building shall provide in every main drain or other drain of such building which may immediately communicate with any sewer, a suitable and efficient intercepting-trap at a point as distant as may be practicable from such building, and as near as may be practicable to the point at which such drain may be connected with the sewer. He shall, except in cases where the means of access to be provided in compliance with the preceding By-law shall give adequate means of access to such trap, provide a separate manhole or other separate means of access to such trap for the purpose of cleansing it."

The Council has already informed the London County Council that they were not prepared to recommend the repeal of the by-law in question, and no action was taken in the matter.

COURT OF COMMON COUNCIL.

A MEETING of the Court of Common Council was held at the Guildhall on Thursday last week, the Lord Mayor presiding.

Appointment of Dangerous Structure Surveyor.—The Streets Committee reported that they had appointed Mr. Martin L. Saunders as Dangerous Structure Surveyor for the Northern and Eastern Divisions of the City, in addition to the other two districts now held by him.

Paving Contracts.—Mr. Carl Hentschel asked if a clause was inserted in the paving contracts compelling contractors to carry on the work both day and night. In reply, the Chairman of the Streets Committee stated that in excavating work such a clause was inserted in the contract, but in the case of asphalt and woodpaving it was considered inadvisable, as the work could not be done properly at night-time.

Foreign Cattle Market, Deptford.—The Cattle Markets Committee presented a report recommending, following the recent expert examination of the structural ironwork of the Foreign Cattle Market, Deptford, the acceptance of the tender of Mr. J. Carmichael, of Trinity-road, Wandsworth, for works of repair to Block F Lairsage, including the provision of a new covering to roof, at a cost of £2,720, payable out of the Foreign Cattle Market Fund; and for authority to retain the services of the clerk of works.—The Court agreed.

Competition.

COUNTY COUNCIL SCHOOL, DURHAM.—Forty-one sets of plans were submitted in competition for a Durham County Council school at South Moor, for 350 senior mixed, 350 junior mixed, 25 infants, and a cookery centre. Messrs. Clark & Moscrop, Darlington, have gained the first and second places, and Messrs. Liddle & Brown, Newcastle, the third place. Mr. W. Rushworth, F.R.I.B.A., was the assessor.

Obituary.

MR. CHRISTIAN.—Mr. Joseph Henry Christian, of No. 18, Devonshire-place, Marylebone, W., died on July 3, in his seventy-fifth year. Mr. Christian was elected a member of the Architectural Association in 1849, and was President in 1864-5. He was formerly architect to the Ecclesiastical Commissioners, and made the plans and designs a few years ago for All Saints' Church, Eastworth, Chertsey. Mr. Christian was a liberal subscriber to the New Premises Fund of the Architectural Association; he was elected a member of Council of the Architects' Benevolent Society, 1902-3, and, having served in that capacity during the following two sessions, retired by rotation in March of last year.

MR. CHURCH.—In our last number we briefly announced the death of Mr. William Daniel Church, senior partner of Messrs. W. D. Church & Son, 30, Mark Lane, architect of an extensive enlargement northwards, with a return frontage of 90 ft. along Fleet-lane, for offices and warehouses, of the Memorial Hall, Farringdon-street (1887); the Plough Inn, Mile End-road; premises for Messrs. Young & Marten, at Stratford; the Congregational Church in Green-lanes, Harringay, opened in January, 1903, consisting of a chancel and choir, nave, aisles, double transepts, with minister's and deacons' vestries, and affording seating accommodation for 800 persons—the complete plans and designs, after the early Decorated style, provided for a school, with classrooms, and a hall, at a total cost of about 9,500; ;

the Congregational Church at Hither Green, for which the designs were selected in a limited competition; and a church in Torrion-road, Lewisham. In last January the designs submitted by Messrs. W. D. Church & Son in two limited competitions were, in each instance, placed first by the assessor, and were adopted by the building committee, for the Baptist Church and Schools, Walthamstow, to cost 7,500, for the buildings, and the Baptist Sunday Schools, Ilford.

MR. WILLS.—The death at his residence, Bar Lodge, Salcombe, is announced of Mr. John Wills, senior partner of the firm of Messrs. John Wills & Sons, of Victoria-chambers, St. Peter's Church-yard, Derby, and of London. Mr. Wills had an extensive practice as the architect of a large number of Nonconformist churches, chapels, and schools in many parts of England. We may mention the following, arranged fairly in their chronological order, amongst those that have been built during the past fifteen or twenty years after his designs for the greater part in the Late English Gothic style, and in the majority of cases with schools, classrooms, assembly halls, and cognate buildings:—South Woodford (Baptist); Ford-street, Methodist Chapel, Coventry, for a mixed congregation of about 500 persons; Wath-on-Deane, W. R. Yorks (Wesleyan); Queen's-road, Kingston-on-Thames (Baptist); Irthlingborough (Wesleyan); Redditch (Baptist), for 760 scholars, the schools being detached; Trinity Wesleyan Methodist Church and Sunday-schools in Firth Park-road, Sheffield, on separate blocks, the cruciform church having a tower and spire 11 ft. high, and 960 seats, erected at a cost of some 9,000; Hollies-lane, Chesterfield Mission Hall; Hartley-road, Nottingham, for 450 persons (Methodist); St. Lawrence, Ramsgate (Wesleyan); the Spital, Chesterfield, with schools for 350 children (Wesleyan, Methodist); Wesleyan Sunday-school, Mosborough, near Eckington in Derbyshire; Kedleston-street Chapel, Derby, Sunday-schools; Baptist Chapel and Schools, Nuneaton; Douglas, Isle of Man, and Grassmoor, Derbyshire (Primitive Methodist); Ulverston (Wesleyan); Balham Grove Schools, Balham; Wesleyan Church and Schools, etc., High-road, Chesham; Wesleyan Church, Brampton; Cambridge-street, Derby (New Connexion); Queen's-road, Beeston, Nottingham, with a square tower and a spire 70 ft. high (Wesleyan); Platt Bridge, near Wigan (Wesleyan); Osmaston-by-Derby (Wesleyan), for 500 persons; Shooter's Hill-road, S.E. (Baptist); Elizabeth-street, Birmingham (Congregational); Stafford-road, Sheffield (Wesleyan), cruciform on plan, with tower and spire rising to 124 ft., and 800 seats—to which church Mr. Wills presented the stained glass in the circular tracery window of the chancel; Eastwood, Rotherham, Sunday-schools for 650 children (Wesleyan); Baptist Chapel, London-road, Portsmouth, for 1,000 seats; Wesleyan Church, Waltham Abbey; Kirtton, Lincolnshire, with schools (Wesleyan); a church, cruciform on plan, and having a spire 75 ft. high, with vestries, Sunday-schools, etc., for the Okehampton Wesleyan Trustees, and accommodating 500 persons; the new Baptist Church, Desborough-road, Eastleigh, Hants, for 750 seats; and Bank-street, Mexborough, for 700 persons (Wesleyan). The following are by Messrs. J. Wills & Sons since 1903: Polperro (Wesleyan), for 450 persons; Chesdale Heath, Westport (New Connexion); Westbourne-road, West Kirby (Wesleyan), for 540 sittings; Stafford-street, Walsall, for 650 persons, with schools, etc. (Primitive Methodist); Baptist Chapel, Haddenham, Cambridgeshire, for 450 persons; Halifax-road, Brighouse, for 600 persons, with schools (Methodist); Wesleyan Sunday-schools, Fletton, for 500 children; Baptist Church, Doncaster; West Bridgeford, Staffs, Baptist Church and Schools; Main Bridge, Sheffield (Methodist); and London-road, Peterborough, Wesleyan Chapel and Schools.

General Building News.

ROMAN CATHOLIC CHURCH, ANNITSFORD.—A new Roman Catholic Church has been built at Annisford at a cost of about 6,000. It provides accommodation for some 450 worshippers. Mr. John C. Ferguson, of Newcastle, was the contractor, and Mr. James C. Parsons, also of Newcastle, the architect.

NEW PARISH CHURCH, ELGIN.—A new church has been erected at Elgin to meet the demands for church extension in connexion with St. Giles' Parish Church. It was designed by Mr. Macgregor Chalmers, architect, Glasgow. The walls inside are of stone. There are stone pillars and arches between the nave and the south aisle, and two arches at the east end, one in front of the choir seats and the other in front of the communion table. The church accommodates 845 persons.

ROMAN CATHOLIC CHURCH, BISHOP STORTFORD.—The new Church of St. Joseph and the English Martyrs on Windhill, Bishop Stortford, was opened recently by the Archbishop of Westminster, and is in the Italian style. Mr. Doran Webb was the architect of the church.

PARISH CHURCH, ROKER.—On the 12th ult. the foundation-stone of a new parish church at Roker, Sunderland, was laid. The church is to cost about 10,000. The church is being built in the Gothic style, of limestone from the Marsden quarries. There is to be a tower at the east end of the building. The building will provide accommodation for 700 worshippers. The architects are Messrs. E. S. Prior, F.S.A., of London, and A. R. Wells.

CONGREGATIONAL CHURCH, BRIDLINGTON.—A new Congregational Church has just been opened at Bridlington. The building has cost 1,600, and is in the Gothic style. It will seat 230 worshippers, and by the opening of two windows it will be possible to utilise the mission room for the seating of an additional 100 persons. Mr. Joseph Shepherdson, architect and surveyor, Bridlington and Driffield, prepared the plans for the work.

NEW CHURCH, ANNESLEY WOODHOUSE.—The new Church of St. John, at Annesley Woodhouse, was consecrated on the 23rd ult. The building is designed in the Early English style, with plain lancet windows. It is built externally of Bulwell coursed rubble, with Weldon stone dressings, and is lined internally with brick, which is plastered. The nave is 77 ft. long, and 49 ft. wide, and is divided into five bays, with arcades and aisles, the former being passages 34 ft. wide. The chancel is 33 ft. in length, by 20 ft. in width, with apse at the east end. The arcades are of Ancaster stone, the arches being moulded, and the pillars circular with moulded caps and bases. The tower is erected as far as the ringing chamber, and will take another 1,000 to complete. Under the tower are the clergy and choir vestries. The main entrance is at the north-west corner of the nave, and there is an inner porch in double swing doors. The floors in the vestries and under the seats are of wood blocks, but in the chancel, porch, aisle, and passages marble mosaic is used. The windows have plain cathedral glass in diamond panes, and the roof is of pitch-pine covered with green Westmorland slates with lead ridges. The clergy and choir seats are of oak, and the congregational seating, which is of pitch-pine, will accommodate 400 persons. The heating is by hot-water, and the lighting by incandescent gas. The pulpit is of stone, being carved by Messrs. Tuttle, of Lincoln. The organ, which was used in the old church, has been removed, but the organ chamber has been constructed for a larger instrument. The church was built by Messrs. Smith & Sons (Newark), from designs by Mr. Louis Ambler, of London.

NEW CHURCH, GRANTHAM.—The foundation-stone of a new church has been laid on a site in Harrowby-road, Grantham. The building will be of red brick, with Ancaster stone dressings and a green-slatted roof, the style being Perpendicular. The length, including chancel, will be 113 ft. by 83 ft. wide, and there will be seating accommodation for 544 persons. The work at present in hand is the erection of a nave with north and south aisles, and a temporary east end. There will be porches at the north-west and south-west angles, giving access to the nave and aisles. When erected the chancel will have accommodation for a choir of 30 voices, and the plan provides for choir and clergy vestries on the north side, and heating chamber beneath the organ loft above. The nave roof will be supported by a stone arcade of four bays on each side, carrying a boarded panelled roof 26 ft. 6 in. high at the apex; the height of the aisle roofs to be 11 ft. 6 in. rising to 20 ft. The architect is Mr. B. H. Tarrant, of Upper Tooting; and Mr. A. S. Cooke, of Stroud, Gloucestershire, is the contractor.

CONGREGATIONAL CHURCH, SOUTH NORWOOD.—The foundation-stones of this church were laid on July 4. The present contract, which embraces the church, accommodating about 635 persons, also the tower up to the belfry stage, together with vestries, cloak-rooms, etc., amounts to 4,090, and has been let to Messrs. Walter Lawrence & Son, of Waltham Cross. The building is being faced with best sand-faced red bricks, all the dressings being of Bath stone. The design is in late Gothic, freely treated. A large future school is arranged for as part of the scheme. The architects are Messrs. George Baines & Son, Clement's-inn, Strand, London, W.C.

CONGREGATIONAL CHURCH, GORTON.—A new Congregational Church has been opened at Gorton, Manchester. The building provides accommodation for 650 worshippers, and has been built at a cost of 3,000. The scheme was carried out by Messrs. Thomas Newby & Son, architects, of Manchester.

CHURCH, SOUTH BEDDINGTON.—The foundation-stone of a new church was laid recently in Milton-road, South Beddington. It is to cost some 10,000, and the architect is Mr. W. D. Caroe.

BAPTIST CHURCH, SOUTHFIELDS.—On the 28th ult. the new Baptist Church of Southfields was opened. The chapel is raised above the level of the road, and is reached by a flight of steps, allowing provision to be made underneath for a school 11 ft. high, 47 ft. wide, and 33 ft. long. The school will stand on the real level of the ground, and access to it will be obtained at the back. The sitting accommodation of the church

is 400, but with the galleries it is proposed to put in later, it is intended to seat 750 people. The contract for the first portion of the chapel is nearly 2,800, with additions of 360. On completion of the entire scheme, with galleries, staircases, and tower, the choir, and adequate vestries above and below, the chapel will cost between 4,500 and 5,000. The architect is Mr. R. Henry Weymouth, of Westminster, and the builder Mr. William Hammond, Battersea.

CALVINISTIC METHODIST CHAPEL, MAESYCWMMER.—The memorial-stone has just been laid of a new Calvinistic Methodist chapel at Maesycwmmmer. The chapel, which will provide accommodation for 400 people, is being built with blue pennant stone with Forest of Dean dressings. It was designed by Mr. T. Taliesin Rees, Liverpool, and the building work is being carried out at a cost of 2,000, by Mr. Rd. Jones, Abertridwr.

CHURCH EXTENSION, ABERTRIDWR.—On the 25th ult. the extensions to St. Michael's Church were consecrated by the Bishop of Landaff. The extensions, which comprise chancel, morning chapel, clergy, and choir vestries, and organ chamber, have been carried out at a cost of about 2,300, which, with the previous amount of 3,700, spent on the nave and aisles, makes the total cost of the edifice about 6,000. The original plans provide for a tower, but as yet that has not been erected. Mr. C. B. Fowler, late of Cardiff, was responsible for the plans, and the present extensions have been carried out by Mr. C. Telford Evans, architect, Cardiff, the builder being Mr. J. Jones, Abertridwr.

CHAPEL, BIRCHGROVE.—The foundation-stone of Nazareth Welsh Calvinistic Chapel, Birchgrove, was laid recently. The new edifice will cost over 3,000, and will have sittings for 650 persons. There will be a large vestry at the rear accommodation 250. The builders are Messrs. Price Brothers, Cardiff; and Mr. Rees Llewellyn, Birchgrove, is the architect.

BIBLE CHRISTIAN CHAPEL, LANDKEY.—The memorial-stones of the new Bible Christian Chapel at Landkey were laid recently. Local stone is being used, and the windows and dressings will be of Bath stone, the various windows being in the Perpendicular style. There will be an open pitch-pine timber roof. The seating accommodation will be for 120 persons. The architect is Mr. J. C. Southcombe, of Barnstaple; the builder being Mr. E. Karslake, also of Barnstaple.

WESLEYAN CHAPEL AND SCHOOLS, ACCRINGTON.—The memorial-stones of a new Wesleyan Chapel and Sunday-schools were laid recently at Spring Hill, Accrington. The buildings are estimated to cost about 9,000. Messrs. Grimshaw & Canliffe, Accrington, are the architects.

WESLEYAN CHAPEL, ST. KEVERNE, CORNWALL.—The foundation-stone has just been laid of the new Wesleyan Chapel at St. Keverne. The architect is Mr. J. Wills, of Derby, and the cost of the new chapel will be about 1,000. The chapel will be in the Gothic style, and internally constructed in the amphitheatre form. It will be capable of accommodating a congregation of 300 to 400. The contractor is Mr. G. Bond, builder, of Hayle.

JEWISH SYNAGOGUE, BRADFORD.—A synagogue has been opened by the orthodox section of the Jewish community in Bradford on a site in Spring-gardens, Manningham-lane. The building is Byzantine in design, built from plans by Mr. B. S. Jacobs, of Hull, at a cost of nearly 4,000, and possesses seating accommodation for 250 males, and in the galleries for 200 females. In the basement of the building are rooms for boys' and girls' evening classes and a literary hall.

SCHOOL CHAPEL, LIVERPOOL.—The memorial-stone of the nearly-completed chapel of St. Bees School was laid recently by Viscountess Mordaunt. The chapel is built of red sandstone from St. Bees quarries, and, with the new library and laboratories, was designed by Mr. J. Curwen, F.S.A., of Kendal. The style is Renaissance, and is in keeping with the XVth century buildings, which form the nucleus of Archbishop Grindal's Grammar School.

GIRLS' SCHOOL, CHELMSFORD.—The foundation-stone of the Girls' Secondary School, which is being erected at a cost of about 6,500, on a meadow on Brookfield-road, Chelmsford, was laid recently. There will be a central entrance to the school, to be used upon public occasions, and on either side entrances for the senior and junior girls respectively. In between will be the assistant mistress's room, and at the other end the rooms of the headmistress, with four classrooms, to accommodate 25, 25, 30, and 30 girls respectively. There will be two staircases leading to the first floor, as a precaution in case of panic. On this floor will be a lecture-room, to accommodate 30 girls, a science-room, a music and art-rooms. The heating will be by radiators, and electricity the illuminating power. The building will be decorated with red brick and stone. Messrs. Chancellor & Son are the architects of the work.

ENLARGEMENT OF CLIFF COLLEGE, CALVER.—This institution is now being enlarged by the erection of a new wing. The architects are

Messrs. Hemmell & Chapman, of Sheffield, and Henry Boot & Son, of Heeley, are the contractors. The cost of the work will be about 10,000.

WESLEYAN SUNDAY-SCHOOL, IPSWICH.—The Alan-road Wesleyan Sunday-school has just been completed by Messrs. Wm. Theobald & Sons, of Needham Market, from the designs of Messrs. Eade & Johns, architects, Ipswich. The work is part of a scheme for the re-arrangement and improvement of the church and schools, the total cost of which is 2,600. The chapel is to have a gallery constructed all round, and other alterations are to be effected. The school-room just constructed has cost roughly 1,800. There are in all eleven classrooms, averaging 12 ft. square, and they are all capable of being separated from the main hall by folding doors, which can be opened up when required. The heating is by gas-pits in the floor of the hall and small gas-ovens in the classrooms. The lighting is by gas. There is lavatory accommodation provided, and ventilation is chiefly by means of a Boyles' Extract Ventilator in the roof. The old school-room is still to be used for the infants, whose old school-room is being converted into a church parlour.

PRIMITIVE METHODIST SCHOOL-CHURCH, HULL.—The laying of the foundation-stones of the new Portobello School-Church in Holderness-road took place a short time ago. The building has been designed by Messrs. Gelder & Kitchen, Mr. G. H. Pantou being the contractor. It is to seat about 600 persons, and will have 30 classrooms beside the main hall. The cost will be about 4,000.

NATIONAL SCHOOLS, BELFAST.—The new Donegal-road National Schools, which were recently opened, will accommodate about 400 scholars, and the money expended on them, including the furnishing and enclosing, amounted to 2,200. The building is of brickwork, Gothic in design, with stone dressings, and is thoroughly up-to-date in every way. Ventilation is obtained by a roof ventilator as well as by inlet ventilators. These are supplied by Messrs. P. M. Walker & Co., of Halifax. The classrooms are fitted with Messrs. Henry Addison & Co.'s (Wellington) patent folding partitions. The building has been heated throughout by Messrs. Musgrave's hot-water system, and that firm have also supplied the roof principals. Mr. Wm. Curran, Belfast, has carried out the plumbing work, and also science-room fittings; the contractor for the entire work being Mr. Isaac Copeland. The architect is Mr. W. D. R. Taggart.

CONTEMPORARY SCHOOLS, NEWINGTON.—The foundation-stones of the new Sunday-school to be built in connexion with the Church of the Transfiguration, North Newington, was recently laid. The architects are Messrs. Brodick, Lowther, & Walker; the contractors being Messrs. Quibell, Son, & Greenwood.

CONTEMPORARY SCHOOLS, WIMBORNE.—The opening of the new Oakdale School, Wimborne, took place a short time ago. The building, which is to be a mixed school to accommodate 208 children (88 boys, 56 girls, 40 infants, and 24 babies), is of brick, with Bath stone facings, and is roofed with slate. The floors are of wood block, and the building is heated with hot-water radiators; the system of ventilation adopted being the ridge foul air extractors with fresh air inlets. The cost was 3,287. The builder was Mr. A. J. Colbourne, of Swindon, and the architect Mr. W. Andrew, of Park Road, Bournemouth.

PARISH HALL, BRIXTON.—The Lord Mayor, on the 23rd ult. laid the foundation-stone of a parochial hall for the parish of St. Paul's, Brixton. The new building will hold 800 persons, and the scheme, which is being carried through at a cost of 5,000, also provides for a gymnasium and classrooms. Mr. C. E. Hewitt is the architect of the work.

CENTRAL LIBRARY, ISLINGTON.—The foundation-stone of the Central Public Library for Islington was recently laid by the Mayor of Islington, Ald. Henry Mills, J.P. The site-area contains 15,000 sq. ft. and it was purchased at a cost of 5,408. The accommodation is as follows:—Ground floor.—Entrance porch and hall, 74 ft. by 14 ft.; children's reading-room and lending library, 27 ft. 6 in. by 35 ft.; lending library, 28 ft. by 43 ft.; reading-room, 78 ft. by 32 ft.; First floor.—Reference library, 78 ft. by 32 ft.; lecture hall, 70 ft. by 35 ft.; committee-room, 35 ft. by 21 ft.; librarian's room, store-room, etc. Mr. Henry T. Hare is the architect of the work, Mr. C. B. Roberts being the builder.

NEW SCIENCE BUILDING, REPTON COLLEGE.—The new science building of this college, which has been erected at a cost of about 7,000, was opened on the 21st ult. The building is of red brick with Stancliffe stone dressings. On the ground floor are the physics laboratory, classroom, physics lecture theatre, make-up room, masters' room, and dark-room, and the first floor comprises the chemical laboratory, the chemical lecture theatre, make-up room, classroom, and research-room for six advanced students. The heating is by hot water, with the exception of in the physics laboratory, where iron has been entirely avoided in order to obtain a parallel magnetic plane. The building is fireproof. All

the rooms have glazed brick dados, and the passages are paved with Pattison's marble and cement tiling. The building was carried out by Mr. A. Smith, of Derby, to the plans of Messrs. Naylor & Sale, of Derby.

FREE LIBRARY, LONG EATON.—A new public free library has been opened at Long Eaton. With all its accommodation on the ground floor, it stands back from the road a distance of 80 ft., with the intervening space laid out as a flower-garden. The floor of the building is raised 4 ft. from the ground, and entrance is gained by a double flight of steps. On either side rise two turrets with stone terminations and gold mosaic panels, while above the entrance door is a stone pediment with a mosaic panel. In the interior the vestibule walls are covered with glazed tiles to the ceiling, and the floor is of black-and-white squares in Hopton Wood stone. The entrance hall, which measures 21 ft. by 15, gives access to the lending library, with references library on the one side and a reading-room and ladies' room on the other, which offer ample accommodation. The walls throughout are treated with duresco in various tints, with a frieze, and all the screens are stained and varnished dark green. The floors are formed of pitch-pine blocks, and the heating is by the hot-water low-pressure system. The building is of brick, with a tiled roof, and the entrance is a tiled frieze, 18 in. deep, runs round the outside. It has been built to the design of Mr. Ross, architect, of Long Eaton, and Messrs. Warner, of Mickleover, have carried out the contract.

PARISH HALL, GREAT BOOKHAM, SURREY.—The Hon. Mr. Cecil Buckley recently opened the Old Barn Hall for its new purpose as a village club and place of meeting and entertainment. The necessary improvements and alterations were carried out from plans prepared by Mr. Richard Lee, architect, of Great Bookham.

BANK PREMISES, LILLEY.—There have just been opened for business in Lilley two new bank buildings, which have been erected at the junction of Wells-road and Station-road for the York City and County Banking Company, Ltd. The structure was designed by Messrs. Clarke & Moscrop, architects, of Darlington.

INSTITUTE PREMISES, DIGBY, BIRMINGHAM.—On the 30th ult. the foundation-stones of the social institute to be erected for the benefit of the inhabitants of the Floodgate-street area by members of Carr's Lane Congregational Church were laid. The scheme is to cost 25,000*l.*, and the building will be a three-story structure consisting of three blocks. The ground floor of the first block will be taken up by three entrances to the different parts of the premises and four shops. On the first floor there will be a café, a reading-room, and rooms for minister, sisters, and lady workers. There will be a billiard-room on the second floor, with a recess for serving refreshments, and two rooms for meetings of friendly and other societies. Behind this block will be a hall capable of seating 1,345 persons. The floor will be raised about 12 ft., and the basement will be occupied by a gymnasium and two games' rooms. Beyond the main building, and quite detached from it, will be the Sunday-schools. This block will consist of a large assembly room, with main class-rooms, the sides, and four dance rooms at the front suitable for an infants' school on the ground floor and senior classes above. The main hall will have a gallery at one end and the classrooms will be formed by collapsible partitions, and when the latter are put back to the walls there will be space to accommodate 600 persons. Close to the Sunday-schools will be a kitchen fitted up for the provision of teas and for making soup. Near by will be a wood-chopping shed or labour yard. The plans have been prepared by Mr. Arthur Harrison.

CHURCH HALL, CARDIFF.—The promoters of the Cardiff Forward Movement have opened a new hall in Whitchurch-road. The building is capable of accommodating 900 worshippers, with classrooms providing seating room for another 400 persons. It cost nearly 4,000*l.* to erect, the architects being Messrs. Veall & Sant, and the contractors Messrs. E. J. Wells.

PAVILION AND CAFÉ, BRIDGINGTON.—A grand pavilion and café have been erected on the extension of the Princes Parade, Bridginton. The pavilion is rectangular in plan, and has a dome and campanile towers. It contains gallery, ladies' and gentlemen's cloak-rooms, and shops, and a hall 96 ft. by 71 ft., which has been calculated along with the gallery to accommodate about 3,000 people. The stage has been specially designed for working variety, dramatic, and orchestral performances, and will be provided with rooms for artists, property and manager's rooms, etc. Two large external balconies are provided for promenade purposes, accessible by doors from the gallery promenade. All possible precautions have been taken for dealing with fire and dispersing the audience rapidly in case of panic, numerous exits being provided from the gallery and body of the hall into the esplanade and Princes Parade Café, which would enable the building in three minutes. The café, which is a large one-story erection, adjoins the pavilion, and is provided with folding screens,

so that the pavilion and café could be thrown into one room when desired. The buildings are constructed of wood on a steel framework, and the internal decorations are in fibrous plaster. Both pavilion and café will be lighted with electric light and heated on the low-pressure hot water system. Messrs. Mangnall & Littlewoods (Manchester) are the architects, and Mr. Thomas Spink (Bridginton) is the contractor.

BANK PREMISES, HULL.—At the corner of Beverley-road and Spring-bank there have been erected new premises of red brick with stone facings, the larger portion of which is occupied by the Union of London and Smiths Bank. Messrs. Gelder & Kitchen were the architects, and Mr. Mark Harper was the contractor.

SWIMMING BATHS, LLWYNYPPIA.—The opening of the new swimming baths at Llwynypia took place on the 2nd inst. The structure is built of local stone, with red brick facings and stone dressings. The roof principals are all of iron, and carry appliances for gymnastic exercises. The building has been erected by Mr. Alban Richards, Ton Pentre, under the supervision of the architect, Mr. Redwood Jones, Cardiff.

CHILDREN'S HOSPITAL, ALVERSTOCK.—On the 20th ult. the foundation-stone of the new hospital at the Children's Home, Alverstock, was laid. The new building will, when completed, provide accommodation for about 25 patients, with a nurse and assistant, and the architects are Messrs. Holman & Gooderham, of London. The cost of the work is estimated at 2,500*l.*, and a further 500*l.* must be added for furnishing.

COUNCIL OFFICES, HEYSHAM.—New offices have been erected by the Heysham Urban District Council. Mr. H. Miller, the Council's Surveyor, prepared the plans. The buildings face the main road, the frontage being 123 ft. and the total area 1,453 sq. yds. The cost has been about 2,142*l.*, exclusive of the cost of the site. The external work is principally finished with Light-cliffe stone. The main entrance doors are of English oak, and the interior work is mainly of pitch-pine. The contractors were:—Masonry, etc., Messrs. J. Edmondson & Co., of joinery, Mr. J. F. B. Platt, of plumbing, Messrs. S. H. Cross & Co., of heating, Messrs. Calvert & Heald, Lancaster; slaters' and plasterers' work, Messrs. R. Hall & Son, Lancaster; and painting, Mr. A. Greenwood.

GUARDIANS' BOARD-ROOM, WEST HAM.—A new board-room has been erected by the West Ham Board of Guardians over the room formerly used for that purpose. The lower part of the building is now to be fitted up as the clerks' office. The new room is 45 ft. by 30 ft. Adjoining are four committee-rooms, members' room, ladies' room, and a waiting-room. The building has been erected by Mr. W. Manders, and the furniture has been supplied by Roberts' Stores, Ltd. Mr. Williams Dunford was the architect.

CO-OPERATIVE STORES, BATLEY.—The Batley Co-operative Society's new central stores were opened on the 23rd ult. The premises have been erected on Commercial-street, from plans prepared by Mr. H. B. Buckley, of Batley. They consist of shops, a suite of offices, and a large assembly hall, and have a floor area of 20,000*sq. ft.*

PUBLIC LIBRARY, GRAVESSEND.—A new public library has been erected in Windmill-street, Gravesend. The architect for the work was Mr. E. J. Bennett, the builder being Mr. E. Tong.

Stained Glass & Decoration.

NEW ALTAR, ST. MARIE'S, HALIFAX.—The Right Rev. Dr. Cowling recently consecrated the altar of the Sacred Heart of Jesus at St. Marie's Church, Halifax. The altar was designed by Mr. Simpson (Bradford). It is of marble and alabaster, and has been executed by Mr. Well, of Cheltenham.

Appointment.

DOVER.—Mr. William C. Hawke has been appointed Borough Engineer of Dover.

Sanitary and Engineering News.

SWANSEA DOCKS.—The new dock, having a water area of 66 acres, is being built by Messrs. Topham, Jones, Rallton & Co., contractors, under the joint superintendence and directions of Mr. A. O. Schenck, M.Inst.C.E., Chief Engineer to the Swansea Harbour Trust, and Mr. P. W. Meik, M.Inst.C.E., of Victoria-street, S.W. The work was practically begun eighteen months ago by the construction of a sea-embankment about 1½ miles long, with some 450,000 cubic yards of stone, having a sea-face of heavy stone pitching, uncoursed, the stones weighing from 2 to 5 tons apiece; behind that have been tipped about 700,000 cubic yards of sand. The dock measures 4,050 ft. (maximum) long by 900 ft. (maximum)

wide; all the new work is below high-water mark at ordinary spring tides. The estimated cost, including warehouses, machinery for loading and unloading, etc., amounts to nearly 1,800,000*l.*

REINFORCED CONCRETE CONSTRUCTION.—A chimney 261 ft. high upon a foundation-base 25 ft. square is being built at Plaistow Wharf, Victoria Dock, for a large sugar refinery, and is calculated to resist a wind-pressure equivalent to a velocity of 110 miles an hour. The cement is supplied by the Associated Portland Cement Manufacturers, Ltd., for whom the Weber Steel Concrete Chimney Company will erect at Northfleet, Kent, a chimney after the same kind, to be 247 ft. high upon a base 18 ft. square and having a flue 8 ft. 6 in. in diameter. It is proposed to erect a ferro-concrete bridge, having six spans of about 44 ft., and a total length of 264 ft. between the abutments, across the river Wansbeck at Stakeford, near Ashington. The safe live load will be a 30-ton engine upon a 7 ft. 6 in. wheel base and a distributed live load of 112 lb. per one foot superficial.

ROYAL SANITARY INSTITUTE.—The following fellows, members, and associates were elected last month:—*Fellows:* Sir Lauder Brunton (Stratford-place, W.); John C. McVail (Glasgow); Allen Macfadyen (Hamstead); Henry Rife (Victoria-street); T. A. Starkey (McGill University, Montreal); E. H. Stigoe (City Engineer, Birmingham); M. J. Dieu (Hotel, Dover); G. R. Strachan (Westminster); Sir Henry Tanner (H.M. Office of Works). *Members:* E. V. Aeton (Town Hall, Port of Spain, Trinidad); T. W. Eays (West Bromwich); E. Parry (Thames); O. H. Peters (Bagthorpe Hospital, Nottingham); Leonard John Small (Council Office, Broadstairs); G. W. Tulley (H.M. Office of Works, Edinburgh); E. van Batten (Borough Engineer, Catford); T. Barless (College street, S.E.); Capt. E. C. L. Fitzwilliams (Gligwyn, Carmarthenshire); A. Golds (Bordon Camp); G. H. Polkinghorne (Albany Barracks, Isle of Wight); W. H. Wainwright (Chelsea); T. Ward; R. A. West (West Norwood); E. Willis (Neasden). *Associates:* J. Jones (Town Hall, Bermondsey); H. Ashwood (Tamworth); A. B. Brown (Belton); W. E. Clayton (Deptford); F. G. Cesar (Hale, Farnham); F. Camble (Exeter); P. W. Cooper (S. Woodford); H. R. Corin (Penzance); C. G. M. Cross (Frome); Mary Davies (Farrington-road); H. R. Faulkner (Upper Park-street, N.); Jessie G. Foulsham (Bromesbury); T. Gardner (Balham); W. E. Hall (Wolverhampton); F. S. Holman (Ilford); C. R. Hooper (Edinburgh); J. T. Hughes (Merthyr Tydfil); Julie A. Jacobs (Ash, near Dover); E. T. Jeffery (Maidstone); G. Knowles, junr. (Maidstone); C. B. W. Lloyd (Fulham Palace-road); Mary Lowe (Battersea); Elizabeth L. Mackay (Edinburgh); W. McNair (The Chop-road, Wandsworth Common); W. Martin (Burslem); J. H. Monk (Poulton-le-Fylde); J. Montieth (Edinburgh); J. M. Perrie (Green Lanes, Essex); G. Pitsof (Cambridge); A. E. Rees (Cockspur-street); R. G. Saint (Ilford); V. A. Small (Islington); Jas. Smith (Tyldesley, Manchester); H. T. Taylor (Polkstone); Bessie Teasdale (Brighton); A. Thomas (Edaling); Margaret J. Thomas (Strathgill); Marie E. Turner (Crouch End); C. W. Womels (Brighton); J. T. West (Stepney); E. R. West (Oakenegates); Annie R. Wilson (Cambridge). At an examination in Hygiene in its bearing on School Life, held in Manchester on June 22 and 23, four candidates presented themselves and one was awarded a certificate—viz., Miss Alexandra E. Evans (Caversham). Mr. James Bolton (Blackburn) was successful in Part II. only. At an examination in Sanitary Science as applied to Buildings and Public Works, held in Manchester on June 22 and 23, 1906, three candidates presented themselves, and one was awarded a certificate—viz., Mr. John Taylor (Bury).

COMBINED DRAINAGE IN ST. PANCRAS.—The Chairman of the Sewers and Public Works Committee of the St. Pancras Borough Council, in his annual report just circulated, says:—"The hardship inflicted on the ratepayers by the unjust condition of the law with regard to combined drainage still remains, rendering the execution of such works necessary, the cost of which ought to have fallen on the owners of the property. It is an extraordinary feature in the present state of the law that a person who has complied with the provisions of the Statute respecting combined drainage has to maintain the same, while another whose drainage has been surreptitiously combined (if only by a rain-water pipe) has not to maintain the drainage because the interpretation clause of the Statute (as defined by the High Court) makes such drainage a 'sewer,' and thus, contrary to principle and by-law No. 5, a man is allowed to profit by what was his own wrongdoing."

INTERCEPTING TRAPS.—Bermondsey Borough Council, at their meeting on Tuesday, considered a resolution adopted at a conference at Greenwich to the effect that the London County Council should be asked to abolish By-law No. 5, with regard to the ventilation of main sewers by intercepting-traps. Bermondsey Council strongly

disagreed with the view that it is desirable to improve the ventilation of main sewers by abolishing intercepting traps, and considered that the evils which would arise from the proposed remedy would be greater than that which now exists. A communication is to be forwarded to this effect to the London County Council.

THE ENGINEERING STANDARDS COMMITTEE.—The Council of the Institution of Mechanical Engineers have appointed their President, Mr. Edward P. Martin, as one of the representatives of that Institution upon the Main Committee of the Engineering Standards Committee, in place of Mr. E. Windsor Richards, Past-President of the Institution of Mechanical Engineers, who has retired.

INFIRMARY FITTINGS.—For the Royal Victoria Infirmary, Newcastle-on-Tyne, Messrs. Doulton & Co. have recently supplied, amongst other fittings, special bath valves and bed-pans sinks. A short description of these may be of interest. The valves are their patent mixing valves in gun-metal, with removable keys, and with inlet to discharge through the side of the bath. They are arranged so that the water can be delivered at any temperature by a slight movement of the hand. It is impossible to turn on the hot water first, the valve giving first cold and then tepid, and this is a safeguard against scalding. There are also a large number of special bed-pans sinks with a scalding sink and drainer combined. These are made in white-glazed fireclay, and are fixed on cantilevers. The bed-pan sink has a rising jet for the bed-pans, and a spray for the urine bottles. These are connected by copper pipes to hot and cold screw-down valves. The sink itself is flushed by a vitreous enamelled siphon cistern.

Miscellaneous.

PROFESSIONAL AND BUSINESS ANNOUNCEMENTS.—Mr. W. H. Burt, A.R.I.B.A., and surveyor, has removed his office from 10, Bush-lane, Cannon-street, to 14, Southampton-street, Strand, W.C.—Mr. Arthur G. Cross, F.S.I., has removed his office from 17, Old Queen-street, to Caxton House, Tothill-street, Westminster, S.W.—Mr. A. C. Conrade, artist, has removed from 268, Kennington-road, to 26, Lorn-road, S.W. Mr. Conrade, many of whose fine drawings have appeared in the *Builder*, notifies his removal in a characteristically artistic manner by a beautifully-drawn card of picturesque and architectural details.

CAMBRIDGE COTTAGE, KEW GREEN.—When the necessary funds are provided the house and grounds of Cambridge Cottage will be transferred to the service of Kew Gardens, and the house will be converted into a museum of forestry and pomology, and of specimens to illustrate the diseases of garden and farm crops. The Cottage was named after its occupant Adolphus, Duke of Cambridge, a son of George III.

BOARD OF AGRICULTURE AND FISHERIES.—The Board have just published a descriptive and illustrated pamphlet relating to the geological survey upon the underground water supply of Suffolk, and to the geological survey of the Sidmouth and Lyme Regis districts, showing sections of the country around Honiton and Axminster, and of the cliffs by the coast. These useful handbooks may be obtained for a small price from the Ordnance Survey Office, Southampton, and from agents for the sale of the survey publications.

JUNIOR ARMY AND NAVY CLUBHOUSE.—The premises at the corner, south, of St. James's and King streets, vacated two years ago by the Junior Army and Navy Club, were sold recently at auction for 27,100. The property, held directly under a lease from the Crown, having fifty-one years to run, at a ground rent of 1,418. 13s. per annum, has frontages of 48 ft. to St. James's-street and 133 ft. 6 in. to King-street, and covers, with No. 10, Crown-court, an aggregate area of nearly 7,700 ft. superficial. It was withdrawn from sale at a bid of 58,000. In May, 1904, and again at a bid of 29,000, on March 30 of last year. The house was built in 1832 after designs by Sir James Pennethorne for John Crookford, who at that time kept the famous gaming-house in St. James's-street, and opened it as the St. James's Bazaar. The grand saloon measured 100 ft. by 40 ft. Wyatt Papworth made some alterations of the house in 1892-3 for its occupation by the Junior Army and Navy Club, founded in 1869, remodelling the interior, as well as the front with bay-windows on the ground floor facing St. James's-street, and he added a curb roof to the return front in King-street.

UNIVERSITY COLLEGE ARCHITECTURAL SCHOOL.—At the prize distribution on Tuesday, the 3rd inst., the Donaldson Silver Medals for general excellence were awarded to H. B. T. Morgan and B. M. Goodwin. The college diploma, which exempts from R.I.B.A. Intermediate Examination, was, on the recommendation of Mr. John Slater, awarded to H. B. T. Morgan, B. M. Goodwin, and F. A. Richards. In the evening

school, held under a grant from the Company of Carpenters, prizes were awarded as follows:—*Design class.*—First prize—H. A. Welch. Second prize—R. S. Bowers. Hon. mention—G. B. Bridgeman, H. B. T. Morgan, F. J. Wille. *Elementary design class.*—First prize—R. J. Hunt; second prize, R. Crombie.

WAR MEMORIAL, BIRMINGHAM.—The unveiling of the monument which has been erected to the memory of 821 men of Birmingham who fell in the war in South Africa took place a short time ago. Of red granite, standing on granite steps, it is surmounted by a bronze group 9 ft. 6 in. high and 5 ft. at the base, and on a rising base, with emblems and attributes of war, is a gun carriage flanked on each side by a soldier vigorously pushing forward the gun. Standing on a half globe is a figure representing Peace. In the front is a fine bronze bas-relief of two figures representing Sympathy and Grief, holding wreaths, and supporting a shield upon which is inscribed the dedication. The total height from the ground level of the monument is about 35 ft., and the width, including the steps by which it is approached, 28 ft. Mr. Albert Toft was the sculptor.

LIVERPOOL CORPORATION DWELLINGS. The report of Mr. John Taylor, manager of the artisans, and labourers' dwellings owned by the Corporation of Liverpool, which has just been published, shows that on December 31, 1904, the total number of tenements under the control of the committee was 1,670 (comprised in twelve separate blocks of dwellings, affording accommodation for 7,892 persons). The committee, at the same date 15 shops. During the year ended December 31, 1905, 150 additional tenements were completed and opened, providing accommodation for 828 persons, thus bringing the aggregate number of tenements to 1,820, containing 4,859 rooms (together with 15 shops), capable of accommodating 8,720 persons. At the close of the year 1905 the total gross annual rental of the tenements and shops amounted to 17,799. 12s. 8d., as compared with 16,329. 18s. on December 31, 1904. The total receipts for 1906 amounted to 14,917. 17s. 10d. Of this amount of 14,902. 17s. 10d., the sum of 14,302. 18s. 2d. was actually collected from the tenements alone, being equal to 95.404 per cent. of the amount of rent accrued during the year (viz., 14,991. 16s. 4d.). The amount written off in respect of irrecoverable arrears was 493. 16s., equal to 2.79 per cent. of the total rental received for the year, or 3.227 per cent. of the rent accrued on the tenements only. The greater portion of this amount written off (i.e., 240. 10s. 8d.) was in respect of those dwellings reserved for housing only persons dispossessed from insanitary property. The total amount lost through empties (inclusive of new dwellings opened during the year and a number of which were empty for some time after completion) was 1,994. 13s., equal to 9.80 per cent. of the total rental receivable for the year. The actual population in the dwellings at the end of last year was 5,924 persons, giving an average for the aggregate number of rooms of 1.53 persons per room.

VICTORIA MEMORIAL, DERBY.—Work has been commenced on the erection of the base and pedestal for the Queen Victoria statue at Derby. The stone base is embedded on a concrete foundation, and upon this base are two plinths of red granite. Then comes the pedestal with the cap, and upon this will stand the statue. The stone-work is being carried out under the direction of Mr. John Ward, the Borough Surveyor.

NEW MUSEUM AT CANTERBURY.—Through the efforts of the Mayor, Mr. Bennett Goldney, the towers of the West-gate, Canterbury, have been adapted for the purposes of a museum (to form a branch of the Royal Museum) and furnished with an interesting collection of antiquities, many of them illustrative of the history of the gate itself. Of the several ancient gateways for which Canterbury was famous the West-gate alone has been preserved intact, and at the inauguration of the new museum last week the Mayor claimed that this gate is the best example of its kind in our islands, being unequalled as a whole in architectural merit, as well as in regard to perfect preservation, by those still extant at York, Chester, Conway, Norwich, Southampton, or Carlisle.

HOUSING OF THE WORKING CLASSES.—The Select Committee of the House of Commons which is considering the Housing of the Working Classes Acts Amendment Bill, heard further evidence on the 27th ult. Sir John Dickson Poynder presided. Mr. Nettelford, Chairman of the Housing Committee of the Birmingham Corporation, was the principal witness. He said that at present part 2 of the Act of 1890 was practically a dead letter. It was very difficult to get even large cities to take it up, and it was very troublesome and very unpopular. The underlying principle was that owners of bad property should put it in repair at their own expense. Unexperience showed that the owners of bad property were rewarded for its being bad. In fact, in some parts of England a few years ago it became the regular

practice to buy up small house property and let it go into bad repair in order to be bought out compulsorily at a high price. When the Birmingham Housing Committee began its work its attention was drawn to this, and part 2 was put in force. He thought that part of the Bill ought to be, and could be, applied to rural districts. There would be difficulty, he knew, but that did not alter his opinion. In Birmingham the overwhelming majority of property owners were working in a friendly way with the Housing Committee. He would suggest that the making of closing orders should be compulsory instead of permissive under this part of the Bill, that demolition should automatically follow a closing order, and that there should be a further amendment by instructing local authorities to specify the works necessary when houses were to be repaired under part 2. With regard to the provision of additional housing accommodation for the working classes, he suggested that the corporations of large towns should acquire land and sell it to public utility building societies at about 3 per cent. interest. By that means, with a sympathetic corporation, excellent houses could be provided in the suburbs of large towns at from 4s. 6d. to 5s. 6d. a week rent, while those who were paying that rent would ultimately become the owners of their own dwellings. It would also have the effect, he thought, of avoiding congestion in large towns. The witness added that in rural as well as urban districts the local authorities should have this power of land purchase and land leasing, but not of house building. The Committee adjourned till Monday. Before the Committee the Chairman of the National Housing Reform Council (Alderman Thompson, of Richmond) was again examined, mainly on the question of the financial facilities necessary to promote housing schemes. He suggested that Government housing loans should be secured at the rate of which the Government could borrow large sums in the open market, plus 1 per cent. for management expenses. This should be the charge to municipalities. In the case of the poorest poor a grant should be made by the Government and half the sinking fund and interest should be other proposals made by him. The full benefit of the reforms would be, said, only be realised after a settlement of proper scientific areas for town development. With regard to the building by-laws, he advised the registration of plans and specifications, and the question of cheap cottages with the Local Government Board. These might be accepted as models, and their repetition permitted under similar conditions as a sufficient compliance with building by-laws. The contentment of a good housing Bill should be a good Bill dealing with the question of cheap cottages and valuation of land. He thought there should be more correspondence between valuation for public charges and valuation for the supply of public needs.

NATIONAL PHYSICAL LABORATORY.—After the ceremony at Busby House on Monday, when Mr. Haldane opened the electrical laboratory of the National Physical Laboratory, Sir John Brunner placed the sum of 5,000. at the disposal of the Committee towards the completion and equipment of the additional buildings for engineering, electricity, and metallurgy, now in course of erection.

SCHOOL BUILDING IN IRELAND.—In Friday's Parliamentary Papers Mr. J. Roche asks the Chief Secretary for Ireland whether he is aware that injury is caused to education in Ireland by the delay in issuing the new arrangements for the building of national schools, and whether steps will be taken to have these new regulations issued as soon as possible. Mr. Bryce said he was aware there is great need for the erection of new national school buildings and the improvement of existing school buildings in Ireland, and the Government was doing its best to accelerate the settlement of a scheme for that purpose.

LEVENSHULME BUILDING BY-LAWS.—It has recently been pointed out that no urban district in Lancashire possesses a building-by-law providing a minimum size for the living-room of a house. The Levenshulme District Council, whose building laws are probably more strict than those of most authorities, is about to try to remedy this, and at last night's meeting a deputation was appointed to wait upon the Local Government Board and request them to approve of a by-law fixing a minimum size for one living-room in every house erected in the district.—*Manchester Evening News.*

MANCHESTER WATER SUPPLY.—A long and interesting report on Manchester's water supply has been drawn up by Mr. J. H. Hill, the Consulting Engineer to the Water Works Committee. It summarizes the history of the Longdendale works, which first supplied Manchester with water in 1851. Since then all the available sites for reservoirs in Longdendale have been occupied. There are five reservoirs in the main valley, the upper one being at Woodhead, and the lower at Bottoms, within about a quarter of a mile of the large mill at Waterside. Below Waterside the valley is occupied largely by manufactories and the houses of the people engaged there. Two reservoirs have also been constructed on the

Arnfield and Hollingworth Brooks. Mr. Hill describes the construction of the reservoirs at Audenshaw. Two more can be made there, one on land where the Corporation own the mineral rights, and the other on land where they are only partially owned. As to the reservoirs at Woodhead and Torside, it was estimated twenty-five years ago that it would cost 70,000 £ to carry out certain extensions. It would cost more now. The work required to be done at Woodhead, Torside, and Rhodes Wood in order to make the two first-named reservoirs available to their full capacity would take at least two years and cost a large sum of money. The increased capacity obtained would make up for the loss of storage through the colliery workings at Audenshaw. Mr. Hill is of opinion that the Longdendale source cannot be safely estimated to afford an average quantity of more than 20,000,000 gallons per day in dry seasons. Taking this at 20 million gallons and Thirlmere, by the first and second line of pipes, at 20 million gallons per day, there is a total quantity available for the city of about 40 million gallons, which will probably meet the demands for the next four or five years; but at that time the supply from the existing works will be exhausted. Mr. Hill explains that the total consumption of water by Manchester in 1905 was at the rate of 19,578 gallons per day. No substantial increase, he says, "in the supply can be obtained from any source but Thirlmere, and by about the year 1910 the third pipe should be ready."—*Manchester Evening News*.

FLOOR TEST AT THE IMPERIAL HOTEL, SOUTHAMPTON-ROW.—In our issue of September 3, 1904, a description was given of the Kleine patent, a flooring system, recently distributed over the seventh floor of the Imperial Hotel, Southampton-row, now in course of construction from the designs of Mr. C. F. Doll, architect. On Thursday last week one panel on the ground floor with the span of 12 ft. from centre to centre of the supporting beams was subjected to a weight test of 3 cwt. per square foot, evenly distributed over an area of about 20 ft. by 11 ft. As no instruments of any kind were provided for measuring the deflection and for determining the elasticity of the construction, the only tangible result afforded by the trial was the evident capacity of the floor to carry the load without failure and without causing any visible cracks in the plastered ceiling below. This is satisfactory so far as it goes, but in these days of scientific inquiry professional men are not generally satisfied with rough-and-ready tests, and we certainly think the proprietors of this particular type of floor would find it antagonistic in any future trials to employ more precise methods, so that results obtained may be compared with those given by other floor systems. In the Imperial Hotel the floors are built of Hemel Hempstead hollow bricks, reinforced in the joints with tension bars of steel strip, and with an upper layer of ordinary concrete to increase the compressive resistance of the construction, and a thin layer of concrete for the surface covering. The total area of the floors on the Kleine system in the Imperial Hotel is about 72,000 square feet, and we are informed that, including work executed in Germany and the United States, upwards of nine million square feet of the flooring are in service at the present time.

ARTISTS' BENEVOLENT FUND.—At the ninety-fifth anniversary festival dinner held last week, under the presidency of Lord Warwick, it was announced that donations and subscriptions to the amount of about 500 £. had been received, and that in the course of the last twelve months nearly 1,200 £. had been distributed out of the fund. The annuity fund is raised and wholly supported by the contributions of the members for their own relief in sickness or old age; the benevolent fund is applied in favour of the widows and orphans of the members of the annuity fund. Mr. Thomas Brock, R.A., is Chairman of the Committee.

STATUE OF QUEEN VICTORIA.—A statue of Queen Victoria, sculptured by Mr. Thomas Brock, R.A., has been unveiled at Brisbane.

CHURCH OF ST. MATTHEW, OAKLEY-SQUARE.—A restoration fund is opened in respect of this church; a grant of 250 £. has been made conditionally by the Ecclesiastical Commissioners. Some members of the congregation have voluntarily painted the exterior iron and wood work of the fabric. The church was built in Oakley-square, St. Pancras, in 1856, for a congregation of 1,240 persons, after designs in the Decorated style, of J. Johnson.

RECENTLY BUILT.—The premises which have been recently built on the site of St. Philip's Chapel, are now occupied in part by the Camstatt Automobile Association, the ground-floor and basement being used for the display of the vehicles and their parts. The new buildings, erected by Mr. J. W. Lorden, contractor, from Mr. Williams' designs, cover an area of about 4,800 ft. superficial, with a frontage of 80 ft., which was let last year upon an eighty years' building lease from the Crown. The chapel was built in 1819-20, after designs in the Classic style of G. S. Repton,

THE LABOUR MARKET IN THE COLONIES.—The July circulars of the Emigrants' Information Office state that the manufacturing trades have been generally busy throughout Canada, and in Ontario there has been some scarcity of men. Railway construction is employing thousands of navvies and labourers in Ontario and the North-west. In regard to New Zealand, in Auckland the building trades absorb all efficient workers, but no more are wanted; the engineering trade is very slack. In Wellington, men in the building trades, except bricklayers, have been very busy. In Christchurch and Invercargill, men in the building trades have been very busy, but the engineering trades have been quiet. No one may enter Cape Colony unless he possesses 20 £. on arrival, or has secured employment beforehand according to a prescribed form of agreement. The labour market is dull, and the supply of labour is equal to, or in excess of, the demand in the building, engineering, and other trades at Cape Town, Port Elizabeth, East London, Cradock, Kimberley, King William's Town, and practically all other places in the Colony. No one, therefore, should go to the Colony at the present time in search of work. In Natal labour is plentiful in all trades, and mechanics in the building trade are warned against going there to seek employment. No one may enter the Transvaal or the Orange River Colony without a permit. Such permits are given immediately to British subjects on their making personal application to the Permit Secretary, Transvaal and Orange River Colony Permit Office, at Cape Town or Durban, or to H.M. Consul-General at Lourenço Marques. But no permit is granted to anyone (1) who does not possess 20 £. or who has not secured employment in the Transvaal or Orange River Colony; (2) who, when asked to do so by any duly authorised officer, shall be unable through deficient education to himself write out and sign in the characters of any European language (not including Yiddish) an application to the satisfaction of the officer, who has persons must apply through their Consuls. The same warning is given in respect of the Transvaal, where the standard of work required from workmen is very high in all trades, and the cost of living generally is from two to three times as much as it is in this country.

APPOINTMENT OF SANITARY OFFICERS.—The Local Government Board has sanctioned the appointment of Mr. C. Q. Lennane as Medical Officer of Health of the Metropolitan Borough of Battersea. The Board has sanctioned increases in the salaries of Mr. F. T. Bare, Sanitary Inspector in the Metropolitan Borough of Bethnal Green; and of Mr. A. G. Duck, Sanitary Inspector in the Metropolitan Borough of Woolwich. The Board has also sanctioned the apportionment of the salary of Mr. H. Oatley, Sanitary Inspector in the Metropolitan Borough of Hammersmith.

WESLEYAN CHAPEL, GREAT QUEEN-STREET.—Arrangements are being made for the transfer to the West London Mission of the chapel and day-school in Great Queen-street, Lincoln's Inn-fields, by the trustees, and for the enlargement of the chapel southwards, so as to form a hall with a capacity for 2,000 persons. The school buildings will also be adapted for purposes of the headquarters and work of the mission. A lease of an acre having a frontage of 90 ft. to Kingsway having been acquired from the London County Council, it is intended to let a portion of the ground for building, and to make an entrance into the chapel on the east side from the new street. Great Queen-street chapel was originally founded in 1700, and then became a chapel-of-ease to St. Giles-in-the-Fields. It was rebuilt in 1811; in 1840 Jenkins rebuilt the façade, and added the Ionic tetrastyle portico.

Legal.

ACTION AGAINST BUILDERS AND CONTRACTORS.

THE case of Mouchel v. W. Cubitt & Co. came before Mr. Justice Swinfen Eady in the Chancery Division on the 28th ult. on a motion by the plaintiff for an interlocutory injunction restraining until the trial, or further order, the defendants from carrying out, or causing to be carried out, without the written consent of the plaintiff any ferro-concrete or other similar work which might be in competition with that system in alleged breach of a covenant contained in Clause 12 of a licence to use the system "within the town of London" granted them by the plaintiff on March 2, 1903.

Mr. Eve, K.C., and Mr. F. Newbolt appeared for the plaintiff, and Mr. Astbury, K.C., and Mr. Percy Wheeler for the defendants.

It appeared from the statement of Mr. Eve that the plaintiff, Mr. L. G. Mouchel, was the English agent for the Hennebique system of ferro-concrete building, which involved the strengthening or "reinforcing" of cement and concrete work in various forms by means of iron. Friction having arisen between the plaintiff and the defendants with regard to the licence the defendants in March,

1906, wrote to the plaintiff formally repudiating the restriction insisted upon, and in order to raise the question at law that they intended to use, under a contract for building at Messrs. Whitbread's brewery at Chiswell-street, E.C., reinforced concrete work according to a system which competed with but did not infringe the Hennebique patents. That contract was carried out by defendants under protests from the plaintiff, but by reason of business relations existing between him and Messrs. Whitbread he took no proceedings, but instances having occurred in which the plaintiff suspected breaches of covenant by the defendants in several parts of the country the present proceedings were commenced. The learned counsel, in support of the motion, said the evidence showed that the defendants had entered into new contracts involving the use of other systems, and had sent customers to Messrs. Whitbread in order to push a rival system.

Mr. Astbury resisted the motion, alleging that the covenant was inoperative as being in restraint of trade. He contended that in any case the patentee, and not the agent, was the proper person to bring the action.

His lordship, in giving judgment, said the consideration for the licence was a payment of 300 £., and another part was the agreement sought to be enforced. Objection had been raised on the motion that the plaintiff was only an agent, but he was of opinion that he was a sufficient plaintiff. The defendants had said they were not then carrying on a rival system, but it was clear they were doing so at Southampton, though the evidence as to Bournemouth was not satisfactory. The question as to whether the terms of the agreement were too wide, and were in restraint of trade was a matter for the trial. *Prima facie*, the plaintiff had a valid contract, and on the balance of convenience he decided in favour of the plaintiff. Enormous damage might be caused to these patents if the defendants were able until the trial to use competing systems and have them referred to so that intending customers might be led to go and see them in operation, and thus new contracts be induced. The defendants had said that they had no such contracts at present, but his lordship was of opinion that the balance of convenience was in favour of the plaintiff, and that he had made out his claim for the relief sought, which he granted on the terms of the plaintiff giving the usual undertaking in damages.

Order accordingly.

NEWPORT BUILDING DISPUTE.

THE case of Thomas Bradford & Co. v. J. Linton & Co., Ltd., and others, concluded before Mr. Justice Neville in the Chancery Division on the 28th ult.

The plaintiffs, a firm of engineers, of Manchester, brought the action against the defendant company, builders, of Newport (Mon.), and the Visiting Committee of the Newport Asylum and others, to recover a sum of money, the balance alleged to be due under a contract between the plaintiffs and J. Linton & Co., Ltd.

Mr. Jenkins, K.C., appearing for the plaintiffs, said the question in dispute was whether the plaintiffs were equitable assignees of a sum of money that the defendants, the Visiting Committee of the Newport Asylum, owed to J. Linton & Co., Ltd. It was the old story of a principal contractor making a sub-contract with another contractor to do part of the work, and, if he (counsel) was right, making an equitable assignment to the sub-contractor of part of the money in case of default by the principal contractor. The defendant company had a contract with the Visiting Committee appointed under the Lunacy Act to erect an asylum. The contract involved very heavy work, and the plaintiffs had previously tendered for certain of the work in connexion with the laundry and kitchens. The tender was approved, but it was pointed out to the plaintiffs that for convenience one general contract would be made with the builders, who would have to agree to supply *inter alia* the goods which the plaintiffs had tendered for and at the price mentioned in that tender. Accordingly the defendant company entered into a sub-contract with the plaintiffs for the supply of the goods in question. There was a special clause in the sub-contract which he (counsel) contended amounted to an equitable assignment or equitable mortgage in plaintiffs' favour by Linton & Co. of the money which was coming to them from the Committee in respect of the work to be done by the plaintiffs in case Linton & Co. made default. If plaintiffs were right in their construction of the clause in question then the next point that arose was this: The contract had been completed, and there were certain moneys in the hands of the Visiting Committee, and the question was to whom they should go. Linton & Co. issued debentures in 1903 and in 1905; the debenture-holders got a receiver appointed. Under these circumstances this further question arose, namely, whether the terms of the debentures were such as to make the equitable assignment bad as between the company and Bradford & Co. There was a clause

in the debentures which provided that no mortgage should be created in priority to the claims of the debenture-holders, and the point was whether that provision applied to the assignment. If it did not then the question arose who got the notice in to the Visiting Committee first—the plaintiffs or the debenture-holders? That exhausted all the points of the case before the court and that was that. He would submit that even if he was not right as against all the debenture-holders his case was that he had a special case against two of them, who were respectively a director and the managing director of the company. These gentlemen actually negotiated the agreement with the plaintiffs, and wrote letters approving of it. The plaintiffs had no notice of the debentures, and his point was that those two gentlemen, even though it should turn out that the debenture-holders were right, could not set up the debentures as a defence so far as they were concerned. The learned counsel said that the whole contract was for a sum of 96,165.

After hearing the evidence called on behalf of the plaintiffs and the defendants, and the addresses of counsel, his lordship made a declaration that the plaintiffs had a charge on the moneys in the hands of the Visiting Committee, but that the debenture-holders' charge had priority. Judgment accordingly.

ACTION AGAINST THE ASSOCIATION OF OPERATIVE PLASTERERS.

THE case of Smithies (trading as C. Smithies & Son), v. the National Association of Operative Plasterers and Others came before the House of Lords, composed of the Lord Chancellor and Lords Macnaghten, James of Hereford, Robertson, and Atkinson, last week on the appeal of the defendants from the judgment of the Court of Appeal affirming an order of Mr. Justice Bucknill in chambers. (The case was reported in the *Builder* of November 25, 1905.)

The action was brought by the plaintiff, a master plasterer carrying on business in Birmingham, and a member of the National Association of Master Plasterers, against the defendants, other than the trustees, for damages for conspiracy, the alleged conspiracy being that defendants unlawfully and maliciously, and with intent to injure the plaintiff, conspired to induce, persuade, and coerce certain workmen not to fulfil their contracts with the plaintiff, and not to enter into further contracts with him or to engage in his services, the plaintiff's claim being for an injunction and for damages against two men named Ecclesley and Forester for alleged breach of contract. The defence was that the acts complained of were lawful, and done for the purpose of persuading the plaintiff to adhere to an agreement to which he was a party as a member of the Master Plasterers' Association. The plaintiff issued a summons for directions, asking for discovery, and the Master made an order for discovery against all the defendants, and this order was affirmed by Mr. Justice Bucknill in chambers and the Court of Appeal. Hence the present appeal of the defendants.

Mr. S. T. Evans, K.C., and Mr. Clement Edwards appeared for the appellants, and Mr. Montagu Lush, K.C., and Mr. McCordie for the respondent on the appeal.

At the conclusion of the arguments of counsel for the appellants, and without calling upon counsel for the respondent, the Lord Chancellor, in giving judgment, said the orders appealed from directed that the appellants should state what relevant documents were in their possession. The appellants contended that no order for an affidavit of documents could be made in cases where a charge of conspiracy might be involved. His lordship was not satisfied that such a practice ever existed, and it would certainly involve far-reaching and dangerous consequences. He moved that the appeal should be dismissed.

The other learned lords concurred, and the appeal was accordingly dismissed with costs.

Patents of the Week.

APPLICATIONS PUBLISHED.*

7,051 of 1905.—E. W. LANCASTER: Combined Ranges, Washing Boilers, and Baths for Domestic Use.

This consists in the combination with a cooking range of a washing boiler heated by the hot gases from the fire in the range or by an auxiliary fire under the washing boiler, a bath folding into a cupboard in or near the room containing the cooking range, a self-feeding cistern with supply pipes, steam and overflow outlets, and a damper or dampers to determine the flow of the hot gases from the range fire to the uptake.

12,006 of 1905.—W. R. BAKER: Locks for the Doors of Lavatories and the like.

This relates to a coin freed lock and consists in the devices for registering the number of coins

* All these applications are in the stage in which opposition to the grant of Patents upon them can be made.

inserted therein, which consist of a connecting device operated by the combined movements of the handle by which the door is opened from the outside and inside respectively.

13,090 of 1905.—J. B. SMITH: Stoves, Ranges, and the like.

This relates to stoves, ranges, and the like, and consists in providing the stove or grate with a back plate open at the top and perforated, or open at the bottom and arranged in such a manner that the smoke rising from the fire is drawn by the draught from the chimney, over and down the back of the said plate, where it passes through and is partially or wholly consumed by the flames and incandescent fuel at the bottom of the grate, the residue, a harmless thin white smoke, being all that passes up the chimney into the atmosphere.

18,290 of 1905.—J. H. GEMMILL: A Stop or Bolt for Slidable Window Sashes.

This relates to a window sash stop device, comprising a frontal plate with fixing holes and bolt slot, also side brackets at the rear of said plate pierced with holes, and connected together by a roof part and a pin, a rectangular square-headed bolt pierced with a curved or irregular-shaped slot having a pin seat or pocket at each extremity thereof, fixed upon and adapted for being moved along the pin.

20,640 of 1905.—T. WADE: Fireproof Partition Blocks and Ceiling Slabs.

This relates to fireproof partition blocks and ceiling slabs for building, composed of a mixture of about equal parts by measure of fire clay, plaster of Paris, and cork dust or ground cork, with the necessary amount of water. These materials are thoroughly mixed together and wetted, and are compressed in moulds and dried, or are formed into ceiling slabs in a similar manner to that employed when making ceiling slabs of any substance, such as plaster of Paris and sawdust.

24,431 of 1905.—F. CHADBORN: Ventilating and Heat Control Apparatus.

This relates to a system of ventilating and heating, and consists in providing separate devices, operated by fluid pressure, controlled by a common thermostat for actuating the ventilating and heating means respectively, such means being normally simultaneous in operation, but the ventilating means being capable of being rendered inoperative.

1,458 of 1906.—W. SURMANN: Presses for Manufacturing Briquettes, Blocks, Artificial Stone, and the like.

This relates to a press for manufacturing briquettes made from mineral coal, lime, sand, blocks, or briquettes, blocks and the like, or other materials, and is characterised by the press mechanism proper being arranged between two devices for ejecting, charging, and preliminarily pressing the material, which devices act alternately and by a press mould carriage or slide containing two press moulds, or press mould systems, being reciprocated periodically to and fro opposite said devices in such a way that after the completion of each pressing operation one freshly-charged mould on the carriage is brought under the press mechanism for the purpose of pressing the material contained therein, while the other mould is brought up to the one or the other system of the above-mentioned devices for the purpose of removing the finished blocks pressed during the preceding pressure stroke, for the purpose of receiving fresh material to be pressed, and for the purpose of preliminarily pressing the material introduced into the mould.

3,912 of 1906.—K. R. M. WILSON: Attachment to the Flushing Pipes of Water-closets.

This relates to a hygienic cleansing device adapted to water-closet cisterns, flushing or supply pipes of water-closets, consisting of a small vessel or bowl connected to the said cistern flushing or supply pipe, by a pipe which may be fitted with a tap, and having a second pipe leading from the said bowl to the water-closet pan or flushing pipe, the said vessel or bowl when filled with water from the cistern serving as a means for cleansing the hands or fingers of the user.

5,671 of 1906.—F. H. BECKER: Manufacture of Blocks for Building and the like.

This relates to a method of manufacturing building blocks, and is characterised by glass powder being mixed as a binding substance with the ground refuse ashes, in the proportion of 25 per cent. or more by weight, and heated until the glass powder melts, the molten glass binding together the ingredients of the refuse ashes.

9,083 of 1906.—J. L. RICHARDSON: Moulds for Concrete Walls.

This relates to a mould for concrete walls composed of printing plates, a rod extending transversely above said plates, said plates having channels integral therewith, and adapted to be secured to said rod, whereby said plates are suspended from and may be adjusted independently of each other along said rod.

SOME RECENT SALES OF PROPERTY:

ESTATE EXCHANGE REPORT.

June 16.—By W. WATSON, SHEPPARD, & WADE (at Littleworth).	
Bitteswell, Leicester.—A freehold Farm, 97 a. 2 r. 10 p.	£4,000
June 16.—By SPELMANS (at Norwich).	
East Tuddenham, Norfolk.—Harrison's Farm, 133 a. 1 r. 1 p. and c.	1,350
Gayton, Norfolk.—The Manor of Westhall, with rights, fines, etc.	475
Mosley of the Manor of Whiston, with rights, fines, etc.	115
June 19.—W. H. & J. A. EADON (at Sheffield).	
Upper Hallam, Yorks.—Hallam Moor Estate, 634 a. 3 r. 13 p. f.	10,500
By WARNER, SHEPPARD, & WADE (at Melton Mowbray).	
Nether Broughton, Leicestershire.—"Broughton Grange Estate," 560 a. 2 r. 33 p. f. (including Royalties).	20,000
June 20.—By KEMSLEY'S (at Romford).	
Stifford, Essex.—Main-rd., freehold market-garden, 15 a. 2 r. 2 p.	740
Collier Row, Essex.—Enclosure of land, 5 a. 0 r. 7 p. f.	320
By WARNER, SHEPPARD, & WADE (at Leicester).	
Kirby Muxton, Leicestershire.—Lodge Farm, 66 a. 2 r. 13 p. f.	2,348
By STAFFORD & ROGERS (at Maldon).	
Maldon, Essex.—"Northey Island" farm, 890 a. 0 r. 11 p. f.	200
June 21.—By WYATT & SON (at Selsey).	
Selsey, Sussex.—High-st., freehold house and shop, p.	600
East-rd., bungalow cottages, also four cottages, 1 f.	640
to 4, Nelson-ter., f. y. r. 401, 88.	560
Manor, Kent.—Courtyard Farm, 125 a. 0 r. 6 p. f.	250
By MARSH & SON (at Northwich).	
Sevensands, Cheshire.—"Frandsley Farm," 60 a. 2 r. 13 p. f.	3,020
Combs, Cheshire.—"The Grange," 125 a. 2 r. 7 p.	300
Antrobus, Cheshire.—"Fox Farm," 23 a. 2 r. 20 p. f.	1,285
Elgton, Cheshire.—"The Grange," 125 a. 0 r. 6 p. f.	1,391
By W. F. FOWLER & BOWLEY (at Birmingham).	
Sutton Coldfield, Warwick.—"Wheatmoor Farm," 100 a. 2 r. 33 p.	10,000
"Whitehouse Farm," 44 a. 3 r. 16 p. f.	2,200
A freehold field, 1 a. 3 r. 8 p.	250
By HUMPHREY & FINCH (at Maidstone).	
Yalding, Kent.—"Kewward Farm," 125 a. 0 r. 6 p. f.	3,450
By STAFFORD & ROGERS (at Coggeshall).	
Great Tey, Essex.—"Cuckoo's Farm," 40 a. 2 r. 31 p. f.	395
By ROBERTS, SON, & TORY (at Sherborne).	
Glavilles, Wootton est., Dorset.—The Glavilles Wootton Estate, 1,137 a. 2 r. 25 p. f.	24,918
June 22.—By WILKINSON (at Chelmsford).	
Writtle Green, Essex.—"The Lindens," f. p.	550
By WARNER, SHEPPARD, & WADE (at Hinkley).	
Hinkley, Leicestershire.—"Fifth House Farm," 86 a. 3 r. 10 p. f.	2,500
June 25.—By DANN & LUCAS.	
Dartford, Kent.—"Stonehill Green Farm," 106 a. 1 r. 7 p. f. (in lots).	7,050
By ELLIOTT, BOY & BOYTON.	
Regent-street—18 and 19 Warwick-st. (business premises), u. 73 yrs. g. 2001, y. r. 1,150, Cavendish-square—23, Wimpole-st. and stabling, u. 99 yrs. g. 2001, y. r. 3501.	16,100
By BRAD & CAPPS.	
Brompton—5, Drayton-ter., u. 774 yrs. g. 24, u. 751.	900
By KEMSLEY'S.	
Hackney—5 to 8 Tudor-st. u. 25 yrs. g. 161, u. 114, 88.	400
6 to 14, 40 to 46 (even), 37 to 45 (odd), 170, Lambeth, u. 4 yrs. g. 831, 108, u. 3301, 108.	1,740
30, St. Thomas-rd., u. 25 yrs. g. 24, u. 40.	240
Romford, Essex.—London-rd., freehold building land, 12 a. 3 r. 36 p.	2,650
By ALEX. MOSSMAN.	
Colnbrook, Bucks.—High-st.—"McGregor's Stores," two enclosures, stabling, etc., 6 acres, f. y. r. 751.	1,375
By THORNE & SON.	
Orsett, Essex.—An enclosure of land, 21 a. 1 r. 0 p. f.	950
"Jolly Locks" field, 7 a. 3 r. 23 p. f.	400
"Potash Cottage," also two other cottages, f. Freehold house, messuage and piece of garden ground.	325
Mucking, Essex.—"Shoulder Stick Hall" cottage and 6 a. 2 r. 20 p. f.	1,080
By F. V. VALER.	
Holloway—17, Russell-rd., u. 54 yrs. g. 51, 55, y. r. 361.	320
By WEATHERALL & GREEN.	
Hackney—35 to 45 (odd), 59 and 61, Broadway (s.), f. y. r. 3001.	5,695
Duncan-st., f. g. rents 871, reversion in 32 yrs.	2,210
Duncan-st., f. g. 104, reversion in 32 yrs.	280
170, Lambeth-rd., f. y. r. 801, 108, u. 3301.	1,600
1 to 4, Hamburgh-st., f. w. r. 1631, 88.	1,800
By MOSS & JAMISON (at Winchester House).	
Islington—Gibson-sq., f. g. rents 4751, 108, reversion in 12 and 21 yrs. (in lots).	21,150
Liverpool-rd., f. g. rents 1461, 108, 6d. reversion in 12 and 21 yrs. (in lots).	2,300
June 26.—By H. J. BROMLEY.	
Whitehall—Buness, f. g. r. 351, reversion in 15 yrs.	400
Dalston—Clifton-gc., f. g. r. 351, u. 451 yrs. f. g. 25.	560
Dulwich-rd. and 20, Rye-st., u. 99 yrs. g. 801.	700
Norwood—25, High-st. (s.), u. 591 yrs. g. 81, p.	345

SALES OF PROPERTY.—Continued on page 29.

List of Competitions, Contracts, etc.

For some Contracts still open, but not included in this List, see previous issues. Those with an asterisk (*) are advertised in this Number: Competitions, —; Contracts, iv. vi. viii. x.; Public Appointments xviii.; Auction Sales, xxx.

Certain conditions, beyond those given in the following information, are imposed in some cases, such as: the advertisers do not bind themselves to accept the lowest or any tender; that a fair wages clause shall be observed; that no allowance will be made for tenders; and that deposits are returned on receipt of a bona-fide tender unless stated to the contrary.

Competitions.

JULY 13.—Mexborough.—SCHOOL.—Mexborough and District Secondary School governors are prepared to receive the names of competent and experienced architects, having permanent offices within thirty-five miles of Mexborough, and desirous of preparing uncoloured sketch plans for new school at Mexborough, for 300 pupils, at an approximate building cost of 8,000l. Architects' commission required, and terms for quantities (if supplied) to be stated. Names to be received by Mr. J. W. Hattersley, Secretary to the Governors, Mexborough, not later than morning post of July 13.

JULY 14.—Doigley.—SEWAGE DISPOSAL.—The U.D.C. of Doigley invite the terms of engineers for (a) the preparation of a scheme for sewage disposal, etc. (tidal outfall or otherwise), for their district, together with a detailed estimate of the cost of construction, and of the estimated annual cost of maintenance; (b) the preparation of detailed plans, working drawings, specifications, and estimates, for submission to and approval by the Local Government Board, and for the purposes of inviting tenders for the construction of the works; (c) the supervision of the works during construction, and their maintenance for a period of six months after completion. Sealed terms to be delivered to Mr. Richard Barnett, Clerk to the Council, Queen's-square, Doigley, on or before July 14.

Contracts.

BUILDING.

JULY 7.—Donaclooney.—MANSION.—New Mansio at Donaclooney. Plans and specifications may be seen at the office of Mr. W. W. Larmor, architect, Banbridge; or Mr. Howard Lyttle, Bailymore, Donaclooney. Tenders must be sent to Mr. Howard Lyttle, Donaclooney, on or before July 7.

JULY 9.—Batley.—HOUSE AND STABLE.—House and stable in Knowis-street, Batley. Plans and specifications may be seen, and quantities obtained, from July 2 to July 9, on which latter date sealed and endorsed tenders are to be sent to Mr. John H. Brearley, architect, Commercial-street, Batley.

JULY 9.—Edinburgh.—FACTORY.—Edinburgh Parish Council invite brick, joiner, plumber, and slater work tenders for the erection of new fireproof factory buildings, Craigleith Poorhouse, Comely Bank, Edinburgh. The plans and specifications, and schedules of quantities obtained, on application to Mr. E. M. Cameron, Architect to the Council, 53, Great King-street, Edinburgh. Sealed tenders are requested to be addressed, delivered, and endorsed, to the Clerk, Parish Council Offices, Castle-terrace, not later than 10 a.m. on July 9.

JULY 9.—Sandbach.—WORKSHOP.—Sandbach Industrial Co-operative Society, Ltd., invite tenders for the erection of new workshops, alterations, etc. at the central premises, Bold-street, Sandbach. Plans and specifications may be seen on application at the registered office of the society. Sealed tenders, endorsed "Tender for Alterations, etc.," to be sent to Mr. William Gibson, manager, not later than p.m., July 9. Allred Price, architect, Elworth, Sandbach.

JULY 10.—Exeter.—ALTERATIONS, ETC.—For alterations and additions to Nos. 4 and 6, Higher Summerlands, Exeter, for the Guardians of the Poor of the Parish of Exeter. Plans and specifications may be seen, and bills of quantities, together with form of tender, obtained at the offices of the Architect and Surveyor to the Guardians, Mr. R. M. Challice, 15, Bedford-circus, Exeter, upon payment of 1s. Sealed and endorsed tenders, on the above form, must be sent to Mr. Arthur Snell, Clerk to the Guardians, New Buildings, Castle-street, Exeter, on or before July 10.

JULY 10.—Huddersfield.—REPAIR OF CHIMNEY STACKS.—Huddersfield Gas Committee invite tenders for the repair and pointing of three chimney stacks at the gasworks in Leeds-road. Forms of tender, specification, and general conditions may be obtained on application to the Gas Engineer, Mr. A. H. Harrison, M.I.E.E., Scarborough, and endorsed "Tender for Chimney Repairs," must be delivered, free of charge, addressed in the handwriting of the tenderer or his agent, to the Town Clerk, Town Hall, Huddersfield, not later than July 10.

JULY 11.—Gainsborough.—PREMISES.—Pulling down and rebuilding premises on Bridge-street, Gainsborough, belonging to the Gainsborough Industrial Co-operative Society, Ltd. Bills of quantities and form of tender may be had on application to Messrs. Sower & Gamble, architects, Bank-street-chambers, Lincoln, on or before July 11, and on payment to them of 2s. The drawings and conditions of contract may be inspected at the offices of the architects. Tenders must be delivered to the manager at the office of the Society, and in the envelope provided for that purpose before 10 a.m. on July 19. Mr. G. Wright, Manager, 11, Bridge-street, Gainsborough.

JULY 11.—Isleworth.—ALTERATIONS TO HALL.—Heston and Isleworth U.D.C. invite tenders for the carrying out certain alterations and improvements

at the Isleworth Public Hall. Plan and specification can be seen at the office of the Surveyor to the Council, Council House, Hounslow, and form of tender obtained, on payment of a deposit of 1l. 1s. Sealed tenders, endorsed "Alterations to Isleworth Public Hall," must be received by Mr. H. J. Baker, Clerk to the Council, Council House, Hounslow, not later than July 11.

JULY 11.—Portadown.—GRAND STAND, ETC.—Portadown Agricultural and Recreation Society, Ltd., invite tenders for the erection of a grand stand, main entrance, gates, sheds, and paling, according to plans and specifications, to be seen at Mr. Thomas Chapman's office, Edwinstreet, Portadown. Tenders to be lodged with Mr. Chapman not later than July 11.

JULY 11.—Swansea, etc.—SCHOOLS, ETC.—Glamorgan C.C. invite tenders for the following works, viz.:—(1) A new mixed and infants' school at Kingsbridge, Gorseinon, near Swansea; (2) new offices and heating chamber and connecting existing building to water-closets, lavatory drains, etc., at Pantteig Council school, near Ystalyfera; (3) new cloakrooms and heating chamber and various alterations at Dunvant Council school, near Swansea; (4) a new heating chamber at Gendros infants' school, near Swansea; (5) heating the following Council schools with the low-pressure hot-water system: Port Talbot Central, Pantteig, Gendros (infants), Cefffran (girls), Glaston (near Clydach), Tynydd (Ozmore Valley), and Miskin Village; (6) cleaning and painting at the following Council schools: Gowerston (boys' girls', and infants), Gorseinon, Penrhiol, Pontardulais (boys' and girls'), Garnswilt, Reynoldston, Rhossili, Blaenllynfi (boys' and girls'), Caerau (infants), Plasnewydd Lower Standards (boys', girls' and infants), Aberdylais (infants), Glynneath mixed, Neath Abbey (infants), Altwen (infants), Cilybebyl, Pontardawe (infants), internally, Pencyn (externally), Bryn Cymmer (infants), Aberavon (infants), internally, in the western division of the county; and Aber (Ozmore Valley), Tynydd, Trelewis, Pen-y-bank, Coity (and master's house), Bridgend, and Gorseinon. Plans and specifications (part only), and also the schoolmaster's house at Llanharan and Miskin Council schools, in the eastern division of the county. Plans and specifications may be seen, and bills of quantities obtained by those desirous of tendering: For works Nos. 1 and 3, at the Gowerston police-station; for work No. 2, at the Gendros Council school, near Swansea. Specifications of works Nos. 5 may be had at offices of Mr. T. Mansel Franklyn, Clerk of the Council, Glamorgan County offices, West-gate-street, Cardiff. Specifications for works No. 6 may be had at the Gowerston, Reynoldston, Maesteg, Neath, Pontardawe, and Port Talbot police-stations in the western division, and at the Tynydd (Ozmore Valley), Bridgend, and Pontyduon police-stations in the eastern division. The plans or documents for all the works may also be seen or obtained at offices of the Council, or on the forms supplied, are to be delivered to the clerk not later than July 11, marked outside "Tender for New School at Kingsbridge." Tender for alterations at Pantteig School, or "Tender for Painting at Gowerston School," etc., as the case may be.

JULY 12.—Hitcham.—HOUSE.—Eton R.D.C. Sanitary Committee invite tenders for the erection upon land at Hitcham, of a house for the sewage works superintendent (Burnham main drainage), and particulars obtained at the office of the Engineer, Mr. A. Gladwell, 160, High-street, Slough. Sealed tenders to be delivered to the Clerk to the Council, Mr. R. H. Barrett, solicitor, Stacey House, Slough, not later than 10.30 a.m. on July 12, endorsed "Tender for Superintendent's House."

JULY 12.—Lincoln.—WAREHOUSE.—For pulling down and rebuilding a warehouse in St. Swithin's-square, Lincoln, for Messrs. W. K. Morton & Sons, Ltd. Full particulars may be had on application to us on or before July 12. Scorer & Gamble, architects, Bank-street-chambers, Lincoln.

JULY 12.—Rilla Mill.—RENOVATING CHAPEL.—Renovating Rilla Mill Chapel. Specifications may be seen at the Chapel, Colkne. Tenders to be sent to Mr. W. Daniel, Rifford, Linton, on or before July 12, who will furnish any further particulars.

JULY 13.—Cotes.—RECONSTRUCTION OF SHOP.—Messrs. Henry Bannister & Co., rope manufacturers, Cotes, N.W., invite tenders for the reconstruction of their shop, offices, and stores in Mill Hill-road, Cotes. Plans and specifications may be seen at their offices between the hours of 9 a.m. and 12 p.m., or 2 and 5 p.m. Tenders are to be delivered not later than 5 p.m. on July 13.

JULY 13.—Great Dunham.—ENLARGEMENT OF SCHOOL.—Norfolk Education Committee invite tenders for the enlargement of Great Dunham school. Names to the Secretary, Norfolk Education Committee, 57, London-street, Norwich, at which office plans and specifications can be inspected and bills of quantities obtained. Deposit of 1l. 1s. will be required. Tenders must be delivered by 12 o'clock noon on July 13, addressed to "The Secretary," at the above address, and endorsed "Tender for Great Dunham School."

JULY 14.—Chorlton-cum-Hardy.—HOUSE.—Manchester Rivers Committee invite tenders for the

erection of a manager's house at the Withington sewage works, Chorlton-cum-Hardy. Drawings may be inspected, and bills of quantities and tender forms may be obtained on application to the Secretary of the Rivers Department, Town Hall, Manchester. Tenders must be enclosed in the official envelope provided expressly for the purpose, and delivered at the above office not later than 10 a.m. on July 14.

JULY 14.—Roche.—STABLE.—The erection of a stable, pigsty, and wash-house at Tregrove Farm, in the parish of Roche, in the occupation of Messrs. Daniel Burnett & Sons, for the Right Hon. Viscount Plymouth. Plans, conditions, and specifications at the farmhouse at Tregrove. Tenders should be sent on or before July 14, to Mr. George Gow, Tregrove Farm, Truro.

JULY 15.—Longwood.—WORKS.—(except joiners) for the erection of four dwelling-houses, in Spark-street, Longwood. Plans may be seen, and quantities obtained, from July 6 to July 15. Sanderson M. Balfour, architect, Longwood, Milsbridge.

JULY 16.—Beckenham.—SCHOOL.—Tenders are invited for extension and modernisation of existing boys' girls', and infants' department of the Public Elementary Schools, Bromley-road, Beckenham, for the Beckenham U.D.C. Drawings may be seen, and bills of quantities and form of tender obtained, on application to Mr. John Air Surveyor-General, after July 2, on deposit of 5s. Tenders, sealed, and endorsed "Tenders for Bromley-road School," to reach the Clerk to the Council not later than 4 p.m. July 16.

JULY 16.—Bedhampton.—SCHOOL WORKS.—Southampton C.C. invite tenders for sundry small works of ventilation, conversion of privies to water-closets, new offices, and drains, and new iron boundary fences to the Bedhampton Council school. Plans and conditions of contract, and specification, at the office of Mr. W. J. Taylor, County Surveyor, The Castle, Winchester, between the hours of 9 a.m. and 5 p.m. (Saturdays 9 a.m. and 1 p.m.). Plans and conditions of contract may also be seen at the school. A deposit of 1s. 1s. will be required for a copy of the specification. Deposits must be made by cheque payable to Hants C.C., and crossed Bank of England, or particulars will not be sent. Tenders, endorsed "Proposed Work, Bedhampton Council School," are to be delivered to Mr. H. Barber, Clerk of the C.C., The Castle, Winchester, before 10 a.m. on July 16.

JULY 16.—Brithdir.—HOUSES, ROADS, AND DRAINS.—Roads and surface water drains, and the erection of ninety-nine (or less) houses in four blocks at Brithdir, for the Cefn Brithdir Building Company, Ltd. Drawings and specification, and bill of quantities of the roads, may be obtained at offices of Mr. J. Levellyn Smith, architect and surveyor, Merthyr, and Aberdare. Sealed, endorsed tenders to be sent to the Secretary, Mr. H. Seymour Berry, 30, Victoria-street, Merthyr Tydfil, on or before 4 p.m., July 16.

JULY 16.—Cleckheaton.—MILL AND OFFICES.—The erection of a four-story mill and offices at Prospect Mill, Cleckheaton, for Messrs. Critchley, Sharp, & Preece, Ltd. Plans may be seen, and bills of quantities obtained, at the offices of Messrs. Howorth & Howorth, architects and surveyors, etc., Old Bank-chambers, Cleckheaton, from July 7, to July 16, sealed and endorsed tenders to be sent, not later than 12 o'clock noon on the last-mentioned day.

JULY 16.—Greenock.—REFUSE DESTROYER.—Greenock Corporation invite tenders for structural and other work required for the installation of a refuse destructor and electric generating works to be erected on the site known as No. 2 Millstead, Bellingburn-square, Greenock. The work is divided as follows:—Specification 26.—Buildings, etc. Contract A, excavator, brick, and mason's work; contract B, carpenter's work and roof glazing; contract C, structural steel work; contract D, slater's work; contract E, the work. Specifications, schedules, and forms of tenders can be obtained on application to Mr. J. A. Robertson, M.I.E.E., Burgh Electrical Engineers, Municipal Buildings, Greenock, on payment of a deposit of 5s. for each specification. The drawings, etc., may be inspected at the office of the department between the hours of 9 a.m. and 12.30 p.m. Tenders, enclosed in a sealed envelope, marked clearly with the number of the contract being tendered for, to be lodged with Mr. Colin MacCulloch, Town Clerk, Municipal Buildings, Greenock, not later than 10 a.m. on July 16.

JULY 16.—Lossiemouth.—SCHOOL ALTERATIONS.—Drainage School Board invite estimates for the mason, carpenter, plumber, slater, etc., work, in executing the following improvements on Lossiemouth School:—(1) Building new latrines; (2) laying and extending the drainage system; (3) levelling and travelling the playgrounds; (4) providing new seating, etc. Plans and specifications to be seen with Mr. R. B. Pratt, architect, Elgin, and estimates to be lodged with Mr. J. H. Glennie, Clerk to the School Board, on or before July 16.

JULY 17.—Elgin.—VILLA.—The mason, carpenter, slater, plumber, plaster, painter, and glazier works of a villa to be erected in Elgin, and specifications may be seen with, and schedules of quantities obtained from, Mr. Charles C. Doig, architect, Elgin, with whom offers must be lodged on or before July 17.

JULY 17.—London.—DWELLING-HOUSE.—The Streets Committee of the Corporation of London will

meet at the Guildhall, in the City of London, on July 17, at 1.30, to receive tenders for erection of a dwelling-house at No. 80, Upper Thames-street, E.C. Drawings and specifications may be seen at the office of the City Engineer, Guildhall, between 10 a.m. and 5 p.m., and bills of quantities and forms of tenders may be obtained on and after July 10, on payment of 3s. 3d. Tenders, addressed to the Town Clerk, Public Health Department, Guildhall, E.C., endorsed "Tender for Dwelling-house," and delivered at office of the Hall-keeper, Guildhall, between 12.30 and 1.30 on July 17.

July 19—Belfast—House.—A dwelling-house near Cultra Railway Station. Plans and specifications may be seen, and copies of the bill of quantities obtained, at the office of Messrs. Graeme-Wait & Tulloch, architects, 77A, Victoria-street, Belfast, on payment of a deposit of 1l. 18s. Sealed and endorsed tenders to be delivered at office of architects not later than 10 a.m. on July 19.

July 21—Heath Town—School.—The Staffordshire Education Committee invite tenders for the erection of new infants' department at Woden-road Council School, Heath Town. Quantities will be supplied on payment of 1l. 18s. Builders desiring to tender should apply to Mr. Graham Balfour, Director of Education, Stafford, on or before July 21.

July 21—Maesteg. Chapel Additions.—Alterations and additions to Bethel English Baptist Chapel, Maesteg. Plans and specifications may be seen with the Rev. S. Davies Rhyl, St. Michael's-road, Maesteg. Sealed and endorsed tenders to be delivered to the Secretary, Mr. George Griffiths, St. Michael's-road, Maesteg, on or before July 21.

July 23—Bexley—CAR-SHEDS, etc.—The Bexley U.D.C. invite separate tenders for (1) the extension of the existing carshed to form a paint shop; (2) the erection of a steel structure for a repairing shop. Drawings, specification, and bills of quantities may be seen at Manager's Office, Carshed, Bexley Heath. Copies of the bills of quantities will be supplied on payment of 10s. Sealed tenders, marked "Paint Shop" or "Repairing Shop," to be delivered to the Clerk, Oak House, Bexley Heath, Kent, before noon, July 23.

July 23—Risca—Public Offices.—Risca U.D.C. invite tenders for the erection of (1) Public offices; (2) stables and cart-shed, together with boundary walls. Plans and specifications may be obtained from Mr. A. J. Davis, Surveyor, County Offices, Risca, on deposit of 2l. 2s. Separate prices must be shown for each of above works. Tenders must be sealed and marked "Tender for Offices," and delivered to Mr. T. S. Edwards, Clerk to the Council, 24, Stoa-hill, Newport, Mon., on or before July 23.

July 24—Streatham Hill. CAR-SHED.—The U.D.C. invite tenders for pulling down and reconstructing the second portion of the Streatham Depot, Streatham Hill, as a car-shed for electric cars. Full information as to the conditions to be observed by tenders is given in the L.C.C. Gazette (price 1d.). Tenders must be upon the official forms, to be obtained from the Superintendent, Architect's Department (Highways Section), Marine Cross, W., and no tender will be received after 10 a.m. July 24.

August 1. London.—WORKSHOPS.—The Guardians of the Parish of Paddington invite tenders for erection of workshops at their workhouse, in the Harrow-road, W., pursuant to plans and specification, to be seen at the office of the architects, Messrs. Gills, Gough, & Trollope, 28, Craven-street, Strand, W.C., between 10 and 5. Bills of quantities may also be obtained at the office of the said architect on payment of 5s. Sealed tenders to be delivered at the Office of the Guardians, 315-317, Harrow-road, W., before 10 a.m. August 1.

No Date—Alderley Edge—Post Office.—The erection of a new post office, Alderley Edge, Cheshire. Names to the architect, Mr. Frederick J. Almond, 16, Kennedy-street, Manchester.

No Date—Camborne.—Alterations—Alterations to two houses in Wesley-street, Camborne, and specifications may be seen at Mr. W. Mitchell's, Roskever-road, Camborne.

No Date—Dunbar—Colliery Village.—For the brickwork, woodwork, plumbing, slating, and plastering, separately, in connexion with the erection of a large colliery village for the Brodsworth Main Colliery Company, Ltd. All communications to be addressed to the Brodsworth Main Colliery Company, Ltd., Doncaster.

No Date—Guvville, I.W.—CHAPEL.—The erection of a Bible Christian Chapel at Guvville, I.W. For particulars apply to Mr. S. E. Tomkins, architect, Castlefield-chambers, Newport, I.W.

No Date—Longton—CLASSROOMS.—New classrooms and other additions to Heathcote-road Wesleyan Mission, Longton. Names to Mr. William Wood, architect, London.

No Date—Milsbridge—MILL PREMISES.—The excavators, masons' and bricklayers', carpenters' and joiners', plumbers' and glaziers', patent electricians', iron and steel founders', slaters', concreters', and painters' work required in the erection of mill premises, containing about 5,600 sq. yds. floor area, together with engine-house, staircase, appointed with the Surveyor to the Council. The person whose tender is accepted will be required to enter into a bond in the penal sum of 500l., with two sureties approved by the Council, for the due performance of his contract. Tenders, which must be at per foot run of heading, and on a form to be obtained from the Council Office by mail or delivered to Mr. Vincent H. Station, Clerk, Council Offices, Trinity-road, Sheerness, at the Council Offices before 5 p.m. on July 16.

No Date—New Whittington and Sutton-in-Ashfield. SHOP AND VILLA.—Erection of shop at New Whittington and villa at Sutton-in-Ashfield. Name to Mr. S. B. D. Shewbrooks, architect and surveyor, Chesterfield.

No Date—Sherwood—FACTORY.—A small one storey lace factory at Sherwood. Builders desirous of tendering apply by letter to Mr. W. H. Radford, C.E., Albion Chambers, Nottingham.

No Date—Sibberden.—RESIDENCE.—Building a residence, stables, and offices, Townshead-street, Skibberden. Plans and particulars may be had on application to Mr. C. T. Donellan, Skibberden, or to the architect, Mr. Arthur Hill, B.E., M.R.I.A., 22, George's-street, Cork.

No Date—Torrington, N.B.—ADDITIONS.—The mason, joiner, plumber, plaster, and slater work proposed to be executed in making additions to Stripside House, near Torrington. Plans and specifications may be seen at the office of Mr

Andrew Muirhead, architect and surveyor, 4, Abbey Park-place, Dunfermline, with whom offers are to be lodged.

No Date—Truro.—RESTORATION OF TOWER.—Restoration of St. Erme Tower, Truro. For specification apply by letter, Mr. Edmund Sedding, architect, Plymouth, or Wadebridge; or to Rev. St. Erme, Truro.

No Date—Walsand.—HOUSES.—The Walsand Industrial Co-operative Society, Ltd., invite tenders for the erection of two houses and flats adjoining their premises, Neptune-road, Walsand. Plans and specifications may be seen on application to Mr. F. Robertson, Secretary at the Society's office, Carlyle-road, Walsand.

No Date—Wellington.—HOUSE, ETC.—HOUSE and butchers' premises at French-road. Plans and specifications may be seen at office of Mr. A. Jenkins, architect and surveyor, Bell street chambers, Wellington.

ENGINEERING, IRON, AND STEEL.

July 9—Bathby. WALLS AND RAILS.—Market Bosworth R.D.C. invite tenders for the building of a retaining wall and erection of ironwork guard rails near River Bridge. Specifications on application to the Highway Surveyors, Messrs. W. Thorpe & Son, Highways Department, Leicestershire, to whom tenders are to be sent not later than July 9.

July 11—Glamorgan-shire.—HEATING SCHOOLS.—The Glamorgan U.D.C. invite tenders for the following works, viz., heating the following Council schools with the low pressure hot-water system:—Port Talbot Central, Pantyff, Gendros (infants), Coed-rhadr (near Cynon Valley), and Miskin Village. Specifications may be had at offices of Mr. T. Mansel Franklin, Clerk of the Glamorgan U.D.C., Glamorgan County Offices, Westgate street, Cardiff. Specifications for works No. 6 may be had at the Govt. Works, Reynolds, Maesteg, Neath, Pontardawe, and Port Talbot Works, Glamorgan. Tender for heating the school at the Tynewydd (Ogmore Valley), Bargoed, Bridgend, and Pontycyfan Police-stations—in the Eastern Division. Tenders, made out on the forms supplied, are to be delivered to the Clerk not later than July 11.

July 11—Greenock.—GAS METER.—Greenock Corporation Gas Committee (price 1d.) Public offices, and erection at Inchgreen Gasworks of a 100,000 cubic feet capacity per hour station meter, with 24 in. inlet, outlet, by-pass, and other connections. Specifications and plan can be seen at the Engineer's office, and tenders may be applied to Mr. Wm. Ewing, Engineer and Manager, Gas Works, Greenock. Sealed tenders, marked "Gas Meter," to be returned to Mr. Colin MacCulloch, Town Clerk, Greenock, not later than 10 a.m., July 11.

July 11—Leith.—CORRUG-ROD.—Leith Harbour and Docks Commissioners invite tenders for the construction of a timber collar dam in the entrance to the West Commercial Graving Dock. Drawings, specification, &c., may be seen on application at the office of the Superintendent, Mr. Peter Whyte, M.Inst.C.E., Rower-house, Leith. Tenders, lodged with Mr. Victor A. Noel Paton, W.S., Clerk to the Commission, 31, Melville-street, Edinburgh, on or before July 11.

July 11—Southport.—PIPS.—Southport, Birkdale, and West Lancashire Water Board invite tenders for the manufacture and delivery of about 370 tons of cast-iron pipes and special castings for the specification and form of tender can be obtained at the offices of Messrs. H. Role & Son, 8, Victoria-street, Westminster, on payment of 5s. Tenders to be sent to Mr. Alcine Brock, Clerk to the Board, 11, St. George's-place, Lord-street, Southport, on or before 10 o'clock in the forenoon of July 12, endorsed "Pipes."

July 13—West Ham.—CABLE AND TRANSFORMERS.—The West Ham Corporation invite tenders for the supply of (1) low, high, and extra high tension cables, insulated and sheathed, and (2) 6,000 volt transformers. Forms of tender and other particulars may be obtained of the Engineer and Manager, 38, Victoria-street, London, E.C. Tenders to be enclosed in endorsed envelopes supplied with the forms, and sent to office of Mr. Fred. E. Hiley, Town Clerk, Town Hall, West Ham, E., not later than 5 o'clock on July 13.

July 16—Eastney.—MACHINERY.—The Portsmouth Education Committee invite tenders for the provision of machinery required in connexion with the fitting up of the conversion shop at Reginald-road School Eastney. Specification, form of tender, and all necessary information may be obtained from the architect (Mr. G. E. Smith), 16, Victoria-road, N. Soutsea. Tenders, together with priced specification, should be delivered at the offices of the Committee, Town Hall, Portsmouth, not later than 11.30 a.m. on July 16.

July 16—Sheerness.—HEADING.—Sheerness U.D.C. invite tenders for the construction of a heading about 110 ft. in length at a depth of 280 ft., or thereabouts, between the two deep wells which supply the town with water in accordance with the plans and specifications, which may be seen at the Council Office by mail or delivered to the Surveyor to the Council. The person whose tender is accepted will be required to enter into a bond in the penal sum of 500l., with two sureties approved by the Council, for the due performance of his contract. Tenders, which must be at per foot run of heading, and on a form to be obtained from the Council Office by mail or delivered to Mr. Vincent H. Station, Clerk, Council Offices, Trinity-road, Sheerness, at the Council Offices before 5 p.m. on July 16.

July 16—Middlewich.—WATER MAINS.—Middlewich U.D.C. invite tenders for laying about twelve miles of 8-in. water mains, in four sections of three miles each or thereabouts, from their waterworks at Deinsford, Cheshire, to Middlewich. Further particulars and specifications can be obtained upon application by letter to Mr. Frederick William Street, Engineer, Town Hall, Middlewich. Sealed tenders, endorsed "For Laying Water Mains," to be delivered to Mr. C. F. Lawrence, Clerk to the Council, Town Hall, Middlewich, before 10 a.m. on July 17.

July 25—Honiton.—BRIDGE.—Devon C.C. invite tenders for the taking down and removal of the

old brick arch and parapets, rebuilding the present abutments to a new line, and supplying and fixing an iron bridge at Honiton. The plans, specification, and form of contract can be seen at the office of the Council at the Castle of Exeter, where tenders are to be sent by registered post on or before July 10.

July 16—Rhonda Valley.—STEELWORK.—The Rhonda U.D.C. invite tenders for the steelwork of a road bridge of 52 ft. span and 40 ft. in width, erected complete to contract on design at Llynpi, Rhonda Valley. Designs and tenders must be received not later than July 26. Plans and sections of the abutments and House and all particulars may be obtained on application to Mr. W. J. Jones, Engineer and Surveyor, at the Council Offices, Pentre, Rhonda, on deposit of 1l. 15s.

October 1.—SIAM.—BRIDGE.—An iron bridge across the Meam River, Siam. Drawings and conditions may be obtained for a payment of 10s. from Mr. W. A. Evans, Acting Financial Agent, Siamice Legation, 23, Ashburn-place, S.W. Sealed tenders must be forwarded to Mr. L. Weiler, Director-General Railway Department, Bangkok, Siam, in whose office they will be publicly opened on October 1.

No Date—Weybridge. RIBLE RANGE.—A galvanised iron rifle range at Oatlands Park, Weybridge. Names to Mr. George L. Crickmay, architect and surveyor, 13, Victoria-street, Westminster, S.W.

MISCELLANEOUS.

July 10. London.—CARTS, ETC.—Levisham Borough Council invite tenders for the supply and delivery of five ordinary vans, two steam roller trucks, five water vans, four orderly barrows, twelve navvy barrows, and four box barrows. Specifications may be seen and forms of tender obtained at the Town Hall (Surveyor's Department). The Tenders must be on forms issued by the Council, enclosed in an envelope, sealed and endorsed "Tenders for Carts, &c.," and must be delivered by 4 o'clock on July 10, at the Town Hall, and placed in the box there provided for the purpose.

July 11—Barking Town.—CABLE.—The U.D.C. of Barking Town invite tenders for the supply and delivery of three core L.T. armoured cables. Specification and forms to be seen at the offices of the Engineer and Manager, Mr. H. L. Howard, A.M.I.Ech.E., A.M.I.E.E., Electricity Works, Barking. Tenders are to be sent in sealed envelopes for cable," addressed to the Chairman of the Electricity and Tramways Committee, Public Offices, Barking, before 12 o'clock noon on July 11.

July 13—Dundee.—TRAMWAY.—Dundee Town Council invite tenders for the delivery of six electrical tramway car bodies. Specifications and forms of tender, with relative drawings, may be had on application to Mr. Peter Fisher, General Manager, Corporation Tramways, Dundee, on deposit of 40s. Tenders to be lodged with Mr. Wm. H. Blyth Martin, Town Clerk, Dundee, marked on the outside, "Tender for Tramway Car Bodies," on or before July 13.

July 14—Norton.—ROLLING.—Norton U.D.C. invite tenders for the rolling of the highway. Particulars on application to the surveyor. Tenders to be sent in to Mr. William Botterill, Clerk, Norton, on or before July 14.

July 16—West Ham.—GAS MANTLES, CHIMNEYS, AND GLOVES.—The Education Committee of the West Ham Borough Council invite tenders for the supply for twelve months of the above. Particulars may be obtained on application to the Committee's Architect, Mr. William Jacques, 2, Pen-croft, E.C., on or before July 16. Tenders to be delivered to the Committee at 55, The Grove, Stratford, on 5 p.m. July 16.

July 17—Penmark Calvinistic Methodist Chapel.—RESEATING, ETC.—Penmark Calvinistic Methodist Chapel for the trustees. Plans and specification may be seen with the Rev. D. Wynne Rees, Llancaide, Sealed and endorsed tenders to be delivered to the Rev. D. Wynne Rees, The Manse, Llancaide, near Cardiff, on or before 5 p.m. of July 17. Mr. W. D. Morgan, architect, Cardiff.

July 18—Athan.—RESEATING, ETC. CHAPEL.—Reseating, etc., St. Athan Calvinistic Methodist Chapel for the trustees. Plans and specification may be seen with the Rev. D. Wynne Rees, Llancaide. Sealed and endorsed tenders to be delivered to the Rev. D. Wynne Rees, The Manse, Llancaide, near Cardiff, on or before 5 p.m. of July 17. Mr. W. D. Morgan, architect, Cardiff.

July 23—Altotts.—SCAVENGING.—The U.D.C. of Altotts invite tenders for the team and manual labour and other works in connexion with the scavenging of their district. Particulars and form of tender may be obtained on application to Mr. J. C. Coates, Council Office, Altotts. Tenders to be delivered at the District Council Office, Altotts, not later than July 23. Mr. A. E. Greaves, Clerk to the Council, 22, Wood street, Wakefield.

July 24—Hoddeston.—STREET LIGHTING.—Hoddeston U.D.C. invite tenders for lighting with gas the public lamps in the district from August 1, 1906, to May 16, 1907. Further particulars may be obtained on application to the Surveyor, Town Council Offices, Hoddeston. Tenders, addressed to the Chairman of the Lighting and Watching Committee, endorsed "Tenders for Lighting," must be delivered at the offices of the Hoddeston U.D.C., High-street, Hoddeston, before 4 p.m. on July 24.

No Date.—Treharris.—LAYING AND CUTTING TYP.—Laying and cutting 100,000 yds of turf for the surface of the new recreation ground, Treharris. Apply Mr. R. Edwards, architect and surveyor, Treharris.

PAINTING, ETC.

July 9.—Huddersfield.—PAINTING.—Huddersfield and County Councils, Ltd., invite tenders for painting and decorating the club premises, situate in Byram-street. Tenders to be forwarded not later than July 9. For full particulars apply Mr. T. H. Offield, Secretary, 16, Ramsden-street, Huddersfield.

July 9.—Liverpool.—PAINTING, ETC.—Royal Southern and Central Waterworks Co., Ltd., invite tenders for washing, preparing, whitewashing, and colouring walls, ceiling, etc., painting, papering, etc. Copies of the specification may be obtained on application

to the Superintendent at the hospital. Tenders to be sent in on or before July 9 addressed to the Chairman of the Board of Economy. Mr. Allen Nadrrett, Superintendent, Liverpool.

JULY 10.—Bradford.—PAINTING, etc.—Bradford Education Committee invite tenders for the inside cleaning and colouring of several schools and the Education Office. Specifications and forms of tender may be obtained at the Education Office (Architect's Department). Sealed tenders, endorsed "Tenders for Colouring Painting, etc.," must be delivered at the Education Office not later than 12 noon on July 10.

JULY 10.—Killingbeck.—PAINTING.—Leeds Sanitary Committee invite tenders for painting the exterior of temporary smallpox hospital at Killingbeck. Further particulars, specification, and form of tender may be obtained at the Town Clerk's office, where tenders, endorsed "Painting, City Hospitals," are to be delivered not later than July 10.

JULY 10.—Manchester.—PAINTING.—Manchester Parks Committee invite tenders for painting required at Alexandra and Queen's Parks. Specifications may be obtained at the City Architect's Office, Town Hall, upon payment of 1s. 12s. each. Sealed tenders, enclosed in the official envelope, to be delivered at the above office not later than 9 a.m. on July 10.

JULY 10.—Newcastle-on-Tyne.—PAINTING.—The Guardians of the Poor of the Newcastle-upon-Tyne Union invite tenders for the cleaning and painting (two coats of paint and one of varnish) of Nos. 8 and 10 to 10 wards and the out-patient department of the Newcastle General Hospital, Westgate-road; also alternative tenders for the doing of the same with putty (two coats, one of body and one of finishing), the work to be completed by the end of August. Further particulars may be obtained on application to the clerk at the Union Workhouse, Westgate-road. Tenders, endorsed "Tenders for Painting," must be sent to Mr. James Atkinson, Clerk, to the Guardians, 127, Pilgrim-street, Newcastle-upon-Tyne, not later than 12 o'clock noon on July 10.

JULY 11.—Glamorgan.—PAINTING.—The Glamorgan County Council invite tenders for cleaning and painting at the following Council schools:—Governton (boys, girls, and infants), Gorsemon, Llanelli, Pontardulais (boys, girls, and infants), Rhodri, Rhodri, Blaenllynfi (boys and girls), Caerua (infants), Plasnewydd Lower Standard (boys, girls, and infants), Aberdylais (infants), Glyn (infants), (mixed), Neath (infants), Ailwen (infants), Clybebyl, Pontardawe (infants, internally), Penclryn (externally), Bryn, Cymmer (infants), Aberavon (infants, internally), in the western division of the county; and Aber (Gorsemon), Tynewydd, Trelewis, Penybanc, Coity (and master's house), Brithdir (infants, part only), Gilfach Fargog (part only), and also the schoolmaster's house at Llan-tyddis and Miskin Council schools, in the eastern division of the county. Specifications may be had at the Governton, Reynoldston, Maesteg, Neath, Pontardawe, and Port Talbot police-stations—in the western division and in the Tynewydd (Gorsemon Valley), Bargoed, Bridgend, and Pontyclun police-stations—in the eastern division, or at the offices of Mr. J. Mansel Franklin, Clerk, at the Glamorgan County Offices, Westgate-street, Cardiff. Tenders, made out on the forms supplied, are to be delivered to Clerk not later than July 11, marked outside "Tender for Painting at Governton School," etc., as the case may be.

JULY 11.—Leeds.—PAINTING.—Leeds Corporation invite tenders for painting all or any of the following:—bridges, viz.:—Carnegie Bridge, Leeds; B. R. Bridges, South Accommodation-road Bridge, Viaduct-road Bridge, and Green's Footbridge over River Aire, near Milford-place. Instructions to persons tendering, conditions of contract, specification, form of tender, and form of agreement, may be obtained from Mr. T. A. Prince, Highways Surveyor, 155, Kirkstall-road, Leeds. Sealed tenders, endorsed "Tender for Painting Bridges," must be delivered to Mr. Robert E. Fox, Town Clerk, must be delivered at the Town Clerk's Office, Town Hall, Leeds, not later than 10 a.m. on July 11.

JULY 11.—Southampton.—DECORATIVE REPAIRS.—The Council of Hartley University College, Southampton, invite tenders for the carrying-out of certain decorative repairs and other work at the college, and the houses at Bevois Mount House, Lodge-road, and Windsor House, Cumberland-place. The specifications and conditions can be seen at the offices of Mr. A. F. Gutteridge, architect, and surveyor, 9, Portland-street, Southampton. Tenders, properly sealed, and endorsed "Tender for Decorative Repairs to College and Hostels," are to be sent to Mr. D. Kiddle, Registrar, Hartley University College, Southampton, not later than 10 a.m. on July 11.

JULY 12.—Cork.—PAINTING.—The Joint Committee of Management of the South Charitable Infirmary and County Hospital invite tenders for the annual painting works at the hospital in accordance with the specifications prepared by Mr. Jas. F. Mullen, M.R.I.A., architect, in which Mr. J. P. Higgins, M.A., M.B., House Surgeon and Secretary. Tenders are also required for flooring one of the wards in accordance with specification No. 2. Sealed tenders are to be lodged with Mr. Higgins at the hospital, before 1 o'clock p.m. on July 12.

JULY 12.—Usbridge.—PAINTING.—Usbridge Joint Hospital Board invite tenders for painting the interior of the hospital premises at Kingston-lane, Hillingdon, in accordance with a specification which can be seen at office of Mr. Charles Woodbridge, Clerk, 38, High-street, Usbridge. Tenders must be sent to Clerk before 12 noon on July 12.

JULY 14.—Southampton.—PAINTING, etc.—Southampton Education Committee invite tenders for cleaning, distemping, painting, and other works in accordance with the specification, which may be obtained from the Borough Engineer, upon the payment of 1s. 12s., which will be returned on the receipt of a bond *fidem* for £100. Tenders, endorsed "Tenders for Maintenance Repairs—Provided Schools," to be delivered to Mr. J. Cruickshank, Secretary, Education Offices, Southampton, by 12 o'clock noon on July 14.

JULY 16.—Dorchester.—PAINTING, etc.—Certain painting, lime-washing, and repairing at the Dorchester National Schools during the summer holidays. Particulars and forms of tender may be obtained at the Secretary's office, where sealed tenders, marked "Tender for Repairs," should be delivered before 3 p.m. on July 16. Mr. Henry O. Lock, Secretary to the Managers, 24, High West-street, Dorchester.

JULY 16.—Maidstone.—PAINTING.—Maidstone Corporation invite tenders for the painting of the exterior of the electricity works, Fair Meadow, Maidstone. Particulars may be obtained at the office of the Borough Surveyor, Fair Meadow, and tenders, endorsed "Electricity Works Painting," are to be sent to Mr. T. F. Hastings, Borough Surveyor, Borough Surveyor's Office, Fair Meadow, Maidstone, not later than July 16.

JULY 17.—Kirkburton.—PAINTING, etc.—West Riding County Education Department, the Kirkburton District Sub-Committee invite tenders for the following works, to be executed during the summer holiday:—Lepton. Provided school, painting exterior of school; Shelley. Provided school, replacing opaque glass in windows of infants' department with clear glass, renewing wooden floors of two classrooms, repairs to roofs and flags. Specifications may be had on application to Mr. T. R. Bryan, Divisional Clerk, Education Office, Penistone, and tenders must be sent in not later than July 17.

JULY 18.—Dublin.—PLUMBING, etc.—North Dublin Guardians invite tenders for plumbing works required to be done at the new residence for the Medical Officer at Castleknock, in accordance with the specification and plans to be seen at the office of Mr. John O'Connell, Clerk of the Union, Board-room, North Brunswick-street, Dublin. Any further information can be had from Mr. Morris, Clerk of Works. Sealed tenders (with bills) will be received in the tender box here up to twelve o'clock noon on July 18.

JULY 23.—Fawley.—PAINTING SCHOOLS, etc.—The Southampton Education Committee invite tenders for the work of external painting, alterations to offices, erection of new lavatories and cloakroom, drainage, new offices, heating, ventilation, etc., at Fawley. Particulars and conditions of contract, and specifications may be obtained at the office of Mr. W. G. Taylor, County Surveyor, The Castle, Winchester, on and after July 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, and 1st August. Plans and conditions of contract may also be seen at the school. A deposit of 1s. will be required. Tenders, endorsed "Proposed Work, Fawley Council School," to be delivered at the office of Mr. H. B. Barker, Clerk to the C.C., The Castle, Winchester, before 10 a.m. July 23.

NO DATE.—London.—PAINTING, etc.—Mile End Old Town Board of Guardians invite tenders for the execution of whitewashing, painting, etc., at the lunatic wards on the Workhouse premises in Bancroft-road, E. Forms of tenders and full particulars relating to the work to be done, upon application at the offices of Mr. J. M. Knight, the architect, 35, Bancroft-road, Mile End-road, E.

NO DATE.—Mile End, E.—PAINTING, etc.—Mile End Old Town Board of Guardians invite tenders for whitewashing, painting, etc., at the Workhouse, Bancroft-road, E. Forms of tender and full particulars can be had upon application at the architect's office, Mr. J. M. Knight, 35, Bancroft-road, Mile End, E.

ROADS, SANITARY, AND WATER WORKS.

JULY 9.—Brighton.—BARRIERS.—Tenders are invited for the reconstruction of certain drainage at Preston Barracks, Brighton. Plan and specification may be seen, and bills of quantities, with form of tender, obtained at the Barrack Construction Office, as above, from July 9 to 11 inclusive, on deposit of 10s.

JULY 9.—London.—MAKING UP.—The Council of the Borough of Wandsworth invite tenders for the making up and paving of Ravensbury-road in three parts (No. 1, No. 2, and No. 3). The specification and bills of quantities, with form of tender, may be obtained at the surveyor's office, 41, High-street, Wandsworth, between the hours of 10 and 4 (Saturdays, 10 and 12). Tenders are to be delivered, under seal, at the Council House, East-bell, Wandsworth, endorsed "Tender for Paving Ravensbury-road," not later than 12 o'clock noon on July 9.

JULY 10.—Bromley.—SEWERING, etc.—Tenders are invited for the sewerage, levelling, paving, metalling, channelling, and making good Albert-road, Devonshire-square, and Sandford-road, for the Bromley Borough Council, in accordance with plans, sections, and specifications prepared by the Borough Engineer, which may be seen, and bills of quantities obtained, on deposit of 10s. 6d. Tenders, endorsed "Tender for Works of Street Improvement," to be delivered to the Town Clerk, Bromley, Kent, not later than 3 p.m., July 10.

JULY 10.—Crew.—TAR-MACADAMISING.—The Crew Town Council invite tenders for tar-macadamising of Mark-eaton, within the borough, in accordance with plans, sections, and specifications which may be seen, and all other necessary information obtained, upon application to Mr. G. Thompson, 30, North Street, Crew. A deposit of 2s. will be required. Sealed tenders and schedule of prices, upon printed forms to be obtained from the Borough Surveyor, must be delivered at office of Mr. F. Strick Cook, Town Clerk, Municipal Office, Crew, not later than 9 a.m. on July 10, endorsed "Tender for Tar-macadamising."

JULY 10.—Leeds.—PAVING AND FLAGGING.—Leeds Highways Committee invite tenders for paving and flagging of the following streets:—Hilton-road, Back Hares Mount, Seaford-avenue, Seaford-road, Back Trafford-avenue, Trafford-terrace, Stratmore-street, Stratmore-avenue, Stratmore-avenue, Stratmore-terrace, Seaford-place, Back Seaford-place, Seaford-terrace, Back Seaford-terrace, Stott-road. Drawings may be seen at the City Engineer's Office, Municipal Buildings. Instructions to persons tendering, conditions of contract, specification, bills of quantities, form of tender, and form of agreement, may be obtained on application at the Highways Office, Kirkstall-road. Sealed tenders, endorsed "Tender for Private Street Works," and addressed

to the Highways Committee, must be delivered at the Town Clerk's Office, Leeds, not later than 10 a.m. on July 10.

JULY 10.—North Ferriby.—SEWER, SCAVENGERY, R.D.C. invite tenders for the providing and laying a sanitary pipe sewer, with manholes, etc., in Swanland Hill, North Ferriby. The drawings, and specifications can be seen, and bills of quantities obtained, any time on application at office of Mr. William H. Welsted, Engineer to the Council, Prince's Dock Chambers, Hull. Whole tenders, sealed and endorsed, to be delivered to the Engineer not later than 10 o'clock on July 10.

JULY 10.—Ottery St. Mary.—FOOTPATH.—The Council of the County of Devon invite tenders for the construction of a new footpath over St. Saviour's Bridge, Ottery St. Mary, to the Railway Station, being a continuation of the present footpath, and about 498 ft. in length. The plans, specification, and form of contract can be seen at the office of the Council, at the Castle of Exeter, where Tenders are to be sent in on or before July 10.

JULY 10.—Pontnewydd.—WIDENING ROADWAY.—Pontypool R.D.C. invite tenders for widening roadway and the performance of other works in connexion therewith at Lower Pontnewydd. Sealed tenders, endorsed "Road Widening at Lower Pontnewydd," to be sent to Mr. T. Watkins, Clerk to the Pontypool R.D.C., Club-chambers, Pontypool, not later than July 10. Plans, sections, and specification may be inspected at the office of Mr. D. J. Lougher, engineer, Bank-chambers, Pontypool.

JULY 11.—Hammersmith.—PAVING.—Tenders are invited for making up and paving Plans and specifications may be seen, and forms of tender obtained, on application to the Borough Surveyor, Tenders, endorsed "Paving Works," to be delivered to the Town Clerk, Town Hall, Broadway, Hammersmith, not later than 6 p.m., July 11.

JULY 11.—Watlington.—DRAINAGE.—Henley R.D.C. invite tenders for making certain house connections with the main sewer at Watlington, and for rendering certain lengths of the main sewer watertight. The house connections are to be in accordance with plans and specification prepared by Mr. W. Wing, sanitary engineer, Caversham and Henley-on-Thames, and the work to be done, the main sewer to be in accordance with the specification prepared by Messrs. John Taylor, Sons, & Santo Crimp, civil engineers, Caxton House, Westminster. The plans and specifications may be seen at offices of Mr. Arthur R. Lloyds, Clerk, and at the residence of Mr. J. H. Mallock, assistant overseer, The School House, Watlington. Forms of tender, with schedule of prices, may be obtained on application to Clerk. Sealed tenders, endorsed "Watlington Drainage," and addressed to the Henley R.D.C., are to be delivered at offices of Clerk, at No. 1, Post Office-bus, Henley-on-Thames, before 9 o'clock p.m. on July 11.

JULY 12.—Kennington Gate.—UNDERGROUND CONVENIENCE.—The Lambeth Borough Council invite tenders for underground convenience at Kennington Gate. Drawings can be seen, and specification, bills of quantities, and form of tender obtained, at the offices of the Borough Engineer, Messrs. Edwards & 346, Kennington-road, S.E., before 10 and 12 and 2 (Saturdays excepted), on payment of 1s. 12s. Tenders, on prescribed form, to Town Hall, Kennington Green, S.E., before 12 noon, July 12.

JULY 13.—Castletford.—ASPHALTING.—The Whitwell District Sub-Committee of the West Riding C.C. Education Department invite tenders for asphaltting playgrounds at Glass Houghton Frodsham school, Castletford, Yorks. Specifications can be had from Mr. B. Leah, Divisional Clerk, Castletford, to whom sealed tenders must be sent before July 13.

JULY 14.—Dewsbury.—PAVING, etc.—Dewsbury Corporation invite tenders for the paving of streets, etc., of Scout Hill-road and Back Rayon's-street. Plans, specifications may be seen, and forms of tender obtained, on application to the Borough Surveyor's Office, Town Hall, Dewsbury. Tenders, under sealed cover, endorsed "Private Street Paving," must be in hands of Mr. H. Ellis, Town Clerk, Town Hall, Dewsbury, not later than July 14.

JULY 16.—Beckford.—SEWERAGE AND WATER SUPPLY.—Winchcomb R.D.C. invite tenders for the execution of all work involved by the connexion of house drains to new sewerage system and laying service pipes from water mains to houses in the Parish of Beckford, Glos., on the basis of a schedule of prices. Specifications and schedules may be obtained at the offices of the engineers, Messrs. Wilcox & Raikes, 63, Temple row, Birmingham, on payment of a deposit of 2s. 2s. Sealed tenders, with schedule of prices filled in detail on the form supplied, endorsed "Beckford Sewerage and Water Supply—House Connections," must be delivered at office of Mr. H. W. Stephens, Clerk to the Council, Winchcomb, Glos., not later than 12 noon on July 16.

JULY 16.—Blean.—SEWERS.—Blean R.D.C. invite tenders for the supply, delivery, laying, jointing, etc., of the materials for, and the construction of, sewers at Port Acres, in the Parish of St. Stephen, near Canterbury. Plans and sections may be seen at the office of, and specifications and form of tender obtained from, the Acting Surveyor, Mr. L. T. Aspinwall, 29, Westgate-Canterbury, on payment of 10s. Tenders to be delivered at the Clerk's office, 39, Castle-street, Canterbury, on or before July 16, endorsed "Tender for Sewers."

JULY 16.—Dulwich.—ROAD WORKS.—The Camberwell Borough Council invite tenders for kerbing, channelling, foundations for asphalt, paving, and the work in the following streets:—viz.:—Exella-road and Turny-road (part 9). Dulwich. Specifications and forms of tender can be obtained from Mr. William Oxbly, Borough Engineer, and tenders must be delivered to the Engineer, on or before July 16, addressed to the Works and General Purposes Committee.

JULY 16.—Durham.—TUNNEL.—The Corporation of Durham invite tenders for driving a tunnel about 200 yds. long under Clay-pit, for laying an 18-in. cast-iron pipe sewer in the said tunnel; and also for constructing short lengths of sewer at each end of the tunnel. Plans and conditions of contract may be seen, and specifications, quantities, and form of

SALES OF PROPERTY.—Continued from page 24.

By E. MARSH & PARSONS. Kennington—5, Kennington-cres., ut. 141 yrs., g.r. 121, s.r. 70.	£390
By MORGAN, BAINES, & CLARK. Wallington, Surrey.—Woodcote-rd., "Sunny Bank," and 14 acres, f. p.	2,000
Landy Hill-rd., "The White House," y.r. 431, also plot of land adjoining f.	645
By RUTTERS. Hemel Hempstead, Herts.—High-st., Green, "The Red House," and nearly 3 a., f. p.	900
By F. W. JARMAN. Bermondsey—Oxley-st., 211, reversion in 501 yrs.	400
Holloway—406, Horseay-rd. (s.), f. y.r. 451. Stoke Newington—82, Midway-pk. (s.), f. y.r. 551.	530
Harrington—5, Harrington-gdns., f. y.r. 381. Stroud Green—59, Regina-rd., ut. 58 yrs., g.r. 75, s.r. 421.	820
Holloway—64, Horseay-rd. (s.), 70 and 71, Ashbury-rd., ut. 34 yrs., g.r. 121, 151, ut. 171 yrs.	450
Caledonian-rd.—23, Twyford-st., ut. 35 yrs., g.r. 61, w.r. 401, 81.	575
Hampton Court—The Green, "Parkside Cottage," f. y.r. 451.	140
By DEBENTHAM, TEWSON, & CO. Stanton, Gloucester.—The Stanton Court Estate, 882 a. 2 r. 35 p. f.	550
Hackney—Penhurst-rd., The "Penhurst Arms," p.h., ut. 401, g.r. 61, y.r. 801.	25,200
City—13, Watling-st., reversion in 51 yrs., y.r. 3701.	1,180
208, Upper Thames-st., ut. 321 yrs., g.r. 711, ut. 171 yrs.	3,000
10, Devonshire-rd., 111, reversion in 51 yrs., y.r. 1801.	1,300
404 and 41, Queen-st., ut. 31 yrs., g.r. 651, ut. 1401.	900
Long Acre—12, Upper Thames-st., ut. 201 yrs., g.r. 371, y.r. 1501.	1,100
Bloomsbury—9, Southampton-rd., ut. 431 y.r., g.r. 181, 191, 201, 211, 221, 231, 241, 251, 261, 271, 281, 291, 301, 311, 321, 331, 341, 351, 361, 371, 381, 391, 401, 411, 421, 431, 441, 451, 461, 471, 481, 491, 501, 511, 521, 531, 541, 551, 561, 571, 581, 591, 601, 611, 621, 631, 641, 651, 661, 671, 681, 691, 701, 711, 721, 731, 741, 751, 761, 771, 781, 791, 801, 811, 821, 831, 841, 851, 861, 871, 881, 891, 901, 911, 921, 931, 941, 951, 961, 971, 981, 991, 1001.	3,250
Marblebone—244 and 248, Old Portland-st., ut. 25 yrs., g.r. 501, y.r. 4001.	4,900
10, Devonshire-st., ut. 9 yrs., g.r. 601, y.r. 1501.	600
Regent's Park—33, Chester-ter., ut. 91 yrs., g.r. 521, 101, y.r. 2251.	820
20, York-ter., ut. 15 yrs., g.r. 61, y.r. 1841. 13, Cornwall-ter., and 13 Cornwell-ter., com- ut. 14 yrs., g.r. 311, 101, y.r. 1821.	1,125
Hyde Park—7, Inverness-ter., ut. 481 yrs., g.r. 301, y.r. 1701.	1,400
Paddington—38, Ornament-st., ut. 391 yrs., g.r. 101, y.r. 1151.	800
By HAMPTON & SONS. Weyley, Herts.—Old road, estate, freehold building land, 32 a. 2 r. 9 p. (in lots)	3,095
By MOSS & JAMESON (at Winchester House). Islington.—Liverpool-rd., "The White Horse" p.h., f.g.r. 1231, reversion in 51 yrs.	2,500
White Horse yard, f.g.r. 211, 31, reversion in 8 yrs.	3,400
Theberton-st., f.g. rents 151, 31, reversion in 12 yrs.	680
Upper-st., f.g. rents 1801, reversion in 9 yrs.	11,305
Upper-st., "The Pied Bull" p.h., f.g.r. 301, reversion in 51 yrs.	4,000
Theberton-st., f.g. rents 251, 141, 131, and peppercorn g.r., reversion in 7 to 21 yrs.	17,500
Studd-st., f.g.r. 281, reversion in 21 yrs.	950
Studd-st., f.g. rents 301, 101, reversion in 8 yrs.	2,520
Moon-st., f.g. rents 431, reversion in 8 yrs.	3,290
Kennington—59, Lower Kennington-lane, with stabling, ut. 111 yrs., g.r. 351, y.r. 931, 141. Milner-st., f.g.r. 161, 61, raising 1001, reversion in 42 yrs.	575
Milner-st., f.g. rents 1031, 101, reversion in 21 and 25 yrs.	3,700
Milner-st., f.g. rents 91, reversion in 21 yrs.	12,455
Barnsbury-st., f.g. rents 501, 41, reversion in 8 to 21 yrs.	2,055
Launceston—Lower Marsh, estate, f.g.r. 1001, reversion in 53 yrs.	2,930
By G. HASLET (at Masons' Hall Tavern). Camdenwell—Peckham-rd., "The Walmer Castle" p.h., ut. 42 yrs., y.r. 1001, with goodwill	3,200
By LONG & SONS (at Masons' Hall Tavern). Ealing—Uxbridge-rd., "The Black Horse" p.h., f. y.r. 351, with goodwill	8,500
By HUBERT & FINCH (at Maidenhead). Maidenhead, Berks.—St. Ivo's-rd., three plots of land, f.	5,200
By J. KITTO & SON (at Launceston). Lanteglos, Cornwall.—"Game Farm," 10 a. Tintagel, Cornwall.—"Condolien Farm," 112 a. 0 r. 18 p. f.	820
Wardour, Cornwall.—Borough Parks Close, 47 a. 0 r. 15 p. f.	1,775
By G. B. HILLIARD & SON (at Dunmow). Dunmow, Essex.—"Martels Manor Farm," 155 a. 1 r. 30 p. f. (including the Manor of Martels)	380
By BALLARD & MARSH (at Twickenham). Teddington—Princes-rd., "Denham and "Maisonette," f. y.r. 641.	2,275
Hampton—Tudor-rd., "Castle Hayes," f. o.r. June 27.—By BAXTER, PAYNE, & LIPSON. Kennington—180 and 182, Vauxhall-st., w.r. 671, 121.	810
By BRADSHAW, BROWN, & CO. Northfleet, Kent.—London Road, The White Cement and Whiting Works, ut. 161 yrs., g.r. 1001 (including plant and machinery)	375
By CHADWICK & SONS. Westminster—54 to 60 (even), Horseferry-rd., and 43 and 45, Romney-st. (s.), area 6,300 sq. ft., f. y.r. 2281, 61.	5,300
By F. PEACOCK & SONS. Islington—16, Cleveland-rd., ut. 451 yrs., g.r. 61, s.r. 401.	330

Putney.—West-hill, f.g. rents 431, reversion in 851 yrs.	£1,225
By RY. HENDRICKS & CO. (at Birmingham). Birmingham.—19, Calverley-rd., ut. 8 yrs., g.r. 111, 101, p.	370
Small Heath, Worcester.—186 and 188, Somer- ville-rd., ut. 97 yrs., g.r. 61, w.r. 491, 81.	400
June 29.—By S. & E. BARRIS. Commercial-road East—Aitchfield-st., etc., f.g. rents 1191, 161, ut. 22 yrs., g.r. 771, 91.	480
By C. W. DAVIES & SONS. Hoxton.—28 and 30, Wenlock-st., ut. 36 yrs., g.r. 81, 81, y.r. 801.	550
Islington.—14, College-st., ut. 101 yrs., g.r. 61, 101, y.r. 361, 151.	105
234, Liverpool-rd., ut. 10 yrs., g.r. 81, y.r. 441. By P. J. DIXON & SONS. East Ham.—10 and 12, Elizabeth-rd., f. w.r. 521.	120
13 and 15, Bernard-rd., f. w.r. 491, 81.	495
Bethnal Green.—159 and 161, Gossett-st. (s.), ut. 9 yrs., g.r. 91, y.r. 581, 101.	475
Walthamstow.—25, Priory-av., ut. 76 yrs., g.r. 41, 101, w.r. 331, 181.	250
By GREEN & SONS. Hyde Park.—5, Old Quebec-st., ut. 16 yrs., g.r. 11, y.r. 851.	160
By LINNETT & LANE. Harlesden.—95 and 98A, Burns-rd. (s.), ut. 87 yrs., g.r. 61, 101, y.r. 551, 121.	650
By J. & S. MORTON. Bloomsbury.—42, Gower-st., beneficial lease for 61 yrs., y.r. 701.	545
Holloway.—15 to 29 (odd), George-st., area 2,850 sq. ft., w.r. 1951.	250
By ROBINS, GORE & MEROER. Soho.—41, Old Compton-st. (s.), f. y.r. 2171.	920
Bloomsbury.—41, Old Compton-st., f. y.r. 801. By WALPOLE & WILSHIN. Anerley.—61, Jasmine-g. f. p.	2,970
By WOODS & SHELING. Paddington.—Pembroke-pl., f.g. 61, 31, 4d., reversion in 571 yrs.	1,460
Notting Hill.—304, Portobello-rd., ut. 581 yrs., g.r. 81, y.r. 341.	300
Southwark.—Borough High-st., f.g.r. 1101, reversion in 80 yrs.	830
City.—Friday-st., f.g.r. 1101, reversion in 41 yrs.	3,600
Hoxton.—Pittfield-st., The "Hop Pole" b.h., etc., f.g.r. 1001, reversion in 16 yrs.	3,450
City.—Basilica-st., f.g.r. 601, reversion in 14 yrs.	8,600
St. Luke's.—Bastwick-st., The "Chamberlain Arms" p.h., f.g.r. 501, reversion in 34 yrs. Fleet Street.—3, Johnson-st., and 3, Pembro- ton-row, area 1,750 ft., f. y.r. 2171, 41.	2,500

Contractions used in these lists.—F.g.r. for freehold ground-rent; l.g.r. for leasehold ground-rent; r. for rent; f. for freehold; c. for copyhold; l. for leasehold; p. for possession; e.r. for estimated rental; w.r. for weekly rental; q.r. for quarterly rental; y.r. for yearly rental; for unexpired term; p.a. for per annum; yrs. for years; la. for lane; st. for street; rd. for road; sq. for square; pl. for place; ter. for terrace; cres. for crescent; av. for avenue; gas. for garden; yd. for yard; g. for garage; b.h. for beerhouse; p.h. for public-house; o. for office; s. for shops; ct. for court.

MEETINGS.
SATURDAY, JULY 7.
Architectural Association.—Sixth Summer Visit to Oxford, under the guidance of Mr. A. H. Ryan-Toulson.
MONDAY, JULY 9, TO SATURDAY, JULY 14.
Royal Sanitary Institute.—Congress at Bristol.
MONDAY, JULY 9.
Clerks of Works' Association (Carpenters' Hall).—Monthly Meeting. 7.30.
WEDNESDAY, JULY 11.
Builders' Benevolent Institution.—Annual General Meeting of the Subscribers and Donors. 3 p.m.

PRICES CURRENT OF MATERIALS.

* Our aim in this list is to give, as far as possible, the average prices of materials, not necessarily the lowest. Quality and quantity obviously affect prices—a fact which should be remembered by those who make use of this information.

	BRICKS, &c.
Hard Stocks.....	1 8 0 per 1000 alongside, in river.
Enough Stocks and Gravel.....	1 5 0 " " " "
Picked Stocks for Footings.....	2 15 0 " " delivered.
Fleetons.....	1 6 0 " " at railway depot.
Red Wire Cuts.....	1 12 0 " " "
Best Farnham Red.....	8 12 0 " " "
Best Red Pressed Buckton Facing.....	5 0 0 " " "
Best Blue Pressed Staffordshire.....	3 15 0 " " "
Do. Bullnose.....	4 0 0 " " "
Best Stourbridge Fire Bricks.....	3 14 0 " " "
GLAZED BRICKS. Best White and Ivory Glazed Stretchers.....	12 0 0 " " "
Headers.....	11 0 0 " " "
Quoins, Bullnose, and Flats.....	16 0 0 " " "
Double Stretchers.....	19 0 0 " " "
Double Headers.....	16 0 0 " " "
One Side and two Ends.....	19 0 0 " " "
Two Sides and two Ends.....	20 0 0 " " "

BRICKS, &c. (continued).

GLAZED BRICKS (continued).			
Splays, Cham	2 s. d.		
ferred, Squint, 20	0 0	per 1,000, at railway dep't.	
Best Dipped Salt			
Glazed Stretch-			
ers, and Header	12 0 0	"	"
Quoins, Bulbous,			
and Flats	14 0 0	"	"
Double Stretchers	15 0 0	"	"
Double Headers	14 0 0	"	"
One Side and two			
Ends	15 0 0	"	"
Two Sides and one			
End	15 0 0	"	"
Splays, Cham			
ferred, Squint, 14	0 0	"	"
Second Quality			
White and			
Dipped Salt			
Glazed	2 0 0	less than best.	

Thames and Pitt Sand	s. d.	
	6 9	per yard, delivered
Thames Ballast		
Best Portland Cement	25 0	per ton, "
Best Ground Blue Lias Lime	19 0	"

NOTE.—The cement or lime is exclusive of the ordinary charge for sacks.

Grey Stone Lime 11s. 0d. per yard, delivered.

Stourbridge Fireclay in sacks 27s. 0d. per ton at rly. dep't.

STONE.

BATH STONE—delivered on road wag-	s. d.	
gons, Fordington Depot	1 6	per ft. cube.
Do. do. delivered on road waggon,		
Nine Elms Depot	1 8 1/2	"

PORTLAND STONE (20 ft. average)—

Brown Whinited, delivered on road		
waggon, Fordington Depot, Nine		
Elms Depot, or Fulmoo Wharf	2 1	"

White Based, delivered on road

waggon, Fordington Depot, Nine		
Elms Depot, or Fulmoo Wharf	2 2 1/2	"

Ancestor in blocks 1 10 | per ft. cube, del. rly. dep't. |

Beor	1 6	"
Greenhill	1 10	"

Darley Dale in blocks	2 4	"
Bed Corshill	2 2	"

Clochem Red Freestone	2 0	"
Bed Mansfield	2 4	"

Yoxa Stone—Robin Hood Quality.

Scrapped random blocks, 2 10		"
6 in. sawn two sides land-		

ings to sizes (under		
40 ft. super.)	2 3	per ft. super., "

6 in. rubbed two sides		
ditto, ditto	2 6	"

3 in. sawn two sides slabs		
(random sizes)	0 11 1/2	"

2 in. to 2 1/2 in. sawn one		
side slabs (random		

sizes)	0 7 1/2	"
1 1/2 in. to 2 in. ditto, ditto	0 6	"

HARD YORK—

Scrapped random blocks, 3	0 per ft. cube,	"
in. sawn two sides land-		

ings to sizes (under		
40 ft. super.)	2 8	per ft. super., "

6 in. rubbed two sides		
ditto	3 0	"

3 in. sawn two sides slabs		
(random sizes)	1 2	"

in. self-faced random		
flags	0 5	"

HOPTON WOOD (Hard Bed) in blocks 2 0 per ft. cube, del.

" " " 6 in. sawn both		
sides landings 2 7	per ft. super. del.	

" " " 3 in. sawn both		
sides random		

slabs	1 0	"
" " " 2 in. do.	0 8 1/2	"

SLATES.

In. In.	s. d.	
20x10 best blue Bangor	3 2	per 1000 of 1200 at r. d.

20x12	13 17	6 "
20x10 first quality	13 0	"

20x12	13 15	0 "
18x8	7 5	0 "

20x10 best blue Port-		
madoc	12 12	6 "

18x8	6 12	6 "
20x10 best Eureka un-		

fading green	15 17	6 "
20x12	18 7	0 "

18x10	13 5	0 "
18x8	10 5	0 "

20x10 permanent green	11 12	6 "
18x10	9 12	6 "

18x8	6 12	6 "
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TILES.

Best plain red roofing tiles	s. d.	
Hip and Valley tiles	3 7	per doz. "

Best Broseley tiles	50	0 per 1000 "
Do. Ornamental tiles	52	6 "

Hip and Valley tiles	4	0 per doz. "
Best Babylon red, brown, or		

brindled do. (Edwards)	57	6 per 1000 "
Do. Ornamental do.	58	0 "

Hip tiles	4	0 per doz. rly. dep't.
Valley tiles	8	0 "

Best "Rosemary" brand		
plain tiles	48	0 per 1000 "

Best Ornamental tiles	50	0 "
Hip tiles	4	0 per doz. "

Valley tiles	8	0 "
Best Hartshill brand		

plain tiles, sand-faced	50	0 per 1000 "
Do. pressed	47	6 "

Do. Ornamental do.	50	0 "
Hip tiles	4	0 per doz. "

Valley tiles	3	6 "
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WOOD.

At per standard.		At per standard.	
Deals: best 3 in. by 11 in. and 4 in.		Deals: best 3 in. by 11 in. and 4 in.	
by 9 in. and 11 in.	13 10 0	15 0 0	"
Deals: best 3 by 8	13 0 0	14 0 0	"
Battens: best 2 1/2 in. by 7 in. and			
8 in., and 3 in. by 7 in. and 8 in.	11 0 0	12 0 0	"
Battens: best 2 1/2 by 6 and 3 by 6	10 0 0	less than	"
Deals: seconds	10 0	0	10 less than best.
Battens: seconds	8 10 0	"	"
2 in. by 4 in. and 2 in. by 6 in.	9 0 0	10 0 0	"
2 in. by 4 1/2 in. and 2 in. by 5 in.	8 10 0	9 10 0	"

Foreign Sawm Boards—

1 in. and 1 1/2 in. by 7 in.	0 10 0	more than	"
3 in.	1 0 0	11 0 0	"

Fit timber: best middling Dunsig

or Mamel (average specification)	4 10 0	5 0 0	"
Seconds	4 0 0	4 10 0	"

Small timber (8 in. to 10 in.)	3 12 6	3 15 0	"
Small timber (8 in. to 7 in.)	3 0 0	3 10 0	"

Swedish balks	2 10 0	3 0 0	"
Pitch-pine timber (30 ft. average)	4 0 0	4 15 0	"

FOREIGN WOOD.

White Sea: first yellow deals,

3 in. by 11 in.	24 0 0	25 0 0	"
3 in. by 9 in.	22 0 0	23 0 0	"

Battens, 2 1/2 in. and 3 in. by 7 in.	18 0 0	19 0 0	"
Second yellow deals, 3 in. by 11 in.	18 0 0	20 0 0	"

3 in. by 9 in.	17 10 0	18 0 0	"
Battens, 2 1/2 in. and 3 in. by 7 in.	13 10 0	14 10 0	"

Third yellow deals, 3 in. by			
11 in. and 9 in.	13 10 0	15 0 0	"

Battens, 2 1/2 in. and 3 in. by 7 in.	11 0 0	12 0 0	"
Petersburg	21 0 0	22 10 0	"

Do. 3 in. by 9 in.	18 0 0	19 10 0	"
Battens	16 10 0	17 0 0	"

Second yellow deals, 3 in. by 11 in.	16 10 0	17 0 0	"
Do. 3 in. by 9 in.	14 10 0	16 0 0	"

Battens	11 0 0	12 10 0	"
Third yellow deals, 3 in. by			

11 in.	13 0 0	14 0 0	"
Do. 3 in. by 9 in.	12 10 0	14 0 0	"

Battens	10 0 0	11 0 0	"
White Sea and Petersburg			

First white deals, 3 in. by 11 in.	14 10 0	15 10 0	"
3 in. by 9 in.	13 10 0	14 10 0	"

Battens	11 0 0	12 0 0	"
Second white deals, 3 in. by 11 in.	13 10 0	14 10 0	"

3 in. by 9 in.	12 10 0	13 10 0	"
Battens	11 0 0	12 0 0	"

Pitch-pine: deals	18 0 0	21 0 0	"
Under 2 in. thick extra	0 10 0	1 0 0	"

Yellow Pine—First, regular sizes	4 0 0	upwards.	"
Ordinaries	32 0 0	"	"

Seconds, regular sizes	33 0 0	"	"
Yellow Pine ordinaries	28 0 0	"	"

Kauri Pine—Planks, per ft. cube.	0 3 6	0 5 0	"
Deasig and Stettin Oak Logs			

Large, per ft. cube	0 3 0	0 3 6	"
Small	0 2 6	0 3 0	"

Wainscot Oak Logs, per ft. cube.	0 6 0	0 6 0	"
Dry Wainscot Oak, per ft. sup. as			

inch.	0 0 8 1/2	0 0 9 1/2	"
1 in. do. do.	0 0 7	—	"

Dry Mahogany—Boudras, B-			
basco, per ft. super. as inch.	0 0 9	0 1 0	"

Selected, Figury, per ft. super.	0 1 6	0 2 6	"
as inch			

Dry Walnut, American, per ft.			
super. as inch	0 0 10	0 1 0	"

Teak, per load	17 0 0	22 0 0	"
American Whitewood Planks,			

per ft. cube	0 4 0	0 5 0	"
Prepared Flooring, etc.			

1 in. by 7 in. yellow, planed and			
shot	0 13 6	0 17 6	"

1 in. by 7 in. yellow, planed and			
matched	0 14 0	0 18 0	"

1 in. by 7 in. white, planed and			
matched	0 16 0	1 0 0	"

1 in. by 7 in. white, planed and			
shot	0 12 0	0 14 6	"

1 in. by 7 in. white, planed and			
matched	0 12 6	0 15 0	"

1 1/2 in. by 7 in. white, planed and			
matched	0 15 0	0 16 6	"

1 in. by 7 in. yellow, matched			
and beaded or V-jointed brds.	0 11 0	0 13 6	"

1 in. by 7 in. white	0 14 0	0 18 0	"
1 in. by 7 in. white	0 10 0	0 11 6	"

1 in. by 7 in.	0 12 9	0 15 0	"
6 in. at 9d. to 9d. per square less than 7 in.			

JOISTS, GIRDERS, &c.

In London, or delivered

Railway Vans, per ton			
Bolled Steel Joists, ordinary	7 0 0	7 10 0	"

sections	7 0 0	7 10 0	"
Compound Girders, ordinary	6 0 0	10 0 0	"

sections	9 0 0	10 0 0	"
Angles, Ties, and Channels, ordi-			

nary sections	9 0 0	10 0 0	"
Flitch Plates	9 0 0	10 0 0	"

Cast Iron Columns and Stanchions			
including ordinary patterns	7 10 0	8 10 0	"

METALS.

Per ton, in London.		Per ton, in London.	
Common Bars		Common Bars	
Staffordshire Crown Bars, good	8 10 0	9 0 0	"

merchant quality	10 10 0	—	"
Staffordshire "Marked Bars"	8 15 0	9 0 0	"

Mild Steel Bars	8 15 0	9 10 0	"
Hoop Iron, best price	9 5 0	—	"

Galvanised	17 0 0	—	"
(And upwards, according to size and gauge.)			

Sheet Iron Black—			
Ordinary sizes to 20 g.	9 10 0	—	"

" 24 g.	10 10 0	—	"
" 28 g.	12 0 0	—	"

LONDON.—For erecting receiving wards and porter's lodge at workhouse, Woodfield-road, for Paddington Guardians. Mr. F. J. Smith, architect, Parlane-st-mansions, Victoria-street, S.W.—

Building.	Fence, Walls, etc.	Total.
£	s. d.	£ s. d.
Alden Bros. & Davis	4,800 7 0 0	5,500 0 0
Appleby & Sons	4,485 6 2 0	5,137 0 0
E. G. Baker	1,250 7 10 0	4,978 0 0
Dearing & Sons	4,295 6 50 0	4,853 0 0
Halliday Ltd., N.*	1,040 7 10 0	5,210 0 0
Fraser & Co.	5,197 7 06 0	5,923 0 0
T. L. Green	4,356 7 80 0	5,225 0 0
H. Kent	4,450 7 70 0	5,230 0 0
Mattock & Parsons	5,060 7 82 0	5,571 0 0
F. G. Minter	4,730 7 82 0	5,571 0 0
B. E. Nightingale	4,578 6 78 0	5,236 0 0
C. North	5,339 7 49 0	6,028 0 0
Patman & Fothering-		
ham	4,320 6 77 10 0	4,997 10 0
J. & M. Patrick	4,751 7 06 0	5,457 0 0
S. Pocock	4,300 7 43 0	5,043 10 0
C. Wall	4,475 7 27 0	5,402 0 0

LONDON.—For erecting a sorting office, Palmer's Green

D. R. Paterson	£1,813 5 6	D. R. Paterson	£1,813 5 6
Martin, Walls, & Co., Ltd.	1,800 0 0	D. R. Paterson	£1,813 5 6
Gathercole Bros.	1,700 0 0	D. R. Paterson	£1,813 5 6
J. & W. Drake	1,690 0 0	D. R. Paterson	£1,813 5 6
Mattok & Par-		D. R. Paterson	£1,813 5 6
sons	1,620 0 0	D. R. Paterson	£1,813 5 6
Perry & Co.	1,661 0 0	D. R. Paterson	£1,813 5 6
C. Ansell	1,660 0 0	D. R. Paterson	£1,813 5 6
F. & S. Foster	1,598 0 0	D. R. Paterson	£1,813 5 6

LONDON.—For adaptation of Springfield House and other work for the London County Council —

Patman & Fother-		Patman & Fother-	
ingham, Ltd.	£1,080	Patman & Fother-	
J. Grover & Son	1,058	Patman & Fother-	
W. J. Clemens	1,010	Patman & Fother-	
Martin, Wells, & Co.,		Patman & Fother-	
Ltd.	978	Patman & Fother-	

MALDON.—For the erection of a new secondary school and pupil teachers' centre, for Essex Education Committee (Maldon Advisory Sub-Committee), Mr. P. M. Beaumont, architect, High-street, Maldon:—

F. Bennett	£7,999	R. Shanker	£7,213
F. P. Bliss	7,878	Myall & Upson	7,130
J. Smith & Son	7,555	J. McKay	7,180
Everett & Sons	7,474	C. Deaves	7,110
Elvy & Son	7,425	H. Potter & Son	7,100
C. Roper	7,400	Grinwood & Son	6,958
W. Holt & Sons	7,375	Mason & Son	6,880
Walls & Sons, Ltd.	7,328	S. E. Mose & Co.	6,750
E. Saunders	7,229	J. Ismay	6,675
Coulton & Lofis	7,800	Parren & Son, Earith,	
F. Thurman	7,280	Hants	6,500
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C. Wright	1,107 0 0	J. J. Wise	980 0 0
Goodall & Sons	1,040 0 0	Sapp, Basing-	
F. J. Eddols	1,027 1 0	stoke	949 13

NEW SOUTHGATE.—For new classrooms for the infants' department, cookery and manual training centres and new offices for the Divisional Clerk, at the Bowe-road Schools, New Southgate, for Middlesex County Council. Mr. H. G. Crothall, Architect to the Education Committee:—

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A. Porter	3,018 0	H. Knight & Son	2,654 0

PENYOEDCAE.—For sewerage works, for the Llantrisant and Llantwit Fardre Rural District Council. Mr. Gomer S. Morgan, Surveyor, School-street, Ponty-culan:—

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PONTEFRAC.—For alterations and additions to store in Salford, for the Industrial Society. Messrs. Garside & Pennington, architects, Pontefract and Castleford:—

Gelder Bros. & Woodcock, Pontefract	£440 13 11
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SEAFOED (Sussex).—For the erection of a detached residence "Rosecroft," for the Seafoed West Co., Ltd., for Mr. R. F. Lamb, Mr. S. W. B. Blackman, architect, Brighton & Seaford:—

Brown & Sons	£2,083	Morling	£1,625
C. Jay	2,090	Smedley	1,500
Wood & Sons	1,925	Wilkinson, Seaford	1,254
J. Martin	1,875		

TURRIFF (N.B.).—For alterations and enclosing walls, Burkenhills School. Messrs. J. Duncan & Son, architects, Turriff:—

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Carpenter: J. Rao & Son			
Sister: C. Dieble			
Plasterer: J. Clark			
Plumbers: C. Duthie & Sons			
[All of Turriff.]			

WARE.—For erecting schoolroom, vestries, and kitchen, and for alterations to the Wesleyan Chapel, New-road. Mr. L. Moore, A.R.E.B.A., Garden House, Harford:—

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H. Norris & Son	1,080 0 0	Herts	1970 0 7
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A. M. Abbott	998 0 0		

WELLINGTON (Somerset).—For completing All Saints Church by erecting a tower and spire. Mr. J. Houghton Spencer, architect, 5, Hammet-street, Taunton. Quantities by Messrs. W. Waterman & Son, Taunton:—

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Follett Bros.	1,925 0	T. H. Mogridge	1,710 0
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WOODBRIDGE.—For erecting a Masonic Hall, New-street, Woodbridge. Mr. H. J. Wright, architect and surveyor, 4, Museum-street, Ipswich:—

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F. Bennett	795 0 0	E. Adams	715 0 0
W. B. Blomfield	790 0 0	A. Gayford	697 0 0
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ILLUSTRATIONS.

Armstrong College, Newcastle-upon-Tyne.....	Mr. W. H. Knowles, F.R.I.B.A., F.S.A. Architect
1. General View.	
2. Principal Entrance, Hall, Council Room, and Principal's Room.	
Sculpture at the Royal Academy:—	
Plate I. "Commerce".....	By Mr. A. H. Hodge
"Justice".....	By Mr. F. E. E. Schenck.
"Madonna and Child".....	By Mr. Bertram Mackennal.
Plate II. "A Royal Game".....	By Mr. W. Reynolds-Stephens.
"Narcissus".....	By Mr. A. Bertram Pegram.
"Pax".....	By Mr. Oliver Wheatley.
Plate III. "Abundance".....	By Mr. F. Derwent Wood.
"Orpheus".....	By Mr. Herbert Hampton.
"The Children of the Sculptor".....	By Mr. Albert Toft.
"War".....	By Mr. Bertram Mackennal.

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Work and Play at the Architectural Congress.



N offering a hearty welcome to all our foreign colleagues who are to visit us next week, we may perhaps usefully give a little *résumé* in advance of what is to be

offered to them both in the way, as one may say, of work and play; of questions to be seriously discussed and opportunities offered for recreation and sight-seeing.

The Inaugural Ceremony at the Guildhall and the Soirée given by the Royal Academy will, we hope, be well attended, and at the latter our guests will have the opportunity of finding out that our sculpture is probably better than they were aware of, and of judging whether the Royal Academy painting is really the contemptible business which a clique of English critics delight in declaring it to be.

On Tuesday the subject of steel and reinforced concrete will be discussed simultaneously with that of the employment of salaried officials to produce the public architecture of a country. It is not likely that these two subjects will attract the same persons; one is purely constructional, and the other purely concerned with what we may call æsthetic administration. But Hatfield and Hampton Court in the afternoon offer a choice; and we should recommend foreigners rather to take Hatfield, for they will there

see a typical example of an English mansion of the best period for that class of building.

On Wednesday the question of how far the architect should receive the training of the craftsman is divided against those of the organisation of Public International Competitions and Copyright and the Ownership of Drawings. In regard to the latter subject, foreign architects may learn, probably with some surprise, how the profession is treated by English law, and it is to be hoped that their votes and their eloquence may support us in an attempt to shake off our fetters. In the evening the simultaneous subjects of the planning and laying out of streets and the conservation of national monuments by Government are both of the greatest interest, but we may suggest that the latter is really the more important of the two, since it concerns the preservation of a chapter of our national history.

On Thursday we hope that the subject of the control of the architect over other artists or craftsmen in the completion of public buildings will receive every attention, for it is not only an important but a difficult one. The rival subject "The education of the public in architecture" is somewhat vague and (in our opinion) hopeless—in this country at least. Among the numerous visits for the Thursday afternoon visitors may find it difficult to choose; but we should recommend those who do not know it to see Windsor Castle, only with the reservation that they will find little of architectural interest there; what they will find is

romantic beauty of situation and picturesque effect, and a great collection of art treasures. Those who do not leave town would do well not to neglect Dorchester House, one of the finest modern houses on the Italian model, and containing some work by a great sculptor.

For the visits on Friday we should certainly recommend visitors who have not been to Oxford or Cambridge to see one of them—Oxford perhaps by preference; for though Cambridge possesses in her "backs," and in the great quad of Trinity, and the King's College Chapel, separate attractions which are superior to any single attraction of Oxford, the *coup d'œil* of Oxford is more concentrated and impressive; so much so that a distinguished German art-critic declared that the High-street of Oxford had not its equal in the world.

On the morning of Saturday we may suggest that visitors will find it more interesting to visit Bridgewater House, the work of one of our great English architects, and containing a fine collection of pictures, than to discuss the vexed and rather unnecessary question of the statutory qualification of architects. For the simultaneous visits in the afternoon there is the choice between modern Gothic at the Houses of Parliament and Westminster Cathedral, and Wren classic at Greenwich. The exterior aspect of Greenwich from the river approach is noble and well worth seeing, but we may warn the stranger that the interest is pretty well confined to the exterior view.

The farewell banquet will at all events, we hope, be unanimously attended.

SCULPTURE AT THE ROYAL ACADEMY.

AS has been the case several times in recent years, the sculpture at the Academy is the best department of the year's exhibition, not only because there is work that stands higher in its class than anything among the paintings, but also because the relative proportion of good to poor work is larger. This however may partly be accounted for by the fact that the space given for sculpture is so much smaller and the number of works therefore more restricted. If we had eleven rooms filled with sculpture it is possible, in spite of the remarkable advance in English sculpture of late years, that we might find the proportion of meritorious work much the same as among the pictures.

We may divide sculpture broadly into two classes; that which represents a very simple idea, or perhaps represents merely form and composition for their own sake, and that which expresses a more or less complex poetic idea which is of importance in itself, apart from the execution. Of this latter class there is much less in England than in France, and it generally does not belong to the highest class in an artistic sense. The best English work is usually to be found in the shape of finely modelled figures of only vague and abstract signification, and which appeal to the purely artistic perception rather than to the imagination. And on the whole this is the safest path for the sculptor. Occasionally one may find a work, like Boucher's "Antique et Moderne," which expresses in the severest sculptural form a very pregnant intellectual idea; but on the whole it is rather dangerous to endeavour to express too much in sculpture, an art which should be symbolical rather than didactic. Thus Mr. Garbe's "Der Selbst-süchtiger" (why a German name?) in the Octagon, though a thoughtful work, attempts to express a little more than can be clearly conveyed, and fails also in sculptural beauty of line.

The central work in the Octagon, the "Death of Dirce," is a turbulent piece of work of no high quality, which is in fact a mere variant on a well-known antique group, and therefore has not even the interest of originality. In purely sculptural quality perhaps Mr. Brock's colossal relief of a nymph and triton for the Queen Victoria memorial is the finest thing of the year, though it can hardly be said to express an idea at all; it simply captivates by its grandeur of line and fine modelling; if it is a specimen of the decorative sculpture which is to adorn the Victoria memorial, we may look forward to the erection of a great work of art in front of Buckingham Palace. Mr. Mackenals's colossal bust of War (see Plate III. of the sculpture illustrations in this issue) is a powerful work, but hardly intense enough to symbolise war (one remembers Gérôme's "Bellona" in a former year); we should rather have taken it to mean "Anger." Mr. Fehr has produced a figure of "A Fallen Angel" which is rather forced and distorted in attitude but a successful work of its kind. So also are Mr. Crook's "Eurydice" and Mr. Hampton's "Orpheus" (for which latter see Plate

III.), but they belong, like Mr. Goulden's "Phryne" in the Lecture Room, to the class of well-executed figures which lack individuality of conception and might as well be called by other titles as those they bear; indeed, we suspect that the Phryne referred to was merely labelled by that name after completion; there is nothing whatever in the character of the head to suggest the Greek courtesan; an example of the frequent mistake of sculptors and painters in giving a classical title to a figure which is quite at variance with its associations. Mr. Clemens's "Eurydice," on the other hand (to return to the Octagon), is a distinct effort to realise the idea suggested by the name; Eurydice lies prone as if exhausted, her head raised, as we may suppose, to look longingly after Orpheus; and the head is a very beautiful and expressive one.

Mr. Oliver Wheatley's decorative bas-relief "Pax" (Plate II.) is a very different class of work from that which we are accustomed to associate with his name; he has hitherto generally been the sculptor of pure form, a figure seen in some momentary action or attitude of purely sculptural interest. "Pax" is a work of more poetic meaning and treated in a decorative rather than a sculptural manner. His reading of the subject is far from commonplace; it is not the usual girl with the olive branch; it is the still armed figure, reminiscent of conflict, almost sad at the recollection of it, and leaning on her shield and trident which are now to be laid aside. It is a very interesting work, serious and thoughtful in conception; the cornice at the head of the panel, bearing the sculptured cross and doves, is perhaps a little heavy in proportion and outline for the rest. With this grave work we may contrast one or two of those which seem intended to show how sculpture can be used in a more playful spirit, more especially Mr. Olson's "La Gamine," a nude figure of a little girl partly encircled by a hoop and putting out one foot playfully on the back of a large tortoise before her; the decorative pedestal is designed to be in harmony with the rest, with a smaller tortoise worked upon each angle; it is an original and piquant production. Mr. Montford's "A Court Favourite" is a good study of a very thin nude youth playing with a panther; Mr. A. C. White's "Naiade" next to it is again what one may call a conception of mischievous expression in sculpture, not without interest, but undecorative in its pose and lines.

On Plate III. we give a representation of the new and original treatment which Mr. Toft has given to a portrait group of his three children, treated in a decorative form: the busts of two of the children being arranged at each end of a long pedestal, the half-length of the elder one standing over them in the middle with a hand placed tenderly round the neck of each of the others, and holding with the tips of her fingers a scroll which extends in front of her. It is an original work, pleasing both in sentiment and in decorative effect. Then we have in the Octagon two or three works of monumental sculpture, of which Mr. Goscombe John's "Sir John Woodburn" is one

of those realistic portrait statues in official dress which, however good as likenesses, seem to represent about the very last use to which sculpture should be put. It is in marble, too; a work of this kind is at all events better suited to bronze. Mr. Henry Pegram's "Sir Thomas Browne," the life-size model of the bronze statue at Norwich, has been illustrated in our pages; it shows the author of "Religio Medici" seated and contemplating a broken ancient pitcher which he holds in one hand. It is a very suitable monument to Browne, though it may be objected that this also is a piece of realistic costume sculpture; but the costume is in itself more picturesque than that of the Sir John Woodburn figure; besides which, it must be admitted that costume of a past age, which is not directly connected with everyday and commonplace associations of life, does not affect us with the same sense of incongruity. Mr. Nicholson Babb has attempted something more poetical in his "Memorial to men who fell in the Boer War," to be erected at Grahamstown. This is a group of a dying man in uniform sinking on the ground, and a winged draped figure standing over him and looking down with a fine expression of sympathy. This is a well intended work in the right spirit, though the extremely robust and largely developed figure of the angel seems a little prosaic in comparison with the intended idea.

In the Lecture-room also memorial sculpture occupies a prominent place, more especially in Sir W. Richmond's remarkable monument to Mr. and Mrs. Gladstone. The finest thing about this is the incident of the winged angel at the head of the monument, bending over the two recumbent figures; a really beautiful and novel idea, which imparts a peculiar solemnity of sentiment to the whole group. The pedestal itself is a somewhat important work; the sides are decorated with groups in relief in circular panels, two on each side; the outer two representing Paolo and Francesca with the figures of Dante and Virgil, and a Homeric scene with a body on a funeral pyre and a warrior seated by it, which we do not exactly identify; the two panels on the inner side (next the wall of the Lecture-room) appear to symbolise Instruction and Family Life. Between the circular panels are upright niches with figures of saints or heroes. On the upper end of the pedestal is a bas-relief of Christ and the Maries after the crucifixion; on the lower end is one illustrating the offerings of the Wise Men at the Nativity. The exhibit is only a full-size model, not the work itself; in the executed work, with the actual materials to be employed, the architectural portion of the monument will probably have an effect of finish which it rather wants in the model. Another monumental effort is that of Dean Hole by Mr. F. W. Fomeroy, a recumbent figure treated in a simple and dignified manner. The opposite position is occupied by Mr. Brock's portrait statue of Gainsborough, standing and arrayed in the dress of his period, a marble statue which would have looked better and more suitable in bronze; the head is fine and energetic; the work is to be placed

in the Tate Gallery. The fourth of the leading works in the centre of the room forms a curious contrast to the solemnity of the Gladstone monument opposite, being a piece of half-playful *genre* sculpture treated as a historical allegory. This is Mr. Reynolds-Stephens's "A Royal Game" (see Plate II.), and represents Queen Elizabeth and Philip II. of Spain seated facing each other on either side of a chessboard and playing a game in which the pieces are little models of ships, with one of which Philip is just making his move; the two sovereigns are clad in the court dress of their period. Whether this is quite the kind of thing for sculptural treatment is a question; but taking it for what it is, there can be no doubt that it is one of the cleverest and most successful works ever exhibited in the Lecture-room. The contrast between the anxious look and furrowed brow of Philip and the cool and half-sarcastic countenance of the English Queen, playing with a locket at her throat as she meditates her next move, is as dramatically effective as it is true to history, and we may congratulate the sculptor on a work which is the best he has yet produced, and which attracts a good deal of interest among the visitors. We regret not to have an illustration of it on a larger scale, but the photograph which the sculptor sent at our request was but a small one, and did not do justice to his work. Among the other works occupying the centre of the floor is one of which we give an illustration, a half-scale bronze "Madonna and the Child Christ" by Mr. Mackenall (Plate II.), which is a new treatment of the subject, showing the Christ not as an infant in arms but as a somewhat older child standing erect in front of the Madonna, who guards him with her hands. The upright composition of this group, with its strongly marked vertical line, is unusual and very effective. The two nude statuettes of children, "The Magic Shell" by Miss Reed, and "Youth and Immortality" by Mr. C. Rutland, though not works of the first order, represent ideals in sculpture of the right kind.

Among the works placed round the room we like nothing better than Mr. Schenck's large relief "Justice," which forms one of our principal illustrations (Plate I.). The lines of this are fine; the contrast between the high relief of the central figure and the low relief of the side ones is very effective, and the pierced panel with the child figure above is a new idea in a work of this kind. Mr. A. H. Hodge's "Commerce," of which we also give an illustration, occupies the central portion on the opposite wall. Among the other works round the room is a beautiful bust of a young girl, "Thirteen," by Mr. Goscombe John, which may help us to forget his unfortunate portrait statue in the Octagon; and a figure of a youth under the title "Narcissus," by Mr. A. J. Leslie, which has a distinctive character and treatment; a graceful, upright, nude figure with the head just inclined as if glancing downwards. The subject of Narcissus is also treated by Mr. Bertram Pegram in a recumbent statuette (Plate II.). Mr. Derwent Wood's life-size group, "Abundance," is illustrated on Plate III., perhaps not from the best point

of view; but as a composition it strikes us as wanting decision and decorative character of line; as a group, it seems somewhat "lumpy" in effect. Mr. H. Pegram's relief "By the Waters of Babylon," gilt bronze within a carved wooden frame, is more effective as decoration than interesting as a sculptural design. Mr. Gilbert's brilliant little sketch for a group of St. George and the Dragon and Victory is just the thing for working out on a small scale in precious metals and other decorative materials; on a large scale the wings of the Victory and the cresting of the knight's helmet would be preposterous in scale; in miniature sculpture they are effective and suitable enough.

Among other things to be looked at are Mr. Colton's two busts of the Maharaja of Mysore; Mr. Lucchesi's pretty life-size group of "The Bud and the Bloom," a girl child playing with her grown-up sister, both of them nude figures of purely sculptural character; Mr. Frampton's fine bust of G. F. Watts; and Mr. Pomeroy's relief tablet in bronze to Archbishop Temple, to be placed in St. Paul's Cathedral. This shows a portrait figure of the late Archbishop kneeling, in robes which spread out behind the figure, the head being, as we so often see in Greek sculpture, in higher relief than the rest of the figure; the field of the composition is filled up with a decorative cartouche for an inscription. The whole is a fine work with a serious feeling about it; indeed its rather tender and reverential sentiment seems little in keeping with the public character of an ecclesiastic who, like Browning, "was ever a fighter"; but it is only fitting to forget these characteristics in a monument, which after all may express a side of character different from that with which Temple faced the world, and not less his own.

As a whole, though we have known better sculpture years at the Academy, the present exhibition shows that the standard of English sculpture is still maintained at the high level to which it has arrived of late years, and which affords such a wonderful contrast to what one remembers of the Academy sculpture-rooms some twenty years ago.

NOTES.

The Highgate
Tramway
Disaster.

IN the face of the evidence given at the Coroner's inquest, the jury could scarcely be expected to bring a different verdict from that recorded on Tuesday. The accident was certainly caused by the wheels skidding and the brakes failing to act, and it is equally certain that the driver made a mistake in applying the hand brake first instead of the magnetic brake, especially when he already had reason for believing the hand brake to be out of order. As only two of the wheels showed "flats" after the accident, it seems probable that the remaining wheels were not skidding all the way down the hill, and if the driver had not kept the lever in the reversed position after he found the wheels were locked it is possible that the car might have been brought under control by the magnetic brake. Although the driver was insufficiently experienced, there is evi-

dence to show that something was wrong with the hand brake. The traffic manager to the tramway company admitted that three complaints had been made against the car in question for stiff brakes and flats on the wheels, and the repair superintendent stated that nothing was done to remedy the stiffness because he knew it would wear off after a time. These are points into which we hope the Board of Trade inspector will inquire, for it is most undesirable that any car should be used for public service when the brake apparatus is not working satisfactorily, even if the defect is one that will not necessarily cause accidents when the car is in the hands of a thoroughly experienced driver.

Tramway
Accidents.

THERE seems to be quite an epidemic of tramway brake failures. Since the disasters

at Highgate, Swindon, and Halifax, reports have been received of similar accidents at Mansfield, in Nottinghamshire, and near Puritan, in Pennsylvania, U.S.A.; while two trams ran off the metals at Kennington Oval on Saturday last. From one point of view it is fortunate that all these mishaps should have occurred in a cluster, for they have demonstrated in a most useful manner several dangers for which safeguards have to be provided. At Highgate the hand brake was the cause of trouble; at Swindon the magnetic brake seems to have been out of order; at Halifax, hand, magnetic, and emergency slipper brakes were unable to prevent the car from running away; and at Mansfield the car ran backwards because the hand brake was defective and the magnetic brake would not act. The Mansfield accident shows the necessity for brakes of the kind mentioned in our "Note" of June 30; the Kennington derailments serve as a hint that magnetic brakes are useless when cars have left the rails; and the disaster in Pennsylvania proves that we need not look to America for effective braking apparatus. The problem now before tramways engineers and the Board of Trade is undoubtedly a difficult one, which in view of recent events must receive careful attention from every possible standpoint.

King
Edward VII.
Bridge,
Newcastle.

By the desire of the King the new high-level bridge at Newcastle-on-Tyne, opened by His Majesty on Tuesday, has received a title which is in every way appropriate and welcome, although not quite so concise as might be desired. The work is the most important undertaking in the way of bridge construction which has been attempted in this country since the completion of the Forth Bridge, and comprises four steel lattice girder spans of 191 ft., 300 ft., 300 ft., and 231 ft., respectively from north to south. The under sides of the girders are 83 ft. above high-water level; thus providing ample headroom for navigation. The spans are supported on granite piers, the foundations of which were taken down to 69 ft. below high-water level by means of caissons. Between abutments the bridge has the length of 1,150 ft., the total length being rather more than half a mile, including the approaches.

In addition to affording a much-needed addition to the cross-river communications of the district, the new bridge has enabled the North-Eastern Railway Company to abolish the inconvenient method necessarily adopted hitherto of running all main line trains into the Central Station on one curve and taking them out in the opposite direction on another curve. In future main line traffic will enter the Central Station from the south along a new line, and, if necessary, trains can be run through Newcastle without stopping. The new bridge has been built from the designs of Mr. C. A. Harrison, the engineer to the North-Eastern Railway, and is a structure whose simplicity and correct proportions are features deserving special commendation.

County Council Finances.

THE weak point of a debate in the House of Lords is that it is a discussion without a practical result. Thus when the London County Council Money Bill was discussed on Monday some useful general criticisms were made, but they are mere academic advice, since nothing was inserted in the Bill to prohibit it. The Bill in question sanctioned loans to the amount of twelve millions, and it was read a second time. It was pointed out during the debate that Manchester and other provincial towns could borrow at a cheaper rate than London. In other words, the financial credit of the Metropolis is lower than that of the great provincial towns. The fact is that there is no little indefiniteness about the borrowing of the London County Council, no limit is fixed not by a Bill but by policy. It is all very well to say that London should not go so fast; what is needed is that some idea should be given as to the loans required for some time ahead, and the probabilities of revenue from street improvements and similar sources. The general impression left by the debate is that those responsible for the financial management of the London County Council are somewhat wanting in restraint.

Rights under Building Schemes.

THE case of *Whitehouse v. Hugh*, commented upon in our Notes, December 2, 1905, has been carried to the Court of Appeal. Certain land in 1875 was being developed by the Birkbeck Freehold Land Society, under a building scheme. In 1878 the plaintiff's predecessor in title had purchased certain plots from the Society, and, having erected a house, had in 1885 conveyed it to the plaintiff. The house was a corner house, and at one side was a roadway, which in 1873 had been roughly made up by the Land Society but never metalled, and at the time when the plaintiff purchased the house this road was overgrown with weeds. Subsequent to the purchase to the plaintiff the Land Society had blocked up this roadway and conveyed the road to the defendant's predecessor in title. The Defendant in 1904 commenced to build on this site, and this action was brought by the plaintiff to restrain him from so doing. On the conveyance to the plaintiff's predecessor in title the road was only marked as "vacant space," and one of the conditions to which the conveyance was

made subject was that the vendors had power to allow a variation of the plans and conditions. The Court of Appeal affirmed the decision of the Court below, dismissing the action on the same grounds, viz.—that the claim to the road as being contained in the plans could not be sustained because of this latter condition; that there was no right obtained by user as the road ended in a *cul-de-sac*; and that there was no dedication to the public by the Land Society. A claim to obstruction of light and air was not persisted in on the appeal.

The Authority of Architects.

THE case of *Betts, Ltd. v. Pickford's, Ltd.*, which is reported in the current number of the *Law Reports*, contains a practical point of some importance as throwing light on the extent of an architect's authority. In this instance Pickford's leased a piece of land on which were some buildings to Betts for the purpose of erecting a warehouse, for which windows and light were needed, and for which Betts stipulated. Pickford's also agreed to clear the land of the above-mentioned buildings, one of which was a large shed which partly occupied the ground, and therefore this part was demolished, leaving however the ends of several of the roof timbers projecting over the boundary line by three inches, and four iron stanchions also stood the same distance within the boundary. During the erection of Betts' new buildings their architect, without their authority or knowledge, verbally agreed with Pickford's architect that the above-mentioned ends and stanchions should be built into the new wall. The result was that the wall became under the London Building Act a party wall, and the Court held that this was a derogation from the grant by the defendants. Then the point arose, was the agreement as to the building in of the stanchions and ends within the scope of the architect's authority? The Court held that it was not. His authority was "to superintend the erection of the buildings . . . according to the plans which had been approved." The Court also remarked that his authority to do the above work could not give him any implied authority "to allow these stanchions and roof beams to be built into the wall." The agreement was no doubt a sensible one, and in many places would have raised no difficulties, but under the London Building Act it produced the intervention of the County Council by making the new wall a party instead of a non-party wall.

Landlord and Tenant.

AN interesting point was decided in the case of *Bourn and Tant v. Salmon & Gluckstein, Ltd.*, in the Chancery Division last week. The basement and part of the ground floor of a house had been leased to the plaintiffs under a lease which contained the clause, "The lessors will from time to time and at all times during the continuance of the said term procure to be paid all rates and taxes payable in respect of the said demised premises." The question was whether the plaintiffs or defendants were liable to pay the amount of the water rate as apportioned to these demised premises,

and the Court held that the covenant made the defendants liable. The learned judge intimated, however, that had his decision been unfettered he would have decided otherwise, but he was bound by the decision of a Divisional Court in a case decided on a similar covenant in 1884.

Over-Bridge Tramways.

GENERAL satisfaction must be felt that the Select Committee of the House of Lords have passed for third reading the Bill of the County Council for constructing tramways over Westminster Bridge, along the Victoria Embankment, and over Blackfriars Bridge. Although various objections were brought against the proposal in Committee of the House of Commons, only two opponents appeared before the Select Committee. The frontagers were concerned about possible dangers to pedestrian and vehicular traffic, and thought that prudent finance demanded the postponement of the project; the omnibus proprietors protested against rate-aided competition with private enterprise, and were also concerned about the financial commitments of the County Council. There is something to be said for those who look with alarm upon the increase of municipal enterprise in London, but in the present case the works proposed are of such manifest advantage that the rejection of the Bill would have been almost a calamity. As the Corporation proposal for widening Blackfriars Bridge has also been approved by the Select Committee the circuit scheme of tramways will soon abolish the very inconvenient termini now established in the middle of busy streets at Westminster and Blackfriars.

Explosion of the Boilers.

A POPULAR fallacy, originated long ago and sedulously fostered ever since by the daily Press, is that the condensation of steam in a closed vessel causes explosion. For instance, referring to the sinking of a ship at Dover on Sunday last, one of our daily contemporaries says:—"She suddenly plunged and disappeared in a cloud of steam, volumes of water being thrown high into the air by the explosion of the boilers." It really ought to be known, even by newspaper reporters, that a given weight of steam is more bulky than the same weight of hot water. The only possible effect of condensing steam in a boiler is to cause a vacuum, and if the shell of a boiler containing a partial vacuum were not strong enough to resist the external atmospheric pressure the result would be inward collapse. Of course, when water gains access to the furnace of a boiler, as happens in a sinking ship, steam is generated with almost explosive force, and produces the effect which is supposed by the reporters and editors of most daily papers to be due to the explosion of the boilers. The absurdity of the theory must be evident to every schoolboy, and we cannot imagine why the daily Press should continue to make themselves ridiculous by its constant reiteration.

The Electrical Production of Nitrates.

PROFESSOR BIRKLAND'S lecture to the Faraday Society last week on the electrical production of nitrates was of

great interest both to engineers and physicists. In the Birkeland-Eyde process a phenomenon discovered when studying high-tension electric discharges with a view of elaborating the scientific theory of the aurora borealis is utilised. When two copper electrodes connected with a high-tension transformer are placed between the poles of a powerful electro-magnet a brush discharge takes place, forming a large flaming disc at right angles to the axis of the magnet. In order to prevent the electrodes heating excessively they are made of bent copper tubes through which water is kept circulating. Air is driven through this electric brush, and the gases formed, after being cooled and oxidised in reaction chambers, pass through towers containing granite, sandstone, and pieces of quartz, on which the dilute acid condenses. The final cooling tower contains ordinary bricks, over which milk of lime is made to trickle. The gases convert the lime into a compound of calcium nitrate and calcium nitrite. A factory has just been started at Notodden, in Norway, for the manufacture of nitrates by this process, and the results obtained up to the present have justified the calculations made by Professor Birkeland. The electric pressure employed is 5,000 volts alternating, and for each of the three furnaces over 600 horse-power is required. It will be seen that when the factory gets into full working order appreciable quantities of the oxygen and the nitrogen in the surrounding atmosphere will be removed, and it seems to us that a factory of this nature might easily become objectionable. If this Norwegian experiment proves a commercial success, and the lecturer had no misgivings on this point, there is not the slightest doubt that the electrical production of nitrates will soon become a very large industry.

Harcourt House, Cavendish-square.

THIS house, occupying nearly all the west side of the square and abutting at the rear upon Wimpole-street, is now being taken down for the erection of new premises after designs by Messrs. Gilbert & Constanduros. The house, which is named as "Bingley House" in Rocque's survey of 1744-6, was built in 1722-3 for Robert Benson, Lord Bingley, after whose death in 1731 it was purchased by Simon, first Earl of Harcourt, who sold it to the second Duke of Portland. In the King's Drawings at the British Museum is J. Rocque's print of the original design lettered: "as it was drawn by Mr. [probably Thomas] Archer, but built and altered to what it now is by Edward Wilcox, Esquire." Samuel Ware rebuilt the stabling in the earlier half of the XIXth century, with the high wall along what is now the southern portion of Wimpole-street. The front screening wall, having two gates, on the east side, the courtyard, and a general air of seclusion, gave the house an uncommon appearance, which is commented upon in the "New Critical Review of the Public Buildings in London," 1736, when its only neighbours in the square—formerly Oxford-square—were the two wings of red brick at the corners of Harley and Chandos streets, ascribed to E. Shepherd and to James, of the mansion designed in 1720 by John Price, but not

completed, for the Duke of Chandos. Harcourt House formed the town mansion of the Dukes of Portland, and was afterwards occupied by the late Marquis of Breadalbane. The lower portions of the structure, now exposed to view, present features which in their details agree with the assumption that Archer was concerned in the designs, being quite after his manner.

THE annual report of the Trustees of the National Portrait Gallery, which was issued last week, should be noted on account of the point made by the trustees that the Gallery needs to be enlarged. They state that without further accommodation the collection cannot be properly arranged, and that it is useless to make additions to the pictures already possessed by them. It is certainly unfortunate that a comparatively new gallery should so soon require extension. The trustees appear to cast longing eyes at the site now occupied by the St. George's Barracks, but there seems to be no chance at present of this ground becoming available. It may perhaps be as well if, in the meantime, the trustees would consider the principles on which portraits should be admitted and retained. Judges, for example, though useful officials, are not as a class persons whose portraits should be admitted, and we are inclined to think that some of the difficulty as to space might for the present be got over by a review of the portraits now in the Gallery. It might also be possible to place a larger number in provincial museums—even temporarily.

At the Fine Art Society there is a most interesting collection of paintings, studies and etchings by Mr. William Strang. Among the paintings is the one, now called "The Sea Pool" (11), which was before exhibited under some other title at Messrs. Agnew's Gallery, the Titianesque quality of which came as such a surprise to those who had only previously known this artist by his etchings, which varied between the grotesque and the pathetic. "The Dancers" (14) is another picture of the same class, not so fine in composition; "Girls Bathing" (20) is another which is masterly in composition and colour. The studies and etchings show how Mr. Strang has been trying the styles of different artists; his portrait of Judge Stephen, of Calcutta (4), is like a recollection of Holbein; the small picture called "The Creation" (34) recalls Blake; and the etching entitled "The Boatman" (42) might have been done by M. Legros. But in spite of these reminiscences, the steps of an artist feeling his way, there is plenty of absolute originality; and many of the etchings are exceedingly fine in their concentrated force of expression, composition, and lighting; we may mention especially "Woman Darning" (39); "The Greengrocer's Shop" (45); "Evening" (59), the two seated figures by the fire, which carries in it indeed a suggestion of Israels; "The Story" (63); "The Traveller" (67) and the "Man with a Cloak" (88), two admirable studies of figures; and the curious and

fanciful composition "The Cat" (100), where a nude figure with her back to the spectator contemplates a large model or *maquette* of a cat. In the adjoining room at the same Gallery is a collection of water-colours, chiefly garden scenes, by Miss Kate M. Wyatt (a relation of the late Sir Digby Wyatt) which are notable for their freedom of style, fine colour, and sense of light. "Azaleas and Dwarf Gorse" (10) is an admirable study in colour; another remarkable in the same sense is "The Lavender Garden, Knole" (17); but besides these foreground studies there are many, such as "The Terrace Border, Brownsea" (11); "The Terrace, Albury" (18); "The Yews, Hutton John" (24); "The Bowling Green, Wrest" (30), which are delightful garden landscapes; while a very successful little picture of "A Sunset Gleam, Honfleur" (46), with the ships and harbour in the foreground, show that the artist's talents are not confined to one class of subject.

At the Dutch Gallery in Grafton-street is a collection of "Water-colour Drawings by Sir William Eden, Bart.," which are in fact no more than sketches, sometimes very slight, but have the interest belonging to the work of an amateur who can see effects of colour and composition truly and record them effectively. "The Old Market Place, Milan" (2) is an excellent memorandum of colour and character in a city scene; "Villa d'Este, Tivoli" (11), is seen in profile against a glowing evening radiance given with remarkable clearness of effect; "Harrogate" is a sketch showing a very fine sky; "Wemmergill, Yorkshire" (31), and "Amersham" (44) are good sketches; while a delicately executed representation of "An Oriental Vase" (20) and a portrait (if one can call it so) of "Lady Eden" (39) seated with her back to the spectator, show that the artist's talents are not confined to landscape sketching.

NOTES ON OLD LONDON.

(Concluded from last week.)

St. Paul's Church.—An Act of 1660 erected the precinct of Covent Garden into a parish taken almost entirely out of that of St. Martin-in-the-Fields. After the fire on September 17, 1795, T. Hardwick restored the church; he displaced Inigo Jones's bell turret for a cupola, rebuilt, of stone, the two rustic east gateways of brick and plaster, and removed the stucco of 1788. In his print of "Rich's Glory" Hogarth draws a flight of steps between only the two inner columns of the portico. Authoritative drawings, for instance, those by Hollar; John Sellar; Colin Campbell, a full set to scale; T. Malton, 1774; J. Maurer and A. Pugin's plan of November 1, 1823, evince that the portico rested upon a stylobate ascended by steps cut in its north, east, and south projecting portions. The removal of the platform renders the floor level with the footpath; that was done, we gather, in 1872, when Butterfield made some rearrangements. The railings were taken away from around the portico in 1879, a manifest improvement; the two bells hang in the west pediment, Hardwick's cupola having been taken down in fear that it might endanger the roof. Over the altar is a composition with two angels, by T. Banks, R.A. The graveyard has been levelled and replanted.

Floral Hall.—Gye projected a "floral arcade" for London florists. Opened with a Volunteer ball on March 7, 1860, it served its intended purpose for a few months, and was then used for concerts and exhibitions. The plan is L-shaped; E. M. Barry's design is a signal advance beyond most structures after

that kind [February 11, 1860, with details of the iron front, and block plan]. The dome, rising to 90 ft., has a span of 50 ft., the main body is 225 ft. by 75 ft.; the basement, now converted for storage, is 16 ft. high. C. & T. Lucas were the general contractors, and H. Grissell for the iron and glass. In the spring, 1888, the Duke of Bedford bought the hall as an adjunct to the fruit market. The south wall, of red brick, was dressed with stone and pierced with new doorways. Though the line of Great Piazza is continued in the iron arcade, the juxtaposition of the two presents an incongruous effect.

Orford House, next west to Great Piazza, was built in or about 1716 for Edward, grandson of Francis, fourth Earl of Bedford, who, for his victory over De Tourville's fleet near Cape La Hogue, 1692, was created Earl of Orford, May 7, 1697. It displaced a house that had been occupied by many notable people—Sir William Alexander of Menstrie, the Scots poet and statesman and friend of Henry, Prince of Wales; Tom Killigrew; Denzell, Lord Holles; Sir Harry Vane, who, says Aubrey, had his laboratory there; and Nathaniel, Lord Crew. Bishop of Durham, at whose door they laid the parish foundations. The fanciful resemblance of the red-brick Dutch façade to the stern of a man-of-war is diminished by the removal of the lofty frontal. Admiral Russell used timbers of his flagship *Britannia* at La Hogue for the finely-carved main stairs, and other portions of the fabric. Lord Orford (*ob.* 1727 *s.p.*) devised the house to Thomas Archer, created Baron Archer in 1747, who lived there until 1758. Hogarth portrays Lady Archer in his picture of Covent Garden. Andrew, second and last Lord Archer, married Sarah, daughter of James West, P.R.S., the bibliographer, who went into residence there. Two years after West's death, in 1772, David Lowe opened the house as a family hotel—the *hotel garni* of Walpole, and it seems the first hotel after that kind in this quarter. "The Grand Hotel" appears on its front in T. Malton's aquatint of 1796; there is another good view by Sutton Nicholls of about 1725. W. C. Evans, of Covent Garden Theatre, leased the hotel which, as "Evans's," became a favourite resort. To him succeeded, in 1844, John, or "Paddy," Green, who managed the business during nearly thirty years. The Institute met at Evans's when first established under the presidency of Earl de Grey (1835-59). W. Finch Hill built over the garden the large supper and music room (December 22, 1855), 72 ft. long, making with the old room a music-hall 113 ft. by 55 ft., divided by columns of Bath stone having wreathed Ionic capitals into a nave and two aisles. It is the "Bivins's Harmonic Cave" of Thackeray; yet some question whether "Evans's" or the "Cyder Cellars" in Maiden-lane is the Cave of Harmony wherein Colonel Newcome sang "Wapping Old Stairs" as he learned it from Inledon. The house has latterly been occupied by the Savage, Vauxhall, Falstaff (1882) New (1883), and other clubs. The effects, theatre, etc., of Evans's Club were sold at auction on June 17-19, 1890; John Fleming opened the National Sporting Club there on March 5, 1891. For the Falstaff Club Albert Calcott decorated the (old) billiard-room upstairs with a set of paintings of the homes of characters in the "Merry Wives of Windsor."

Bedford House, Tavistock-row, and Tavistock-street.—After the attainder of Protector Somerset, the Crown granted, in May, 1552, to John Russell, first Earl of Bedford of that house, the conventual home farm or garden, together with the Elms Close, or Seven Acres, lying to the north through which ran a by-way, cited in 1612—the later Long-acre. Either the Earl John, or his son Francis, built in the Strand (Southampton street), and opposite their former home the Bishop of Carlisle's "inn," what Strype

describes as—
"a large but old built house, having a great yard before it for the reception of coaches, with a spacious garden, having a terrace walk adjoining to the brick wall next the garden."

The front yard was entered from the Strand. The garden wall to the north became the southern wall of Covent Garden. Two plans, one of about 1680, the other of 1690, plot Bedford House (constructed mainly

of wood) as extending from the Strand to the southern side of Maiden-lane. To the north lies the house garden, with a smaller garden eastwards. The entire garden blocks the eastern end of Maiden-lane, and on the east side it is separated from the stables by a passage—since Tavistock-court. The stables are entered in the south western corner by a way, leading from the courtyard, now represented by Tavistock-street; there are two stable gates facing northwards at what was then the elbow of York and Charles streets. Charles street is now absorbed in Wellington-street, passing over the site of the gateway and portion of the stable-yard. The courtyard has another approach from the end of Exeter-street (Denmark-court). In the plan of 1690 the garden walls have three rounded bastions, whereof two turn out of the northern wall and the other turns westwards behind Maiden-lane. After the demolition of Bedford House in 1704, Tavistock-row, which is shown in Canaletti's picture cited above, supplanted the long wall to the north, and has in its turn succumbed. In December, 1885, was dismantled the last remaining house, No. 13, where lodged Zincke, the famous enameller and miniature painter. Nathaniel Dance, and Dr. Wolcott, who there, in a garret, began his literary career as "Peter Pindar." At No. 4, north west corner of Tavistock-court [April 15, 1676] Charles Macklin, the veteran of the stage, whom Murphy happily named the black letter copy of Macbeth, passed the close of his long life, and in that house Lord Sandwich, after purchasing some neckcloths, first saw Miss Reay, who had served her apprenticeship at a mantua-maker's in St. George's-court (since Albion-place), St. John's-lane, Clerkenwell. In No. 5 lived and died (1707) William Vandervelde the younger, and Thomas Major, engraver to the Court and the Stamp Office, who, in 1784, furnished in twenty hours a perfect substitute in brass of the Great Seal stolen from Lord Chancellor Thurlow's in Great Ormond-street.

Covent Garden Theatre and Royal Opera House.—The annals of the stage are silent about any theatre in Covent Garden before Rich went thither from the Duke's Theatre in Lincoln's Inn-fields. A ticket, inscribed "for the Musick at the play house in Covent Garden, Tuesday, March the 6th, 1704," relates doubtlessly to that in Drury-lane. A fire on the morning of September 20, 1808, destroyed the Shakespeare Tavern and Apollo room in the angle of the two Piazzas, some adjoining property, and the theatre which Edward Shepherd built for John Rich, who opened the house on December 12, 1732. The auditorium, 55 ft. deep, and the stage stood north and south. Handel's "Messiah" was performed there in 1741, and on March 28, 1800, Haydn's "Creation," for the first time in London. The Ionic doorway (see T. Malton's aquatint of 1796) in Great Piazza gave access to the auditorium: at the north end of Little Piazza remained until lately the older and smaller door where, on April 7, 1779, Hackman shot Miss Reay whilst awaiting her coach after the play of "Love in a Village." Holland made some alterations in 1794; in 1803 Cresswell and Phillips greatly improved the auditorium, adding sixteen private boxes entered from Bow-street, where also was the pit door; see the water-colour drawings by W. Jones and T. H. Shepherd, 1808, in the Grace Collection. The theatre, rebuilt by Sir Robert Smirke, R.A. (see lithograph), assisted by C. R. Cockerell and John Newman, was opened with "Macbeth" on September 18, 1809, by John Kemble, whose new scale of prices occasioned the "O.P." disturbances that lasted ten weeks before the public gained a victory. The insulated house occupied an area larger than that of any contemporary theatre in Europe. The frontages to Bow and Hari streets extended, over all, to 220 ft. and 178 ft.—the actual building, the portico excepted, being 209 ft. 3 in., by 166 ft. 4 in. (*Builder*, March 22, 1856). The structure presented an example of an early use of cement for an important public building, and the tetrastyle portico one of the first specimens of the revival of the Grecian Doric mode. Flaxman's and Rossi's statues of the Tragic and Comic Muses, with Flaxman's bas-reliefs of the ancient and modern drama adorn the later building. The auditorium, to the south, for 2,800 persons, measured

51 ft. by 52 ft. 9 in., the stage to the north was 68 ft. deep, and 82 ft. 6 in. wide from wall to wall, the proscenium extending 38 ft. 8 in. between the pilasters. The Anti-Corn Law League rented the house in 1843-5, and Messrs. Grieve fitted the interior as a Tudor Hall for the bazaar. In December, 1846, Albano began a thorough reconstruction of the interior [April 10, 1847], expending 40,000*l.* in all, and on April 6, 1847, the house was reopened for Italian Opera with "Semiramide." Sir Michael Costa being musical director. There Julien gave his popular promenade concerts, and Grisi took her farewell on August 7, 1854. At the close of a masquerade ball given by Anderson, the conjuror, a fire, on Wednesday morning, March 5, 1856, caused damage computed at 250,000*l.*; Queen Victoria went to see the ruins. E. M. Barry (*ob.* 1880), the architect of the new house, planned the auditorium and stage to the east and west; Frederick Gyo opened the season with "Les Huguenots" on May 15, 1858. The whole height from the floor of the pit-tier boxes to the crown of the ceiling was 61 ft.; below that level the lower basement floor beneath the pit and stage descended to 23 ft. The whole height from the bottom of the footings to the lower flange of the roof-girders—themselves 9 ft. more—was upwards of 85 ft. The highest portion of the walls at the west end rose to 95 ft. from the street, and 109 ft. from the basement floor. On iron truss girders, had a ridge-and-furrow covering. The interior dimensions were:—From curtain to front of central box, 81 ft.; width between boxes, 63 ft.; proscenium opening, 50 ft. wide by 43 ft. high; stage, 60 ft. deep from curtain-line and 90 ft. wide between the walls. C. & T. Lucas were the general contractors, and H. & M. D. Grissell sub-contractors for the ironwork [October 24, 1857, east front; April 2 and 16, 1859, interior, plan, on grand-tier level, and section]. In 1893 Mr. Pilditch altered the gallery and basement and carried out some structural improvements to protect the auditorium and dressing-rooms from fire by means of concrete floors and ceilings and iron doors. In January March, 1899, the Grand Opera Syndicate, sub-tenants, took over the forty-six years' remainder of the lease held directly from the Duke of Bedford, and engaged Mr. Edwin O. Sachs as their technical adviser for extensive improvements, including sanitary rearrangements, installation (by Mr. Wingfield-Bowles) of electrical light in four colours; a large "wing" store, redecorations, and so on. Mr. Sachs followed those alterations with a complete modernisation of the whole house and stage; all the works are fully described in the *Builder* of June 6, 1899; May 4 and June 1, 1901 (with plans of the house and stage and a section); and May 24, 1902: Messrs. Colls & Son being general contractors.

Bow-street.—In the days of Dryden, Wycherley, Congreve, and the *Spectator* Covent Garden and Bow street (1637) were the St. James's-square and Bond-street of that part of the town.

"I've had to-day a dozen Billet doux
From Pops and Wits, and Cits, and Bow-street
Bouxy
Some from Whitehall, but from the Temple more—
A Covent Garden porter brought me four."

Thus Mrs. Bracegirdle, in reciting at Drury-lane Theatre Dryden's epilogue to "King Arthur." The upper end of the once crooked street, which ceased to be a fashionable quarter in about 1725, terminated in a *cul-de-sac* abutting against Long-acre a few yards east from Phoenix-alley, since Hanover-court. The widening of the later narrow Bow-court formed part of Chawner and Pennethorne's improvement for Endell-street and Long-acre—see *Builder*, July 2, 1904, with plan. On the west side were the pit, and, after 1803, the box entrances into Rich's Theatre, for which was pulled down the house inhabited by Dr. Radcliffe at the time of the memorable dispute about his garden door with Sir Godfrey Kneller in Little Piazza. In the next house, south, Waller's home during two years, was established the police-court, with three magistrates in 1749—confer Sir Patrick Colquhoun's "Treatise on the Police of the Metropolis." By a Magistrate's third edition, 1796, Sir John Fielding, the first residing magistrate, lived in the house, as did his half-

brother and fellow-justice, who there finished his "History of Tom Jones, a Foundling," and wrote "Amelia," 1749-51. The "No Popery" rioters sacked the house on Tuesday, June 6, 1780. Its successor, constructed of red brick, could be identified in our time by its stuccoed front, rising one floor above its neighbours, the railings before Nos. 3, 4, and 4A having terminals in shape of Roman fasces, and by the high-pitched gable at the rear. The police-court and cells to the south were on the ground floor at the back. The house, Nos. 4 and 4A, was with Nos. 3 and 5 taken down in the winter 1887-8 for the foreign flower market. Opposite, in the early years of the century, stood the Old Brown Bear, which, having served as the police-station until the completion of the new court and offices, was adapted for constables' lodgings. A metal plate on the wall of one of the women's cells marked the boundary of St. Paul's and St. Martin-in-the-Fields parishes. When the lease expired ten years ago quarters for unmarried men were established in Clark's-buildings, High-street, St. Giles. The old station, on the Bedford estate, is now the Opera Hotel, having two columns in the doorway. The old court and station were the cradle of the Metropolitan force; the detective department originated in the Bow-street "runners," of whom Towns- end was the chief. Sir Robert Peel's Act, 10 George IV., c. 44, superseded Sir John Fielding's horse patrol, the Bow-street foot patrol, and all the parochial watch and police outside the City. V. G. Dowling, editor of *Bell's Life in London*, claimed to have initiated the present system of a force which derives from the night watch established in 1253. For the new police-court and station [Sir John Taylor, June 21, 1879, drawing and plans], opened in 1881, and enlarged in 1902, were taken down Duke's-court at No. 27, and Nos. 22-30 between Broad and Market- court. The buildings, which afford sleeping accommodation for 100 men, cost about 40,000l., Messrs. Geo. Smith & Co. being the contractors. The site was leased from the Duke of Bedford for ninety-nine years at a ground rent of 1,300l. per annum. Broad-court is almost entirely rebuilt; Market-court, formerly Market's-row, has lately been cleared for a footway into Drury-lane, and with it the homes of John Mills, comedian (*ob.* 1736); Thos. Hull (*ob.* 1808), founder of the Theatrical Fund, and an actor at Covent Garden during forty-eight years; Shuter, actor, at No. 2, in 1756; Suetts, the very personification of famous whimsicality and whose laugh was a peal of giggles; Thomas Dibdin; O'Keefe, dramatist, in or about 1780; and it is said, Harriet Mellon, who married Thomas Coutts. No. 20, the London, City, and Midland Bank, and the adjoining block in Broad-court, are by Mr. R. Selden Wornum, 1897. In 1848 H. Roberts (*ob.* 1876) enlarged and improved the Scottish National Church [July 8, 1843], by R. Wallace, 1842, in Crown-court, after the Norman style, with two outside flights of stone steps, and built the adjoining schools. Tavistock Chapel, now St. John's Church in Broad-court, was remodelled by Butterfield in 1855-6, and altered and repaired by Messrs. M. Hills & Son in 1894; the stained glass of "The Majesty" above the altar is by Wallis. *Theatre Royal, Drury-lane.*—The wittiest volume of parodies in our tongue keeps alive the memory of an eventful day in the story of Drury-lane Theatre:—

"Sobriety cease to be sober,
Cease labour to dig and to deliver,
All hail to this tenth of October,
One thousand eight hundred and twelve."

On that day Sheridan opened, with a prologue by Lord Byron, the house built by B. Dean Wyatt to replace that by Holland (*ob.* 1806) (see lithograph). The conflagration in the night of February 24-5, 1809, was visible from afar; in the Guildhall Art Gallery is A. Pether's view of the theatre in flames as seen from Battersea Bridge. There had been no play that evening; Sheridan was in the House of Commons, and opposed, upon public grounds, a motion for adjournment; Kelly, acting-manager, says he remained at his post, thus falsifying the story that Sheridan was drinking at the Harp in (Little) Russell-street, and, on being told a fire had broken out, replied that surely a man might take a glass of wine by his own fireside. Holland's

Theatre, opened on March 12, 1794, succeeded the King's House in the Riding-yard, so often mentioned by Pepys, latterly known as the Theatre Royal in Brydges-street, Covent Garden, and pulled down in 1791, which Wren had rebuilt in 1673-4, after the fire in January, 1672, that consumed sixty houses besides. Adam added the west front in Brydges-street in 1775; Gwyn's plan shows that in Garrick's time the theatre stood where is the present auditorium. At the two corners, north and south, were the Rose and Windmill taverns: "supper and friends expect me at the Rose." Holland's theatre, on a site 320 ft. east to west, by 155 ft. north to south, had 3,611 seats, including 800 in a pit 54 ft. by 46 ft.; the stage measured 105 ft. deep by 75 ft. A colonnade screened part of the north side; the design remained unfinished at the time of the fire when the fabric had already cost 200,000l. The allusions to Samuel Whitbread, M.P., in "Rejected Addresses" are explained by the fact that he played a leading share in reinstating the renters' affairs. Wyatt based his plan upon that of the theatre at Bordeaux, famed for its acoustical properties. His main building measured 131 ft., north to south, by 237 ft., east to west, the scene-rooms, etc., extending 93 ft. further. Wyatt planned the staircases and landings with space enough for nearly as many, 3,060, as could collect in the auditorium. The tender for 112,750l. by Henry Rowles, was, it is said, one of the first *bona-fide* contracts made in London; other expenses for fittings, etc., amounted to 13,040l.; see the *Builder*, with Hodson's letter, September-October, 1855. Either James Spiller or Soane added the portico in 1820, and S. Beazley the colonnade of hollow iron Ionic pillars in 1831. In 1822 Beazley remodelled the interior; altering it from a three-quarter circle having a diameter of 58 ft. across the pit between the breast-work of the dress boxes, to a nearly horseshoe form measuring 48 ft. from the stage to the dress boxes by 46 ft. 6 in. at the two ends; the stage being 96 ft. to the back wall by 77 ft. 5 in. between the walls [October 2, 1847; interior as redecorated for F. Gye]. The proprietors pulled down four houses in Marquis-court for an addition, by Phipps, to the east buildings in 1884; at that time Sir Augustus Harris, lessee, paid a rent of 6,000l. per annum, plus 10l. for every performance after 200; the Duke of Bedford taking 1,355l. as ground rent under the lease of seventy-five and a quarter years from September 29, 1819, and the new renters' trustees 3,100l. per annum. The patent of April 25, 1662, empowered Killigrew, his heirs, etc., to erect without limit of time:—

"One theatre . . . in any place within the cities of London and Westminster or the suburbs thereof to be assigned and allotted out by the surveyor of our works."

In 1893 the Duke of Bedford declined to renew the lease in view of a contemplated extension of the market, and stated, further, that, as he was only tenant for life, he felt unable to grant a short lease except at a rack rent. On November 11, 1897, the renters and debenture holders closed their accounts and agreed to a final dividend of 4l. 9s. on 293 subsisting shares. In 1897-1901 Messrs. Campbell Smith & Co. carried out Mr. P. E. Pilditch's scheme of redecoration within and without; the structural works by Mr. Pilditch comprised new exits, a new system of ventilation, reinstallation of electrical light supply in two alternative services, reconstruction of the grand and first circles of fire-proof materials, and the erection of workshops, stores, ballet-rooms, etc., with a block of shops and residential flats in Drury-lane to the south and east. On March 26, 1904, this journal printed a list of the London County Council's 143 requirements for, mainly, the protection of the audience and company from fire. H.M.'s Office of Works nominated Mr. John Slater as arbitrator between the parties; in the result Mr. Pilditch was appointed to carry out a large number of structural alterations at a cost of nearly 25,000l. At the north-west angle, where stood the Rose, is the Harris Memorial, 1897, a drinking fountain designed by Mr. Sidney R. J. Smith, with a bronze bust by Mr. T. Brock, R.A.

Drury-lane.—In 1877 the late Metropolitan Board of Works applied to Drury-lane the provisions of the Artisans' and Labourers'

Dwellings and Improvement Act, 1875. They obtained statutory powers in respect of nearly all the area between Great Queen-street, Great Wild-street, Prince's, renamed Kemble, street, and Drury-lane. The condemned quarter was traversed from Drury-lane to Great Wild-street (1651) by Lincoln-court, formerly Stewart's-rents, and previously Holford-court; Brewer's-court; Wild-passage; Orange-court, where typhoid fever broke out in the autumn of 1879; Pit-place or Cockpit-alley, site of the Cockpit or Phoenix Theatre; and Princes-court. Orange-court was barely 5 ft. wide, the two entrances were narrower; the upper stories in the courts and alleys leaned forward; the all-pervading poverty, dirt, and disease were unrelieved by even the few touches of gaiety and brightness that characterised the Rue de Calandre and similar purlieus of the old Cité of Paris described by Eugene Sue. The Peabody-buildings, erected there in 1880-1, occupy the western confines of Oldwick Close or Aldwych Field owned by Sir Henry Drury and Harry Holford, *temp.* Elizabeth, and since by Humphrey Weld, who built Great Wild-street and nearly all the houses between that street and Drury-lane in and about 1651 [November 18, 1854, Wild-court]. The Housing of the Working Classes Act, 1903, requires rehousing accommodation to be provided where thirty of that class are displaced under any Bill in the County of London; before that Act the limit below which rehousing was not required was twenty houses in any metropolitan borough. On October 15, 1895, the London County Council resolved to clear the insanitary areas between (a) Drury-lane, Stanhope-street, Blackmore-street, and Kemble-street; (b) Clare-street, Clare Market, Houghton-street, and Stanhope-street; and (c) White Hart-street, the Strand, Drury-lane, Drury-court, and Helmet-court (Fig. 1), wherein the death rate had reached nearly forty in 1,000, the population being 3,038. They, for rehousing purposes, amalgamated that scheme with the measure for the new thoroughfare to High Holborn. For some of the 3,700 ultimately dispossessed, they provided homes on the Duke's-court and Marquis-court sites, and in Kemble-street House, a lodging-house for 610, at the corner of Drury-lane; in October, 1893, they agreed to buy land from the Duke of Bedford for 118,740l. for the three blocks of Sheridan, Beaumont, and Fletcher buildings on the west side of Drury-lane to the north of Russell-street. The "property" and store rooms added to the theatre in 1884 absorbed Vinegar-yard garden within the curved wall, and the pit door of Wren's house facing Cross-court. In "My First Play" Charles Lamb writes:—

"At the north end of Cross-court there yet stands a portal, of some architectural pretensions, though reduced to humble use, serving at present for an entrance to a printing office. This old doorway, if you are young, reader, you may not know was the identical pit entrance to . . . old Drury—Garrick's Drury—all of it that is left."

On the north wall, east end, of Marquis-court, pulled down in December, 1894, was a well-designed stone tablet inscribed "Marquis Court, 1763." The court derived its name from the Marquis of Granby public-house, adapted in 1885 for a working-boys' home. In Vinegar-yard, mentioned in "Roderick Random," "The Memoirs of Mr. C. J. Yellowplush," etc., a corruption, probably, as in St. Giles-in-the-Fields, Aldgate, and Bermondsey, of Vineyarden-yard (1621), was the home, in her girlhood, of Fanny Barton, Mrs. Abington, successor to the comic muse of Mrs. Pritchard and Kitty Clive, and unrivalled as Lady Teazle and Miss Prue: Lockie's "Topography of London," 1817, calls it Vine-yard. A plan of 1700 plots the Windmill Tavern at the north-western corner; at the south-western corner stood the Whistling Oyster. In the first-floor room of the Crown, opposite Lady Burdett-Coutts's box-door, the first contributors to *Punch* met for the weekly dinner, the room was afterwards used by the Reunion Club, and in 1857, by the Savage Club; the (old) Eccentric Club migrated from Chandos-street to the Crown. The west portion—named "Little Bridge [Brydges] street" in Gwyn's plan of 1766, and "Woodburn-street" in Horwood's survey of 1799—was closed in 1890, and covered over for a pit and gallery entrance to the theatre

in November, 1899, affording shelter for playgoers who have lately adopted the *queue* system. Between Vinegar-yard and Russell-court, and overlooked by the *Builder* offices, lay the long-neglected burial ground, 112 ft. by 40 ft., of St. Mary-le-Strand, converted by the Metropolitan Public Gardens Association into a playground, 1886. A faculty of July, 1897, provided for the interment of all human remains at Woking, and the London County Council, who had taken over the maintenance of the playground seven years previously, arranged with the Duke of Bedford and his trustees to throw the area, together with Russell-court, into new York-street, paying in compensation 500*l.* to the Association, and 2,500*l.* to the vestry and rector of St. Mary's. The iron-barred gate at the end of the covered passage—"a reeking little tunnel of a court"—from Russell-court, the stone step, and other details contribute to the identification of the graveyard with that of which Charles Dickens writes so gruesomely an account in "Bleak House," whither Jo conducts Lady Dedlock to see Hawthorn's grave.

SOME NOTABILITIES

Strand.—C. Forster Hayward's plan for new street to High Holborn (November 13, 1882); proposed widening by the Strand Improvement Association, H. W. Brewer's bird's-eye view (December 26, 1885); plan for improvement (April 20, 1889); Mr. P. G. Jackson (April 27, 1889); and Mr. Cavston (February 15, 1890). The Cross, and after it the Maypole, opposite a point midway between Drury and Windsor courts. John Gargen's maypole renewed in 1715, given by Newton 1718 to Dr. Pound for his telescope in Wanstead Park; first hackney-coach stand to west of the maypole, 1838; St. Mary's Parapets and vases repaired 1879—Butchered; all stone-work restored 1889—Mr. M. Anderson; drawing of steepie [July 26, 1888] by J. T. J. Kitchie from his and Mr. J. Hinchings' measurements; view from north-east, across the cleared ground [April 9, 1904]—Mr. A. C. Conrade; 352 [June 28, 1902]—Mr. T. E. Collett; 323-4, Conrade; 322 [February 27, 1885]; for Mrs. S. S. Forrie—T. E. Knightley. *Lyons' Inn*: The hall (1700), Ireland's print, 1890; Architectural Association, 1885; Professor Kerr, first president, the sign of a carved lion from Holywell-street to Guildhall Museum, 1888. *St. Clement Danes*: the sign of a carved lion from Holywell-street to Guildhall Museum, 1888. *St. Clement Danes*: Complete restoration of interior and exterior, 1897-8, by H. Curry; pews lowered, two lower windows in apse opened out, aisle-groining and arched ceiling and spandrels of vaulting cleaned and coloured by Messrs. Burlison & Gyllis; organ, by Father Smith, rebuilt 1856 by Robson; tablet, 1881, in Dr. Johnson's pew in north gallery, east end; glass in the three upper windows in north wall by Collins, 1844; two wooden gates at west door designed by Street for another church (see also *Builder*, August 6, 1892); view from north-west, across the burial ground [February 20, 1904]—Mr. A. C. Conrade; 413 and 415, two old houses, at Heathcote-court.

Bedford-street.—Post Office—Jas. Williams (ob. 1872); C. S. Storey—Lockwood & Mansons (August 8, 1877). *Exeter-street*.—Dr. Johnson first lodged in London at Norris a staymaker's, 1737. *Lyceum Theatre*: Society of Beelzebubs, Dr. Johnson, Isaac Ware, and John Webb, members; Ball's English opera opened, 1841; Charles Matthews the younger and Mme Vestris, 1847-56; Mme. Ristori, 1856; Fechter, 1852-56. *Wellington-street*.—Printed by printer, 1865. *Clatter-street*.—Editors of the *Builder*, J. A. Hansom (ob. June 29, 1882) took out patent for the cab, 1856, brought out the first number on December 31, 1892. A. B. Holman, F.R.S. (ob. January 2, 1845); George Godwin, F.R.S. (ob. January 27, 1888), retired October, 1883; Mr. H. Heathcote Statham: A Retrospect, Vol. I. of the *Builder*, April 6, 1904. *Covent Garden*.—Hart, originally Elm, since December, 1895, Floral-street. *Plazza*: Langford's, formerly Cock's afterwards Robins' auction rooms; the second Beefsteak Club at Langford's; ground-plot, with Bedford House about 1690, from a drawing peres J. C. Crowle, copiously annotated, Smith's "Westminster," 1897; Winston's water colour, 1808, and lithograph after W. Daniell, A.R.A., 1809, of front, Covent Garden Theatre, Grace Collection. *Garrick-street*.—With subway, by the late Metropolitan Board of Works, 1863-4, at a net cost of 34,140*l.*; Garrick Club-house—F. W. Marrable. *King-street*: 35 (altered as a bank), the Garrick Club, the G., the little G., the dearest place in the world," of Thackeray (ob. December 24, 1863); Westminster Insurance Office, 1867—T. Little, on site of Speaker Lenthall's house; Charles's second refuge from Lovelace "at Mr. Smith's, a glove-shop in King-street Covent Garden." *Long Acre*: 137, Dryden, 1692, the last that survived of his homes in London, taken down a few months ago; 124, for Mr. F. Stanford—Messrs. Reid & Macdonald, in the rear, between Rose-street and Conduit-court, were the house and stone-yard of Nicholas and his sons until 1660; see a survey of Elm Close, 1650, and Verne's note in the Stone MS. *Account of Works*: 1637—W. Westmacott, for John Hutton's singing schools (1841), from Exeter Hall, after a fire on August 26, 1860 converted for Alfred Wren into the Queen's Theatre for an audience of 2,500—C. J. Phipps; opened as a gymnasium, June 7, 1888, by the National Physical Recreation Society; the Mercers' Company's estate of 10 acres, once known as Elm Field, or Close, bounded by St. Martin's lane, Castle-street, Drury-lane, and the north side of Long-acre, is all they have retained of Dame Joan Bradbury's devise, 1599, of 120 acres in St. Giles and St. Martin, and 29 acres in St. Marylebone

parishes; the Company's cognisance of a demi-quin, crossed, issued from the clouds at 139, 140, and 142, has been mistaken for Joan. *Tavistock-street*.—North side pulled down in 1887, and a market-house built at east end on the site of Bedford House, stable, 1813. *Taverner-row*: Strand Board of Guardians' Offices—R. Walker (ob. 1896). *Henrietta-street* (1637)—At Rasthwell's coffee-house Dr. Mead, and Society of Art established, 1754; St. Peter's Hospital, 1822—J. M. Brydon (ob. 1901); Woburn-chambers (February 19, 1888)—C. Gray; London and County Bank, 1889—Mr. A. Williams. *Madden-lane*.—Turner, R.A., until 1800, at his father's house, 26, on the north side, at the west corner of Hand-court, two drawings in Archer's "Vestiges," pulled down, 1891; Pohl's Ireland; 20, Cedar Cellars, haunt of Chatterton and Porson, Andrew Marvell, Voltairre at the White Perique; Corpus Christi Church, memorial to Cardinal Manning—Mr. P. Fitzgerald.

York-street.—Samuel Baker, 1748, founded Sotheby's, removed 1804 to 241 (now 140) Strand, in 1818 to 3 (now 3) Wellington-street; tablet, 1636, at 4-5, H. G. Bohn (ob. 1884) started at 4 as a second-hand bookseller, 6, Bell & Daidy; street extended eastwards to Drury-lane, 1889-90; Siddons and Strick buildings for 390 in eighty tenements—Mr. W. E. Riley. (Great) *Russell-street* (1634): Sir Edmund Verney leased, at 153*l.* per annum the two houses north and south, east end, the ordinary rooms had only shutters, but there were fixed locks on the doors, a "latest improvement" in that day—see *Memoirs of the Verney Family*, 1892. 7, Tom's, closed in 1814, rebuilt in 1865, relics sold at Sotheby's, July 3, 1899, see *Builder*, August 9, 1899; 17, T. Mill, tablet, 9, Sir William Chambers' son, Nicholas; 9, Butlers, the lion's head here, 1733-35, then taken to Shakespeare Tavern, Great Piazza, bought for 17*l.* 10*s.* on November 8, 1804, by Richard C. Mr. of Covent Garden; 10, the head here, 1733-35, Duke of Bedford; 8, lately the Caledonian coffee-house, Tom Davies there introduced Boswell to Johnson, May 16, 1765; 7, taken down June, 1905; Thomas Crispin, watchmaker, 1719, his brother Charles, line engraver, and his son Charles, portrait painter; 20, Charles and Mary Lamb, 1817-23; 21, Willis's (Russell-street), 1822—Mr. A. Vickers; 18, 1891, 1895, pulled down 1902, and the Harp, banister of actors, etc.

Drury-lane.—Cock and Mapple, opposite Craven-building (December 13, 1897). Cornwallis House, Sir Lewis Leake, temp. James I., taken down 1807 for widening north end; St. Martin-in-the-Fields burial ground laid out by the Metropolitan Public Gardens Association 1877, opened as a playground with gymnasium 1890, 141-4, for Messrs. Lambert & Butler—C. P. Hayward (ob. 1901); St. Mary-le-Strand hall and library, 1892—Mr. A. Vickers; 8, 8, for Messrs. Hart, Son, Peard, & Co., 1892—Mr. R. F. Russell, schools in Macklin-street—J. J. Soles (ob. 1853). Streets renamed: Betterton (once Broadway), Goldsmith (Coal-yard), Macklin (Charles, formerly Leake's-land), Shelton (King), and Kemble (Princess). Pulled down since 1865: 1-15, Wynd-street to Short-street; 47-54, with Dukes-court, 124-40, for Peabody buildings; 65-123, with White Hart-street, Craven-buildings, Craven-yard, Black-roof-street, Clare-court, and White Horse-yard; and Drury-court, Vinegar-yard. At the Dove, John Symphon engraved many of Hogarth's pictures.

LETTER FROM PARIS.

THE Municipal Council purchase every year, out of the two Salons, a certain number of works of painting and sculpture. The former go to augment the art collection of the Petit Palais; the sculptures are for the most part for the decoration of the squares and other public places of Paris. So far, the purchases of pictures have always been confined to the works of French artists. This year, for the first time, the Council have purchased a work by an English painter, "Le Dernier Voyage," by Mr. Frank Spence, exhibited at the Old Salon. This first exception, made in favour of an Englishman, may be regarded as a new manifestation of the "entente cordiale."

During its last session, the Council decided on rebuilding and enlarging the Pont des Saints-Pères, which, in consequence, will be for about three months closed to public traffic. This bridge, where the traffic is very great, was built in 1834 from the designs of the engineer Polonceau. It connects the Square Voltaire with the Quai du Louvre, and is composed of three arches in iron formed by tubes with an elliptical section. It is decorated at its two ends with statues by Pétitot, symbolising respectively "Abundance," "Industry," "The Seine," and "The City of Paris."

Thanks to M. Dujardin-Beaumetz, the Under-Secretary of State for Art, the garden in the Cour de Carrousel, behind the Gambetta monument, adorned with masses of lilacs, is to be consecrated to the memory of French sculptors and painters. Four symbolical groups are to be erected in it. One of these, M. Landowski's group of "Les Fils de Caïn" (the shepherd, the poet, and workman), is one of these. Painting, sculpture, and architecture are to be the subjects of the three other groups, which will include portrait busts of celebrated artists, such as Poussin, Watteau, Rude, and others. The scheme will probably be completed by the monument to

the French landscape-painters which, as already mentioned, it had been at first intended to erect on the Cours La Reine. But in accordance with the subsequent decision of the Council to allow no more erection of sculpture in the Champs Elysées, it is probable that this monument also will find place in the Cour de Carrousel.

An old project, formerly much discussed, has recently been revived, which it carried out will give Paris a splendid new road. This is, to prolong the line of the Avenue de la Grande Armée as far as the Croix de Noailles, in the Forest of St. Germain, thus making one great straight line of road of the Avenue des Champs Elysées, the Avenue de la Grande Armée, and the Avenue de Noilly, as far as the Pont de Courbevoie. The cost of completing this great avenue, which will necessitate two bridges over the Seine, is estimated at ten million francs. It would form, between the Tuileries and the terrace of St. Germain, a promenade unique in the world.

The Ministry of Fine Arts has recently proposed to remove from the façade of the Opera House the celebrated group of "The Dance," by Carpeaux, in order to place it in a museum, under pretext of preserving from injury by violence or by the action of the weather. The proposal will probably meet with strong opposition, and Mme. Carpeaux, the widow of the eminent sculptor, has protested vehemently against the removal of his work, which is not approved either by M. Dujardin-Beaumetz. He is of opinion that the best preservation of the group would be a simple cleaning, of which the whole façade of the Opera stands in much need, for the colour of the rose marble, and the gilding with which Garnier profusely garnished his work, have long ago been hidden under a thick coating of dust. The cleaning of the façade is at all events to be carried out, and the original polychromatic design of the architecture will thus be brought out again.

Last year Mr. James Stillmann, President of the National City Bank of New York, presented to the Ecole des Beaux-Arts a sum of 500,000 francs, the interest of which is to go to forming travelling studentships for French pupils at the Ecole. According to the decision of Council of the Ecole, this fund is to be distributed, for the first time, this year; and the sum available, which amounts to 15,000 francs, will be divided into twelve studentships of 1,200 francs each, to be distributed as follows:—Three studentships to painters, three to sculptors, four to architects, and two to engravers. The choice will fall on those students in each department who have obtained the highest "recompenses" during the scholastic year, with the exception of the Grand Prix de Rome, and the beneficiaries will be required to make their tours of study from August 1 to October 15.

A Committee has been formed to raise a monument in Paris to the memory of Garibaldi. It is entrusted to an Italian sculptor, Signor Cochi, and will be erected on a new place to be formed in the XVth Arrondissement, on the occasion of the centenary of Garibaldi.

The Louvre will receive soon an important collection which has been offered to it by M. Moreau Nélaton, and which includes thirty-five pictures by Corot, eleven by Delacroix, and others by Manet and Carrière.

We have to record the death, at the age of seventy-eight, of Jules Breton, widely known as a painter of peasant life and of the fields and the sea, and who, as far as his peasant figures were concerned, might be regarded as in some degree the precursor of Millet. Success came to him early, and after quitting his first atelier at Drolling, he obtained in 1855 a third medal at the Salon for his "Les Glaneuses," while in 1857 the "Bénédictin des Blés" earned him the second medal of the year. The latter picture is in the Luxembourg Museum. In the exhibition of 1859 he obtained a first medal and the cross of the Legion of Honour. He was then only thirty-two years of age. In 1865 he exhibited the "Fin de la Journée," and was promoted to be "officier" in the Legion of Honour. In 1872 he obtained the "Médaille d'Honneur" of the Salon for two very remarkable works—"La Fontaine" and "Jeune Fille Gardant les Vaches." He continued for many years to produce a series of fine pictures, and in 1886 was elected a member of the Académie des

Beaux-Arts; and some years afterwards he was made "Commandeur" in the Legion of Honour. Of late years he had ceased to exhibit, and to the younger generation his work was not much known; but it will certainly not be forgotten. M. Breton was the father of Mme. Demont-Breton, herself an artist of genius.

MAGAZINES AND REVIEWS.

THE *Art Journal* includes an article by Mr. H. C. Corlette with the title "Architecture and Painting," but which seems to be really a review of the decorative work of Mr. J. D. Crace, who well merits the compliment of being taken as a text for an essay on this subject, with which in the main we are quite in agreement. But we do not understand the remark in the closing sentence, that the Sistine ceiling paintings would be quite out of place if transferred to the vault of Westminster Abbey—at least we do not understand the reason given: "The curved ceiling of a church is an admirable field for decorative design in colour, whether floral, pattern, or figure work. But it is the wrong place for any kind of painting which is first of all pictorial and only secondarily decorative." But the ceiling of the Sistine chapel is a curved section. Did Mr. Corlette forget that? In a note on the work of the late Mr. Brabazon, who produced pictures which were blots of harmonious colour without any attempt at drawing, we are told that "it is one of the hundred sins of omission on the part of the Chantry Trustees that they have disregarded his delightful art"; a sentence which serves to give us some idea of what the Chantry purchases would have been like if they had been in the hands of some of the critics of the Academy.

In the *Burlington Magazine* we are glad to see an illustration of a picture by Northcote, with a note in favour of this much neglected and indeed nearly forgotten artist. One or two works by him in recent loan exhibitions have surprised those who only knew him previously from his recorded conversations with Hazlitt. Probably his historical pictures are of little interest now, but he was evidently a much better portrait painter than the present generation have hitherto had any idea of. Mr. C. J. Holmes, who writes the note, comments on the fact which more than one modern French critic has noticed, that there is so little of a fixed tradition in English painting, each artist going his own way, or taking hints from this or that painter among his predecessors, according as his fancy led him. Accordingly, the picture here in question, attributed to Northcote, is said to show evidence, in its execution, of imitation of the manner of Reynolds in one particular, of Romney in another. The number contains an article by Mr. Solon on a rather new subject, "Coloured Pottery of the Renaissance in the Austrian Country," a review of a German book on the subject by Ritter von Moltheim. The illustrations include two remarkable examples of earthenware stoves of about the date of 1500, one of them from the Castle of Salzburg.

In the *Architectural Record* (New York) is an article by Mr. Montgomery Schuyler on "The New Custom House at New York," of which Mr. Cass Gilbert is the architect. The comparison of the illustration of the old Custom House with the new suggests some considerations on the architectural employment of the Classic Order in modern buildings. Mr. Schuyler maintains, and we agree with him, that the monolithic Ionic colonnade of the old Custom House, with the space behind it, was a much finer architectural effect than is presented by the new one with its engaged order; that it is true the other one shut out light from the rooms, but this was merely a question whether or not architectural effect should be sacrificed to convenience or not; that it was possible the architectural effect was the thing, of the two, the better worth having; at all events, that there should be no compromise, use the Order in its true architectural sense, as an order of free columns, or dispense with it altogether. There is a good deal in this. It is rather curious to find in the same issue Mr. Schopfer, in the second instalment of his essay on Roman art, arguing just the contrary, and asking us to recognise what an effective use the Romans made of engaged Orders in the Colosseum.

In *Concrete and Constructional Engineering* for July the promise of the two previous issues is well sustained by original articles and selections of matter from various sources relative to concrete and reinforced-concrete construction. An article on "The Historical Evolution of Reinforced Concrete in France," by M. de Tedesco, necessarily covers well-trodden ground, and refers at length to the work of such pioneers as Coignet and Hennebique. As an example of the activity displayed by M. Hennebique, it is said that "from 1892 to 1899 3,000 constructions of various kinds in reinforced concrete to a total value of two millions sterling had been carried out by his firm alone." This remarkable record is largely the result of an unrivalled commercial organisation, but it is probably due in no small measure to the extreme simplicity of the Hennebique system, and the invariable satisfaction that has attended its adoption. The most interesting part of the article is that foreshadowing the general scope of the French regulations governing reinforced-concrete construction. "Reinforced Concrete Bridges," by Mr. W. Noble Twelvetrees, M.I.Mech.E., is the first of a series of articles, the present instalment dealing with various types of girder construction, from the simple foot-bridge to works intended for heavy road and railway traffic. Some typical examples are also given of reinforced concrete arches in Europe and America. A second article is printed on "The Setting of Portland Cement," this time from the pen of M. Candiot, of Paris, who treats the subject from the French standpoint. After showing reasons for the capricious behaviour often exhibited by cement in the process of setting, the writer shows how this may be rendered more regular. The methods in question are interesting theoretically, but certainly should not be permitted in practical work unless under most careful and experienced supervision. Moreover, by selecting cement of suitable character in the first instance expedients of the kind are quite unnecessary. On p. 183 two paragraphs referring to cement that "appears to set extremely slowly" are somewhat ambiguous, not to say contradictory, apparently because the translator has not completely caught the precise meaning of the writer. This is a pity, because the subject matter is of real importance. Among the remaining articles that by Captain Sewell, U.S.A., on "The Theory of Reinforced Concrete" deserves special mention as a useful summary of the present position of reinforced concrete in the United States by an engineer who, as an officer of the Corps of Engineers, has had considerable experience of that material in the execution of various important works.

The *National Review* contains a very interesting article by Lady Susan Townley on "The Panama Canal," from the point of view of a visitor occupied with the aspect and impressions of the country through which the canal is to be carried, the present stage of the work, the condition of the workmen connected with it, and stories in regard to the state of things in the early days of the enterprise under the French. Lady Susan seems to have found evidence and full admission on the part of the American staff, that the work already done on the canal by the French in the days of De Lesseps was by no means unimportant, and that they had at least gone very far in rendering the task easier for their successors.

The *Nineteenth Century* contains two articles on artistic subjects, one of them as good as the other is bad. The good one is "International Art: A Duologue," carried on between two ladies, Elizabeth, an ultra-modern æstete, and Jane, a Philistine (as her friend considers her), in respect of that horrible exhibition called the "International" held not long since at the New Gallery. Jane, after patiently going through it with her friend and listening to her instructions, points out that everything they have seen is ugly; that she liked a pretty *dansuse*, but that even the studies of ballet-girls seemed only designed to show how ugly they could be; from the pretty *dansuse* the artist shrank; he was true to his ideal, "the ideal of ugliness, squalor, and degradation glared at us from every wall." We go to art, she says afterwards, for a world seen through other eyes, not for life as it is to us, and the question is whether we should see it through the eyes of

painters like Mason, Corot, and Puvis de Chavannes, or through what rather appear to be eyes of waiters, scenshiffters, and attendants at lunatic asylums. Elizabeth is speechless with scorn, and Jane concludes the interview by saying, "I am going to the National Gallery." It is a clever and bright bit of satire; Miss F. P. Seeley is the author. The bad article is one by Mr. H. Hamilton Fyfe on "The Revival of Sculpture," which commences with the usual cant about the contemptible character of the paintings at the Royal Academy, describing the present exhibition as "the worst of the worst" (there are better pictures in it than Mr. Fyfe can understand), and going on to state that this year there is—for the first time it is implied—a revival of sculpture in England, that the sculpture at the Academy alone saves the exhibition from contempt, and this (of course) is due to the influence of Rodin. It is true that the sculpture this year, as in some previous years recently, is the best part of the exhibition; but if the writer knew anything about his subject he would have known that the remarkable advance in English sculpture commenced at least fifteen years ago; that Rodin had no more to do with it than the man in the moon; and that as a matter of fact two or three of the previous sculpture years have been distinctly superior to the present one. The number concludes with a short and admirably expressed article on "Improved Shop Architecture for London," by Sir Aston Webb, written especially in respect of the new Regent's-quadrant, and pointing out, in regard to the foolish clamour of the shopkeepers for their plate-glass fronts, that the most superficial observation shows that it is not necessarily the best firms that have the largest window shows, but rather the contrary; he works out at greater length, in fact, the argument that we have before suggested in a Note on the subject, that good and solid architecture in shop fronts is a quality which an improved public taste is likely to demand more and more, for the sake of the dignity of our street architecture, and that it will in the end be to the interest of the best class of shops to encourage instead of opposing it.

THE CLERGY AND ARTISTS' ASSOCIATION EXHIBITION AT BRIGHTON.

THREE rooms at the Brighton Public Art Galleries are devoted to a miscellaneous exhibition—the tenth of its kind—got up by this Association. In the catalogue it is set forth that "the aim of the Association is to meet the growing demand for freshness and imagination, for personal expression by the artist, freed from mere conventionality and assumed tradition . . . to counteract the evils resulting from the low standard of art in churches at the present day, and to form a centre to which the clergy and others could apply directly for advice and help . . ." It is difficult to say whether this possibly laudable aim has been overreached in the present exhibition, or merely not yet attained; but we are much exercised as to what can be the net effect on the minds of the good people of Brighton, visitors thereto, and others whom it is expected to concern, who try to take this exhibition as a serious contribution to present-day ecclesiastical art. Amongst the innumerable exhibits by the hon. secretary of the Association, Mr. Reginald Hallward, there may be some rather nice suggestions for the simple painting of church roofs, &c.; but his "Vision of Death," though never so full of symbolism, his "Vision of Spring," with a most distressful maiden fleeing as for her life from some half-dozen woolly white birds at her head, and his "Dwarfs Disturbed by a Witch," constrain us to ruminate whether such works are seriously meant to have homes found for them in the clerical drawing-room or study, or perchance to adorn some hapless village church. There are some vigorous and well-drawn cartoons by Mr. Louis Davis for windows in the chapel at Wynyard Park which are commendably free from that affectation and effeminacy in form and colour characteristic of so much that may be seen in this exhibition. Mr. Conrad Dressler has a panel in enamelled earthenware entitled "The Crucifixion," and we sincerely hope, in the name of "authentic artistic quality" (*vide* preface to catalogue), that the piece shown is but a part of the panel, and that the poor dismembered robbers come into

their own in the completed composition. Quality is also sadly lacking in the blues and greens of the enamels. There is a good altar cross in polished steel by Mr. Bainbridge Reynolds, and a series of fine photographs of a ship vase for Osborne Cadet College. The construction of his brass lectern is, however, anything but sound, nor would the leather aprons be tolerated. Turning to the architectural exhibits which are scattered through the three rooms without much classification, there is an excellent detail drawing for reredos, Hornsey Parish Church, by Mr. H. C. Corlette, where the altar and reredos, as well as the treatment of the wall surfaces on either side of the reredos proper, have all received careful attention. The colour scheme as indicated in this drawing is very happy. Mr. Corlette's drawing of the colour decoration in the Lady Chapel, Chichester, by Theodore Bernardi, A.D. 1519, is also one of the good things of the exhibition. The same may be said of the design for a small village church, by Mr. F. W. Troup, where the altar is set in a played recess with vaulted roof with wonderful accession of dignity to so small a church. Good photographs of Mr. Troup's brick diapered "Sandhouse, Witley," are shown, as well as a quiet country house admirably terraced to its hilly site. Sir Charles Nicholson's interiors of St. Alban's, Southend—notably the chancel screen—and Cockington Church show the virtue of method and restraint. Mr. A. H. Skipworth has numerous exhibits of a type of work which has, perhaps, suffered from over-illustration. We like the exterior of Mr. Ernest Newton's church at Hither Green chiefly for the honesty of his treatment of the chimney stack as seen from the S.E. Then, besides landscapes, book illustration and binding, chairs, &c., there are hatpins, brooches, necklets, and the rest. The exhibition is to remain open until August 15.

THE ASSOCIATION OF MUNICIPAL AND COUNTY ENGINEERS:

ANNUAL MEETING IN LONDON (continued).

THE following is the conclusion of our report of the proceedings at the annual meeting of the Association on Thursday, Friday, and Saturday, June 28, 29, and 30.

Mr. S. H. Chambers (Hampton) thought there was danger of the pollution of the estuary of the Thames by the deposit of the mud of the London sewage therein.

Mr. Wilkinson (Manchester) thought Mr. Dibden's statements as to sludge-pressing and chemical precipitation subject to a considerable amount of qualification. There were cases in which chemical precipitation and sludge-pressing were an absolute necessity. He submitted that where sewage was fouled to an inordinate extent by chemical refuse that chemical treatment was almost a *sine qua non*.

Mr. Dibden said there had been some misapprehension as to the sense in which he used the words ancient history. He did not mean them to imply that in every case chemical treatment and sludge-pressing were useless, but that it was useless for him to say anything about them.

Mr. F. W. Pearce (Twickenham) said they had now reached the stage at which they could all agree that the tank treatment of sewage was the best preliminary method.

Mr. G. W. Lacey (Oswestry) remarked that there seemed at present no possible hope of obtaining finality in regard to the treatment of sewage.

Mr. Watson, in reply, said no one was more surprised than himself when he found it possible to reduce sludge to a non-stinking state.

Mr. Dibden, in reply, agreed with Col. Jones that the sooner the sewage matter was disposed of in the earth the better. That was the object of the bacteria bed. He laid it down in the first instance that the bacteria bed was nothing else but artificial land. There was no danger whatever of the sludge settling down in the estuary of the Thames. He had spent weeks dredging the channel and taking samples, but had never found a trace of the sludge. His successor, Dr. Clowes, had also done the same, and never found a trace of it.

The proceedings of the Annual Meeting were resumed at the Institution of Mechanical Engineers, Westminster, on Friday,

June 29, Mr. J. Patten Barber, President, again in the chair.

Carrying-out of Public Works.

Mr. A. H. Campbell, M.Inst.C.E. (East Ham), read a paper, entitled "Notes on the Carrying-out of Public Works Departmentally." He said this question was one much to the fore at the present, and that the annual meeting was a proper place for some official pronouncement on this matter of public policy could not be questioned. The vast annual expenditure on local works—for the design and construction of which the members of that Association were in the main responsible—and the various views held by different authorities as to the best method of carrying-out such works, entitled the Association, from its most intimate knowledge of the subject, to be a fit vehicle of official opinion as to this question of public policy.

Recent decisions, moreover, of the Local Government Board in their sanctions to loans, seemed to call for consideration. Without referring to individual cases, which in that paper would be obviously indelicate, the author submitted in general terms those objections which the central authority had recently raised when sanctioning, or withholding sanction, to loans. These are as follows, viz. (1) That excess of expenditure incurred beyond that for which a contractor might reasonably have completed the work, is a proper surcharge upon the authority carrying it out; (2) that no payment out of borrowed moneys should be made to any salaried officer of the Council, save, under certain conditions, the clerk; (3) that the wages of any permanent staff or workmen of the authority should not be charged against the loan, although such workmen and staff may be solely engaged upon the work for which the loan is sanctioned.

Strictly interpreted and applied to local life, those conditions of sanction seemed to preclude the carrying-out of works by direct labour, or, at least, to put across its path such barriers as made its progress difficult. Looking at those objections in their order, the first-mentioned—that of surcharge—imposed upon the local authority a risk which they were hardly likely to accept, either in their individual or their corporate capacity. Surcharges were the pin-pricks of public life, and it was well to avoid them. Whether intended or not, this decision operated as an almost effectual deterrent to the policy of direct labour, especially where the elements of risk applied. The conditions, therefore, that made for success, and *vice versa*, should be examined, and these the author stated as:—(1) That for any work about to be undertaken by direct labour under "sanction," the estimate of cost should be tested by the estimate of another expert; (2) that in the actual carrying out of the work the same system should apply, as between the engineer and his resident agent, as would apply were the work the subject of a contract; that was to say, the rules which regulated the carrying out of public works' contracts should apply to the policy of direct labour, monthly measurements being made by the engineer of the value of work executed, and that he certify to the authority as it in the case of a contractor; (3) that in the execution of the works the engineer or manager be granted a free hand as regards (a) purchase of materials at the lowest market prices, (b) as regards employment and discharge of labour, and (c) as regards the administration of all details. The system of monthly measurements of work done would prove an effective check during the progress of work as to whether the authority, as direct employer of labour, was holding its own in the matter of cost. It was further essential at the outset of any work to be done by direct labour, that an analysis be made of the estimated value of materials, and of labour for each separate section of the work. Such analysis would reveal upon what section of works profit or loss was being made, and at the end of a work the resultant gain, or the reverse, over the completed work. A further factor determining the success of this policy, was the hearty and substantial backing of the public authority. The author would not say "unanimous" backing, for, in the composition of a Council, unanimity was not desirable; but, certainly, the policy of direct labour demanded for its success the confidence

and enthusiasm of such a substantial majority as would, in numbers and intelligence, fairly represent the sentiments of the authority, and that still stronger sentiment of public opinion behind the authority. For illustration one had only to recollect the chequered career of the Works Department of the London County Council in its early days. Until the party supporting this policy obtained at the polls such pronounced ascendancy, the Works Department scarce realised security of existence. Since the composition of parties had changed, and apparently so for a long lease of power, the Works Department had prospered—that was to say, along lines that, if not liberal, were certainly fair to the Department, and which, if copied by other authorities, might produce like results. These are:—(1) The Works Department does not tender in public competition with contractors, but its tender is based upon that of the Chief Engineer or Superintending Architect of the Council; (2) the Department is allowed fairly free scope in its arrangements with labour, by payments for work done on the "bonus" system. This acts as an undoubted spur to the men in the diligence of their daily work and their individual output; (3) the Department, in the carrying on of its work along those lines, is the expression of the people's will. So long as it enjoys that support, it should continue to prosper. Change the composition of the Council, then may come the imposing vision of the Department of tests that criticize, and of conditions that may kill. The Works Department of the London County Council had been selected, because it was the first authority in the country, for the magnitude and probably continuity of its constructive necessities. They were undoubtedly the leading exponents of the policy of direct labour, generously applied, and with results which, in the quality of its workmanship could not be surpassed. Objections 2 and 3 of the Local Government Board, viz.—"Any payments out of capital accounts to any salaried officer" or as wages to any permanent workman" of the authority, seemed to preclude altogether the possibility of separate existence of a Works Department, unless such salaries and wages were to be paid out of revenue account. The last-named application to the wages of permanent workmen was a new decision of the Board, and one of possibly far-reaching importance considered in its relation to this subject. If it did not expressly veto the direct employment of labour on municipal and public works, it would tend to cripple the policy and hinder its progress. As a way of meeting and combating, possibly, dishonest trading combination, undoubtedly direct labour was a sure defence. From that origin had sprung the County Council's Works Department as it was to-day; and as the living embodiment of the well-settled policy of the County Council it had achieved a great measure of success, favoured by the conditions which regulated and fostered its existence.

Mr. W. Harpur (Cardiff) proposed a vote of thanks to Mr. Campbell for his paper, remarking that he had treated the subject in a very fair manner indeed.

Mr. T. W. A. Hayward (Battersea) believed that if works were carried out properly by direct labour that money could be saved. No one could buy material so cheaply as a municipal authority, and they could also assure satisfactory workmanship.

Mr. C. F. Wike (Sheffield) said the average expenditure in Sheffield on works carried out by the Works Department was 300,000l., and, in his opinion, not only had the Council secured satisfactory work, but had got it at a minimum cost.

Mr. Nisbet Blair (St. Pancras) said they did not always secure from workmen in the employ of a Corporation the same amount of work as under the stronger domination of a contractor and his foremen. There was a tendency to go easy, and it was often encouraged by some of those who ought to give them strong and zealous support when they were undertaking work on their behalf. In some instances workmen's representatives on the Councils urged the men to go easy. There was another danger. The establishment of these large Works Departments was, under present circumstances, the preparation of a huge voting machine.

Mr. Campbell, in reply, said there was a whole-hogger contract party as there was a

direct labour party, and, being diametrically opposed, it was as difficult to convince the one as the other.

Motor Vehicles for Municipal Work.

Mr. A. Brodie, M.Inst.C.E., M.I.Mech.E. (Liverpool), read a paper on "Motor Vehicles for Municipal Work." He said the use of light motor vehicles for industrial and other purposes first became practically possible in this country after the passing of the Motor Car Act of 1896, and about that time several societies and associations were formed for the purpose of gathering together persons interested in the advancement and improvement of motor traction on ordinary roads.

In 1896 a branch of the Self-Propelled Traffic Association was formed in Liverpool, having on its Council a number of influential representatives of the shipping interests and trade of the port of Liverpool and of the engineering profession, who expended a large sum and gave much valuable time for the purpose of encouraging the construction of motor vehicles for commercial purposes; and exhaustive trials, held in 1898 and following years in Liverpool, together with the very full reports and particulars of the performances of the vehicles, probably did more than anything else in the early days of the movement to make known the possibility of the heavy motor vehicle.

It was soon seen that a considerable opening for such vehicles would be found in the work carried out by municipal authorities, and during the trials, in May, 1898, the then Lord Mayor of Liverpool (the late Alderman Houlding) publicly stated that he was so much impressed with the working of the motor wagons that he would do what he could to see whether the motor-car would not be a great improvement in the Corporation service, as compared with horse-and-cart traction.

At the conclusion of the first motor trials an order was placed with the winners of the gold medal for a 4-ton steam vehicle for the use of the Liverpool Corporation; and this machine, delivered in January, 1899, was still at work, though it was soon found advisable to reduce the load carried and to use the vehicle for a lighter class of work than was originally intended. It had, however, been found a most valuable help in quickly conveying materials from depôts to street works in progress and street-gravelling, and during the summer season it had been largely used for street-watering and other purposes in which the weight of the load to be carried was not a matter of first importance.

The experience gained by the regular working of the earlier types of vehicle was of considerable value to users and manufacturers, and it was soon found that oil-firing would have to give place to coal or coke-fired boilers, whilst, contrary to the general practice in the lighter type of vehicle, the vertical type of engine originally adopted had also given place to the horizontal type, no doubt principally due to the demand for platform space.

After the completion of the third Liverpool trials in 1900, the City of Liverpool ordered from the Lancashire Steam Motor Company, Leyland—who again secured a gold medal—six 4-ton steam motor wagons, which were obtained in the beginning of 1901, and these wagons had been continually in use up to the present time.

The Liverpool Corporation wagons had been well maintained, and were now in good working order, all unsuitable portions having been replaced; and the repairs at the present time were costing less than formerly, whilst the average time lost was also less than at any period of their life.

The principal troubles which had been experienced in connexion with the use of these motor vehicles had arisen from the fact that they were originally constructed to comply with the then existing law that the tare weight should not exceed 3 tons, which it was advisable to make one of the conditions of the specification.

It was, however, soon found impracticable to adhere to the tare limit if the vehicles were to carry paying loads, and very considerable alterations had had to be made to them, and the weights of such parts as frames, springs, axles, and wheels had been materially added to, the total weight with steam up and ready for work now amounting to 4 ton 19 cwt. on the average, as

against their original nominal tare of 2 ton 19 cwt. 3 qr.

The passing of the Motor Car Act of 1903, combined with the regulations which were subsequently issued, was welcomed by motor-wagon users throughout the country generally, as it legalised the additions which had already been made as a matter of necessity. The alteration in the weight limit, together with the additional requirements as to the width of tyre, appeared to have met the demands of motor-users; and since the necessary alterations to comply with the provisions of the Act had been completed the difficulty at first experienced in maintaining the motor-wagon wheels had entirely disappeared, and the only difficulty which still remained was the noise and vibration caused by the running of the wheels over the comparatively rough roadways, and this difficulty was likely to remain so long as a rigid wheel was driven at a considerable speed over the rigid and uneven roadways which still exist to a considerable extent in the older neighbourhoods of Liverpool.

In Liverpool a considerable number of wheels had been experimented with. In the first instance the manufacturers of a solid rubber tyre came forward and offered a contract with the payment arranged on the basis of mileage run, the existing wheels being provided by the company with special rims suitable for their own type of solid rubber tyres. The front wheels of the wagon, which at the time carried an axle-load of 2½ tons, ran some 1,500 miles before failing, and satisfactorily reduced noise and vibration so long as they lasted. The driving-wheels, which carried an axle-load of 6½ tons, only lasted 300 miles; and up to the present time, though every effort had been made to obtain a guarantee of solid rubber tyres, no manufacturer had been found ready to contract with the Corporation for rubber tyres for these vehicles, although for some purposes the Corporation were prepared to pay a rate per mile in excess of that now annually paid for the maintenance of motor omnibus tyres.

A trial was also given to an early type of resilient wheel manufactured under the Gair patents, the tyre consisting of hard-wood blocks jointed on rubber with treads consisting partly of fibrous material, the whole being completely impregnated with rubber solution. So far these wheels had not completed their mileage under the contract. This type of wheel had undoubtedly advantages, especially in the matter of freedom from side-slip on stone set pavement, and also to a great extent from noise, but there appeared to be some difficulty in making it sufficiently lasting in the case of the driving wheels where the axle load amounted to 8 tons.

A metallic wheel under the Hele-Shaw patents had also been experimented with, and this type of wheel had completed a distance of about 3,000 miles. The noise and vibration had been considerably reduced, but up to the present time the spokes had been rather light for the strains thrown upon them in Liverpool due to the axle weight and the rough condition of the boulder-paved streets passed over.

An offer was also accepted for the trial of a pair of wheels with a rubber tyre shielded by metallic sectional plates called the "Buckingham" tyre, but this wheel did not give satisfactory results, as a number of the shields gave way, and these had the effect of injuring the resilient tyre underneath.

Another pair of wheels had been tried to some extent, the tread portion consisting of paper impregnated with a composition and afterwards compressed between plates, and this arrangement had undoubtedly resulted in a quiet wheel, but the trial had not been sufficiently extended to state definitely whether a satisfactory life could be got out of it.

Some two years ago the idea occurred to the author that it might be worth while to try the wear of double pneumatic tyres with an outside stiffened rim, so that the vibration due to the hammering of the tyre on the setts need not be transferred to the machinery, and a pair of wheels on this principle were constructed, and had been continuously in use since January, 1905, travelling over 5,000 miles, and had required practically no attention beyond the fixing of stops between

the outer and inner rim, and the rubber tyres could be avoided.

A peculiarity which had been observed was that the wear on the steel tyre was noticeably less than in the case of the tyres shrunk on to the wooden wheels direct, and the cost of maintaining the machinery was also less, due apparently to the reduction of vibration.

Mr. H. T. Wakelam (County Surveyor of Middlesex) proposed a vote of thanks to Mr. Brodie for his paper.

Mr. A. E. Collins (Norwich) said the cost of repair of the earlier motor-wagons was so heavy that they thought of dropping them altogether, but a wagon bought three months ago under the new regulation as to weight had not cost a penny in repair. Where they could load and discharge quickly motors did the work much cheaper than horses.

Mr. Harpur (Cardiff) said he had four motor-wagons working on the collection of refuse, and his experience was not favourable, as they cost 35 per cent. in excess of the cost of the same work when done by horse haulage.

Mr. O. E. Winter (Hampstead) said his experience of motor-wagons for refuse collection was the same as Mr. Harpur's, that they cost 30 to 40 per cent. more, but for street watering they had given excellent results, coming out much cheaper than horse haulage.

Mr. E. G. Mawbey (Leicester) having spoken,

Mr. Brodie briefly replied to the discussion.

Road Construction, etc.

Mr. H. T. Wakelam, M.Inst.C.E. (County Engineer of Middlesex), read a paper on "Road Construction, Maintenance, Improvements, and Subsidies." He said that the suitability of the principles of road formation and construction, followed for so many years in this country, had of late been much questioned as to whether the principles were framed on the right lines or otherwise to meet the requirements of the mechanical traction introduced upon main and district roads in recent years. In consequence of this mechanical traffic and its resultant dust nuisance (for five or six months of the year) considerable agitation had been and was being created in various directions for an improvement of the highways of this country, and many ideas were being put forward with a view to effecting a drastic change and reform in the existing arrangements and systems connected with road maintenance throughout England and Wales. Rainfall was the greatest factor of all in connexion with roads and their maintenance, and in differentiating the degrees of its influences, construction, drainage, quality, and selection of materials, etc., formed an important part. Given a good subsoil, a good foundation, good materials, consolidation, etc., a macadamised highway, formed upon proper constructive principles, should not be much affected when subjected to the mean rainfall of this country, provided a proper system of drainage had been devised to meet the ordinary requirements of each particular case. The author understood that a State Institution had been suggested or formed to initiate tests of different stones suitable for road macadam, in addition to which, as all the members were aware, tests of various materials assumed to be suitable for such a purpose had in different directions recently been made. That disintegration takes place under light motor-cars with smooth india-rubber wheel tyres could not be gainsaid, and these tyres caused more wear and tear to road surfaces than was perhaps appreciated. The passage of rapidly-moving motor-cars along carriageways, especially in which flints or poor quality materials were used, caused the particles of the detritus in the interstices of the metalling to rise to the surface, to be subjected to crushing by heavier vehicles with ordinary wheel tyres, and so to create a large addition to the dust nuisance. With a general use of basalts or granites, well steam rolled, first in a dry state until a mosaic-like surface was obtained, and afterwards covered with ½-in. chippings of the same material as that used for metalling, blinded with machine dust also of the same material, and well watered and rolled until thoroughly consolidated, the dust nuisance would be considerably reduced. This method of sheeting resisted much abrasion, with a minimum of wear by light

locomotives and mechanical traffic, and obviated much disintegration. In his opinion the most complete mitigation of the dust nuisance would be best obtained by the utilisation of some suitable agent in connexion with basaltic or granite road formations, or some such hard-wearing materials, so as to procure an asphaltic kind of road surface preparation with a good foothold for horses. The first cost in most counties of basaltic or granite formations, untreated with asphaltic or bituminous compounds, left sufficient margin in cost to allow some kind of treatment to ensure an efficient degree of waterproofing, at any rate favourably comparable with treated slag or limestone, and with a resultant life much longer than could possibly be obtained by the use of either the latter materials under heavy-traffic conditions. Some such formation had lately been carried out on the Heaton Moor road near Stockport, Cheshire, and in the Stretford Urban District, Manchester, at what he understood to be a most reasonable first cost. In connexion with these roads the Local Government Board granted a loan for fifteen years, over which period the repayments of principal and interest extend. From calculations for repayments of instalments of principal and interest with charges for maintenance scavenging and watering, etc., on main roads carrying the heaviest traffic in Middlesex, the author found that when a road costs (inclusive) about 2s. 6d. per sq. yard per annum to maintain in macadam, scavage, water, etc., it was in the end as cheap to pave it with soft wood on a Portland cement concrete foundation as to continue the use of macadam. The Local Government Board granted loans for creosoted deal-paving to be repaid in five years, with twenty years for the concrete foundations. An equated period of nine years for the blocks and concrete together could also be obtained. Five years could not be considered to be the full life of soft-wood paving, as there were roads in Middlesex paved with this material carrying a heavy traffic which had not been repaved for nine years, and upon which the original deal blocks were still in a good condition. This factor must be taken favourably into account in considering the replacement of macadam by wood paving.

Mr. W. Harpur (Cardiff) moved a vote of thanks to Mr. Wakelam. He said the question was one which more directly concerned county surveyors, as the nuisance was more observable on county roads in consequence of the absence of facilities for watering and cleansing.

Mr. Dryland (County Surveyor of Hereford) thought the manner in which the money was raised for road maintenance would have to be changed. The use of the roads could not now be said to be local, as it was in former times, and he thought the cost of maintenance would have to be moved from local shoulders to the whole community. Tar-painting of macadam roads preserved the surface to a considerable extent, increased the life of the material, and reduced the nuisance from dust.

Mr. Leete (County Surveyor of Bedford) approved the policy of tar-painting the roads, which he had done in Bedfordshire with much success.

Mr. R. Brown (Southall) advocated the use of oil-tar on the roads for dust-laying purposes.

Mr. Purser (Grantham County Surveyor) criticised any system of putting oil on the roads, and expressed a preference for painting.

Mr. Wakelam was thanked for the paper, and briefly replied to the discussion.

On Saturday a visit was paid to the Northfleet Works of the Associated Portland Cement Manufacturers, Ltd., and, after an inspection of the works, the members were entertained to luncheon. Mr. White, Chairman of Directors, presided.

REMBRANDT CELEBRATION.—The three-hundredth anniversary of Rembrandt's birthday will be celebrated at Amsterdam on July 15-16 with the exhibition of some paintings from the Royal Galleries and of examples of modern pictures by Sir Lawrence Alma-Tadema, R.A., Israels, Maria, Rochussen, Weissenbruch, and Mauve. In our number of last November 4 we gave some particulars of the house, No. 4, in Joden-Broestraat, Amsterdam, inhabited by Rembrandt, and of its purchase by the municipality for a museum.

FIRE-RESISTANCE OF BUILDINGS CONSTRUCTED WITH REINFORCED CONCRETE.

Importance of being able to Attack Fire at Close Quarters.

ALL practical fire-fighters will, in view of their own experiences, unanimously agree that the fullest success in fire-fighting can only be secured by vigorous attacks at close quarters inside the burning building. Unless in some measure such close attacks on the discovery of a fire can be made with ample volume of water at efficient pressure, the building involved, especially if of large extent, will probably with its contents be destroyed, and the prevention of the spread of fire to the surrounding property may become both difficult and dangerous. Buildings erected to meet these requirements have lamentably failed under the test of actual fires, chiefly owing to non-compliance with conditions obviously necessary to secure success.

Nature of Buildings Needed to Assist Firemen.

To avoid such disasters, buildings effectually separated into compartments of moderate extent, planned without unprotected floor openings, and constructed so as to give ready and secure access for firemen to every part, for the longest period of time possible after an outbreak of fire, are required both in the interest of the public and of the chief officers of fire brigades and salvage corps and the men under their command. Buildings constructed with reinforced concrete, properly prepared with suitable aggregates, sand and cement, ample thickness of such concrete being continued in front of all metal rods or net work, will satisfactorily meet these requirements if the conditions as to extent and other provisions referred to are duly observed.

Danger of So-called "Fireproof" Buildings having Structural Metal Work Unprotected.

Experience has repeatedly proved that large buildings constructed with incombustible materials only, but without due protection against the inevitable action of heat, fire, and water on the metal and other materials used, although called "fireproof," are during the burning of their contents of a most treacherous and dangerous character, defying all reliable calculations as to the time and manner of their certain collapse. Responsible officers therefore very properly hesitate to send men into or even close to such buildings after any portion may be well alight, and frequently structures of this nature are unavoidably left to their fate.

Responsibility of Architects and Engineers.

Why architects and engineers continue to waste their clients' money on the erection of dangerous buildings of this character and proclaim them "fireproof" is a mystery which firemen fail to comprehend. It cannot be too strongly asserted that it is false economy of the worst description to omit efficient protection against the action of fire for all structural metal work used in important warehouse and factory buildings.

Slow-burning Buildings.

In view of the experience referred to in the case of buildings constructed with unprotected metal columns and girders, the use of timber in post and beams of large scantling with thick plank floors, made air and water tight, have been extensively employed with considerable advantage, especially where protected with an efficient system of automatic sprinklers, further advantage would be secured if the timber used is made thoroughly and permanently flameproof, but effective processes with this object appear at present to be too costly for general use.

Reinforced Concrete.

The term "reinforced concrete" is used to describe systems of construction in which iron or steel, in the form of rods, bars, or network, is embedded in concrete, both horizontally and vertically, so as to take all tensional strain and offer resistance to shear, leaving the concrete to resist compression, thus uniting both materials so that each is applied to the best advantage.

Previous methods of fire-resisting and slow-burning construction, especially for

* A paper read by Mr. James Sheppard, A.I.F.E. (Chairman, International Fire Library, Member of Executive of British Fire Prevention Committee), at the Milan International Fire Congress, 1906.

warehouses, trade, and manufacturing premises, are now rapidly giving place to reinforced concrete systems, used either alone or in combination with hollow reinforced concrete or porous terra-cotta blocks. These systems, it is hoped, will enable architects and engineers to meet conditions necessary to obtain resistance to fire.

Reinforced concrete is claimed by its advocates to be a new structural material, but this can only be conceded so long as normal conditions continue, which many users of these new structural methods appear to consider will always be the case, and therefore make no provision against possibilities of probable changes resulting from fire amongst the goods stored in buildings of this construction.

The materials employed in reinforced concrete acquire no new fire-resisting qualities, and although they may be made effectively to assist each other in this respect and offer every facility for providing building of the character needed in the interest of the public and of firemen before mentioned, it is necessary, to secure such qualities, duly to consider and provide against the effect of heat, fire, and water on the materials employed, using only materials and methods proved from actual experience under various known conditions to be effective. This is equally necessary with reinforced concrete systems as with other methods of construction if satisfactory resistance to fire is expected and the avoidance of disasters that have occurred with other systems desired.

Building Codes and Fire-insurance Regulations on Reinforced Concrete.

The city of New York Building Code, 1901, provides that all systems of floor construction used in buildings required to be "fireproof" shall be submitted to an official test for four hours under a distributed load of 150 lb. per sq. ft. placed on bays 4 ft. wide between steel beams 10 in. deep, weighing 25 lb. per ft. run, having a clear span of 14 ft., these beams being protected in the manner adopted by the system under test, the temperature to average not less than 1,700 deg. Fahr. for the whole period of the test. At the end of this four hours' heat test a stream of water through 1½ in. nozzle under 60 lb. pressure to be applied to the underside of the floor for five minutes; the top of floor to be then flooded with water under low pressure, and the stream from the 1½ in. nozzle under 60 lb. pressure again applied to the underside of the floor for a further five minutes.

A load of 600 lb. per sq. ft. to be then placed between the beams equally distributed. If during these tests any flame has passed or any part of the load has fallen through, or if the maximum deflection of the beams, having a clear span of 14 ft., exceeds 2½ in., the use of the system is prohibited in any building required to be "fireproof." Similar test regulations are also applied to partitions.

The materials used, the method of application and workmanship employed in the structure under test, constitute the standard for the system when used in actual building.

The American National Board of Fire Underwriters, in their carefully considered Building Code, recommend that the thickness of protecting concrete for all important metal members in columns and beams of reinforced concrete should be not less than 4 in.

The Fire Offices Committee of the United Kingdom require that for "standard fire-resisting buildings" constructed with reinforced concrete the aggregates and Portland cement used shall be of the special character defined, with a thickness of not less than 2 in. in front of all important metal members of columns and beams.

These requirements are the minimum that can be adopted with reasonable prospect of avoiding collapse in case of a serious fire amongst combustible goods stored in large buildings.

The Necessity of Precautions regarding Reinforced Concrete.

Hitherto architects and engineers who devote themselves to reinforced construction appear to be so confident of the strength and stability of this new structural material under all conditions that they fail to give reasonable attention to the fire-resisting qualities of the materials they use, being quite content to declare that steel rods embedded in concrete must be more fire-

resisting than any other combination of materials.

Published examples of the action of reinforced concrete under actual fire fail to give definite particulars with regard to the diameter of the reinforcing rods, the composition of the concrete used, and its thickness in front of metal members. Information as to the nature of the fire and its extent, where extinguishing appliances are brought to bear, with the power of these appliances and water supply available, are also usually of the vaguest description or altogether absent.

Any photographs submitted by interested parties illustrating the effect of the fire will doubtless be taken from points of view most favourable to the object the photographer desires to serve. Sometimes such photographs do not even illustrate the portions of the building affected by fire, but only parts damaged from some other cause, such as explosion or shock, having no bearing whatever on questions of fire-resistance.

Experts in reinforced concrete buildings agree that to obtain the best results (considered only from a structural point of view and under normal conditions) reinforcing rods must be placed near the outer surface of the concrete, a thickness of 1 in. in front of the rods being generally adopted; but this thickness is altogether insufficient for the protection of metal rods against a serious fire, and the aggregates, sand and cement, for the concrete used to protect the metal rods are of the greatest importance.

It has been conclusively proved that concrete having gravel aggregates is especially unreliable under the action of fire, and the same may be said of other dense material. Aggregates that have passed through fire and are of a porous nature, such as broken stock brick, clinkers, clean coke-breeze with fine ground high-class Portland cement and sand, offer the greatest resistance to fire; but even with these materials a thickness of at least 2 in. in front of all important metal members is essential for reasonable security.

There would be no difficulty in applying a thickness of 2 in. of concrete to this description for the protection of all metal work, while the central portion of the concrete might be of different material.

It is to be feared that some of the large buildings already erected with reinforced concrete will fail when subjected to a serious fire amongst their inflammable contents, especially in cases where the building chiefly consists of extensive galleries round large central vertical spaces passing through all floors; such buildings certainly involve the possibility of very serious consequences, as proved in numerous instances, and even reinforced concrete construction can do but little to lessen this evil. The Horne Building, Pittsburgh, is a case in point.

The method adopted for protecting columns and other parts of reinforced concrete structures against mechanical injury during the making and deposit of merchandise is of the greatest importance. With this object, in many large public warehouses constructed in reinforced concrete, steel angles of considerable size and weight are partly embedded in the concrete flush with its outer face at each corner of numerous square columns supporting very heavy loads; these steel angles are held in place by riveted eyes passing into the concrete. In the event of a serious fire amongst merchandise stored round these columns these steel angles would twist, displacing portions of the concrete, leaving important reinforcing rods exposed at most critical moments. Any mechanical protection needed should be held in position independently of the concrete and be placed against its outer face only.

Divisional walls relied upon as fire-stops in warehouses and similar buildings should not be less than 9 in. thick.

Some Examples.

In a fire test made in a reinforced concrete box on thick walls enclosing about 175 cubic ft. moisture was freely driven through the sides of the box, two of which were 6 in. thick and two 4 in. thick. The evaporation of this moisture kept the outer side of the concrete cool, but on the passage of moisture ceasing, which it did at the end of the test of forty-five minutes' duration, the outer surface of the concrete became very hot.

Combustible goods against a reinforced concrete wall less than 9 in. thick would be liable to ignition by heat from a fire burning on the opposite side of the wall.

With the kind permission of the executive of the British Fire-Prevention Committee, I am glad to be able to give a few photographic lantern views showing results following test with different classes of concrete and metal construction, in which all conditions are definitely recorded.

As you are all aware, the Fire-Prevention Committee's test are conducted under the Universal Standards of 1903, which require for classification, as affording "full protection" against fire, a fire test of four hours' duration (attaining 1,800 deg. Fahr.), followed by the application of water for five minutes from steam fire-engine to a floor measuring at least 200 ft. super., loaded with at least $2\frac{1}{2}$ cwt. per ft. super.; whilst other classifications are obtainable, such as that of affording "partial protection" and "temporary protection" for lesser periods and under less stringent conditions.

According to these standards it will be observed how few of the examples I am presenting have obtained the highest classification, and it will also be observed that some of the examples presented are entire failures.

RESOLUTIONS PASSED AT THE INTERNATIONAL FIRE CONGRESS.

At the recent International Fire Congress at Milan, the following resolutions were passed, which it will be seen embody points of considerable importance in regard to the protection of buildings from fire:—

Resolution I.—External Openings to Buildings.

(a) That greater attention be accorded to the protection of vertical external openings to buildings than heretofore.

(b) That some approved means of protection be compulsory for all opposing windows having less than 8 ft. intervening, and for opposing windows in enclosed courts having less than 15 ft. intervening.

Resolution II.—Public Buildings.

That it is necessary to accord greater attention than heretofore to safety from fire in large public buildings, such as churches, museums, hospitals, colleges, etc.

Resolution III.—Reinforced Concrete.

(a) That no reinforced concrete construction should be permissible in buildings intended to be fire resisting unless the aggregate be most carefully selected and applied in such a manner as to give substantial protection to all metal parts.

(b) That it is advisable where reinforced concrete is intended to be fire resisting that every portion of the metal rods or bars contained therein be covered by not less than 2 in. of concrete, the aggregate of which must be able to pass through a sieve of not more than 1 in. diameter, and that Portland cement of great fineness only be used.

(c) That where feasible all external angles should be rounded.

(d) Any angle iron needed for mechanical protection should be held in position independently of the concrete.

Resolution IV.—Motor Garages.

(a) That accommodation for motor-cars (motor garages) be not allowed under dwellings.

(b) That special measures for isolating motor garages from adjacent dwellings be adopted.

(c) That special measures be taken to avoid the possible access of benzine or petrol into the cellarage, drains, or sewerage system of buildings.

(d) That for the storage of small quantities of petrol or benzine the cans should be kept below ground level, but where a greater quantity be kept than can be easily removed by hand, a proper underground metal receptacle should be employed, from which the liquid could be extracted without the pressure of air.

THE ROYAL ACADEMY ARCHITECTURAL SCHOOL.

We have been asked to give publicity to the following notice with reference to the Architectural School of the Royal Academy:—

"1. The Architectural School of the Royal Academy will from October 1 next be open five evenings in the week (Monday, Tuesday, Wednesday, Thursday, Friday) from 6 p.m. to 8 p.m., instead of, as now, three.

2. Applicants for admission to the school who can produce a certificate of fair proficiency from an institution for architectural education recognised by the Royal Academy, will be exempt from the necessity of showing the work required for the admission of probationers.

These institutions are:—The Royal College of Art; the Architectural Association; King's College, London; University College, London; Liverpool University; Manchester University. The list may be added to at the discretion of the President and Council.

3. The first date for the admission of probationers under this new system will be Tuesday, July 31 next, and the certificate, together with the printed form to be previously obtained from the Royal Academy and duly filled in, and the certificate of birth, must be delivered at the Royal Academy on Saturday, July 28 next.

The examination for the admission as students of the successful applicants will be held in October next. Any further information can be obtained on application at the Royal Academy."

THE ROYAL SANITARY INSTITUTE: CONGRESS AT BRISTOL.

ON Monday the Autumn Congress of the Royal Sanitary Institute was opened at Bristol, and the sittings of sections, the lectures, and visits to places of public interest were continued during the week, and terminated to-day (Friday). On Monday morning the members and delegates were welcomed in the Council House by the Lord Mayor of Bristol (Mr. A. J. Smith), and a public luncheon in the Royal Hotel followed. Later in the day the Lord Mayor opened the Health Exhibition, which is held in the Drill Hall, and in the evening Sir Edward Fry delivered the inaugural address to the Congress in the Victoria Rooms. Amongst those attending the Congress were Fleet-Surgeon F. A. Jeans, representing the Admiralty; Mr. H. B. Woodward and Dr. A. Eicholz, from the Board of Education; Messrs. S. Lambert and W. F. Penfold, representing the Metropolitan Asylums Board; Col. H. E. R. James and Mr. W. C. Tyndale, from the War Office; and representatives from the Governments of Portugal, Sweden, and Turkey. Over 200 municipal and public bodies sent delegates, including the Architectural Association, British Medical Association, Civil and Mechanical Engineers' Society, Incorporated Association of Municipal and County Engineers, Royal Institute of British Architects, Rural Housing and Sanitation Association, etc.

In the evening the members of the Congress were received in the Victoria Rooms by the High Sheriff, when Sir Edward Fry gave an inaugural address.

Presidential Address.

Sir Edward Fry, in the course of his presidential address, touched on the progress of science, and remarked that one of the effects of an increase in scientific knowledge had been to increase the burthen of our duties, both as individuals and as citizens. And as was the fate of the individual, so is the fate of the municipality. The State rightly required of such bodies that they should make due provision for what was now called public health; that they should, at any rate, deliver their citizens from the dangers arising from the accumulation of putrefying matter and the contents of the drains. This had led to a vast amount of litigation, and to the onlooker at these contests there naturally arose the thought that a science which could admit of such a conflict of opinions must be in a more or less chaotic condition, and that much yet remained to be done before it could be considered to have reached the condition of an exact science or of an unerring guide to those who wandered in ignorance and darkness. It was to such congresses as that that they looked to restore to them the peace they enjoyed in the days of their ignorance, and to make the new life not only more healthful than the old, but as full of repose and peace. He knew that the questions involved in sanitary science were many of them of much intricacy and difficulty, as well as of much interest; but they were confident that as those interested in the matter pursued their labours from year to year they would more and more approach to an exact knowledge of the matters which arise, and would thus afford a more and more certain guidance to a public who earnestly desired some uniformity of advice from those whom they trusted in such matters. Having referred to the ordinances of Menn, the Levitical laws of the Jews, and some passages of Hesiod where he enunciates some of the rules of rural life in Boeotia some 700 or 800 a.c., Sir Edward said it was to the Romans and not to the Greeks that they looked for the first practical works of a sanitary kind, and their earliest structures were such as still to challenge our admiration and wonder. Probably no drainage operation ever had so mighty an influence on the world as the great works for the drainage of Rome, for the result of these works was not merely to carry away polluting matter, but to convert the low, swampy land lying in the midst of the hills of Rome into the solid ground on which the Forum Romanum was constructed, and thus to afford a common meeting-place for the inhabitants of the several communities

of the several hills of Rome, and so form the very home and nursery of the fierce Roman people from whence they went forth to conquer. A few months ago he visited in North Africa the remains of the town of Thamugus (now Timgad), built by Trajan, and not the least surprising thing in this magnificent city is the system of drains constructed down all the principal thoroughfares. The city, moreover, was abundantly furnished with magnificent baths and cisterns of water, and in the house of Faustus one still sees the bath room, and on each side two pillars, one inscribed with the name of the god Æsculapius and the other with that of the goddess Hygeia, so consciously did the Romans in this remote spot recognise the duty of seeking after health. If Rome in her ignorance could do all this for herself and her remote provinces, what ought this country to do for herself and all the branches of her empire?

The Health Exhibition.

The Health Exhibition was housed in the Drill Hall, and about one hundred exhibits were shown. The following acted as judges: Mr. H. D. Searles Wood, Mr. H. Adams, Dr. P. Boobyer, Mr. H. Pery Boulnois, Mr. T. W. Cutler, Mr. E. T. Hall, Dr. L. C. Parkes, Dr. Geo. Reid, Mr. J. Osborne Smith, Mr. W. C. Tyndale, and Mr. J. E. Wilcox. In the preliminary list of awards the following were awarded silver medals: W. M. Glover & Sons, Ltd., for new pattern covered dust cart and for the Warmth sprinkler and flusher; the Horsfall Destructor Company, Ltd., for centrifugal dust catcher; Messrs Pocock Bros. for padded room fittings.

Bronze medals: Neville Engineering Company, for Cains jets and sprinklers; Constable & Son, for house refuse tip van; "England" Works, for steel portable cloak-room fittings; John Knight & Sons, for metal inspection covers with non-detachable fastenings, and for gully trap, etc.; W. Harriman & Co., for glazed fireclay ware twin sink and for channel bends for manholes; John Jones, for cast-iron inspection chamber and for cast-iron intercepting bottom for building into brick chamber; Doulton & Co., for non-convulsive water mixing valve and also for glazed fireclay fireplaces; Freeman Hines, Ltd., for locking bricks; Candy & Co., Ltd., for glazed fireclay fireplaces; Pountney & Co., Ltd., for non-erosing semi-porcelain ware; Messrs. J. Duckett & Son, Ltd., for radial jointed trap outlet; Rowe Bros. & Co., Ltd., for lead pipes; Combination Collapsible Ventilator Company, for hopper ventilator with folding sides; and D. Smith, for combined expansion drain-testing plugs.

The following additional awards of bronze medals were subsequently announced: The Safety Water Elevator Company, for safety water elevator well gear; Messrs. Geo. Howson & Sons, Ltd., for mural bracket closet; Messrs. Doulton & Co., Ltd., for school urinal with vertical water check and flush riser to channel; Messrs. C. W. Outram & Co., Ltd., for the Hassell w.c. suite, with 1½ gals. flush; Messrs. Shanks & Co., Ltd., for bath with concave plinth, and also for adjustable vulcanite grill for bed-pan snitter; and the Iron and Marble Company, for the Drawell register grate.

The following amongst other exhibits have been deferred for further trial and consideration: G. Percival Milnes, automatic apparatus for governing the supply and discharge in connection with contact filter beds, automatic apparatus for dosing sprinklers, and automatic flushing apparatus to discharge at varying intervals; George Howson & Sons, Ltd., automatic drop-by-drop flushing cistern and asylum safety bath with regulating valves; Edward Bennis & Co., Ltd., improved smokeless chain stoker; Doulton & Co., anti-scalding control apparatus for bath; McDougall Bros., disinfectants; H. Birch, Killon, & Co., Fiddian's distributor; British Fuel Economiser and Smoke Preventer Company, Bunsen bridge for boiler furnaces; Newton, Chambers, & Co., Ltd., disinfectants; Maughan's Patent Geyser Company, Ltd., geyser with safety gas valve; the Plastoment Asbestos Flooring Company—Plastoment asbestos flooring.

Visitors to the exhibition found inventions and appliances of all kinds which are intended to make the home more beautiful and more healthy, and to carry out present-day ideas of what is necessary for the disposal of

unsavoury refuse and the prevention of disease. The Safety Meter Elevator Company were showing their safety-meter elevator, which raises water from any depth to the surface. Messrs. Doulton & Co. had two stands. In the corridor they were showing glazed fireclay stones and fireplaces, and in the main hall were two bath-rooms fitted up most invitingly, the one with a cast-iron white vitreous enamelled bath, wide-rolled edge, standing, waste, and lever valves, and the other with a cast-iron Sitz bath, white vitreous enamelled, with jet, wave, and spray fittings. The same company were also exhibiting other specimens of baths and a double range of fireclay trough lavatories, with spray supply, specially suitable for schools. Several of their pedestal and other closets suitable for houses, schools, and institutions were shown.

Amongst the stands specially interesting to surveyors were those of the Nevile Engineering Company, of Worcester, showing Caink's jets and sprinklers for street-watering carts; Messrs. Constable & Sons, of 1, Harrow-road, London, who had on view their latest improvement in house-refuse tip-vans, with sanitary cover-lids and wind-guards combined, as well as street orderly truck with sanitary cover-lids; that of the Bristol Wagon & Carriage Company, showing improved street-watering vans and new patent tipping dust van; and that of Messrs. W. M. Glover & Son, Ltd., who were showing their "Warwick" sprinkler and flusher fitted with lead and leather hose attachment, and the new pattern dust van. The Horsfall Destructor Company had models of their well-known destructor, both of the "back-fed" and "top-fed" types, as well as samples of crushed clinker and clinker bricks.

An interesting exhibit was that of Messrs. Murray & Co., of Preston, showing their automatic flood trap. Mr. G. P. Milnes, of Stroud, was exhibiting his three automatic apparatus for governing the supply and discharge in connexion with contact filter beds and the like, and these are being tested by the judges. Messrs. John Knight & Sons, 24, Gertrude-street, Chelsea, S.W., were showing disconnecting chambers with intercepting trap, fitted with Knight's cover to chamber and access trap on cap. Amongst other things also being exhibited by the firm was the Aldwych double-seal manhole-cover, for which a bronze medal was awarded. Glazed fireclay, more sinks of various descriptions, together with cisterns, urinals, intercepting-traps, etc., made up a noticeable exhibit by Messrs. W. Harrison & Co., of Newcastle-upon-Tyne. Lavatory arrangements were also the exhibits of Mr. J. Jones, of the Carlyle Works, Chelsea.

Messrs. Freeman Hines, Ltd., of 2, Victoria-street, London, were showing their pipe-joint, which is now pretty well known. They were also showing Hines' locking-bricks for bacteria bed-wells, with which no cement or mortar is required. In close proximity to this exhibit was that of Messrs. Geo. Howson & Sons, of Hanley, who were displaying cisterns of all kinds, lavatories for hospitals, etc., closets, and many other sanitary fittings.

A distinct novelty was the natural sanitary water-closet, exhibited by the inventor, Mr. E. A. Rawlence, Salisbury. Messrs. H. Birch, Killon, & Co., of Manchester, were showing a working model of a bacterial filter of 4½ ft. diameter, fitted with Fiddian's distributor, and had a number of drawings and photographs of installations of all types of Fiddian's distributors. Messrs. W. & R. Leggett, of Bradford and London, showed devices for regulating roof-lights, lantern-lights, etc., for ventilation, as well as brass and other metal goods of all kinds. The British Fuel Economiser and Smoke Prevention Company, of Bedford-row, W.C., had a section of a boiler furnace showing the Bunsen bridge and apparatus for the prevention of smoke and economy in fuel by the introduction of highly-heated air in regulated quantities to all parts of the furnace. Mr. J. Hoskins, of the Warnley Pottery, had various stoneware pipes, gullies, traps, and interceptors on view, including Hoskins' open-inspection pipe-joint, and further, he was showing the "Smokeless" chimney-pot and ventilator. Sanitary inspectors found much to interest them in the Spring Bending Company's (Handsworth) exhibit of drain-cleaners of different types.

Messrs. Candy & Co., Ltd., 87, Newman-street, W.C., were showing their several designs of "Devon" fireplaces, manufactured of fireclay backs, with glazed bricks and glazed hearths and kerbs to match. The Devon type is made in a large variety of type to suit any room in any building, and they were well spoken of by the Committee, who recently carried out tests for the Smoke Abatement Society in conjunction with H.M. Office of Works.

Another exhibit of considerable interest to a gathering of sanitary specialists was that of McDougall Bros., of Manchester, and 10, Mark-lane, E.C., who were showing sanitary appliances of various kinds, as well as disinfectant powders, fluids, soaps, etc. Messrs. Newton, Chambers, & Co., Ltd., of Thorncliffe, near Sheffield, had a capital exhibit of the well-known "Izal" preparations. Snowdon, Sons, & Co., Ltd., of London and Birmingham, were showing lubricators, electro fittings, disinfectants, etc.

Messrs. C. W. Outram & Co., of Woodville, made a speciality of the Hassall water-closet suites, fitted with Hassall's patent flushing rim. Messrs. Jas. Crispin & Sons, of Bristol, were showing boilers, radiators, calorifiers, steam traps, etc., and Messrs. Pountney & Co., Ltd., of the Bristol Potteries, were showing some porcelain lavatory basins in various sizes. The hand-painted decoration on some of the lavatory basins attracted considerable notice.

The Carlybrook Brick Company, of Bristol, made a most attractive exhibition of their blue and red vitrified bricks, terra-cotta, and moulded bricks, etc. The firm's bricks are being largely used for sewerage work in the west of England. A very large show of lavatories, closets, urinals, and fittings of all kinds was made by Messrs. J. Duckett & Sons, Ltd., of Burnley; while Messrs. Hughes & Stirling, of 7, Arundel-street, Strand, W.C., exhibited a model of a complete "Sterling" destructor, with boiler, flues, dust catcher, and chimney. Many photographs were also shown of installations of refuse destructors, which have been carried out by the firm for local authorities. Probably the most noticeable exhibit to the visitor not specially connected with any branch of sanitation was that of Mr. P. E. Gane, of College Green, Bristol, who was showing a scheme of furniture and decoration for the dining-room and library of a modern house. Messrs. Shanks & Co., of Barrehead, had baths, urinals, water-closets, etc., of their own design on view, and another good exhibit of a similar nature was that of Rowe Bros. & Co., of Bristol.

In the West Hall the most noticeable exhibit was undoubtedly that of the Range and Gas Stove Company, of Birmingham and London, who were showing all kinds of ranges and grates in operation. The London Warming and Ventilating Company, of 20, Newman-street, London, had also an attractive display of grates, including the "Florence" patent warm air and ventilating grate in action, the "Everbrite," "Brilliant," "Economic Anthracite," and other stoves. In the same hall Maughan's Patent Geyser Company were showing various types of geysers.

Several heating and ventilating exhibits were also to be found in the East Hall, and these included the exhibit of Mr. J. D. Prior, of Birmingham, who was showing his patent heat distributor and the "Venetian" fire-grate; the Iron Marble Company, Ltd., of Bristol, who had various types of register grates and ranges on exhibition; Jas. Stott & Co., of Oldham and Birmingham, who were showing water heaters, reflex lights, automatic exhaust roof ventilators, and electric and motor-driven fans; and Messrs. Hendry & Patterson, Ltd., of 3, Taybridge-road, London, S.W., showing D. O. Boyd's "Hygiastic" warm-air ventilating grate. The Plastoment Asbestos Flooring Company, of Lamb's-passages, Bunhill-row, London, were also exhibiting in this hall the Plastoment asbestos flooring.

Engineers' and Surveyors' Conference.

Mr. H. Percy Boulnois, M.Inst.C.E., presided on Tuesday morning at the Bristol Blind Asylum over the Conference of Engineers and Surveyors to County and other Sanitary Authorities, and, in opening the proceedings, referred to the undoubted value of such Conferences, and remarked on the many changes

and advances made in many of the branches of engineering. With regard, for instance, to the much-discussed question of sewage disposal, since 1892 great changes in the methods adopted for purification have been made, and the bacterial processes had made great progress, though they were still some way off finality. The Chairman proceeded to deal with the various methods of the disposal of sewage, and said that, although great strides had been made in this branch of municipal engineering, much more remained for solution in this difficult and controversial subject. The proper housing of the labouring classes, both in urban and rural districts, was a problem which had not yet been satisfactorily solved, and it involved not only engineering, but serious economic questions which were not easy of solution. Another question which loomed large in this perspective is that of the recent revolution in the description of the locomotion on the roads and streets by the introduction of motor-cars and traction engines, which had entirely altered the character of the traffic which the roads and streets were designed to carry. Whilst, on the other hand, their surfaces would not be subjected to the hard hammering of the horses' hoofs, they would be subject to a tearing, disintegrating action from the rapidly-revolving pneumatic tyres of the motor-car and to greatly increased weight of the traction engine and its accompanying loads. Further, there was the terrible nuisance of dust, which must be stopped before serious damage thereby is caused to persons and to property. The question of the economic supply of pure water to our villages and scattered houses was worthy of every engineer's attention, but, unfortunately, the cost was generally prohibitive. Concrete construction had made considerable progress since 1892, due to the introduction of the Henniobique patent process, and there was no doubt a large field open for this description of construction in many branches of engineering. The strength obtained by this fortified concrete had been remarkable, and it looked as if the text books on the strength of this material would have to be revised. Progress was the watchword of every engineer, and it was especially so with the municipal engineer, as the eyes of the public were so constantly upon him, and he was subject to much criticism. There was no finality in engineering, and it behooved them who had the wellbeing of the country at heart to take advantage of everything that would help them to meet the difficulties which must ensue for the modern desire of the human race to aggregate together in large centres of population.

Construction and Maintenance of Rural Roads.

Mr. Robert Phillips (County Surveyor, Gloucestershire) gave his personal experience in constructing some thirty-five miles of road in England and in the direct maintenance for the past seventeen years of 1,050 miles of country main roads. He pointed out that the ideal road was a straight one, but this was not often obtainable. If the road was to be properly drained no part should be absolutely level. The most suitable gradient was 1 in 30. Experience had shown that a metalled surface of 18 ft. was required for rural main roads, and a width of 40 ft. between the fences, and in the neighbourhood of large towns these dimensions should be increased to 30 ft. and 60 ft. respectively. The construction of the road would depend on the material available in the neighbourhood. If hard clinkers of refuse from a destructor is to be used this would require to be 12 in. in depth and to be well rolled before the broken top metal was applied. The road bed would be 20 in. below the finished surface of the road, and should be curved to give a fall of 6 in. to 9 in. from the centre to the sides; where possible the finished road surface should be kept above the level of the adjoining land. If any bog, springs, or running sand is found below the road bed, it should be excavated, and 12 in. of clay puddle placed over it. If a trouble some yellow clay, that is sometimes found between the coal measures and the limestone, it should be trenced across every 3 yds., 2 ft. deep, and the trenches filled with ashes. Where the road is in cutting there should be at least 1 yd. of levelled surface between the metalled surface and the toe of the slope.

The top metal should be of hard broken stone, not more than $2\frac{1}{2}$ in. in its longest diagonal dimension, spread from the shovel to give an even surface of about 1 in 30 from the centre 4 in. thick; this will require 1 ton to every 8 yds. superficial, and when consolidated the top metal will be 3 in. in thickness. In all cases of thick coating use a profile mould to obtain a good cross section. If all the roads were constructed in this manner the duties of the surveyor would be light, but many were simply worn tracks which had been covered with macadam. His practice was to have the road scraped or swept clean before applying the fresh metal. The new material to be of the hardest obtainable, and to be broken by hand (on the roadside where possible) to a 2½-in. ring. Occasionally a 2-in. stone is used; the new metal to be kept as clean as possible, and spread one-stone thick, 1 ton to cover 12 superficial yds.; this to be dry steam rolled without any bindage till the stones are fixed, and then the smallest possible quantity of bindage. He stored the road-scrappings for this purpose in heaps till vegetation has decayed. With regard to the dust problem, the solution appeared to be the use of the hardest and heaviest stone procurable, to use as little bindage as possible, and perhaps to front it with pitch and tar before applying any bindage after it has been dry rolled.

Macadamised Roads and Dust.

Mr. A. P. I. Catterell, M.Inst.C.E., in a paper on this subject, said it was nearly one hundred years since MacAdam began to lay down the principles of road construction to which he had given his name, and there was an appropriateness in considering this topic at Bristol, for it was in this neighbourhood, in 1816, that Mr. MacAdam, as Surveyor to the Bristol Turnpike Trust, first put in practice the methods that he advocated. In the days of Telford and MacAdam the question of dust was probably of little account. One of the requirements of a macadamised road on which horse traffic is used was that it shall be slightly elastic. Theoretically an unyielding surface may be better for vehicles, but practically a considerable amount of wear would ensue both to the road and the vehicle unless the road surface was slightly responsive to any jar. This vital requirement of elasticity was really one of the chief causes of the trouble experienced with dust. It was generally said that motor-cars were the cause of the dust, but motor-cars would not raise the dust if the dust were not already there either on the surface or in the interstices of the metalling. It was better to get at the cause of the trouble than to blame the instrument, and the cause was undoubtedly the fine material that lies upon and between the metalling. There appeared to be three directions along which efforts may be made to reduce dust:—

(a) By treating the macadamised surface in such a manner as to retard the formation of dust, or fix it when it is formed; (b) by introducing another substance as a cushion between the metalling in place of the grit and dust with which the interstices are usually filled; (c) to use as road material stone of a silicious or basaltic nature less liable to be broken down by wear or dissolved by moisture. With regard to (a), the City Engineer of Bristol had furnished the results of experiments as to the relative cost of dressing the roads with different dust-preventing solutions. The experiments took place in Coronation-road, Bedminster, and those who had formerly complained as to the street watering both spoke and wrote of the good results. No record was kept of the reduced cost of cleansing, but it was probable that there would be a saving as compared with ordinary street watering. In Liverpool experiments were made in treating the roads with oil, and apparently the treatment resulted in a distinct saving in maintenance as well as reduction of wear; but on the other hand, the oil did not form a very pleasant surface for traffic, and the smell was complained of. It is probable that the trouble from dust can be very much palliated on existing roads by the use of calcium chloride and other similar solutions without appreciably increasing the cost of watering, if at all. On the other hand, the best way to make dustless roads is to use better material. A bad material can never be made permanently satisfactory by simply

fixing the surface dust. (b) Treating the roads with a watering solution may be possible in urban, but, as a rule, it is altogether beyond the means of rural districts, and another method must be found. The dust nuisance has been successfully tackled by coating newly-rolled metalling with boiling tar and pitch. Immediately after the road is formed the tar and pitch is applied in a flat stream from a watering-pot. It is then dressed with fine flint grit and allowed to stand a day or two for consolidation before the traffic passes over it. Even with mendip limestone, which is notorious for giving off dust, this method has been found to be successful. Another example of the second way of overcoming the dust question is the use of tarred macadam. This has been tried for some years with more or less successful results. Tarred slag appears to have answered well in some of the busy thoroughfares of London. The tar, as in the previous case, is applied hot, the slag being also heated to dryness. Apparently better results have been obtained with slag than with limestone or basalt. This method will probably be followed up still further, and there can be no reason why, in course of time, it may not become uniformly successful. It appears to aim in the right direction of substituting for dust an elastic and non-frangible material as a cushion between the stones. (c) Anyone who travels over the country will notice how much less dust there is where basaltic or silicious stone is used as compared with limestone, lime, or oolite. If every macadamised road could be made up with basalt the dust question would assume a very different aspect. It is not only that such roads are less easily broken down by weather, but the material being of greater specific gravity is not so easily moved by wind. The argument against the more general use of basalt, in districts remote from basaltic quarries, is its cost. But it does not necessarily follow that a material which is cheapest in first cost will be cheapest when the cost of maintenance is taken into account.

Mr. Fletcher (Dorset) opened the discussion, and said he found it better and cheaper to scarify. In Dorsetshire the cost of their main roads had increased in seventeen years from 12,000l. to 25,000l., and he attributed that to traction engines. They could make the roads, but it was all a question of cost, and he thought either the Government would have to take over the main roads or else give them grants.

Mr. Read (Gloucester) pointed out that hundreds of roads had no artificial foundation, and this was a cause of a great deal of the difficulty.

Mr. C. E. Nichols (Folkestone) described what had been done at Folkestone with regard to the tar-painting of roads, and said it had been so successful that he intended to do all the roads of the town. It prevented dust, and was cheaper. He used ordinary tar with no addition.

Mr. Wheeler (Eastwood) also instanced some roads which had been treated with tar macadam which had been done four years and would last another five. The cost for two years worked out at 16s. 2d. for the tar macadam as against 24s. for granite.

Dr. Rideal remarked that the presence of even a small quantity of soluble alkali made a difference in the hardness of material. He suggested that the dust nuisance could be greatly removed in the country by cutting down the hedges. He thought in the use of cloude salts they might make it a sterilising solution as well as a dust-preventing solution.

Mr. Martin (Eastbourne) advocated the treatment of the roads with a thick coat of tar and pitch, and afterwards the spreading over of some well-slaked lime and then coarse sand or gravel.

Mr. H. Baldwin (Coalville) also advocated the addition of lime in the preparation of tar macadam.

Mr. Mawbey (Leicester) said that in days gone by he found that the addition of lime to the pitch and tar made a splendid damp course. They had tried caliche of chloride, but found it cost more than the watering although it kept the dust down.

Design of Works for the Bacterial Treatment of Sewage.

Mr. J. S. Pickering (Borough Engineer, Cheltenham) read a paper on this subject, in which he pointed out the necessity of

the overflow arrangements being adjusted to the varying flow of sewage. The ordinary fixed weir will, with a heavy head of storm-water, permit an excessive volume to pass to the works, and the type known as the "leap weir" was also unsatisfactory. A type of storm-water overflow not generally known, but far in advance of the usual forms adopted, was one having a separating plate fixed horizontally at their level across the sewer. The quantity to be treated passes underneath this plate, and all in excess is deflected by a vertical plate into the overflow culvert. No storm-water overflow which did not take into account the fluctuating dry weather flow of sewage could be considered entirely satisfactory. Some means should be adopted for preventing such objectionable matter as paper and other floating matter from entering the water-course. The author proceeded to give figures obtained from nearly a hundred works where the bacterial system is in operation, and pointed out that, where almost identical conditions prevailed, the practice of different engineers is so much at variance as to lead one to the only possible conclusion that in many points of detail the bacterial treatment of sewage has by no means passed the experimental stage. The author next dealt with screens, detritus tanks, sedimentation or septic tanks, filters, and land. He considered it necessary that sewage should be screened upon entering the works, but the design of the screens would depend somewhat on the character of the sewage and its subsequent treatment. He suggested that where shallow screens to be raked by hand are provided the total width should not be less than 9 in. per 1,000 population, to be dealt with to a minimum of, say, 5 ft. All road detritus and other mineral matter should be intercepted in properly-designed tanks, and, having freed the sewage of the greater part of the mineral matter, some form of tank treatment is necessary prior to its application to filter beds. If septic treatment was to be carried out he suggested that the tanks should be covered and thoroughly ventilated. Provided that suitable arrangements are made for removing some of the deposited sludge at frequent intervals, tanks of a capacity of three-fourths the dry-weather flow should be of ample size to effect the clarification and give any necessary septic action to the sewage. The question as to whether the tank effluent should be dealt with in contact-beds or continuous filters depended largely upon the levels of the site and other local conditions. Broadly speaking, the effluent from a percolation filter 6 ft. deep is equal in its standard of purification to an effluent of the same quality sewage from a double-contact system. He felt that a system of percolation filters will, as a rule, be much more economical, both in initial outlay and working expenses, than a system of double-contact beds. The permanent success of a filter depended largely on the use of a suitable filtering medium, and materials liable to disintegration should be avoided. He was of opinion that a very hard angular material, such as broken granite, will prove the most advantageous for use. Little information was forthcoming on the relative results of various sized materials, and until this is forthcoming it is difficult to arrive at a satisfactory conclusion. Great hopes were at one time entertained that the Royal Commission appointed eight years ago to deal with the subject of sewage purification would bring forward a final and satisfactory solution, but, so far, it has not been forthcoming, though some useful information may be obtained from the various reports issued. What appears to be required is a properly organised State Department, which would collect reliable information from works in operation and conduct trials and experiments at the expense of the nation for the guidance of sanitary authorities, who are now left to their own resources to find a solution of the sewage problem.

Considerable discussion followed the reading of this paper.

Mr. Unson (Maidenhead) doubted whether the author was correct in saying that they would get a liquefaction of 50 per cent. of the organic solids in a septic tank, and thought they would not be justified in placing the percentage higher than 25 per cent.

Mr. Read (Gloucester) thought that the proper place to intercept road detritus was at the street gulleys.

Mr. Smith (Kettering) spoke at some length on the necessity of more attention being paid in sewage works to the overflow weir, and thought that the weir might be combined with a detritus-chamber, and made to serve all purposes. He also expressed some doubt as to whether screens were necessary.

Mr. Lacy hoped that the final Report of the Royal Commission would assist engineers in determining to some extent what was the best of the varying systems of sewage disposal. He did not think that septic tanks gave rise to any nuisance which was perceptible outside the immediate proximity of the works.

Mr. Collins (Leicester) described how sludge was dealt with in that town by placing it in furrows and then ploughing it.

Dr. Rideal said it was extraordinary that although the Local Government Board requirements as to bacterial works were the same, yet there was such tremendous differences in actual practice. He agreed that screens, as a rule, were a mistake. If they could remove the detritus by rushing it through the detritus tank and then press it on to the land instead of using storm tanks, he thought it would be better.

Mr. Mawbey expressed the opinion that they ought to view the suggested abolition of screens with great caution. It might be all very well with gravitation schemes, but they could not do without them where they had to pump.

Mr. Pickering agreed with Mr. Unson that 50 per cent. of liquefaction was rather high, although experiments at York had actually shown 60 per cent. He agreed also that it would be well to intercept the detritus at the street gulleys, but believed a good deal would still get through. He was still of opinion that there were few cases where screens could not be done away with in spite of what had been said. Mr. Dibdin had designed slate beds to actually take the place of tanks, and he believed that that gentleman was working on right lines in trying to get a system of aerobic treatment.

Rational Extension of Modern Cities.

At the Conference of Municipal Representatives held at University College on Tuesday, Mr. A. Richardson, M.P., read a paper on this subject, and remarked that the abnormal growth of large towns and cities presented them with a great social problem—the proper housing of the working classes. The modern city in this country has been built up piecemeal and in patches without any regard for the artistic and with no attempt on a large scale to lay down building blocks for residences, separate areas for manufactories, wide central spaces for schools, institutes, theatres, churches, etc. The result is large slum areas, dwellings side by side with industrial works, *bona-fide* working men, in order to be near their employment, gradually accommodating themselves to the tenement system—all of which heavily handicap him in the race for bread and lower his moral vitality. In addition to these drawbacks in consequence of our system of rating and taxation municipal debts are accumulating at such a rate that they become increasingly heavy, and the pace we are travelling at in that direction is somewhat alarming. The efforts of reformers in the future, as taught by the above fact, must be of a twofold nature:—(a) To prevent the influx of village labourers into the cities, thus giving partial relief to the congestion; and (b) to secure big belts of land outside cities, but within reasonable distance of industrial works, for building purposes. One of the principal aims of the intelligent reformer is the prevention of the growth of slums in the future. Every thoughtful and intelligent man who has devoted any serious attention to the housing problem of our great cities must have realised that much of our cottage property put up in recent years, or now being built, will show very little superiority over the dwellings it displaces when it has been in existence as long as the latter. Faulty design, faulty material, faulty construction, and want of surrounding space all combine to render the houses but little better than their predecessors so far at any rate as the prospect of future fitness is concerned. Many of our municipalities and private owners know what ought to be done, and would be prepared to do it but for legal

and departmental difficulties of an insuperable character standing in the way. Local authorities can now buy land either within or without their districts for the construction thereon of workmen's dwellings, but the houses must be built at once, and the purchase money, if obtained from Public Works Loan Commissioners, repaid within thirty years. What we require is the power to buy large tracts of prospective suburb before it has acquired the price of building land, such suburban areas to be laid out on plan after careful and expert consideration, but only to be built upon when the need for new building arises, and then only in accordance with the pre-arranged plan. The roads should be wide, straight, and planted with trees, and should be arranged to intersect as far as possible at right angles. The area should be segmented, and certain definite sections set apart for certain definite and separate purposes, e.g., one section should be for good-class residences, another for workmen's dwellings, another for factories of various kinds, and suitable railway-sidings and depôts connected with them. Special attention should be paid to the question of provision of open spaces, municipal lungs, and specific sections of these parks and recreation grounds set apart and equipped for very young children. Baths (swimming and washing) should not be forgotten in connexion with these. The minimum area allowed for these breathing spaces ought not to be less than one acre in ten. There should be no such thing as the intrusion of slaughtering establishments or other offensive trades into residential neighbourhoods. If we in this country were in a position to arrange for the future extension of our cities in this way we should be able to deal with the so-called housing problem of the times in a far more satisfactory manner than at present.

Engineering and Architecture.

The first sitting of the Engineering and Architecture Section was held at University College on Wednesday morning under the presidency of Mr. E. T. Hall.

The President, in his opening address, said he felt he could not address them with advantage on such subjects as sewage treatment, water supply, or river purification, or deal with the chemical, medical, and bacteriological problems with which they were intimately connected, but he could address some practical remarks on the best way of utilising in our buildings sunlight and air, the two best aids in the restoration of the sick to health and in the prevention of disease. In architecture, light and air exercise a potent influence, not only on exterior design but on the planning of buildings. He might be pardoned if he lay stress on the necessity of the design of buildings being within rather than from without. In other words, to take care that the exterior, so far as fenestration is concerned, shall express and grow out of the internal requirements of the building. To sacrifice the interior in order to get an external effect is insincerity in architecture. It means inconvenience to those who use the buildings, and results in unsanitary conditions prejudicial to body and mind. Appropriateness in design is the correct aim in art, and this arises where the design is the natural and ordered outcome of the purpose for which the building is intended. In the dwelling house of the wealthy and middle class this principle of design is not so frequently overlooked, but it is not uncommon in towns, both in these and poorer dwellings, to see the neglect of such simple rules as that windows should be so disposed that all parts of a room shall be well illuminated, not only because light is the great germ-killer, but because it serves to point out impurities otherwise unnoticed; that the tops of windows shall be as near to the ceiling as possible, and that windows should be made to open wide, so that all parts of the room may be scoured by currents of fresh air. Through ventilation of rooms and buildings is a gain of great importance, and we must see that other provision than that of open windows is made for the entrance of fresh air and for the exit of foul air, and to this end we should provide inlet ventilation of a simple type and outlets into upcast flues. Having referred to the block-planning of large buildings, such as hospitals and schools, the President said that this open-plan type

brought him to the mention of sanatoria, which are not merely the temporary abodes of consumptive patients, but are great colleges of hygiene. The architect must make the sanatorium a model, an object of what a sanitary building should be. He must lay out his scheme on broad lines, and design to give all the rooms a maximum of sunlight. Every where facilities for cleanliness must be evident—cleanliness of the habitation and of the person. He could not but think that the public guardians of the health of the poor in towns might follow the precedent set in country sanatoria, and he would suggest that our large hospitals under private management might specially fit up some parts of their noble institutions and become schools of hygiene in a very special sense. Further, he urged that the ventilation of schools should be done by the natural system of open windows and of warming fresh air brought directly into the classrooms. Children are keen observers, and if they are taught in schools where the windows are never open they will go home and think that windows ought not to be opened. In the planning of schools a word of caution was needed. It had been the practice of the last twenty years to design schools with a large central assembly hall, but it should be separated entirely from the side classrooms by well ventilated and naturally-aerated corridors parallel to the sides of the hall. He thought also in such a hall an artificial or forced system of air-supply is almost a necessity. Passing to the question of the smoke-laden atmosphere of large towns, the President said he was not so unpractical as to run a tilt against the open fireplace for sitting-rooms, but, on the contrary, he was an advocate for such fireplaces. He could not think, however, that science is impotent to invent some simple apparatus to arrest and utilise the whole of the fuel used and save those products of combustion which now go to waste. The kitchen range, which was the great smoke-producer, might be done away with and gas or electricity substituted. In factories he thought the coal furnace and the tall chimney may in the relatively near future be entirely done away with for the substitution of electricity. In public buildings, like hotels and similar institutions, and in large boarding-schools, we can, however, all do our share towards smoke abatement. In bedrooms, for example, fireplaces for coal consumption should be done away with, and hot-water pipes and radiators substituted, with, of course, good ventilation. He had adopted this system in all the nurses' houses of his recent hospitals, and its advantages are obvious. Dealing next with the subject of rural by-laws and their effect on the housing of the poor, Mr. Hall said it was reasonable to insist on damp courses in the walls, on preventing ground air from passing into rooms, on sound drainage and its ventilation, and on preventing water pollution, but beyond these essentials a great many of the present requirements for cottages are not only unnecessary, but are deterrent of building. From housing the workman to housing those who were past work is a natural transition, and he asked if it could not be possible to grade our houses for the indigent classes. As architects, they could assist the authorities in the design of buildings suitable to different classes. Attempts had been made to classify inmates of the present poorhouses, but he suggested the classification of the houses themselves. After briefly alluding to the use of steel in building construction, the President urged that they should press on the public at large to take care that new buildings shall be worthy of our towns and cities; that there shall be a real desire to get good architecture to adorn their streets. The Royal Institute of British Architects has been earnestly striving for many years to raise the standard of the practitioners of our art by enforcing thorough training, by making the examinations for young architects sound tests of knowledge; but many men (particularly in the provinces) evade these and hold aloof from our organisation on the ground that it is useless for them to toil, because the incompetent man, unempowered by study and having no claim to the title of architect which he assumes, receives the employment which his local friends secure for him without inquiry as to whether the representative body of architects

have given him their diploma or not. May we hope that the Institute's efforts will receive the cordial support of all public-minded men, because then we may be sure the standard of architectural art in the public mind will be raised, and competent men alone will be commissioned to see to the adornment of the great centres of industry, of liberty, and of throbbing life, which are the glory of our country.

On the motion of Mr. Woodward (Board of Education), seconded by Mr. Whittaker, a vote of thanks was passed to the President.

Isolated Homes for the Aged Poor.

Mr. A. Saxon Snell read a paper on "Isolated Homes for the Aged Poor v. the Workhouse." Having dealt with the historical part of the subject, he said they would agree that better treatment was needed for those who had drifted to the workhouse by force of circumstances beyond their control. It was for this class that isolated or cottage homes are proposed, and have been in some cases erected, and he thought there could be no question as to their being an improvement on associated wards, subject to an exception for the case of those who are too old and feeble to attend to their daily wants without assistance. After all, the cottage home is a modified reversion to the principle of the almshouse—that institution which took shape some centuries ago, and lasts till this day in all parts of the country. The question to be asked is, can they be built, maintained, and administered at a reasonable cost, a cost per inmate, at any rate, not exceeding that which obtains in a workhouse? There are, unfortunately, no data of the cost of administration to go upon as yet, but if he might venture to express an opinion, for whatever little it may be worth, he thought that it was quite possible. If they were content to build just a little beyond what the poor had been used to, he felt that they could build such cottages cheaply. In a large institution they wanted a great number of officers, and elaborate heating apparatus, lighting, and fire-prevention apparatus; but in cottages they would not want that. Mr. Snell exhibited a plan of suggested cottages, which, allowing three inmates in each room or tenement, or twelve in each cottage, would accommodate seventy-two old men. Each tenement comprises a sitting-room, the bed cubicles being curtained off during the day. To each is attached a small scullery and food cupboard. There is a small porch with a seat in it, and this forms an inglenook by the fireplace which would be very cosy. The sanitary conveniences would be grouped together and screened off by trees, &c. Each room has a fireplace with a small range and oven, which would be used by the inmates in preparing their own breakfast and tea. No hot water would be laid on either to the sink or lavatory basin. The kettle would have to be brought into requisition for such a luxury, which, by the way, is denied to the vast majority of those who live outside the workhouse. The administrative block or cottage should also be designed on the most economical lines. The cost of these cottages, worked out on the basis of 6d. per foot, amounts to 3160l., or 44l. per inmate. The administrative blocks, drainage, fencing, &c., would bring up the cost to between 60l. and 70l. per inmate.

Miss Cochrane pleaded that consideration should be given for the rural poor, and instanced sad cases of old people turned out of their homes and having to go to the workhouse.

Mr. Harding Roberts pointed out that there was nothing gained in the villages by taking a person from his own home to another home. They had better give the person sufficient outdoor relief to enable him to live in his own cottage. Even if they had the homes suggested by Mr. Snell they would still need the workhouses.

Utilisation of Pits, etc., for Rubbish.

Mr. H. B. Woodward, F.R.S., followed with a paper on "The Utilisation of Old Pits and Quarries and of Cliffs for the Reception of Rubbish," and said that it had been the custom to utilise abandoned pits for the reception of town refuse. The evils likely to result from the process, when dwelling-houses are afterwards erected on the tracts, have been sufficiently recognised, and

the law now exercises its protective influence. The pollution of building sites is not, however, the only objection that should be raised to the indiscriminate infilling of pits and quarries. In many parts of the country picturesque heaths and commons, places that may be regarded as natural health resorts, have been defiled by the shooting of rubbish into old gravel or clay pits or stone quarries. Moreover, the material—glass and crockery, sharp fragments of metal, as well as dust and decomposing organic matter—is apt to be scattered on ground bordering the abandoned pits. From an aesthetic point of view this is deplorable; but the rubbish is not only unsightly, it is unwholesome from the ill odours that arise, and dangerous from the wounds that may be inflicted, especially on children. But further than this, the geologist is naturally concerned at the way in which the water-bearing strata are rendered liable to contamination from the practice of shooting parish refuse into old chalk pits, limestone quarries, or gravel pits. When the local supply of drinking water is drawn from shallow wells in the adjacent strata, the danger of pollution may be serious. In many places around our sea coast, cliffs have been appropriated for the tipping of rubbish, and there is a lamentable pollution of the foreshore in many a picturesque locality adjacent to fishing and other villages. The author pointed out, in conclusion, that the only method of the final disposal of refuse was by fire.

Mr. Cotterell pointed out that some law was needed to prevent pollution of the water supply, and, as a matter of fact, it was the local authorities themselves who were generally the offenders.

Mr. Whittaker gave several instances of the disposal of sewage by local authorities near the wells of water companies, and urged that such things should be put a stop to.

Mr. Woodward moved a resolution to the effect that the by-law of the Stroud District Council dealing with the disposal of rubbish should be brought before the Council of the Sanitary Institute with a view to their making representations to the Local Government Board.

The resolution was carried.

Bacterial Treatment of Sewage.

Mr. Stuart H. Davies brought the subject of the bacterial treatment of sewage before the section, and drew particular attention to the following points:—(a) Residence in tanks as a means of equalising sewage or as a preparation for further treatment; (b) sludge reduction; (c) the arrestment of suspended or irreducible matters. In attempts to arrive at better results by the aid of such guidance as the present state of imperfect knowledge affords, it appeared necessary to keep the following aims in view:—(a) The collection and concentration of sludge without undue interruptions to the flow of sewage; (b) the more effectual arrestment of suspended matters, and the avoidance of clogging, by improved methods of working rather than by elaboration in design; (c) the resolution of sludge under an aerobic condition as productive of less offence and more rapid treatment. In connexion with these aims the claims of trickling filters and contact beds, relatively or in combination, together with methods of working, as best calculated to overcome the difficulties met with, must be considered. As a means of securing rapidity of treatment, the value of trickling beds is evident. Analyses of sludge taken from beds have frequently revealed the fact that matter has been carried forward (by accelerated flow and by the activity taking place in tanks) which should have been deposited, and removed from grit chambers. The difficulty of holding back such matter does not arise in connexion with schemes which simply aim at the sedimentation of suspended matter as a preliminary to removal, but, apart from such schemes, it would appear desirable to aim at the more effectual arrestment of inorganic material by a uniform rate of flow.

Variation in flow is particularly objectionable in connexion with detritus tanks. He suggested that a uniform rate of flow under varying discharges can and should be attained by adapting the form of tank to such requirement. A tank to fulfil this purpose would be of considerable width and shallow depth, and would necessitate the construction

of a stepped weir at the outlet end, but in a tank of this form the height of flow would at any time afford an indication of the quantity of sewage to be dealt with on beds and the greatest possible head would at all times be available, and while the cost of construction and labour in cleaning must be greater than that in connexion with some forms of tank, the advantages gained would seem to justify such expenditure, the ill-effects of imperfect design in this particular being felt more or less throughout the process of treatment. In the case of large tanks he suggested the possibility of emptying from below, screw-down valves being placed at intervals in the floor of the tank.

Experimental Coke Clinker Filter Beds.

Mr. Douglas Archibald gave the life history of eight years of the experimental coke clinker filter beds at Kingston-on-Thames, which he illustrated by a number of diagrams. The coke bed at Kingston, after eight years' continuous working, with scarcely a single day's rest and often no attention to, or cleansing, except on one occasion, is now receiving and dealing with no less than eight fillings a day of the Kingston tank effluent at the special request of the Royal Commission, and is giving an average purification of about 61 per cent., as reckoned by the analyses of albuminoid ammonia.

Dr. Rideal said it was unfortunate that, as engineers and surveyors, they could not use the figures which Mr. Archibald had given because, in all these problems, they had the Local Government Board to contend with, and they had to submit to their particular "flow pure," which negated any practical conclusions which could be drawn from the results which Mr. Archibald had put before them. He questioned also whether the "flow pure," as measured by the albuminoid ammonia, was, after all, a real "flow pure." With regard to Mr. Davies's paper, he might say the question of the detritus tank had been discussed in another section, and it had been agreed that the inorganic detritus should be removed from the organic matter; the smaller the size of the detritus tank the better it was to prevent the accumulation of organic solids at that stage. They all knew that septic tanks or chemical tanks required some method for the removal of sludge from the bottom, and now such sludge could be automatically removed without emptying the tank. It was, he believed, the general opinion that the sludge they had to deal with by modern

bacterial methods was not so offensive as that they used to deal with, and it might be that this removed, to some extent, the sludge problem. A special problem to be considered at the present time was the arial nuisance arising from the distribution of effluents on the filters, and in this connexion he deprecated the use of the nozzle distributor. In the case of circular or rectangular distributors he thought they made many of the sprinklers much too high.

Dr. Reid thought that Mr. Davies was approaching the conclusion that many of them had arrived at, that percolating filters were much to be preferred to contact beds. At present Mr. Davies suggested a combination, but that would mean having another tank. The speaker proceeded to compare results obtained at Hanley with those obtained by Mr. Archibald.

Mr. A. J. Martin remarked that, in his experience, he had no difficulty in keeping down everything which could legitimately be called detritus in a tank which would hold from ten to twenty minutes' flow. He was not at all sure that they would not get clogging of the filters even if they succeeded in keeping back every particle of suspended matter in the effluent, because his observation led him to think that a great deal of the clogging was due to the absorbed matter in the effluent. Growths would take place in the filter where the effluent was apparently clean. To the best of his knowledge Mr. Archibald was justified in claiming for Kingston a record in the number of fillings a day, for he knew of no place where the contact beds were filled eight times a day. It was a very creditable record, and he trusted that the Local Government Board would take note of it, and that they would see some relaxation of those hard-and-fast regulations to which Dr. Rideal had referred.

The section then adjourned till Thursday.

Architectural Societies.

THE EDINBURGH ARCHITECTURAL ASSOCIATION.—This Association held on Saturday its annual excursion, when the members visited Tullialan and Culross. The party, which numbered upwards of fifty, was met and welcomed by Sir Jas. Sivewright at Tullialan and shown by him over the modern castle and gardens. The party then proceeded to the

old castle, where Mr. Harold O. Tarbolton, F.R.I.B.A., read a short paper. After inspecting the castle, the members were entertained to luncheon by Sir Jas. Sivewright in the old banquet hall. At the conclusion of the luncheon Sir James gave the toast of the Association, to which Mr. H. O. Tarbolton, president, replied, and thanked Sir James for his hospitality. Thereafter the party drove to Culross, where they visited the palace by permission of Miss Luke, and the Abbey Church and the Abbey House by permission of the Rev. David Hampton and Lord Bruce respectively. In the absence of Sir R. Rowand Anderson, Mr. A. F. Balfour Paul, architect, acted as leader at the palace and abbey.

Illustrations.

THE ARMSTRONG COLLEGE

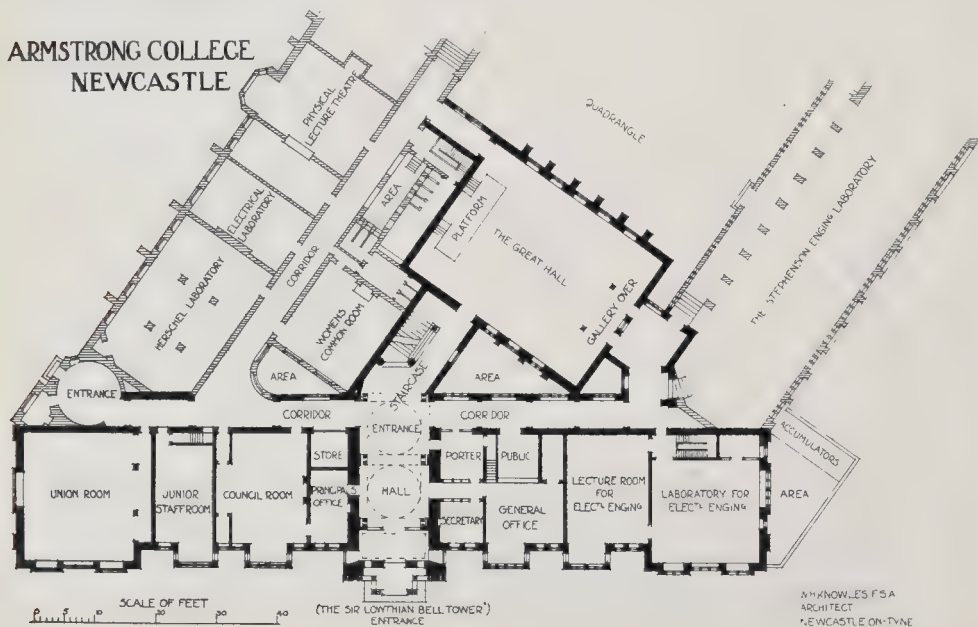
WE are able to give, by the courtesy of the architect, Mr. W. H. Knowles, tolerably full illustrations of the Armstrong College at Newcastle-upon-Tyne, which has just been opened by the King. These include an exterior view taken from the architect's drawing, and views of a part of the front, showing the principal entrance, and of the great hall, the council room, and the principal room: these are taken from photographs. The plan is annexed.

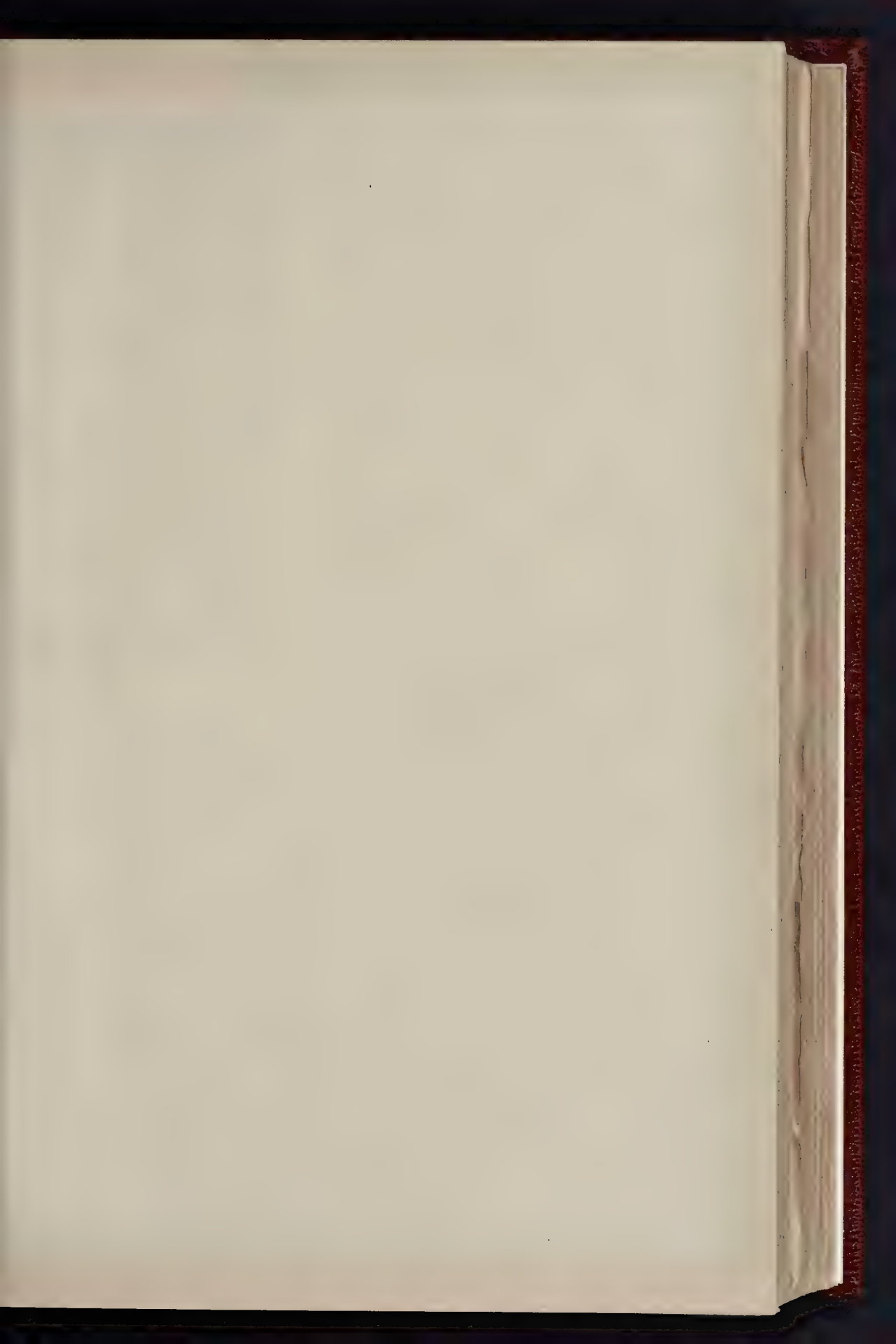
The building was so fully described in our issue of June 30 (page 733 *et seq.*) that it is not necessary to say any more here.

SCULPTURE AT THE ROYAL ACADEMY.

We have combined in some illustration plates of this issue, numbered consecutively for reference, all the photographs of sculpture at the Royal Academy which have been lent to us by artists who are exhibiting in the Octagon and the Lecture-room.

They are all referred to and commented on in the article on another page specially devoted to the subject. The only information we need add here is that in Mr. Schenck's relief, "Justice," the figures on each side represent "Poetry" and "Prose," and that the work forms part of the interior decoration in the Public Library, Hammersmith.







"MADONNA AND CHILD."—BY MR. BERTRAM MACKENNAL.



"A ROYAL GAME": AN ALLEN.



"NARCISSUS."—



BY MR. W. REYNOLDS-STEPHENS.

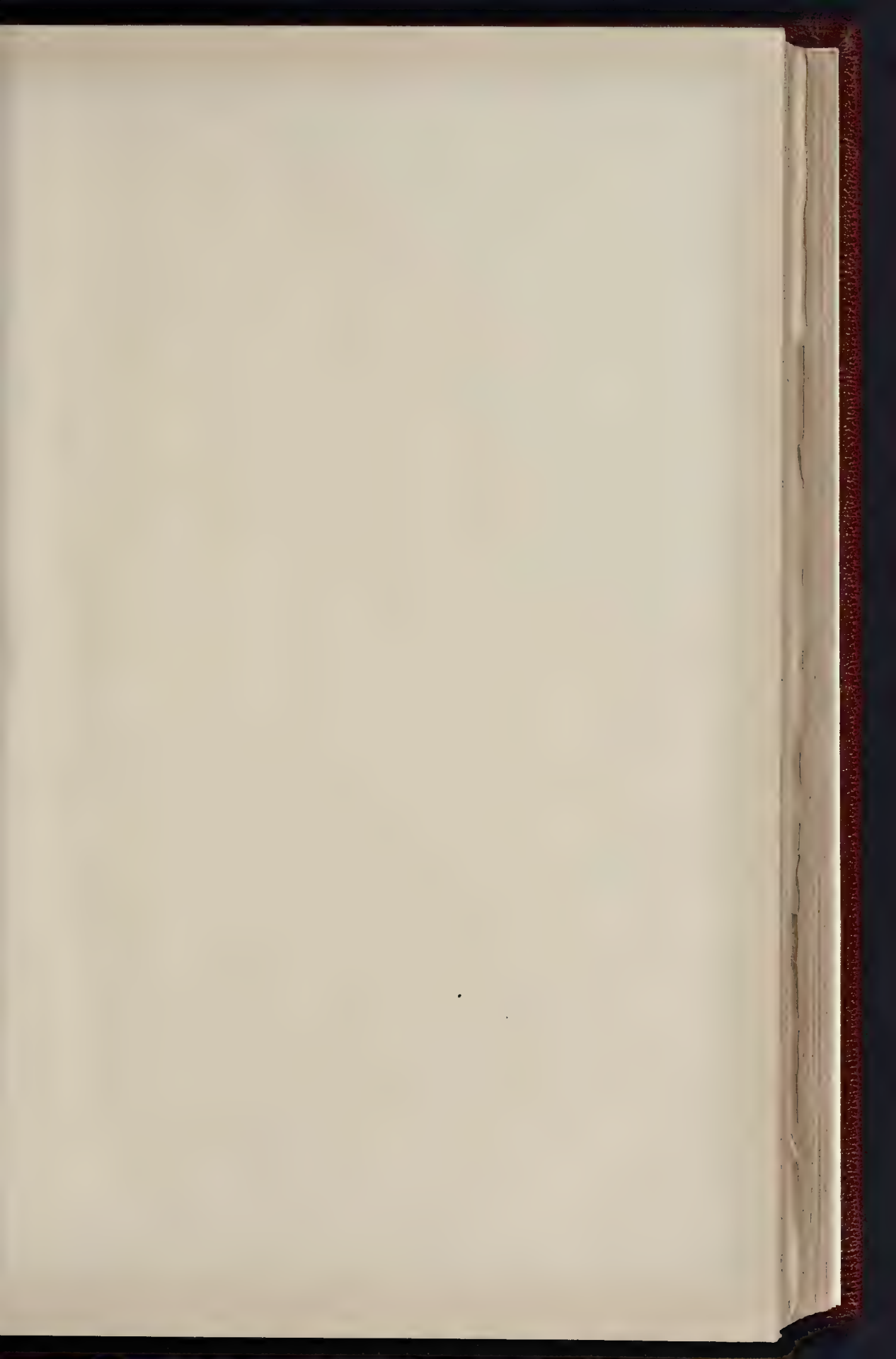


A. BERTRAM PEGRAM.



"PAX": RELIEF.—BY MR. OLIVER WHEATLEY.

NO PHOTO SPRAGUE & CO. 4 & 5 EAST HINDIC STREET FETTER LANE E.C.





“COMMERCE.” RELIEF. BY MR. V. H. HODGE.

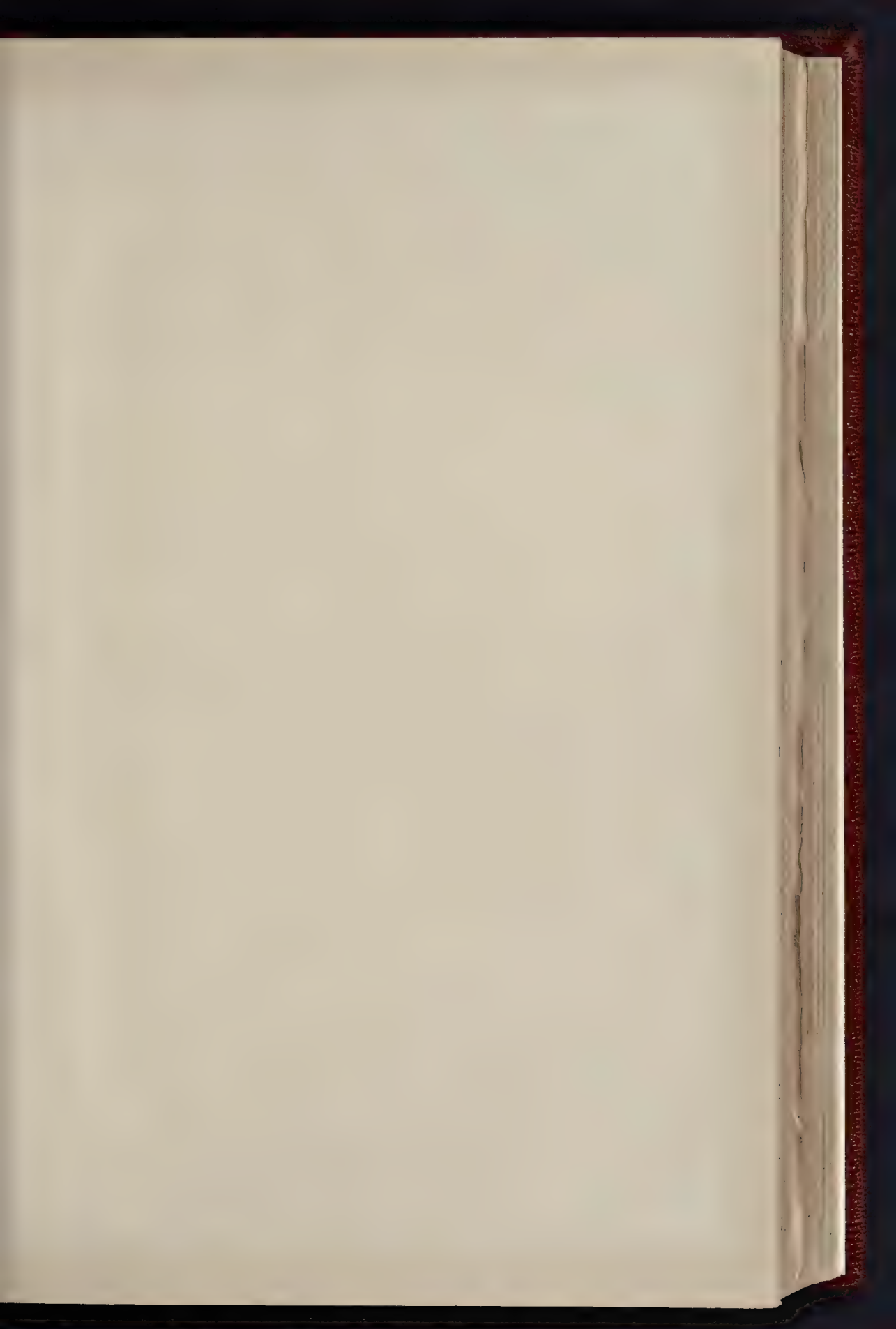




"JUSTICE," RELIEF, BY MR. F. T. P. SCHENK

NY 9100 - PAGE 2 - 4 X 5 LAST HUNGING SHEET TITLED LANE F C

SCULPTURE AT THE ROYAL ACADEMY - I

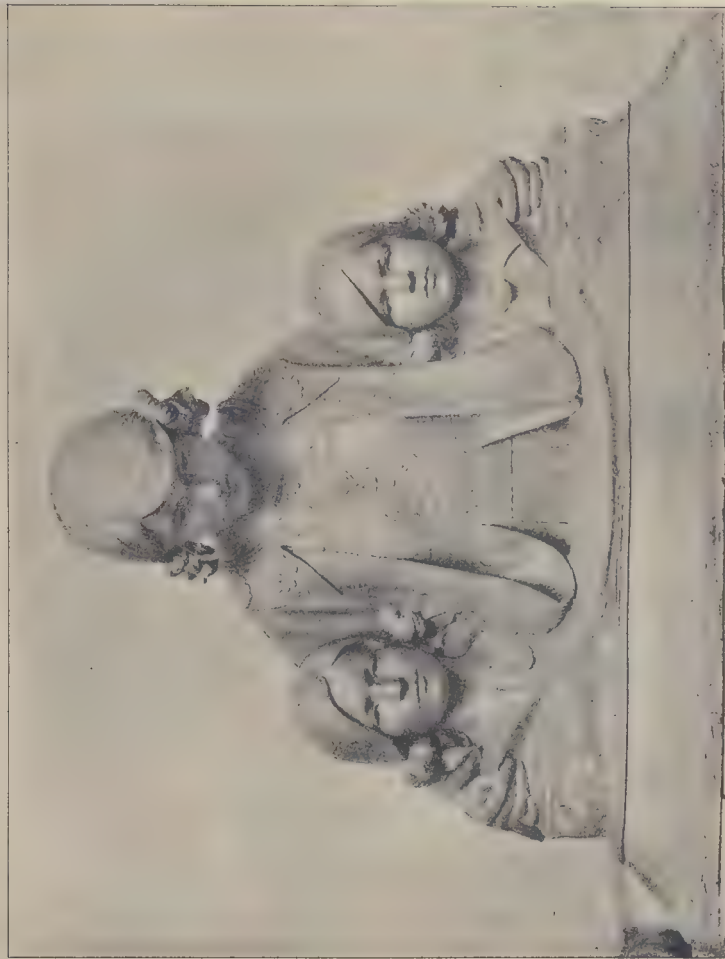






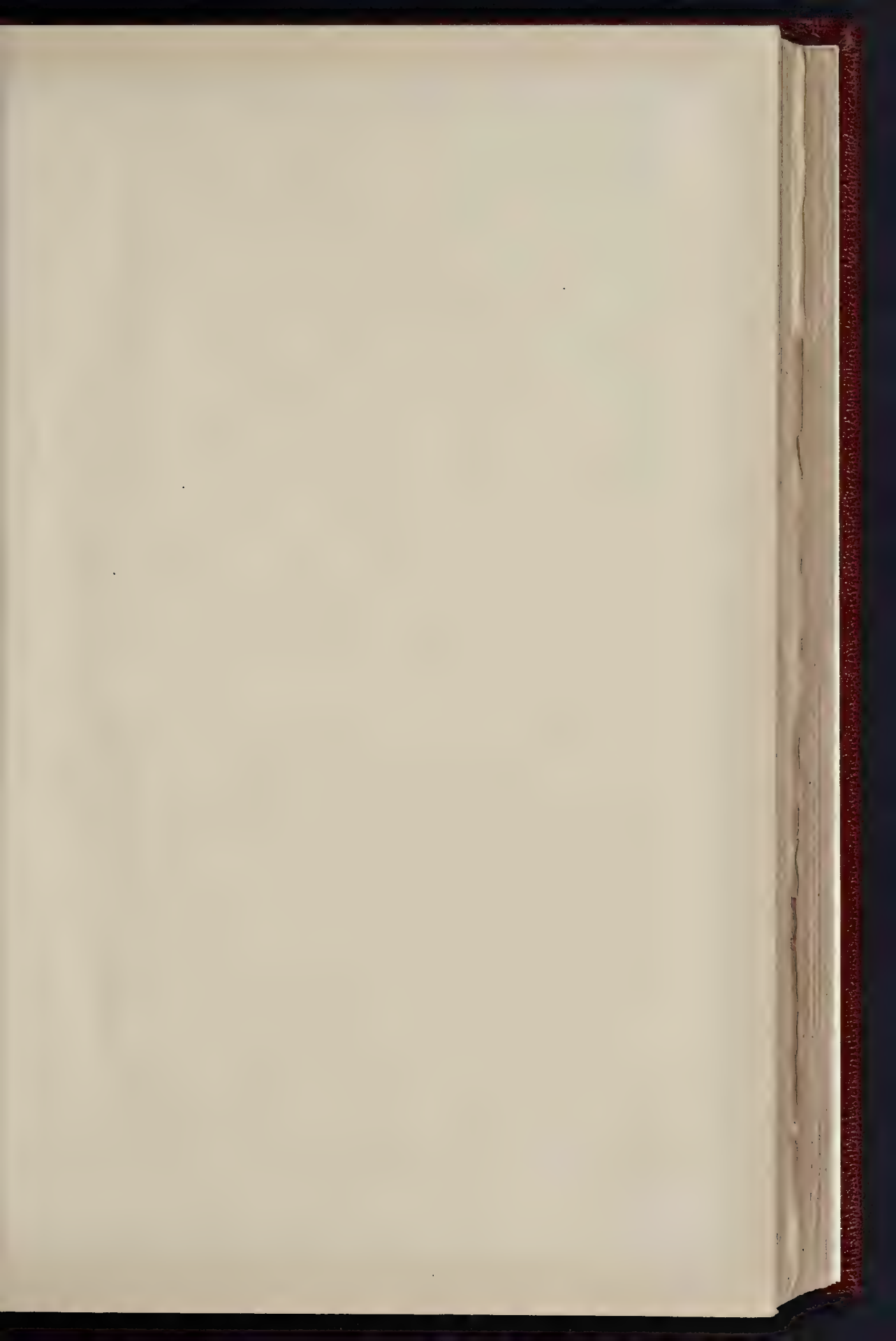
WALL. BY MRS. HERBERT SPENCER.

THE PHOTOGRAPH BY J. S. BENTLEY, 10, JARVIS STREET, LONDON, E.C. 4.



THE CHILDREN OF THE SCULPTOR. BY MR. ALBERT TOFT.

SCULPTURE AT THE ROYAL ACADEMY—III





PRINCIPAL ENTRANCE.



THE COUNCIL ROOM.

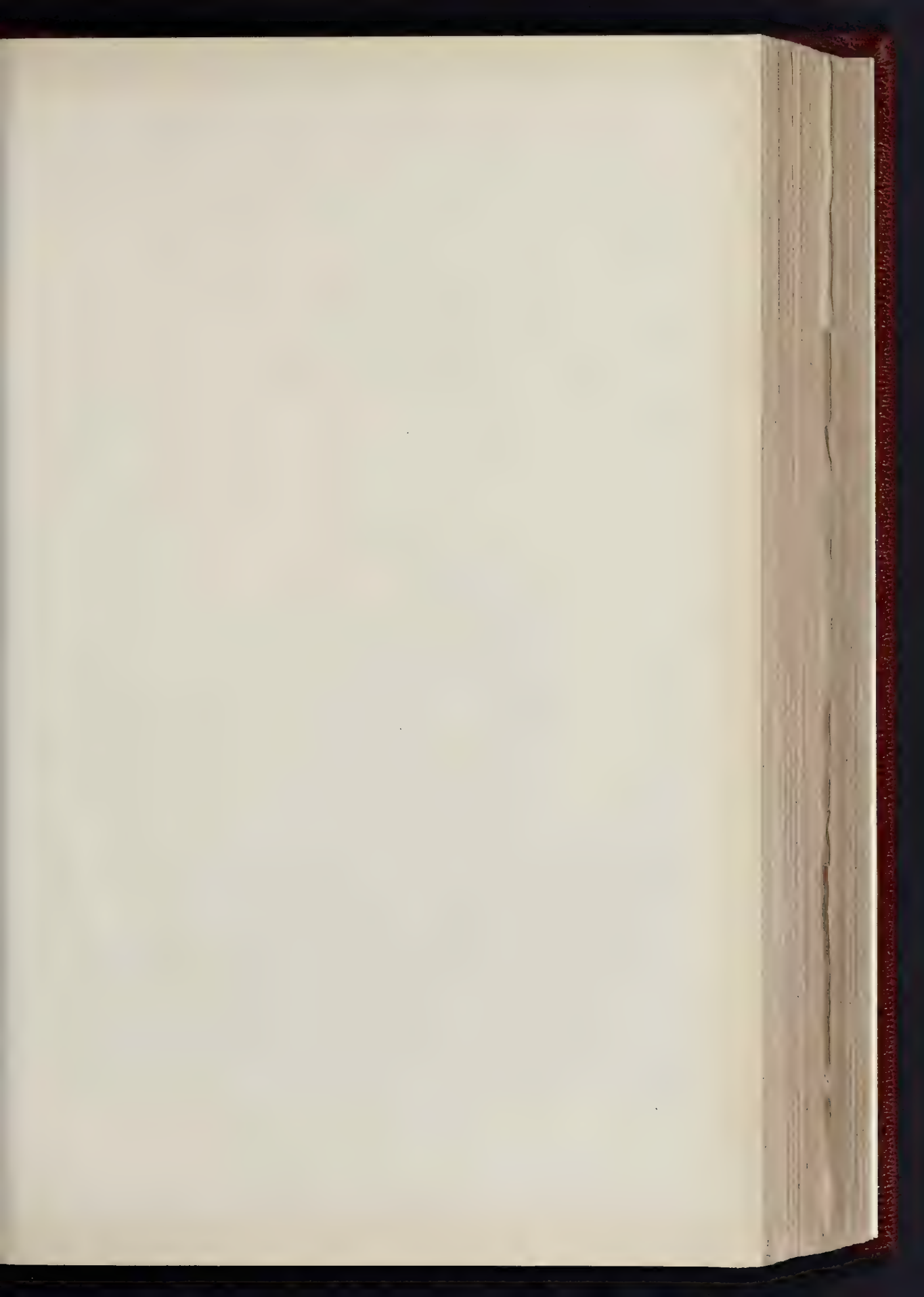


THE GREAT HALL.



THE PRINCIPAL'S ROOM.

INT. PHOTO. BY H. C. L. 4. 5. 5. EAST HIND STREET, FETTER LANE, E.C.



ARMSTRONG COLLEGE.
NEWCASTLE *upon* TYNE.
W.H. KNOWLES F.S.A.
Architect.





PHOTO BY H. SPRAGUE AT L. 435 EAST HARDING STREET, FETTER LANE, E.C.

THE LONDON COUNTY COUNCIL.

The usual weekly meeting of the London County Council was held on Tuesday in the County Hall, Spring-gardens, Mr. Alderman Spicer, Chairman, presiding.

Loans.—On the recommendation of the Finance Committee it was agreed that the following loans be granted: To Battersea Borough Council £9,666, for paving footpaths; to Camberwell Borough Council £750, for housing purposes; and to St. Pancras Borough Council £6,203, for street improvement.

White Hart-lane Estate—Finishing of Roadways on Section A.—The Housing of the Working Classes Committee recommended and it was agreed:

"That additional expenditure on capital account not exceeding £900, be sanctioned in respect of the paving of the footways on sect. A of the White Hart-lane estate; that the offer of Mr. E. J. Knifton to provide and lay "Patent Victoria" stone and to make up the footways required for 6s. a square yard be accepted.

Mare-street—Sale of Land.—The Improvements Committee recommended that a freehold interest in a site in Mare-street be sold for £2,500, to the governors of the Cripplegate Schools Foundation. This was agreed to after discussion and the defeat of an amendment.

List of Rates of Wages and Hours of Labour.—The Works Committee recommended that the Council's list of rates of wages and hours of labour be amended so as to provide that the rate of wages of drivers of Scotch derricks shall be 9½d. an hour. This was agreed to.

Housing, Islington: Burns, Knox, Scott, and Wallace Buildings.—The Housing of the Working Classes Committee reported that four blocks of dwellings, named Burns, Knox, Scott, and Wallace buildings, on the Caledonian Estate, Islington, are almost completed. The dwellings contain accommodation for 1,032 persons in four tenements of four rooms, 116 tenements of three rooms, and seventy-six tenements of two rooms. The Caledonian Estate, which was formerly the site of the Royal Caledonian Asylum, was acquired by the Council for the purpose of providing working class dwellings under Part III. of the Housing of the Working Classes Act, 1890. The total number of persons for whom accommodation will ultimately be provided on the estate is 1,388.

Displacements of Persons of the Working Class.—They also reported as follows:

"In continuation of previous reports on the subject of the displacement of persons of the working class in connexion with the development of private property, we desire to draw attention to clearances effected or about to be carried out in the metropolitan borough of Chelsea. About 200 houses bounded by Green-street, Ravelling-street, Little Colindale-street, and Marlborough-road have been acquired by a company with a view to the redevelopment of the property. The buildings are occupied by 1,025 persons of the working class, who will be displaced when the houses are required for demolition, an undertaking having been given by the company that the displacement will be carried out gradually during 1906 and the years following, and that each tenant will receive not less than four months' notice to leave.

The leases of the majority of the houses standing on an area bounded on three sides by Colledge-street, Leader-street, and Pond-place, and adjoining a block of working-class dwellings known as Onslow-dwellings, will fall in during 1907, and the land is now being offered on building leases. Fourteen houses have been demolished, and the remaining seventy-three houses will no doubt be demolished at an early date. The buildings contained 278 persons, which were occupied by about 437 persons of the working class, of whom ninety-one have already been displaced.

Thirty-three houses in Smith-street, Durham-terrace, and Queen's-road West have been demolished, and eleven houses in Christchurch-street are about to be demolished. The forty-four houses contained about 218 persons, of which thirty-six are still occupied. About 275 persons of the working class have already been displaced, and it is estimated that the whole clearance involves the displacement of 327 persons.

These clearances, therefore, in one metropolitan borough involve the demolition of about 331 houses and the displacement of about 1,788 persons of the working class."

Vauxhall Bridge—Proposed Models of Propylæa.—The Improvements Committee reported as follows:

"The Council on May 19, 1903, upon the recommendation of the late Bridges Committee, approved the design, then submitted, of the new Vauxhall Bridge and the proposed architectural and artistic treatment of the same, but reserved for future consideration the question of erecting propylæa on the abutment piers. On April 10, 1906, we advised the Council to sanction the erection, at an estimated cost of £2,000, of two propylæa at each end of the bridge, but on May 1, 1906, our Chairman accepted an amendment to refer the matter back for further consideration and report.

We have given further consideration to the matter, and we think that, in order to afford members of the Council and of the general public an accurate idea of the architectural effect which will be produced by the proposed propylæa, full-sized models should be built at one approach to the bridge in the exact positions which the propylæa, if sanctioned, would occupy. In order to withstand the high pressure which may be expected, and to provide a structure which might last for several months, each model should consist of a strong wooden staging securely anchored to the top of the existing granite pier. The staging would be faced with slabs of light fibrous plaster screwed to wood studding. The work would be of a special character, and we have therefore consulted a firm, which has great experience in work of this description, as to the probable cost. As a result, we estimate the total cost of two models at £400. The provision of rough plaster figures would cost about £50, but we think that these figures on the models may be dispensed with. In our opinion, the work is not one which should be executed without the intervention of a contractor.

We have caused small models of the propylæa, and copies of a statement describing the same to be placed in the lobby of the Council chamber. One of the models (No. 1) is square and of plain design; the other (No. 2) has rounded ends and some decorative treatment of the sides. The total estimated cost of erecting, in granite, propylæa for both approaches to the bridge in accordance with design No. 1, would be £26,000, while if design No. 2 be adopted, the cost would be £15,200. We think that design No. 1 would be in greater harmony with the general features of the bridge than No. 2, and we propose that the models should be constructed on this design. The unexpended balance of the recent votes passed by the Council for the construction of the bridge is amply sufficient to defray the cost of the works proposed, and we recommend:—(a) That expenditure on capital account not exceeding £400 be sanctioned for the erection at each end of the approach to Vauxhall Bridge of two full-sized models of the suggested propylæa. (b) That two full-sized models of the suggested propylæa be erected at the west approach to Vauxhall Bridge, according to design No. 1 submitted to the Improvements Committee on March 28, 1906; and that the Committee be authorised to arrange for the erection of the work."

The following is the statement referred to:—
"This model, to a scale of 1 in. to a foot has been prepared to show in effect the decorative treatment of the finished structure, and the principles which guided the composition as a whole. It will be observed that the constructive steelwork has been accepted in its mercantile form, and treated in the most legitimate manner, such artistic value as obtains being dependent solely on the fine sweep of the balustrade from end to end, and the bold curved projection to the footways. The decorative, which is in the hands of sculptors of distinction, and is thus of the best quality obtainable, is employed sparingly and only on such parts as are of considerable importance in the design. The approaches, for example, are marked with granite propylæa, rising to a height of 55 ft. from the pavement by double flights of balustrade figures, while the points of support, over the culverts, are treated with bronze figures representing Science, Fine Arts, Local Government, Engineering, Architecture, Agriculture, Education, and Pottery. The foregoing treatment of the work is, it is submitted, justified on both economical and artistic grounds, for it will be seen that when the whole of the decoration is paid for, including the sum required for the proposed propylæa at both approaches, a balance of about £25,000 on the sum voted for the bridge will remain. In the result, it is thought, is such as will assure a dignified and satisfactory effect, worthy of the important work it is intended to complete."

No. 17, Fleet-street.—The Local Government Records and Museums Committee reported as follows:

"We have had under consideration the arrangement for admitting the public to the "council chamber" on the first floor of No. 17, Fleet-street, which, as the Council is aware, has been specially reserved. The stained glass windows kindly presented by Mr. Sturge have now been fixed, and the room has been furnished mainly with surplus furniture not suitable for general office use and placed at our disposal by the Establishment Committee. We propose that the hours during which the public will be admitted to the room shall be from 10 a.m. to 2 p.m. on each day except Sundays, Good Friday, and Christmas Day. These hours have been selected owing to the fact that, while the right of the public to access to the room will be secured, the Council will also be in a position to let the room for the purposes of learned societies and the like for the purposes of meetings. The fact that the room is available for such purposes has been advertised, and two applications have already been acceded to upon agreed fees providing the fixing of a scale of charges. It has also been suggested that the room, owing to the position it occupies, would be useful as a depot for the sale of the more important of the Council's publications. The caretaker would have charge of these arrangements, and all that would be necessary to be provided would be a specimen case and storage accommodation. We concur in the suggestion, and we submit a recommendation accordingly. There will be published and placed on sale in the room a handbook with regard to the building, in which its historical associations, and also the action taken by the Council in preserving it, will be stated. The handbook will be circulated to members of the Council. We had hoped that it would have been practicable to accommodate a portion of the Council's staff in the room without hindrance to its use by the public, but we have reluctantly had to abandon the proposal. We are not yet in a position to make a recommendation as to the permanent custody of the room, but in order that it may be opened at the earliest possible date, we propose that a woman should be

temporarily employed as caretaker, and to do the necessary cleaning. Provision for the expenditure is made in the maintenance estimates (vote 59) for the current financial year. We recommend:—
(a) That the "council chamber" at No. 17, Fleet-street, E.C., be opened to the public on week-days (except Good Friday and Christmas Day) between the hours of 10 a.m. and 2 p.m.

(b) That during the time the room is not open to the public it be available for hire for the purposes of meetings; and that the Local Government Records and Museums Committee be authorised to act on behalf of the Council in the matter.

(c) That arrangements be made for the sale in the room of the handbook relating to No. 17, Fleet-street, and of the most important of the Council's publications.

(d) That, pending the settlement of permanent arrangements for the custody of the room during the time it is open to the public, the employment temporarily of a female caretaker at the wage of 5s. an hour be authorised."

London County Buildings Bill, 1906.—The Parliamentary Committee reported as follows:

"The London County Buildings Bill came before a Select Committee of the House of Lords, presided over by the Earl of Camperdown, on June 26 and 27, and July 2, 1906. The Hon. D. Fitzgerald, K.C., and Mr. Vesey Knox appeared as counsel in support of the Bill, and Mr. J. W. Gwynne, M.P., the Chairman of the Select Committee, was the chief witness on behalf of the Council. The Council's Architect, the Chief Engineer, and the Valuer gave evidence on technical matters, and Mr. Norman Shaw and Professor A. Beresford Pile gave evidence, as to the necessity for acquiring the whole of the lands scheduled in the Bill for the erection of the proposed buildings. The only petitioners against the Bill were Messrs. Holloway Bros., who objected to the acquisition of their premises, contending, as they did before the House of Commons Committee, that the Council had sufficient space without interfering with their property; that their premises were indispensable for the conduct of their business; that it would be impossible to find other suitable premises on the river side, and that no compensation which might be given to them would be adequate for the injury which they alleged would be caused by their being disturbed. On June 27 the hearing of evidence was concluded, and the Committee decided that the Bill should proceed, and adjourned the consideration of the clauses of the Bill until a later date. On the consideration of the clause relating to the committee on the opposition of Messrs. Holloway, decided to strike out clause 11, which provided that if the arbitrator was of opinion that a claimant had failed to give to the Council sufficient particulars of his claim for compensation, and in sufficient time to enable the Council to make a proper offer, such claimant should pay one-third of the costs of the arbitration. Counsel for Messrs. Holloway submitted a clause for the reinstatement of the company on a site in the Belvedere-road, with a river frontage, equivalent in all respects to the site now occupied by them. This was strongly opposed on behalf of the Council, and the Committee declined to insert the clause, but accepted a proposal made by counsel on behalf of the Council, that Messrs. Holloway should not without their consent be disturbed in the possession of their premises until three years after the date of service of notice to treat. And that they should have free access to their premises by road and by river so long as they were in occupation. A clause embodying the proposal was accordingly inserted in the Bill. An undertaking that the notice to treat should be served within twelve months from the passing of the Act, was given on behalf of the Council, and was amended, has been reported to the House, and awaits third reading."

The Council, having transacted other business, adjourned.

APPLICATIONS UNDER THE LONDON BUILDING ACT, 1894.

The London County Council at their meeting on Tuesday dealt with the following applications under the London Building Act, 1894. The names of applicants are given between parentheses:—

Lines of Frontage and Projections.

Clapham.—An addition to a one-story shop on the forecourt of No. 650, Wandsworth-road, Clapham, abutting upon Queen's-road (Mr. W. C. Poole for Mr. M. Jones).—Consent.

Clapham.—A porch in front of No. 9, Bolingbroke-grove, Clapham (Mr. F. G. James for Mr. Stuckey).—Consent.

Dulwich.—A deviation from the plans approved for the erection of buildings on the west side of Vestry-road, Camberwell, so far as relates to (a) an alteration in the position and form of the bay windows; (b) a rearrangement of the planning of the rear portions of the buildings; and (c) the erection of three pent roofs in front of such buildings (Messrs. E. Crosse & Co. for Mr. G. Pedley).—Consent.

Holborn.—A building to be used as an outpatients' department at the Hospital for Sick Children, Great Ormond-street, Holborn (Mr. C. E. Barry for the Chairman and Board of Governors of the hospital).—Consent.

Islington, North.—A one-story building on the eastern side of Hornsey-road, Islington, to abut upon Lambton-road (Mr. C. H. W. McCullagh).—Consent.

Levensham.—A one-story shop in front of No. 3, Brownhill-road, Catford (Messrs. Norfolk & Prior for Mr. J. Alder).—Consent.

Paddington, South.—A deviation from the plans approved for the erection of one-story shops in front of Nos. 110 and 112, Westbourne-grove, Paddington, so far as relates to the erection of a pilaster on, and the projection of the fascia and cornice over, the land to be dedicated and left open for the use of the public (Mr. J. A. L. Gimblett).—Consent.

Wandsworth.—Porches to thirty-seven proposed houses in Landford-road, Putney (Mr. H. Biggall for Mr. G. A. Gale).—Consent.

Wandsworth.—That the application of Mr. H. G. Hills, for the Wandsworth Metropolitan Borough Council, for an extension of the periods within which the erection of buildings on the northern side of Mitcham-road, Tooting, to abut upon Epsom-street, was required to be commenced and completed, be granted.—Consent.

Wandsworth.—A one-story building on the southern side of Wilna-road, Garratt-lane, Wandsworth, westward of Farlington-road (Mr. D. H. Smith for Mr. P. Bleines).—Consent.

Wandsworth.—The retention and erection of porches to forty-four houses on the south-eastern side of Back-lane, Tooting, between Welham-road and Southcroft-road (Mr. E. L. Schneider for Mr. R. H. Miller).—Consent.

Lewisham.—The retention and completion of a dwelling-house adjoining No. 106, Bargey-road and of a dwelling-house adjoining No. 113, Inchmery-road, Catford, with the flanks of such houses abutting upon Thornsbeach-road (Messrs. Norfolk & Prior for Mr. J. Watt).—Refused.

Peckham.—An open-air pulpit with entrance steps thereto, in front of a mission church and hall on the site of Nos. 109, 111, and 113, Albert-road, Peckham (Mr. G. A. Lansdown for the vicar and churchwardens of St. Mary's Church).—Refused.

Strand.—A crane over the public way at the front of No. 71, Dean-street, Oxford-street (Mr. E. K. Purchase).—Refused.

Strand.—An addition to the existing porch in front of No. 10, Carlton House-terrace (Messrs. D. Blow & F. Billerey for the Right Hon. the Viscount Ridley).—Refused.

Westminster.—An addition over the one-story shop in front of No. 127, Victoria-street, Westminster (Messrs. Zeph King & Son for Messrs. White, Chilton, & Co., Ltd.).—Refused.

Width of Way.

Kensington, South.—Two studio buildings on the southern side of Logan-place, Kensington, at less than the prescribed distance from the centre of Logan-mews (Mr. G. H. Jenkins for Professor G. Moira and Mr. F. L. Jenkins).—Consent.

St. Pancras, South.—A factory and warehouse building on the northern side of Leake-street, King's-cross-road, St. Pancras, eastward of the Metropolitan Railway cutting, at less than the prescribed distance from the centre of the roadway of Leake-street (Mr. M. Garbutt for the Metropolitan Railway Surplus Lands Committee).—Consent.

Whitechapel.—A deviation from the plan approved for the re-erection of Nos. 21, 22 and 23, Great Pearl-street, Spitalfields, so far as relates to the re-erection of water-closet buildings, not exceeding 9 ft. in height, in the yards at the rear of the said premises (Mr. W. Gilbert for Mr. A. Wearing).—Consent.

Width of Way and Lines of Frontage.

Kensington, North.—The retention of a building at the rear of No. 124, Holland Park-avenue, Kensington, abutting upon Princes-road, at less than the prescribed distance from the centre of the roadway of Princes-road (Mr. S. J. B. Stanton, for the Holland Park Motor Company).—Consent.

St. George, Hanover-square.—An alteration to a projecting bay-window at the rear of No. 37A, Park-lane, abutting upon Norfolk-street (Messrs. W. H. Romaine-Walker & Besant for Mr. H. J. Duveen).—Consent.

Stepney.—Four one-story shops in front of Nos. 31, 33, 35, and 37, Redmans-road, Mile End, at less than the prescribed distance from the centre of the roadway of the street (Mr. W. E. H. Crawley).—Refused.

Westminster.—The retention of an office building at No. 45, Horseferry-road, Westminster (Mr. R. G. Hammond for Mr. J. Garlick).—Refused.

Width of Way, Lines of Frontage and Space at Rear.

Holborn.—A deviation from the plans approved for the erection of a building, known as the Cranston Ivanhoe Hotel, on a site abutting upon Great Russell-street, Bloomsbury-street, Streatham-street and Dyott-street, Holborn, so far as relates to the erection of an addition, to consist of cloak-rooms and a water-closet in the area at the rear of such building (Mr. T. Rhind for Cranston's Hotel Company).—Consent.

Width of Way and Space at Rear.

Marylebone, West.—Working-class dwellings upon the site of Nos. 26 to 30, Lisson-street, and Nos. 28 to 30, Mitcham-street, St. Marylebone (Mr. W. Lockwood for Lieut.-Col. Sandys, M.P.).—Refused.

Lines of Frontage and Space at Rear.

Battersea.—An addition at the rear of Nos. 417 and 419, Battersea-park-road, Battersea, to abut upon Carlton-grove (Mr. H. E. Rossiter for Mr. F. Mühlenkamp).—Consent.

Space at Rear.

Lewisham.—A modification of the provisions of sect. 41 with regard to open spaces about buildings, so far as relates to the proposed erection of an addition at the rear of a house on the northern side of Lanier-road, Lewisham (Mr. A. H. Wentworth for Mr. J. Phillimore).—Consent.

Space at Rear and Alteration of Buildings.

Marylebone, West.—Bath-rooms and water closets at No. 4, Duke-street, St. Marylebone (Messrs. Freeman & Ogilvie for the Hon. Louis Kinnaird).—Consent.

Formation of Streets.

Marylebone, East.—A deviation from the plan approved for the formation or laying out of a new street for carriage traffic, to lead from High-street, Regent's-park, into Lower William-street, so far as relates to an alteration from 6 ft. to 5 ft. 8 in. in the width of a strip of land to be dedicated to and left open for the use of the public in Barrow-hill-road (Mr. F. J. Stevenson).—Consent.

Greenwich.—That an order be issued to Mr. A. Roberts, refusing to sanction the formation or laying out of new streets for carriage traffic leading out of the north side of Woolwich-road, Greenwich, westward of Lombard-road (for Mr. E. T. Fysh).—Refused.

Lewisham.—That an order be issued to Mr. R. Stewart, refusing to sanction the formation or laying out of new streets for carriage traffic upon the St. German's estate, Catford, leading out of the south side of Downhill-road (for Mr. A. Cameron Corbett).—Refused.

Utting of Buildings.

Kensington, South.—A deviation from the plans approved for the retention of openings uniting Nos. 4 and 6 to No. 8, Leckham-gardens, East-hill, so far as relates to a slight alteration in the planning of the premises and an extension of the conservatories at the first floor at the rear. (Mr. E. L. Wratten).—Consent.

Cubical Extent.

Marylebone, East.—An addition to a motor repository at No. 1, Albany-street, St. Marylebone (Messrs. Brown & Barrow for Messrs. Friswell, Ltd.).—Consent.

The recommendations marked † are contrary to the views of the local authorities.

Competitions.

BATHS, FIRE STATION, AND LIBRARY, REDDISH.—The assessor, Mr. Bramwell Thomas, has awarded the premiums in connexion with the Reddish Baths, Fire Station, and Library competition as follows:—(1) Messrs. A. E. Dixon and Mr. C. H. Potter, 65, King's-street, Manchester; (2) Mr. J. Myrtle Smith, 8, Trafalgar-square, Chelsea; and (3) Messrs. Shewbrooks & Hodges, 24, Grainger-street West, Newcastle-on-Tyne.

WESLEYAN CHURCH, OSSETT.—In a limited competition for new Wesleyan Church and classrooms at South-parade, Ossett, the plans and designs by Messrs. Garside & Pennington, architects, of Pontefract and Castleford, have been selected. The church is to seat 400, to be fitted with the best pitch pine, and built of stone, with red tile roof, and the windows glazed with leaded lights. The style is perpendicular Gothic.

HOLBORN COUNCIL'S NEW OFFICES.—At the meeting on Wednesday evening of Holborn Borough Council, the Establishment Committee reported having considered the plans sent in for the proposed new Council offices by the six architects appointed to submit competitive designs. In deciding upon the respective merits of the plans, the committee had carefully gone into the convenience of the proposed arrangements, and the access of light and air to the different parts of the building. They were of opinion that set No. 1 best met the Council's requirements, and as it incorporated a larger portion of the existing building than any other set of plans, it appeared to them to be the most economical. While not less pleasing than any of the other designs, it was better adapted for the particular site. The committee considered design No. 5 second in order of merit, and design No. 6 third. With regard to the expenditure, all the six architects estimated the cost of carrying out their plans at about £20,000. The actual price estimated by the architect of No. 1 set

was £19,205. Alderman Donaldson Rawlins, K.C., moved (1) that the architect of No. 1 set be appointed architect, (2) that the other competitors be thanked for the care and skill shown in their designs, (3) that the Establishment Committee be instructed to communicate with the selected architect, with the view of his preparing working plans, and to take all other necessary steps for proceeding with the erection of the new offices. The Mayor then announced that the authors of the selected design were Mr. Septimus Warwick and Mr. Herbert Hall, South-square, Gray's Inn, W.C.

BOOK RECEIVED.

HADDON: THE MANOR, THE HALL, ITS LORDS, AND TRADITIONS. By G. Le Blanc Smith. (Elliot Stock.)

Correspondence.

DURHAM COUNTY SCHOOLS, SOUTHMOOR.

SIR.—The notice in your issue of the 6th inst. is contrary to fact. Mr. W. Rushworth, R.I.B.A., did not act as the assessor in the selection of the designs, but drew up a report for the Education Committee, in which one of the designs of Messrs. Clark & Moscrop was placed fourth in order of merit, whilst the other was not mentioned at all; that of Messrs. Dodd & Brown was placed fifth. The sub-committee, consisting of four members, ignored Mr. Rushworth's report, and selected the designs they themselves preferred.

A COMPETITOR.

* * We published the information as furnished to us; we had no means of testing its accuracy.—Ed.

METROPOLITAN ASYLUMS BOARD.

THE usual fortnightly meeting of the Managers of the Metropolitan Asylums District was held on Saturday last week at the offices, Victoria-embankment, E.C.

Half-yearly Estimates.—The Finance Committee submitted a statement showing R.I.B.A. estimates of expenditure on that of current account for the half year ending Lady Day, 1907, were 531,148l.

Leavesden Asylum.—The Works Committee reported having authorised the expenditure of 173l. 5s. on the provision of a vertical common sewer for the sewage irrigation works at this Asylum.

The Asylums Committee submitted a report dealing with the heating arrangements at the Asylum. The matter had occupied the attention of the Committee for some time, and reports from the Works Committee and the Engineer-in-Chief had been considered. As a result of their consideration of the subject, the Committee recommended that the existing grates should be replaced by modern slow combustion grates, the work to be carried out by the Asylum staff. This was agreed by the Board. It is estimated that the work will cost 308l.

Joyce Green Hospital.—Plans prepared by Messrs. Treadwell & Martin for the provision of a goods reception station, with a porter's lodge, and sixteen cottages, on the Joyce Green Hospital Estate, were approved and forwarded to the Local Government Board.

The Student's Column.

ROOFS: STRUCTURALLY CONSIDERED.—I.



ROOF is very generally defined as the external upper covering of a building, intended to protect the inmates and contents against inconvenience and injury by the weather. The definition is not entirely satisfactory, for the roof is always an essential portion of a building, whether it assists or does not assist to tie the walls together. Moreover, the roof frequently constitutes a characteristic feature of architectural design as applied to the exterior or interior of a building. In some cases, again, it is impossible to draw a line of demarcation between the roof and the sides of a building, as, for instance, in types of domed or arched construction where the springings are at or not far above ground level.

Bearing these points in mind, we see that it is not easy to formulate a short and simple definition covering every form of roof construction, and for the purpose of the present series of articles we need not make the attempt.

1. General Classification of Roofs.

Judged from the standpoint of structural design, roofs are divisible into two main classes:—

(1) Roofs exerting pressure upon the supports in a purely vertical direction.

(2) Roofs exerting pressure upon the supports in an outward direction at an angle with the vertical.

It should be pointed out, however, that horizontal thrust may be exerted against the supports of any roof coming within Class 1, in consequence of lateral wind pressure and of expansion due to temperature rises.

The two classes cover every conceivable type of roof construction, but while the classification is useful for the purpose of permitting us to differentiate between the two essential principles of design, it affords no clue to the form of a roof or even of its principal members, nor does it suggest the manner in which a roof is applied to or incorporated with the other portions of a building.

These are points to which attention will be devoted in due course, but before doing so we propose to consider briefly the two main portions of which all roofs are composed.

2. Roof Framework and Covering.

Every type of roof comprises two portions:—

- (1) The framework.
- (2) The covering.

The chief members of the most elementary flat roof are horizontal rectangular beams—of timber, steel, or other material—with parallel sides, resting at each end upon the walls of a building, and fixed so as to constitute a simple form of framework.

The covering for the same roof consists of timber boards, metal sheets, or a layer of any suitable material, attached to or incorporated with the upper surface of the beams, and serving two purposes:—(1) To exclude rain, snow, wind, heat, and cold from the interior of the building; and (2) to connect the beams together. Hence the covering of such a roof virtually completes the framework. Assuming the covering to consist of boards, it would be necessary to overlay them with some waterproof material to prevent the penetration of rain to the interior of the building, and the roof must also be made with a fall sufficient to permit water to flow away from the upper surface.

The roof here considered is a most rudimentary type of construction, illustrating the primary components of a flat roof designed in accordance with the principle embodied in Class 1.

An equally simple type of roof is that where the main members of the framework consist of inclined rectangular beams with parallel sides supported on walls of unequal height, and the covering is of the kind indicated above. In this case the beams are termed *rafters*, and, as before, the covering practically completes the framework.

This type of structure, generally designated a *lean-to*, *pent*, or *shed* roof, comes under Class 2, because outward pressure is exerted against the supports by the ends of the rafters.

The inclination or slope of the roof, technically described as the *pitch*, facilitates the rapid flow of rainwater from the upper surface. Therefore, the design is distinctly preferable to that of a flat roof, although circumstances frequently arise in which the latter is desirable or necessary.

3. Roof Framework.

Even in the most elementary types of flat and lean-to roofs the ends of the beams, or rafters, as the case may be, are often connected by horizontal members laid upon or built into each wall with the object of distributing the weight of the roof over the brickwork. These horizontal members are termed *wall-plates*, and help to consolidate the system of beams or rafters into a self-contained frame, more or less independent of the lateral bracing afforded by the roof covering.

When the length of the span and the spacing of the main beams in a flat roof are increased beyond certain limits, lateral support must be given to the beams by the introduction of *secondary beams*, in accordance with the practice followed in floor construction. Under similar circumstances the rafters of a lean-to roof would be braced by the

addition of horizontal members analogous to secondary beams, but technically described as *purlins*.

If the span of a lean-to roof exceeds about 8 ft. or 10 ft., it is usual to place beneath the rafters a series of strong sloping beams or frames termed *principals*, and spaced at wider intervals than those between the rafters. The principals are connected by *purlins*, upon which the rafters are supported, and the roof covering is laid and secured to the rafters in an appropriate manner. In roofs of still longer span between walls of equal height, the principals consist of simple or complex framed structures of rectangular, polygonal, or segmental outline, which are generally described as *roof trusses*.

Such trusses or principals are self-contained and belong to Class 1, because, under normal conditions, they exert only vertical pressure upon the walls or other supports. Other principals are designed as arch ribs exerting outward thrust against the supports, and so come under Class 2. Roof principals are connected laterally by purlins on which the rafters and roof covering are supported, substantially in the manner previously mentioned.

Although the framework and the covering of a large roof are necessarily somewhat complicated, the general idea of the design is not essentially different from that embodied in a small roof wherein principals, purlins, and rafters are employed.

Hence we have three forms of framework for practically all roofs.

(1) Consisting of simple beams or rafters connected at the supports by walls or wall-plates, and between the supports by the roof covering.

(2) Consisting of beams or of rafters connected at the supports by walls or wall-plates, and between the supports by secondary beams, or by purlins, as the case may be.

(3) Consisting of properly-framed principals connected by purlins carrying the rafters.

In practice, purlins are not applied between the rafters of small and simple roof frames built without principals, because the rafters themselves are usually spaced at such short intervals apart that intermediate lateral support is not necessary. The framework of a roof covered by glass also includes the sash-bars between the rafters, as well as wind-ties and other details that need not be specified at the present stage.

4. Roof Covering.

The nature of the material employed as the outer covering affects the details of roof construction in some measure.

For instance, in a roof built with principals and purlins, when either felt, zinc, lead, or copper is laid over boarding, intermediate rafters may sometimes be omitted, as the boards can be attached directly to the purlins.

When this course is followed, the spacing of the purlins must be less, or the thickness of the boards greater than in a roof where rafters are retained. Again, for fixing tiles or slates, longitudinal battens are attached to the rafters at intervals corresponding with the dimensions of the tiles or slates. In this case the battens constitute bracing, which adds considerably to the stiffness of the upper framework. As slates are very often laid upon battens nailed over boarding and felt, intermediate rafters can be omitted in roofs with principals of small span, providing due compensation be made by increasing the number of purlins and the thickness of the boards. The pitch of a roof may be affected by the character of the covering material, if the use of any particular substance is obligatory.

When corrugated iron roofing is adopted, the framework can be reduced in weight or even omitted, as shown in Par. (6).

5. Roofing Felt.

Asphalted felt made of animal or vegetable fibre is an inexpensive and useful material for roofing purposes. It is largely applied as an outer protection to the boarded covering of sheds and temporary buildings, and, being a good non-conductor of heat, is also used to form an insulating layer beneath slates, galvanised iron, and other materials in permanent as well as in temporary roofs. Roofing felt is supplied in rolls containing from 25 yds. to 35 yds., 32 in. wide, the

thickness of the material being about 3-16 in. The sheets should be laid with an overlap of 2 in. at the joints, and secured to the boarding beneath by nails, dipped hot in grease or oil, at intervals of about 2 in. When exposed to the weather, the enduring quality of a felt covering is much increased by the application of a mixture of tar and slaked lime, well boiled and laid on hot, the outer surface being sprinkled with fine sand.

6. Corrugated Iron.

Galvanised corrugated iron sheeting is another form of roof covering for buildings of more or less temporary character. This material necessitates a specially-designed roof framework to permit the full strength of the sheets to be utilised. If disposed so that the corrugations are parallel with the slope of the roof, the sheets are laid directly on the purlins, which can be spaced from 6 ft. to 12 ft. apart according to the gauge of the sheets and the depth of the corrugations. By employing curved sheets of corrugated iron, roofs can be formed without supporting framework of any kind, the eaves being stiffened by an angle bar or gutter, and connected by tie-bars to take the horizontal arch thrust. Roofs built in this way are only to be recommended for temporary purposes, though if provided with a light framework they are quite suitable (structurally) for some types of permanent work. If the sheets are disposed with the corrugations parallel to the eaves of a building, sufficient support is afforded by rafters, spaced from 6 ft. to 12 ft. apart according to the stiffness of the sheets, and no purlins are necessary. The disadvantage of such an arrangement is that rainwater cannot flow away unless a special type of corrugation be adopted.

In comparatively pure air, galvanised sheets last for many years, but in large cities and manufacturing districts their life is short unless protected by paint. Owing to minute defects in the zinc coating, and to cracks caused during the subsequent process of corrugation, galvanised sheets are often inferior to well-painted sheets in respect of resistance to corrosive influences. For this reason many engineers prefer to use plain corrugated sheets in situations where the atmosphere contains a high proportion of sulphurous and other acid gases.

Corrugated iron sheets in stock sizes vary from 5 ft. to 10 ft. long, and from 2 ft. to 2 ft. 9 in. wide, the corrugations ranging from 3 in. to 5 in. apart, centre to centre. Sheets for roofing purposes are used in various thicknesses from No. 16 to No. 22 Standard Wire Gauge. No. 16 gauge is only adopted for roofs of exceptional strength, No. 18 gauge is generally considered sufficient for high-class work, No. 20 gauge is employed for ordinary permanent roofs, and No. 22 gauge for the roofs of temporary buildings.

When laid, the sheets should overlap about 2½ in. along the corrugations, and from 3 in. to 6 in. along the edges crossing the corrugations, the overlap being inversely proportional to the pitch of the roof. The sheets should be connected by single riveting along the edges, and double riveting at the ends. The pitch of the rivets may be 9 in. centre to centre. Galvanised bolts are frequently employed in place of rivets, but are not so satisfactory for permanent work. Bolted joints should always be made along the ridge of the corrugations to minimise the pervasion of water through the holes. Bolt and rivet holes can be punched by hand during erection of the roof. By first trying the sheets in place the precise position of the holes can be determined and marked. The adoption of this course enables the fitter to avoid blind holes, which always offer a loophole for the penetration of water between the sheets.

Where the roof framing is of steel, corrugated sheets are generally fixed in place by means of galvanised hooked bolts passing under the purlins and held by nuts on the outer surface of the sheets.

In the case of timber framework, the sheets are attached by means of galvanised screws or spikes.

Galvanised iron roof ridges, louvre blades, gutters, and other fittings are readily obtainable for the completion of the roof covering. Makers of corrugated iron supply galvanised rivets, bolts, screws, spikes, together with curved washers of suitable shapes.

The following rule will be found useful for calculating the transverse strength of corrugated iron sheets:—

$$W = 100,000 \frac{b^3 d}{l} \dots (1)$$

where

W = breaking weight (uniformly distributed) in pounds.

t = thickness of sheet in inches.

b = breadth of sheet in inches.

d = depth of corrugation in inches.

l = length of sheet between supports in inches.

Example (1).—Find the breaking weight for a galvanised corrugated iron sheet, of No. 18 standard wire gauge, 2 ft. wide, with an unsupported span of 6 ft., the depth of corrugation being 1 in.

Here

t = 0.048 in. (see Table I.).

b = 24 in.

d = 1 in.

l = 72 in.

Substituting these values in formula (1) we have

$$W = 100,000 \times \frac{0.048^3 \times 24^3 \times 1}{72} = 115,200 \times \frac{1}{72} = 1,600 \text{ lb.}$$

As the area of the sheet is $(6 \times 2) = 12 \text{ sq. ft.}$, the breaking weight per square foot is $1,600 \div 12 = 133 \text{ lb.}$

TABLE I.—GALVANISED CORRUGATED IRON SHEETS.

Depth of corrugation is usually one-fourth the width

S.W.G.	Equivalent in Inches.	Corrugations.	No.	Width.
16	0.064	5 and 6	3	5
18	0.048	5 and 6	5	5
18	0.048	6 and 7	4	4
20	0.036	8 and 10	3	3
20	0.036	8 and 10	3	3
22	0.028	8 and 10	3	3
24	0.022	8, 9 and 10	3	3
26	0.018	8, 9 and 10	3	3
28	0.0148	8, 9 and 10	3	3

Obituary.

MR. BRADLEY BATSFORD.—We regret to hear, at the moment of going to press, of the sudden death of Mr. Bradley Batsford, the senior partner of the firm of architectural booksellers and publishers, of 94, High Holborn. Mr. Batsford's death follows somewhat soon after that of his father, the founder of the firm, so that it is only necessary to say he was responsible for the inception and in great measure for the development of the publishing side of the business, which has always owed much to his ability and judgment, and many other sterling qualities of which the authors and all others who came in contact with him will be aware. He was a man of taste and artistic perception, and took a great personal interest and pleasure in his publications. Mr. Bradley Batsford was born in 1846, and entered his father's business at the age of thirteen, and remained in it until his death. He leaves a widow and two daughters.

MR. GANT.—Mr. William John Gant, of No. 11, Havelock-road, Hastings, died at his residence, The Glen, London-road, St. Leonards-on-Sea, on Monday in last week, aged eighty-two years. He was elected an Associate in 1881, and in 1892 a Fellow of the Royal Institute of British Architects.

General Building News.

WESLEYAN CHAPEL, HUDDERSFIELD.—The opening recently took place of a new chapel which has been erected for the Wesleyan community at Orsland Moor, Huddersfield. There is a nave, two transepts, and a turret rising to over 70 ft. Accommodation is provided for a congregation of 610. The interior woodwork is of pitch-pine. Messrs. J. W. Morley & Son (Bradford) were the architects.

SUNDAY SCHOOLS, IPSWICH.—New Sunday-schools have been opened in connexion with the Bethesda Baptist Chapel, in Fonnereau-road, Ipswich. The structure is Gothic in style, constructed with red-brick facings, with ornamental red-brick dressings. It will accommodate about 400 children, and is so arranged that it can be divided by curtains into separate classrooms, while at the east end is a platform. The floor is of wood, laid on concrete, and ventilation is secured by means of ventilating tube inlets and roof ventilators. Warmth is provided by means of hot-water (low-pressure) pipes. Seating accommodation is provided by means of rows of stained and varnished forms, with reversible backs. There are lavatories and a kitchen attached.

The new buildings were designed by Mr. Frederick G. Fauch, the contractor being Mr. G. A. Kenney.

PARSONAGE HOUSE, GRENOSIDE.—A new Parsonage House is to be erected at Grenoside by the Stacey Memorial Committee. Seven architects submitted designs for the house, and Messrs. R. & W. Dixon, of Barnsley, were the successful competitors. The tender of Mr. C. W. Squire, of Barnsley, has been accepted. This figure, however, does not include the value of the ground, boundary walls, or roads. Up to the chamber floor the house will be built of Grenoside stone, and above the wall will be tiled. Stone alone is to be used for the tower.

NEW GASWORKS, TAVISTOCK.—The new gasworks have just been completed, after designs by Mr. J. W. Buckley, Engineer to the Devonport Corporation Gasworks, the plant being by Messrs. Willey & Co., of Exeter. The works will produce about fifty millions cubic feet of gas per annum; the two gas-holders, in steel tanks at ground level, 20 ft. deep and 50 ft. in diameter, will contain 90,000 cubic ft., and 60,000 ft. more when enlarged to their greatest extent. Three settings, after the regenerator type, of six 21 in. by 15 in. D-shaped retorts in the retort-house will yield an output of 7,300 cubic ft. per mouth-piece every twenty-four hours, at a consumption of 14 lb. of fuel for each hundredweight of coal carbonised.

HOTEL BUILDINGS, KINGUSSIE.—Tenders have been accepted for the erection of additional buildings in connexion with the new hotel which is in course of construction on the same site and conjointly with the old hostelry—the Duke of Gordon Hotel. These will consist of stabling accommodation for about twenty horses, a building to accommodate at least a score of motor-cars, wash-house and laundry, and a stone and lime boundary wall. Mr. Alexander Cattaneah, The Laurels, Kingussie, the designer of the new hotel, is the architect, and the successful contractors are as follows:—Masons, Messrs. Ferguson & Co., Newtownport; carpenters, Messrs. Hay & Sime, Perth; plasterers, Messrs. R. & L. Macpherson, Kingussie; painters, Messrs. Dunbar & Macpherson, Kingussie.

HALL EXTENSIONS, SUNDERLAND.—The foundation-stone of an extension hall in connexion with the Thompson Memorial Hall was recently laid. The extension has been designed by Mr. G. L. Brown, and the contractors are Messrs. R. Stafford & Sons.

Stained Glass & Decoration.

EGLISKERRY CHURCH, NORTH CORNWALL.—A large four-light memorial east window has just been executed and erected in Egloskerry Church. In the four lights are depicted the four archangels—Gabriel, Raphael, Uriel, and Michael—and in the tracery openings are angels with musical instruments. The whole work was designed and executed by Messrs. Percy Bacon & Brothers.

Miscellaneous.

A CONFERENCE ON HOUSING.—The Christian Social Union will hold a conference upon housing on July 14 at Lechlade, Gloucestershire. Lady Gwendolen Cecil and Miss Sybilla Gurney will read papers upon "Rural Housing" and "Co-partnership in Housing." and Mr. Henry Vivian, M.P., will open the discussion. Mr. F. Litchfield, of No. 22, Red Lion-square, W.C., is secretary of the conference.

THE MALL.—In the House of Commons on the 4th inst., Mr. T. Davies (Fulham) asked the First Commissioner of Works whether he could inform the House when he expected the work of extending the Mall would be completed; and whether it was his intention to demolish any range of the buildings in Spring-gardens in order to have a wider and a more imposing entrance from Charing Cross. Mr. Harcourt (Lancs, N.E., Rossendale)—The new Admiralty building at the end of the Mall is expected to be completed by the end of 1908. The buildings in Spring-gardens referred to are not the property of His Majesty's Government, and I am not aware of any proposal to demolish them; but if this is suggested it would seem to be in the nature of a metropolitan improvement, and as such is a matter for the London County Council.

HOUSING OF WORKING CLASSES.—The Select Committee of the House of Commons on the Housing of the Working Classes Amendment Bill met again on the 4th inst., Sir J. Dickinson-Poynder presiding, and took the evidence of Mr. Wilson Fox, of the Board of Trade. He gathered from inquiries that there was still a considerable deficiency of labourers' cottages, in spite of a marked improvement in the last ten or twelve years. In reference to the talk of cottage building as if it were charity to labourers, he pointed out that, although a cottage might not pay interest on the building expense, it might indirectly bear good interest as part of the equipment of a farm. In the purely rural

districts a rental much over 1s. 6d. a week was a high rent. The cash wage of the labourer ranged from 12s. to 20s. a week, it averaged over a large number of counties, and he did not know how some of them lived. It would be better for the farmers, as well as for the men themselves, that they should have an adequate quantity of land attached to their houses, and that labour would be available when wanted only at odd times. Experiments in co-operative utilisation of small holding produce would be worth trying under official guidance. The organisation in the country must precede that in the town. The building by-laws had been the result of neglect of proper sanitary precautions in the past. If the local authority did their duty in a proper spirit we should not want many by-laws; good inspection would take their place and would result in cheaper cottages. He would personally prefer that County Councils should build the cottages. He did not think that the cottages required could be built in any case without charge to the rates; and he thought it reasonable that a charge on land values in towns should contribute to the necessary subsidy. He did not suggest that too much should be done. They could not subsidise the agricultural interest too far. A new era was beginning owing to electric development. We should have a rural population comprising many gardeners, small traders, and motor-car drivers. The Committee adjourned.

OVERHEAD WIRES, ST. PANCRAS.—In an arbitration case as between the Borough Council and the Post-office, Mr. F. Taylor has given his award, with costs, in favour of the Postmaster-General for the erection of three 84-in. iron pillars, 35 ft. high, in Granby-street, Camden Town, for telephone and fire-alarm wires. The Council had refused their consent on the grounds that the posts would obstruct the traffic, and that overhead wires endangered the public safety, more particularly in times of storm or snow, and that in the public interest the wires should be laid below the surface. Mr. W. N. Blair, St. Pancras Borough Engineer, and Mr. W. F. Loveday, Engineer for the Post-office, were concerned in the support of the Council's contentions, but Mr. Taylor held the evidence tended to show that the over-head system was attended with less danger and inconvenience, and he expressed his opinion that if there was anything in the points raised to the contrary the matter should be referred for legislative prohibition of all over-head wires.

METROPOLITAN WATER BOARD.—At their meeting on Friday last week a recommendation of the Works and Stores Committee was adopted to accept a tender by Messrs. James Byrom, Ltd., of Bury, Lancs., to construct reservoirs and execute other works at Fortis Green, Stairi reservoirs communication, New River district. The returns for last May show that the mean daily supply per head to the total estimated population of 6,811,098 persons amounted to 32.2 gallons, the average daily supply being 219,193,000 gallons (or 1,048,988 houses and other premises). Sir Melville Beauchert, chairman, acknowledged a vote of thanks on behalf of the Special Arbitration Committee, who reported that the arbitration proceedings, which are now terminated, have cost the Board a total sum of 265,544, in respect of the forty-seven millions dealt with under arbitration.

HAMPSTEAD HEATH.—At their meeting on July 5 the Hampstead Board of Guardians carried unanimously a resolution moved by Mrs. Hepburn that there is urgent need of greater supervision by the police (whether the Metropolitan or that of the London County Council) since the present condition of the heath is a source of danger to ratepayers and their dependants who desire to use it for business or pleasure. It was further resolved to bring the matter to the notice of the Local Government Board, the London County Council, and the St. Pancras Guardians, with the object of preventing the misuse of the heath, more especially at night time by vagrants and misdoers.

ST. ANNE'S CATHOLIC CHURCH, BUXTON.—The wooden and stone steps of the sacristy in this church have been replaced by a marble floor with a mosaic predella. Messrs. Burgess & Mills, marble and mosaic workers, of Manchester, have executed the work from the drawings of the architects, Messrs. C. & C. M. Hadfield, of Sheffield.

STATUE OF THE LATE MR. JOSEPH COWEN, NEWCASTLE.—On the 7th inst. a bronze statue of the late Mr. Joseph Cowen, for many years Member of Parliament for Newcastle, erected by public subscription in Westgate-road, Newcastle, was unveiled by the Right Hon. Viscount Ridley. It was cast by Messrs. Singer & Co., Farnley, and the architect for the pedestal is Mr. C. R. Clark, of London; Mr. Tweed being the sculptor.

A NEW YORK SKYSCRAPER.—Plans for an immense office building, to be the highest skyscraper in the United States, have, it is stated, been filed in New York. The site is at the junction of Broadway and Liberty-street. The building will have forty-one stories and, including the tower, will be 825 ft. high.

HACKNEY CENTRAL PUBLIC LIBRARY.—The

tenders for the central library building will be received by the Hackney Borough Council on the 26th inst. In view of the recess it has been decided to consider the tenders the same evening, and accept the most favourable one. The draft agreement between the Council and Mr. H. A. Crouch, the architect, has been approved.

UNIVERSITY OF LIVERPOOL.—The following degrees and certificates have just been conferred on students of the School of Architecture by the Chancellor, Lord Derby, in St. George's Hall, Liverpool. *Faculty of Arts*.—B.A. Degree with Honours, School of Architecture, first class—Maurice Lyon; L. K. Adams. Certificate in Architecture: First class—W. N. Adams, D. A. Campbell, A. C. Farner, M. Ravenscroft. The above degrees and certificates exempt students from the intermediate examination of the R.I.B.A., and admit without preliminary work to the Royal Academy School. The Holt Travelling Scholarship of 50*l.* for measured drawings and designs made during the last year of study, was awarded to M. Lyon. The measured drawings included the Bank of England, Liverpool (by Cockerell), the Town Hall, parts of St. George's Hall, and the Petit Trianon, Versailles. Special scholarship 10*l.* to L. K. Adams, *proxime accessit*, H. Holt.

Legal.

ALLEGED OBSTRUCTION OF THE LIGHT OF ST. GEORGE'S CHURCH, HANOVER-SQUARE.

The hearing of the case of Anderson and others v. Francis & Adams commenced before Mr. Justice Swinfen Eady in the Chancery Division on the 3rd inst., an action brought by the plaintiffs, the Rector and Churchwardens of St. George's Church, Hanover-square, for an injunction to restrain the defendants, the owners and occupiers of Nos. 40, 42, and 44, Maddox-street, W., opposite the north side of the church, from heightening the roof of their building so as to obstruct or diminish the light of the church.

Defendants denied that the plaintiffs had any cause of complaint.

Mr. Eve, K.C., and Mr. George Cann appeared for the plaintiffs; and Mr. Micklem, K.C., and Mr. Stokes for the defendants.

Mr. Eve, in opening the case, said it was not one in which damages were asked for or one in which damages would be any compensation for the interference of which complaint was made. In George-street the church was entered by a porch, and there was no means of obtaining light from that end, while the windows at the east end were of stained glass. The result was that the church had to rely almost exclusively for light on the windows on the north and on the south sides. Experiments showed that the greater part of this light was received from the north side, and, therefore, a scheme to fill those windows with stained glass had been rejected. The ancient lights of the church was not contested, and the sole question was whether the story the defendants proposed to erect would obstruct the light to such a material extent as would justify the injunction being granted. The learned counsel said that in addition to the usual services there were many marriage ceremonies performed at St. George's, and the Rector and other officials would give evidence as to the diminution of light which would occur during the day-time if defendants' building was carried out.

The Rev. David Anderson, Rector of St. George's since February, 1891, examined by Mr. Eve, said that the church was erected in 1725. The light had already been affected by the defendants having converted an attic into a full story.

What would be the probable effect on your light if the defendants' building is completed according to the proposals of the defendants?—I consider it would be utterly disastrous.

Examination continued.

They had taken up this position as the trustees of a public building. The windows of the church were all plain transparent glass, with one exception, that there was a stained glass window at the east end of the church. He was present at the experiments made on June 20 last by their expert witnesses. He was standing in the middle aisle. A tarpaulin was put up, and its effect on the light was distinctly seen directly it was put up. The effect on the light of the church was something like drawing down a blind. If the defendants' proposed building was carried out the parts of the church particularly affected would be the pulpit, and the choir stalls would be certainly affected on the north side, and the lectern and the organist would also suffer. There would also be some loss of light to the choir and the middle aisle. The light of the pulpit at present was obscured to the extent of about one-third. If the alterations as proposed by the defendants were carried out it would have a disastrous effect on the light of the church, and they would have in the future to employ the use of artificial light where in similar circumstances in the past they had no need to do so.

Cross-examined.

The important windows were the four windows on the north side and the four windows on the south side. Up to 2 o'clock p.m. a strong light came into the building from the south side. Eleven years ago alterations were made in the seating arrangements of the church, and then a deputy chancel was formed and the pulpit moved slightly to the southward of the chancel. There was also a slight change made in the aisles. What was particularly complained of was that if the defendants' proposed building went up they would lose a certain amount of sky surface obtainable for the middle aisle.

Dr. Chas. Edward Jolly, the organist of the church, also gave evidence to the effect that the defendants' alterations had a prejudicial effect on the light to the key-board of the organ.

Mr. A. J. Bolton, A.R.I.B.A., examined, said he had acted as Surveyor for the Rector and Churchwardens of the church for thirty years. The witness gave evidence formally proving the preparation of the plans pursuant to instructions for use by the plaintiffs in the present proceedings. He said the length of the church was 71 ft., and its width 63 ft., and it was capable of seating about 800 persons. If the defendants' proposed alterations were carried out the light of the church would be seriously interfered with.

The light coming to the church from the south was obstructed, but he could not give the angle of obstruction. No doubt there was a large amount of light to the church derived from the south-west window. He disputed the assertion that the main quantity of light came to the church from the south and south-west. In his opinion Maddox-street was not flooded with light in the afternoon; neither did he think that the only light the church received from the north was reflected light. When the test was carried out by putting up a tarpaulin where the proposed building would be, he found that it made a considerable difference to the light coming to the church. It darkened the church and affected the reading of the services. The church was a dark church, but would be much darkened by the defendants' building if heightened as proposed.

Mr. E. A. Gruning also gave evidence to the effect that serious harm would be done to the church by the proposed building, as it would reduce the duration of daylight in the church. In his opinion the northern windows were the principal source of light, though there was also light from the windows on the south at the eastern end, but not at the western. There it was obstructed by a house the front of which looked on George-street. He was present at the experiments and noticed that the putting up of the tarpaulin caused an immediate gloom, and also altered the direction of shadows on the floor from the southern to the northern side of the objects which caused them.

In cross-examination, the witness said that to block the southern windows would have no more effect than to block the northern. The former gave more direct sunlight, but that was no real advantage, for it required to be shaded. Questioned as to the angles of obstruction, the witness said that in effect a large building like a church could receive more injury from light from a lower building than could a small house, because the rays of light, having to penetrate further into the former, must come from a lower level. Thus 30 degrees in the case of a church would be equivalent to 46 degrees in an ordinary case. The obstruction of light would make the access to the gallery still more awkward than at present. In his opinion the defendants' building, if erected as proposed, would interfere with the ordinary use of the church through its affecting the daylight.

Mr. Alexander R. Stenning, an architect and surveyor, also gave evidence in support of the plaintiffs' case. He said he had visited the church last Tuesday, and, in his opinion, the defendants' building would make a material difference to the light of the church.

Other evidence having been given, the plaintiffs' case closed.

Mr. Micklem, in opening the defendants' case, said there would be a great discrepancy in the evidence, as he should call experts who would give a different version to that given on behalf of the plaintiffs. The defendants were the lessees of the premises in Maddox-street, and it was of the utmost importance to them that they should be able to erect the additional story they proposed. Maddox-street was one of the most valuable streets in London, and the rents there were enormous. The mere addition of the one story would mean a difference of 140*l.* a year to his clients' rent. It was common ground that the addition of the story proposed by the defendants would cause some diminution of light to the gallery windows of the church, but it would be such a slight diminution that, having regard to the light left, he submitted it was not a case in which the Court would grant an injunction.

His lordship said the short point he had to consider was this: would the effect of the defendants' proposed alterations affect the light to the church so as to substantially and materially interfere with the comfort of the worshippers and others who used the church?

Mr. Micklem agreed that that was the short point at issue. His case was that, having regard to the neighbourhood and the use to which the premises were put by the defendants, they would not be interfering with the light coming to the church by what they were doing. His submission was that the light at the side windows was ample for all church purposes. He contended that the law on the subject was not whether there was any diminution of light, but whether the amount of light that was left was ample for all ordinary purposes.

Mr. M. E. Collins, examined, said he was an architect and surveyor practising in Old Broad-street. He had made an examination of the church and buildings in Maddox-street. He was familiar with the buildings and surrounding neighbourhood. He had examined the church after the first part of the defendants' building was erected, and at that date the church was thoroughly well lighted in every respect except at the south-west corner under the gallery. The windows on the south and north side of the church gave a total lighting area of 1,250 ft. super, which was more than was absolutely necessary for a church which had a superficial area of 4,300 ft., as this church had. In his opinion, if the defendants' proposed building were carried out he did not think it would interfere in any undue way with the comfortable use of the church. In his opinion, the chief light of the church came from the south and north-west. The north light was a diffused light, and not the principal light. If the defendants' proposed building were erected the effect on the light of the church would be quite inappreciable.

Cross-examined by Mr. Eve, the witness said in his view the amount of light which would be taken from the church if the defendants' buildings were completed as now proposed was "immeasurable and inappreciable." At the present moment the church was perfectly well lighted, and that, in his opinion, was all that was required.

Mr. H. Chatfield Clarke, architect, examined said he had visited the church on May 28 and 30, and June 20 last. In his opinion it was an exceptionally well-lighted church for a town church. It had a very large glass area in comparison with the wall area. He differed entirely from Mr. Gruning on this point, and thought the church was an extremely well-lighted one. In his opinion, the defendants' proposed building would not materially or substantially affect the light of the church. When he visited the church he was struck with the large amount of light it received from the north-west.

Mr. S. E. Adams, an architect, who prepared the modified plans for the defendants' buildings, gave evidence to the effect that they represented the minimum of defendants' requirements if the upper story was to be of any use at all. The plan, if carried out, would have very little effect on the light, and would not interfere with the comfort of those using the church. He did not think that the photographs put in as evidence had been taken in a manner likely to show the conditions fairly.

Mr. J. Douglas Matthews, an architect, gave evidence to the effect that the proposed new building of the defendants made no difference to the light, but the proposed addition would make some, though not so as to interfere with reasonable comfort. The plan before modification would have caused material interference. The witness admitted that he had not observed the state of things existing before the alterations were commenced.

At the close of the defendants' case, Mr. Stokes addressed his lordship on behalf of his clients. He submitted that the plaintiffs had not made out a case of nuisance, the question being not how much light was abstracted, but whether a sufficient quantity was left. He said there was ample window space in the church, the greater part of it on the gallery level. A church stood in a different position to that of a dwelling-house, as a church was only used at certain times. It could not be suggested that the obstruction would interfere with the services held in the morning or the afternoon; inconvenience could only be felt during the evening services at the time of the year when the afternoons were short. Defendants could not dispute that their proposed building would interfere in some slight degree with the light of the church, but whether it would amount to such a diminution as to create a nuisance was another thing.

His lordship: The short point is whether you occasion a nuisance to the church by what you are doing?

Mr. Stokes agreed. He submitted that the injury, if there was any, affected only the eastern windows on the north side, and in view of the quantity of light available from other directions, he submitted that the defendants were entitled to succeed on the principle laid down by Lord Justice Farwell in the case of "Higgins v. Betts."

Mr. Eve, in replying on behalf of the plaintiffs, submitted that his clients had a right to sue for action, and that the remedy was by injunction and not by damages. The whole case was a practical illustration of the truth of the problem that it

was the last straw which broke the camel's back. But for the imposition of the last straw the action would not have come before his lordship. The learned counsel, commenting on the evidence given, said that as far as theories went the theorists were pretty evenly balanced, and in setting off the one group of expert witnesses against the other, there remained on the side of the plaintiff three witnesses—the Rector, the organist, and the vergers—whose personal experience enabled them to give that practical testimony which was worth far more than scientific evidence. The duties of these three persons took them constantly to the church, and nobody could suggest that there was an attempt by any one of these persons to exaggerate. One question on which opinions were much divided was whether the church was a well lighted one, but Lord Justice Vaughan Williams, in the case of "Kine v. Jolly," had pointed out that "well lighted" was a comparative term, depending for its meaning on opinions and circumstances. It was on such a point as this that the evidence of those constantly using the church was of the greatest weight. He submitted that the church could not be defined as "well lighted." The Rector, organist, and vergers were able to speak of the light of the church not on particular days when they visited the church, but they were able to speak of the light of the church from their general experience extending over a series of years. It was clear that the church was not a well lighted one. He agreed that as the law stood it seemed to be lawful to take away a certain portion of a man's light so long as sufficient light was left. He did not know whether that applied to other classes of property.

His lordship: The short answer to that is that no one has a right to any property in light.

Mr. Eve said he must, of course, accept the law as it was, and it was not his duty to criticise it. What his lordship had to consider was that this church was used every Sunday of the year for services, for week-day services, and for marriages, and other matters. Taking the average amount of light which the church enjoyed the whole year, was what the defendants were doing and proposing to do likely to materially detract from the comfortable and convenient use of the church? If his lordship accepted the conclusion to which Mr. Anderson and Mr. Jolly had come, that the immediate result of the defendants' building would be to necessitate the larger use of artificial light during the services, he would probably hold that the effect of the defendants' building was to render the church less comfortable. A building of this sort was lighted from both sides for the purpose of bringing about a general result in the church for the convenience of those who had to use it. It would be a serious interference with the use to which the light in a building of that sort was to be put if any one did anything which destroyed or disturbed the equilibrium of the light coming from each side. In the present case it would be extremely difficult to measure the damages, because a church was not a property to which one could attach any rental value. It would be difficult to estimate in compensation the amount of the damages. On the whole facts of the case he asked his lordship to see that the plaintiffs had a good case of this kind, and to grant an injunction to restrain the defendants from erecting their building so as to cause a nuisance.

His lordship said he would take time to consider his decision.

Judgment was accordingly reserved.

BECKENHAM BUILDING DISPUTE.

The case of *Whitehouse v. Hugh* came before the Court of Appeal composed of Lords Justices Vaughan Williams, Romer, and Fletcher Moulton last week, on the appeal of the plaintiff from a judgment of Mr. Justice Kekewich in the Chancery Division. (The case was reported in the *Builder* of December 2, 1905.)

In this case the plaintiff, a market-gardener carrying on business at No. 19, Mackenzie-road, Beckenham, brought the action to restrain the defendant from building on a roadway adjoining the plaintiff's premises, in alleged contravention of a building scheme adopted by the Birkbeck Freehold Land Society in 1878, and from interfering with the plaintiff's use of the roadway. The plaintiff also sought to restrain the defendant from building so as to obstruct his ancient lights, but on the present appeal the question of obstruction of the plaintiff's ancient lights was not raised.

It appeared that the plaintiff purchased the freehold of his premises from Mr. Chamberlayne in 1885. At this time the north-western boundary of plaintiff's premises was laid out as a road which led from Mackenzie-road to a level crossing on the London Chatham and Dover Railway. The plaintiff's house was built on plots 351 and 352, terms as the July agreement, was entered into. The two out of three plots purchased from the society by Mr. Chamberlayne in 1879. On the plan in the conveyance by the society to Mr. Chamberlayne the roadway was designated as a vacant space between lots 352 and 355. By the conveyance the society reserved to itself the right of allowing a variation in the plans and conditions. The roadway had only been roughly

made up, and, by reason of its not being much used, had been allowed to fall out of repair. This road, after it crossed the railway, led to a meadow, to which there was no other means of access for vehicles. In 1894 the society purchased and laid out the meadow as a building estate, and by an arrangement the railway company were released from maintaining the level crossing, and the company subsequently removed the gates of the crossing and erected an iron fence without gates. In 1897 the society erected a fence at the Mackenzie-road end of the roadway, and conveyed the plots occupied by the roadway to the defendant's predecessor in title, and since that date there had been no means of communication between Mackenzie-road and the roadway, except by a gate in the fence, which was kept locked. The defendant, in 1904, purchased from plaintiff's predecessor in title No. 21, Mackenzie-road, which was built on plot 356. He also purchased plots 353 and 354, over which the roadway passed, and in November last he commenced to dig up the roadway for the purpose of laying the foundations of two houses he proposed to erect. The plaintiff alleged that defendant by so building was depriving him of the use of the roadway and the light and air coming over it to his premises. He also said that when the defendant's buildings were completed they would so interfere with the light coming to his premises as to constitute an actionable nuisance. Plaintiff further said that the society had dedicated the roadway in question to the public. Mr. Justice Kekewich held that no representation had been made that there was a rear or third vacant space between lots 352 and 355 should remain vacant. He said that it could not be contended that the society could not allow defendant to build houses on plots 353 and 354, and, therefore, plaintiff was not entitled to restrain the defendant from so building. He further held that upon the question of dedication to the public of the road, plaintiff's case broke down, and that there would be no such obstruction as would substantially lessen the plaintiff's comfortable enjoyment of his house. He accordingly entered judgment for the defendant with costs. Hence the present appeal of the plaintiff.

At the conclusion of the arguments of counsel, their lordships affirmed the decision of Mr. Justice Kekewich, and dismissed the appeal with costs.

Mr. E. Todd appeared for the appellant, and Mr. P. Ogden Lawrence, K.C., and Mr. Cozens-Hardy for the respondent on the appeal.

ACTION BY BUILDING OWNERS AGAINST BUILDERS.

THE case of *Abbey and others v. Galer* came before the Court of Appeal composed of the Lord Chancellor, the Master of the Rolls, and Lord Justice Cozens-Hardy, on the 5th inst., on the appeal of the defendant from an order of Mr. Justice Bucknill in Chambers dismissing the defendant's appeal from the order of the Master giving leave to the plaintiffs to sign judgment under Order XIV.

Counsel in support of the appeal said his notice of motion asked that the appeal should be allowed, and that the proceedings in the action should be stayed until the order of the Arbitration Act. The plaintiffs were brewers, and the defendant was a builder. In July, 1905, a building agreement was entered between the parties whereby the defendant was let into possession of certain property belonging to the plaintiffs at Tottenham, on terms which were shortly as follows:—The defendant had to pay a rent during the time of his occupation of 24*l.* 18*s.* a year; he was to erect on the plots various houses and a shop at a minimum cost of 230*l.* each; during the erection of the houses, the plaintiffs, the building owners, were to make deferring advances from time to time not exceeding 135*l.* on each house, and upon completion of the houses the defendant was to be entitled to a conveyance of these houses from the plaintiffs upon payment of 62*l.* 2*s.* 6*d.* for each house built, and, in addition, on payment of the advances made by the building-owners plus 6 per cent. on the amount of such advances. There was provision that every house and one shop were to be completed by March 20, 1908, and a further provision that upon default by the defendant under the agreement the plaintiffs should be entitled to re-enter and serve the defendant with notice to determine the agreement provided that if at any dispute should arise between the parties as to the construction of the agreement or as to anything to be done thereunder, the matter should be referred to arbitration. Various payments were made to the builder under the agreement, and on October 5, 1905, another agreement, which was practically in the same terms as the July agreement, was entered into. This agreement referred to seven other houses and shops on the same estate, which had to be completed by June 24, 1906. Clause 7 of this agreement provided that the plaintiffs were not bound to make any advances exceeding 1,400*l.* in respect of the works executed under that agreement and the other agreement. Under the July agreement the plaintiffs were under no obligation to make

a total advance in excess of 1,000*l.* His (counsel's) contention was that the two agreements became merged on the signing of the second agreement, and the time fixed for completion was postponed until June 24, 1906. Various complaints were made from time to time that the defendant did not proceed with the work as he should, and negotiations were entered into with a view to prepare a supplemental agreement, and an agreement was in fact prepared but not executed. The next thing which happened was the issue of the writ on May 14, under which the plaintiffs claimed possession, the plaintiffs alleging that the tenancy was determined by notice to quit on May 11, 1906. He submitted that neither the master nor the judges had power to make the order they had for summary judgment, and that the defendant was entitled to have the matters in dispute referred to arbitration in accordance with the provision contained in the clause in the agreement.

Counsel for the respondents on the appeal said that his clients would be willing to allow defendant to resume possession within a month if he performed his obligations under the agreement.

On the respondents giving an undertaking to this effect their lordships dismissed the appeal with costs.

SOME RECENT SALES OF PROPERTY: ESTATE EXCHANGE REPORT.

June 18.—By TALBOT & WHITE & T. H. NEWMAN (at Billesley).	
Ramden Bellhouse, etc., Essex.—"Allen's Farm," 102 a. 3 r. 4 p. f.	1,750
"Walt's Farm," 30 a. 2 r. 19 p. f.	170
"Park," 40 a. 3 r. 18 p. f.	1,000
"Red Rose Holding," 22 a. 3 r. 12 p. f.	500
June 19.—By TALBOT & WHITE & T. H. NEWMAN (at Billesley).	
Wickford, Essex.—"Freehold building land, 35 a. 2 r. 17 p. f.	2,400
"Salem Farm," 95 a. 0 r. 25 p. f.	2,800
"Green Farm," 71 a. 3 r. 17 p. f.	2,330
June 20.—By TALBOT & WHITE & T. H. NEWMAN (at Billesley).	
Rayne, Essex.—"Haverings," and 135 a. 0 r. 25 p. f.	2,600
"The Street Farm," 29 a. 0 r. 10 p. f.	440
"Goulds" and "Kings" Farms, 130 a. 1 r. 2 p. f.	2,875
"Moors Farm," 71 a. 3 r. 17 p. f.	630
"The Common Farm," 25 a. 1 r. 11 p. f.	940
June 21.—By MERRY & NORMAN (at Billesley).	
West Stafford, Oxon.—"Freehold farm, 125 a. 8 r. 16 p. f.	2,700
June 22.—By TALBOT & WHITE & T. H. NEWMAN (at Chelmsford).	
Stock, Essex.—"Stock Mill," and 4 a. 1 r. 82 p. f.	850
"Bishop's Farm," 30 a. 3 r. 11 p. f. and c.	500
South Hanningfield, Essex.—"Great Trefoil Farm," 208 a. 2 r. 3 p. f.	2,000
June 23.—By TALBOT & WHITE & T. H. NEWMAN (at Southend).	
Rayleigh, Essex.—"The Rayleigh Brewery and 117 acres, f.	1,450
June 25.—By MERRY & NORMAN (at Rugby).	
West Haddon, Northants.—"Church House Farm," 201 a. 12 a. 6 d.	4,500
June 26.—By HOLLIS & WEBB (at Leeds).	
Adel, Yorks.—"Cookridge Towers," and 13 acres, f.	5,000
June 28.—By W. DAY & SONS (at Maidstone).	
Maldstone, Kent.—1, 3 r. 7, and 11, Maidstone, f.	935
Lookers, Kent.—"The Lookers," 100 a. 1 r. 16 s.	1,295
June 29.—By ROBERT NEWMAN (at Uxbridge).	
Harrow, Middx.—"Hayes Station-rd., four plots of land, f.	250
By HOLLIS & WEBB (at Harrogate).	
Nidderdale, Yorks.—"High Longside Farm," 117 acres, f.	2,650
June 30.—By HARRY BALL (at Bedford).	
Bedford.—"34, Grafton-rd., f. yr. 25 <i>l.</i>	380
24, Wellington-st. (s.), f. yr. 25 <i>l.</i>	450
By C. J. PARRIS (at Tunbridge Wells).	
Mayfield, Sussex.—"Holmestall Farm," 25 a. 3 r. 35 p. f.	1,330
Two freehold building sites, 10 a. 2 r. 5 p.	505
"Stone House" and 9 a. 2 r. 37 p. f.	570
"Dapland Farm," 14 a. 0 r. 2 p. f.	650
June 30.—By CO. (at Colchester).	
Ardleigh, Essex.—"Slough Farm," 171 a. 1 r. 21 p. f.	2,500
"Colchester," 100 a. 1 r. 23 p. f.	2,500
By H. J. WAY & SON (at Newport).	
Niton, Isle of Wight.—"Sunnyside," two cottages and plot of land, f.	670
July 2.—By DAVID BURNETT & CO.	
Stratford.—"to 64 (even), The Broadway (s.), area 17,600 ft. l., yr. 49 <i>l.</i>	14,500
62 and 64, Broadway (s.), f. yr. 210 <i>l.</i>	7,000
Leightonstone-rd., "The Royal Oak" b.h., f. yr. 45 <i>l.</i>	1,000
91, 93, and 95, Leightonstone-rd. (s.), f. yr. 97 <i>l.</i>	2,040
Maryland-st., a block of land, area 9,400 ft. f. yr. 210 <i>l.</i>	1,180
194, 194A, and 194B, Maryland-st., f. yr. 210 <i>l.</i>	1,610
Platow-st. 24 to 38 (even), James-st., f. yr. 152 <i>l.</i>	1,310
42, Belmore-st., f. yr. 152 <i>l.</i>	870
Bethnal Green.—53 to 70 (even), Collingwood-st., f. yr. 182 <i>l.</i>	1,180

SALES OF PROPERTY.—Continued on page 61.

List of Competitions, Contracts, etc.

For some Contracts still open, but not included in this List, see previous issues. Those with an asterisk (*) are advertised in this Number: Competitions, —; Contracts, iv. vi. viii. x.; Public Appointments, xvi.; Auction Sales, xxviii.

Certain conditions, beyond those given in the following information, are imposed in some cases, such as: the advertisers do not bind themselves to accept the lowest or any tender; that a fair wages clause shall be observed; that no allowance will be made for tenders; and that deposits are returned on receipt of a bona-fide tender unless stated to the contrary.

Competition.

July 23.—Sheffield.—BATHS.—Architects practising within the Sheffield City boundaries are invited to submit competitive drawings for public baths proposed to be erected at Primrose Meadows. The competition will be conducted and the awards made by an assessor appointed by the City Council. Premiums of 30*l.*, 20*l.*, and 10*l.* will be awarded to the authors of the schemes placed respectively first, second, and third in order of merit. Conditions of competition, with instructions and schedule of requirements, etc., may be obtained from Mr. Henry Saver, Town Clerk, Sheffield, upon payment of a deposit of 1*l.* 1*s.*

Contracts.

BUILDING.

July 14.—Bradford.—ALTERATIONS TO HOUSE.—Advertisements to house at Westgate Hill, Bradford. Names to Messrs. Fairbank & Wall, architects, Craven Bank-chambers, Bradford, on or before July 14, when quantities will be forwarded.

July 16.—Alfreton.—SCHOOL.—Derbyshire C.C. invite tenders for school for 400 infants at Alfreton. To be delivered not later than July 16. Quantities will be supplied on application to Mr. Percy B. Town Clerk, Alfreton.

July 16.—Brighton.—REPAIRS, &c.—Brighton Education Committee invite tenders for internal and external repairs, painting, etc., to certain of the schools, to be carried out during the month of August next. The Committee are also prepared to receive tenders for the installation of the electric light in the boys' department of the York-place school. Specifications of the work may be seen, and forms of tender obtained, at the offices of the Surveyors to the Committee, Messrs. T. Simpson & Son, 17, Ship-street, Brighton, between the hours of 10 a.m. and 5 p.m. Sealed tenders, endorsed "Tenders for Repairs, Painting, etc.," to be addressed to Mr. John Carden, Clerk to the Committee, Offices of the Committee, 56, Old-street, Brighton, and delivered at the offices of the Committee, 54, Old-street, Brighton, on or before July 16, at 1 o'clock p.m.

July 16.—Carlisle.—CHURCH ROOMS.—The various works required in the erection of Church rooms at Heads Nook. Plans and specification can be seen, and forms of tender obtained, at offices of Mr. J. H. Mortland, F.R.I.B.A., architect, Eagleside, Abbey Rooms, Castle-street, Carlisle, during office hours from July 9 to July 16, when tenders are to be sent before 10 a.m.

July 16.—Dinnington.—CLUB.—The building of Dinnington Workmen's Social Club. Tenders, with a deposit of 1*l.*, on or before July 16 to Mr. Wm. Whitehead, Secretary, Dinnington, Doley, F.S.O. For Schedules and full particulars apply Messrs. Marshall & Tweedy, architects, Eldon-square, Newcastle-on-Tyne.

July 16.—Sandiacre.—SCHOOL.—Derbyshire C.C. Education Committee invite tenders for the erection of school at Sandiacre, to accommodate about 320 children. Drawings, specification, agreement, etc., may be seen at the offices of Mr. George H. Widows, A.R.T.B.A., Architect to the Committee, County Education Office, St. Mary's-gate, Derby, between the hours of 10 a.m. and 4 p.m., except on Saturday, when they will be on view from 10 a.m. to 12 noon. A copy of the bill of quantities, specification, conditions of contract, and form of tender can be obtained at the architect's office upon payment of 1*l.* 1*s.* Sealed tenders in envelopes provided for the purpose, endorsed "Tender for New Council School, Sandiacre," must be delivered to the architect, at his office, not later than 5 p.m. on July 16.

July 16.—Senghenydd.—HOUSES.—Twenty dwelling-houses at Senghenydd for the Trustees of the Gwynnifur Building Club. Plans and specifications may be seen with Mr. G. L. Watkins, architect, Rectory-road, Caerphilly. Sealed and endorsed tenders to be delivered to the Secretary, Mr. E. Humphreys, 131, Commercial-street, Senghenydd, on or before 12 o'clock noon, July 16.

July 16.—Southampton.—BROOK.—The Guardians of South Stincham Union invite tenders for the erection of cook's bedroom at the Union Workhouse, Westland, Southampton, in accordance with the plan, specification, and conditions of contract prepared by Messrs. W. H. Mitchell, Son, and Gifford, architects, of 9, Abchurch-lane, London. The plans, etc., may now be seen, and all particulars obtained, at the offices of the architects. Sealed tenders, on the form provided, are to be sent to Mr. J. W. White, Clerk to the Guardians, 20, Portland-street, Southampton, not later than 12 noon on July 16, endorsed "Tender for Cook's Bedroom."

Edinburgh.—TENDERS.—Edinburgh Corporation invite estimates for the mason, carpenter, smith, slater, plumber, plaster, painter, and asphalt works to be executed in the reconstruction of tenements, Glaiside-ron. Schedules of quantities and all particulars from the Burgh Surveyor. Sealed offers, endorsed "Tender for Reconstruction, Glaiside-ron," must be lodged with Mr. Thomas Hunter, W.S., Glasgow City-chambers, Edinburgh, not later than July 17.

July 17.—Halifax.—ALTERATIONS TO SHOPS.—Halifax Market Committee invite tenders for the execution of the joiner's work required in connection with alterations to shops in the Market Hall, and shop in Piece Hall. Plans and specifications may be seen, and form of tender obtained, on application to Mr. James Lord, M.Inst.C.E., Borough Engineer, Town Hall, Halifax. Tenders, endorsed "Shops, Market Hall or Piece Hall, as the case may be, must be sent to Mr. Keighley Walton, Town Clerk, not later than 12 o'clock noon on July 17.

July 17.—Llanwrtyd Wells.—CHAPEL.—For erection of new Calvinistic Methodist chapel, Llanwrtyd Wells. Plans and specification may be seen with the Rev. Rhys Evans, Chapel House, Llanwrtyd Wells, and at the offices of the architect, Mr. W. Beddoe Rees, architect, 5, Dunfermline-place, Cardiff, from whom bills of quantities may be obtained. Tenders to be sent to Rev. Rhys Evans on or before July 17.

July 17.—Machynlleth.—RENOVATION OF CLOCK TOWER.—The renovation of the town clock tower of Machynlleth, for the Machynlleth U.D.C. Specifications and further particulars may be obtained of Mr. J. John Rowlands, Clerk to the Council, Machynlleth, Montgomery. Tenders to be delivered or sent in not later than July 17.

July 17.—Milton Abbott.—CHAPEL ADDITIONS.—Proposed additions and alterations to Milton Abbott Wesleyan chapel. The drawings, specifications, and conditions may be seen by applying to the caretaker. Tenders must be sent to Mr. Walter Eise, Leys, Milton Abbott, Tavistock, not later than July 17. Mr. Ernest Wise, M.S.A., architect, Lanneston.

July 17.—Treherbert.—ALTERATIONS.—Alterations to the front of the Conservative Club, Treherbert. Plans and specifications can be obtained by applying to the Secretary; or Mr. Jacob Rees, architect, Pentre. All tenders to be in the hands of Secretary by July 17.

July 18.—Dublin.—DINING-HALL.—The Board of Public Works, Ireland, invite tenders for erecting and equipping new temporary dining-hall at R.T.C. Depot, Phoenix Park, Dublin. Tenders will be received up to, but not later than, 10 a.m. on July 18. The plans and specification can be seen at the office of Mr. H. W. Wilson, Secretary, Office of Public Works, Dublin, where also forms of tender may be obtained. The envelope containing the tender must be endorsed.

July 18.—Dublin.—STORE.—South Dublin Guardians invite tenders for the fitting-up of a butter store in the workhouse, in accordance with specification prepared by the Clerk of Works. Tenders to be lodged with Mr. John P. Condon, Clerk of the Union, Board Room, James's-street, not later than 12.30 o'clock p.m. on July 18.

July 18.—Leyland.—HOUSES, &c.—The Leyland and Warrington Industrial Co-operative Society, Ltd., invite tenders for the erection of five houses and a shop, near Leyland Station. Plans may be seen and bills of quantities obtained at the Secretary's office, Chapel-brook, Leyland, on payment of 10*s.* Tenders must be delivered before 6 p.m. on July 18.

July 18.—Teddington.—OFFICES.—Teddington U.D.C. invite tenders for the erection of offices at Elmfield-house, Teddington. Plan and specification may be seen on application to Mr. M. Hainsworth, Surveyor, Council Offices, Teddington. Tenders, endorsed "Offices," must be sent to Mr. G. H. Salmons, Clerk, Elmfield House, Teddington, not later than July 18.

July 18.—Whitley.—SCHOOL ADDITIONS.—The Administrative Sub-Committee for the Runcorn Rural District invite tenders for alterations and additions to the school buildings, Whitley, near Runcorn. Plans and specification can be seen at the office of Mr. H. Beavick, County Architect, Newgate-street, Chester, and quantities obtained on deposit of 1*l.* Tenders to be sent to Mr. George F. Ashton, Clerk, 7, High-street, Runcorn, on or before July 18, endorsed "Tender for Works at Whitley."

July 19.—Leshmahagow.—SCHOOL WORKS.—Leshmahagow School Board invite tenders for new bath-room at Bent School-house, and alterations of school latrines; (2) for new bathroom at Blackwood School-house; (3) for new water closets at Blackwood School; (4) for alteration of front lobby and lavatory at Leshmahagow Senior School. Separate offers required for mason and brick works, joiner works, plumber works, plaster and cement works. Plans and specifications may be seen at the different schools or school-houses, and offers to be lodged with Mr. J. N. Gilmore, Clerk, School Board Office, Leshmahagow, marked "Offer" on outside, not later than July 19, at 12 noon.

July 19.—Somerset.—BUNGALOW.—For the erection of a bungalow residence, on the Cromcombe Estate, Somerset, for Mr. G. Conington. Plans and specification may be seen at Cromcombe Station, on application to Mr. John A. Tozer, and further particulars from the architect, to whom tenders are to be delivered on or before July 19. Mr. George C. Strawbridge, architect, 25, Alma-street, Taunton.

July 20.—Alnwick.—ALTERATIONS.—Tenders (single or whole) are required for alterations to No. 1, Seaview, Craster North Side. Plans and specifications may be seen at office of Mr. M. Temple Wilson, architect and surveyor, Alnwick, and copies thereof upon application to Mr. Chas. Archibald, No. 5, Craster South Side. Tenders are to be delivered to architect on or before July 20.

July 20.—Belfast.—WAREHOUSES.—Building and completing a block of warehouses at Franklin-street, Brunswick-street, and James-street South. Quantities may be had on application to Mr. S. C. Hunter, building surveyor, 2, Wellington-place, Belfast. Plans, etc., may be inspected at office of Mr. Henry Seaver, B.E., M.R.I.A.I., architect, Scottish Temperance-buildings, Belfast. Sealed tenders, endorsed "Warehouses," to be lodged with architect not later than 12 o'clock noon, July 20.

July 20-23.—Kirkmichael.—RENOVATION OF CHURCH.—The mason, carpenter, slater, lath and plaster, and painter and glazier works to be done in connexion with the renovation of the parish church of Kirkmichael. Plans and specifications to be seen with Mr. John Robertson, architect, Inverness, and also copies of both plans and specifications to be seen with the Rev. Mr. Fraser, The Manse, Kirkmichael, Baldindalloch, from July 5 to July 20, and tenders to be lodged with Mr. Robertson, on or before July 23.

July 20.—Stretford.—COTTAGES.—Stretford U.D.C. invite tenders for the erection of twenty pairs of semi-detached cottages in Lucy-street, Stretford. Plans, form of tender, etc., may be seen, and bills of quantities obtained, at the offices of the architects, Messrs. John Bowden & Co., 14, Ridgfield, Manchester, and Messrs. Upham & Messers, 20, St. Ann-street, Stretford. Tenders to be sent to the Chairman, Sanitary Committee, at the Council Offices, Old Trafford, on or before July 20, endorsed "Tender for Cottages."

July 21.—Crompton.—SEWAGE WORKS BUILDINGS, &c.—Crompton U.D.C. invite tenders in connexion with their sewage works at New Hay for the following:—Contract No. 1.—Erection of buildings to contain sludge pressing machinery and other works in connexion therewith; Contract No. 2.—Supply and installation of suction gas producer plant, gas engine, pump, air compressor and receiver, water tanks, and all shafting, piping, etc., in connexion therewith; Contract No. 3.—Supply and installation of sludge pressing, new temporary mixer, cast-iron overhead sludge tank, and all piping, etc., in connexion therewith. Plans, specifications, and general conditions may be seen and forms of tender, with all necessary information, obtained on application to the Council's Engineer for the scheme, Mr. J. P. Wilkinson, M.Inst.C.E., 301, Cathedral-street, Manchester, accompanied by a deposit of 1*l.* 1*s.* in respect of each contract. Sealed tenders, endorsed "New Hay Sewage Works," must be addressed to Mr. F. F. Garside, Clerk to the Council, Town Hall, Shaw, near Oldham, and be delivered at the offices of the Guardians, at 10 a.m. on July 21.

July 21.—Guildford.—SPYRE, &c.—Guildford Guardians invite tenders for (a) the construction of a small store, external shelter, and a pent roof in connexion with the new casuals block; and (b) external painting at the Infirmary buildings, both at the Union Workhouse, Guildford. Specifications of the proposed work can be seen on application to Mr. Edward J. Lunn, architect, 36, High-street, Guildford. Sealed tenders, endorsed "Building Work at Casuals Block" and "Painting Infirmary Buildings," are to be sent to Mr. W. S. V. Cullerne, Clerk to the Guardians, at the Union Offices, Commercial-road, Guildford, not later than 10 o'clock a.m. on July 21.

July 23.—Ayrbridge.—SOUTHAMPTON C.C. invite tenders for sundry small works of repairs, painting, provision of lavatory accommodation, erection of offices, etc., at Ayrbridge Council school. Plans and conditions of contract may be seen, and specification obtained, at the office of Mr. W. J. Taylor, County Surveyor, The Castle, Winchester, between the hours of 9 a.m. and 5 p.m. (Saturdays 9 a.m. and 1 p.m.). Plans and conditions of Contract may also be seen at the school. A deposit of 1*l.* 1*s.* will be required for a copy of the specification. Deposits must be made by cheque payable to Hants C.C., and crossed Bank of England, or particulars will not be sent. Tenders, endorsed "Proposed Work, Ayrbridge Council School," are to be delivered to Mr. H. Barber, Clerk of the C.C., The Castle, Winchester, not later than 10 a.m. on July 23.

July 23.—Bexley.—CAR-SHEDS, &c.—Bexley U.D.C. invite separate tenders for:—(1) The extension of the existing car-shed to form a paint shop; (2) the erection of a steel structure for a repairing shop. Drawings, specification, and bill of quantities may be seen at the Council's office, Car-sheds, Bexley Heath. Copies of the bill of quantities will be supplied on payment of 10*s.* Sealed tenders, marked:—(1) Paint Shop; (2) Repairing Shop, as above, to be delivered to the Clerk, Mr. T. G. Baynes, Oak House, Bexley Heath, Kent, not later than noon July 23.

July 23.—Brighthelm.—SCHOOL WORKS.—Southampton C.C. invite tenders for sundry small works of repairs, painting, and provision of lavatory accommodation at Brighthelm Council school. Conditions of contract may be seen, and specification obtained, at the office of Mr. W. J. Taylor, County Surveyor, The Castle, Winchester, between the hours of 9 a.m. and 5 p.m. (Saturdays 9 a.m. and 1 p.m.). A deposit of 1*l.* 1*s.* will be required for a copy of the specification. Deposits must be made by cheque payable to Hants C.C., and crossed Bank of England, or particulars will not be sent. Tenders, endorsed "Proposed Work, Brighthelm Council

School," are to be delivered to Mr. H. Barber, Clerk of the C.C. The Castle, Winchester, not later than 10 a.m. on July 23.

July 23.—Cosham.—SCHOOL. Works.—Southampton C.C. invite tenders for sundry small works of erection of buttresses, new fencing, the rods, dis-tempering, new urinal, and drains, at Cosham Infants' Council School. Plans and specifications of contract may be seen, and specification obtained, at the office of Mr. W. J. Taylor, County Surveyor, The Castle, Winchester, between the hours of 9 a.m. and 5 p.m. (Saturdays 9 a.m. and 1 p.m.). Plans and conditions of contract may also be seen at the school. A deposit of 1l. 1s. will be required for a copy of the specification. Deposits must be made by cheque, payable to Hants C.C., and crossed Bank of England, or particulars will not be sent. Tenders, endorsed "Proposed Work, Cosham Infants' Council School," are to be delivered to Mr. H. Barber, Clerk of the C.C. The Castle, Winchester, not later than 10 a.m. on July 23.

July 23.—Darranias.—SCHOOL.—Mountain Ash U.D.C. Education Committee invite tenders for the erection of a mixed school (to accommodate 400 children), with the necessary office, boundary walls, etc., at Darranias, Mountain Ash. Plans and specifications may be seen, and forms of tender and bills of quantities obtained, on application to the architect, Mr. W. H. Williams, Town Hall, Mountain Ash, upon the deposit of 2l. 2s. The bill of quantities is to accompany the tender, but in separate sealed and endorsed envelope. Sealed tenders and sealed bills of quantities, endorsed "Darranias Mixed School," to be received by Mr. A. Morrison, Director of Education, Town Hall, Mountain Ash, not later than July 23.

July 23.—Fareham.—REPAIRS, etc.—Southampton C.C. invite tenders for sundry small works of repairs, external and internal, painting, ventilation, etc., at Fareham Council School. Plans and conditions of contract may be seen, and specification obtained, at the office of Mr. W. J. Taylor, County Surveyor, The Castle, Winchester, between the hours of 9 a.m. and 5 p.m. (Saturdays 9 a.m. and 1 p.m.). Plans and conditions of contract may also be seen at the school. A deposit of 1l. 1s. will be required for a copy of the specification. Deposits must be made by cheque, payable to Hants C.C., and crossed Bank of England, or particulars will not be sent. Tenders, endorsed "Proposed Work, Fareham Council School," are to be delivered to Mr. H. Barber, Clerk of the C.C. The Castle, Winchester, not later than 10 a.m. on July 23.

July 23.—Funtley.—WORKS.—Southampton C.C. invite tenders for sundry small works of gravelling, enlarging gateway, erection of cloak-rooms and lavatories, drainage, etc., at Funtley Council School. Plans and conditions of contract may be seen, and specification obtained, at the office of Mr. W. J. Taylor, County Surveyor, The Castle, Winchester, between the hours of 9 a.m. and 5 p.m. (Saturdays 9 a.m. and 1 p.m.). Plans and conditions of contract may also be seen at the school. A deposit of 1l. 1s. will be required for a copy of the specification. Deposits must be made by cheque, payable to Hants C.C., and crossed Bank of England, or particulars will not be sent. Tenders, endorsed "Proposed Work, Funtley Council School," are to be delivered to Mr. H. Barber, Clerk of the C.C. The Castle, Winchester, not later than 10 a.m. on July 23.

July 23.—Halehead.—LIGHTHOUSE.—The Upper Mersey Navigation Commissioners invite tenders for a new lighthouse at Halehead, and beacon near Halehead, on the Mersey. Plans and specifications may be seen at the office of Mr. J. A. Sauer, Northwich. Tenders to be sent in by 9 a.m. on July 23 to Mr. J. Meadowcroft, Clerk to the Commissioners, Office of the Commissioners, Runcorn.

July 23.—Portchester.—SCHOOL. Works.—Southampton C.C. invite tenders for sundry small works of gravelling, erection of offices, ventilation, etc., at Portchester Council School. Plans and conditions of contract may be seen, and specifications obtained, at the office of Mr. W. J. Taylor, County Surveyor, The Castle, Winchester, between the hours of 9 a.m. and 5 p.m. (Saturdays 9 a.m. and 1 p.m.). Plans and conditions of contract may also be seen at the school. A deposit of 1l. 1s. will be required for a copy of the specification. Deposits must be made by cheque, payable to Hants C.C., and crossed Bank of England, or particulars will not be sent. Tenders, endorsed "Proposed Work, Portchester Council School," are to be delivered to Mr. H. Barber, Clerk of the C.C. The Castle, Winchester, not later than 10 a.m. on July 23.

July 23.—Waterloo.—SCHOOL. Works.—Southampton C.C. invite tenders for sundry small works of painting and decorating, new drains, plans and specifications, etc., at Waterloo Council School. Plans and conditions of contract may be seen, and specification obtained, at the office of Mr. W. J. Taylor, County Surveyor, The Castle, Winchester, between the hours of 9 a.m. and 5 p.m. (Saturdays 9 a.m. and 1 p.m.). Plans and conditions of contract may also be seen at the school. A deposit of 1l. 1s. will be required for a copy of the specification. Deposits must be made by cheque, payable to Hants C.C., and crossed Bank of England, or particulars will not be sent. Tenders, endorsed "Proposed Work, Waterloo Council School," are to be delivered to Mr. H. Barber, Clerk of the C.C. The Castle, Winchester, not later than 10 a.m. on July 23.

July 24.—Muteley.—PLYMOUTH.—POLICE AND FIRE STATION. For the erection and completion of a police and fire station at Ford Park, Muteley. Plans and specifications may be seen, and forms of tender and bills of quantities obtained, on deposit of 2l. in cash. Sealed tenders, accompanied by the fully-priced bill of quantities, to be delivered at the office of Mr. James Paton, Borough Engineer and Surveyor, Borough Engineer's Office, not later than 5 p.m. on July 24.

July 25.—Ashford.—WALLING.—Ashford U.D.C. invite tenders for the erection of a Kentish ragstone boundary wall, about 1,200 ft. long, at its cemetery, Canterbury-road, in accordance with plans and specification, which may be seen. Form

of tender, and any other information, obtained on application to Mr. William Terrill, surveyor, North-street, Ashford, Kent. Sealed tenders, endorsed "Canterbury Walling," to be sent to Mr. P. Hughes Hallett, solicitor, Clerk to the Cemetery Committee, not later than 5 p.m. on July 25 at his office, 11, Bank-street.

July 25.—Dartford (Kent).—ALTERATIONS.—The Metropolitan Asylums Board invite tenders for structural alterations to the laundries at Darent Ash Asylum, Dartford, Kent, in accordance with drawings and specification prepared by Mr. W. T. Hatch, Engineer-in-Chief. Drawings, specification, conditions of contract, and form of tender may be inspected at the Office of the Board, Embankment, E.C., on and after July 16, and can then be obtained on payment of 1l. Tenders, addressed as noted on the form, must be delivered at the Office of the Board before 10 a.m. on July 25.

July 25.—Sutton.—STABLING, etc.—The Metropolitan Asylums Board invite tenders for stabling and other buildings on the Belmont Asylum Estate, Sutton, Surrey. Copy of specification, conditions of contract, bills of quantities, and form of tender can be obtained, on payment of 1l., at the Office of the Board, Embankment, E.C. The drawings can be seen at the offices of Messrs. T. W. Aldwinckle & Son, architects, 20, Denham-street, London Bridge, E.C. Tenders to be delivered at the Office of the Board before 10 a.m. on July 25.

July 26.—Nantymoel.—CO-OPERATIVE PREMISES.—New stables, carriage, yard, and boundary walls, also new butcher's shop, and conversion of existing stables into shoemaker's shop, at Nantymoel, near Bridgend, for the Co-operative Society. Plans and specifications may be seen, and forms of tender and bills of quantities can be obtained, upon a deposit of 1l. 1s. Sealed and endorsed tenders to be sent to the Secretary, Mr. John Morgan, Co-operative Society, not later than July 26. Mr. J. Morris Williams, architect and surveyor, Blackmill, near Bridgend.

July 27.—Greenwich.—LIBRARY.—The Greenwich Borough Council invite tenders for a branch library in London-street, West Greenwich, according to drawings, specification, and conditions of contract and bond, which may be seen at Messrs. W. & A. Anderson, architects, 40, Birchbush-square, W.C., between 10 and 12, on July 18, 19, and 20. Bills of quantities may be obtained of the Town Clerk, Town Hall, Greenwich, on deposit of 2l. Sealed tenders, on form supplied, sealed and endorsed "Tender for Branch Library," must be delivered to Town Clerk before 12 noon, July 27.

July 27.—St. Anne's-on-the-Sea.—SCHOOL.—St. Anne's-on-the-Sea U.D.C. invite tenders for the erection of a new technical school, at St. Anne's-on-the-Sea. Plans may be seen, and forms of tender obtained, from the office of the County Architect, Mr. Henry Littler, 16, Ribblesdale-place, Preston, by payment of a deposit of 2l. Sealed tenders, endorsed "Technical School," must be sent to Mr. Thomas Bradley, Clerk, Public Offices, St. Anne's-on-the-Sea, not later than 12 o'clock noon on July 28.

July 30.—Glasgow.—LAUNDRY.—The Directors of the Caledonian Railway Company invite tenders for the works to be executed in the construction of a sponge cloth laundry, at St. Rollo's, Glasgow. The drawings may be seen at the office of the Company's Engineer, Buchanan-street, Glasgow, where copies of the specification and bills of quantities may be obtained on payment of 2l. 2s. Sealed tenders, endorsed "Tender for Construction of Sponge Cloth Laundry at St. Rollo's," to be lodged with Mr. J. B. Gurney, Secretary, Caledonian Railway Company's Offices, 302 Buchanan-street, Glasgow, on or before July 30.

July 31.—Derby.—POST OFFICE.—Tenders are invited for the enlargement of branch post office at Melland-road, Derby, for H.M. Office of Works. Drawings, specifications, conditions, and form of tender may be seen, and bills of quantities may be obtained at H.M. Office of Works, Storey-gate, S.W., on deposit of 1l. 1s. Tenders must be delivered to the Secretary, H.M. Office of Works, for Derby Branch Post Office Enlargement, "not later than 12 o'clock noon, July 31."

NO DATE.—GUILDFOID.—STEPS.—The Trustees of Poyle Charity Estate, Guildford, invite tenders for the construction of a flight of steps in Harvey-road, Guildford. The drawing and specification of works can be seen at office of Mr. William G. Lower, Surveyor to the Trustees, 124, High-street, Guildford.

NO DATE.—HEBBURN.—HOUSE.—For building caretaker's house on St. John's Church grounds at Hebburn-on-Tyne. Plans and specification can be seen at St. John's Vicarage between 10 a.m. and 6 p.m.

NO DATE.—MAGHERHAMLET.—RESIDENCE.—For building at eachers residence at Magherahamlet, Ballynahinch. Plans and specifications can be seen, and full particulars given, by Rev. Wm. Garne, Magherahamlet.

NO DATE.—NEWCASTLE.—PAROCHIAL BUILDINGS.—St. Jude's, new parochial buildings, Mr. A. B. Munmer, F.R.I.B.A., M.R.S.A., Director, Architect, 13, Grey-street, Newcastle-on-Tyne, and at Tyneworth.

NO DATE.—SAXTON.—FARMHOUSE.—The erection of a small farmhouse at Saxton, near Church Fenton. For particulars apply Mr. L. James, Estate Office, Womersley, Pontefract, where plans and specifications can be seen.

ENGINEERING, IRON, AND STEEL.

July 15.—Belfast.—BRIDGE.—Belfast Improvement Committee invite tenders for the supply and erection of a steel lattice girder bridge, 51 ft. span and 15 ft. high, with 12 ft. clearances, and particulars may be obtained from the City Surveyor on payment of 1l. 1s. Sealed tenders, endorsed "Tender for Bridge," to be lodged in office of Mr. Samuel Black, Town Clerk, not later than July 16.

July 16.—Warrington.—WAGONING MACHINE.—Warrington Markets Committee invite tenders for a 20-ton weighing machine. Any further information may be obtained at the office of the Borough

Surveyor, Town Hall, at which place tenders must be delivered before 12 o'clock on July 16.

July 17.—Great Yarmouth.—TANKS.—Great Yarmouth Board of Guardians invite tenders for the following:—One cast-iron tank, 18 ft. 6 in. by 13 ft. 6 in. by 5 ft. deep; one cast-iron tank, 18 ft. 6 in. by 13 ft. 6 in. by 5 ft. deep; rolled steel tank, 18 ft. 6 in. by 13 ft. 6 in. by 5 ft. deep, complete at the Great Yarmouth Workhouse. Specifications and all particulars to be obtained on application to Mr. J. M. Carter, Esq., M.C., South Docks, Road, Great Yarmouth, on deposit of a cheque for 1l. 1s. Tender, endorsed, to be addressed to "The Clerk, Great Yarmouth Board of Guardians, Queen-street, Great Yarmouth," and must be received by him through the post on or before noon on July 17.

July 18.—COYCHURCH, etc.—BAIRDOS.—Glamorgan C.C. invite tenders for (1) improvement of Coychurch Bridge; (2) widening Coedwynn Bridge, over the Swansea Canal, on the Swansea and Pon-tarwain main road, near Cydych. Plans and specifications of the respective works may be seen, and copies of the bills of quantities obtained, at the following places:—Work No. 1, the County Surveyor's Office, Town Hall, Bridgend; work No. 2, Cydych Police-station; and for both works at office of Mr. T. Mansel Franken, Clerk of the C.C., Glamorgan C.C. Offices, Westgate-street, Cardiff. Sealed tenders, sealed and endorsed "Bairdos," supplied, are to be delivered to Clerk, together with the full names and addresses of two substantial sureties, not later than July 18.

July 19.—HARTLEY-WINTNEY. Hull Corporation have decided to invite amended tenders for the construction of a covered concrete service reservoir at Keldgate to hold about 2 million gallons. Drawings may be seen, and copies of specification and form of tender may be obtained, at the office of Mr. F. J. Bancroft, City Water and Gas Engineer, at the North Gas Works, Hartley Wintney. Copies of Cheques and postal orders to be made payable to Mr. T. G. Milner, City Treasurer, Hull. Tenders, endorsed "Tender for Covered Service Reservoir," are to be delivered to the City Engineer, City and Gas Committee, and delivered at the Town Clerk's Office not later than July 19.

July 20.—HARTLEY-WINTNEY. WATER SUPPLY.—The Hartley Wintney R.D.C. invite tenders for providing and laying about 2,800 yds of 6-in. cast-iron main, together with the provision of a 10 h.p. engine, and 50 ft. of 12-in. main, and three 12-in. valves. The drawings, specifications, etc., may be seen at the office of Mr. F. L. Wetherall, Clerk to the Parish Council of Hartley Wintney, from 10 to 12 noon, on July 20. Tenders, sealed and endorsed "Hartley Wintney Water Tender," must reach Mr. W. H. Wright, Clerk to the Council, Odham, Hants, not later than 9 o'clock on July 20.

July 20.—FORTH.—CONDENSER, etc.—Rhonda U.D.C. invite tenders for the supply and erection of a condenser, washer, scrubber, and two pumps, at the Forth Gas Works. The drawings and specifications may be seen, and forms of tender supplied upon application to Mr. Octavius Thomas, Engineer, at the Forth Gas Works. The tenders must be sent to Rhonda upon depositing the sum of 1l. 1s. Tenders to be addressed to the Chairman of the Gas and Water Company, endorsed "Contract No. 37, etc.," and delivered at office of Mr. Walter P. Nicholas, Clerk to the Council, Council Offices, Pentre, on or before 10 a.m. on July 20.

July 23.—London.—ELECTRIC LIGHT INSTALLATION.—Stepney Borough Council invite tenders for laying on an electric light wiring installation at the two underground conveniences, Sutton-street, St. George. But for the enlargement of branch post office at Melland-road, Derby, for H.M. Office of Works. Drawings, specifications, conditions, and form of tender may be seen, and bills of quantities may be obtained at H.M. Office of Works, Storey-gate, S.W., on deposit of 1l. 1s. Tenders must be delivered to the Secretary, H.M. Office of Works, for Derby Branch Post Office Enlargement, "not later than 12 o'clock noon, July 31."

NO DATE.—GUILDFOID.—STEPS.—The Trustees of Poyle Charity Estate, Guildford, invite tenders for the construction of a flight of steps in Harvey-road, Guildford. The drawing and specification of works can be seen at office of Mr. William G. Lower, Surveyor to the Trustees, 124, High-street, Guildford.

NO DATE.—HEBBURN.—HOUSE.—For building caretaker's house on St. John's Church grounds at Hebburn-on-Tyne. Plans and specification can be seen at St. John's Vicarage between 10 a.m. and 6 p.m.

NO DATE.—MAGHERHAMLET.—RESIDENCE.—For building at eachers residence at Magherahamlet, Ballynahinch. Plans and specifications can be seen, and full particulars given, by Rev. Wm. Garne, Magherahamlet.

NO DATE.—NEWCASTLE.—PAROCHIAL BUILDINGS.—St. Jude's, new parochial buildings, Mr. A. B. Munmer, F.R.I.B.A., M.R.S.A., Director, Architect, 13, Grey-street, Newcastle-on-Tyne, and at Tyneworth.

NO DATE.—SAXTON.—FARMHOUSE.—The erection of a small farmhouse at Saxton, near Church Fenton. For particulars apply Mr. L. James, Estate Office, Womersley, Pontefract, where plans and specifications can be seen.

July 15.—Belfast.—BRIDGE.—Belfast Improvement Committee invite tenders for the supply and erection of a steel lattice girder bridge, 51 ft. span and 15 ft. high, with 12 ft. clearances, and particulars may be obtained from the City Surveyor on payment of 1l. 1s. Sealed tenders, endorsed "Tender for Bridge," to be lodged in office of Mr. Samuel Black, Town Clerk, not later than July 16.

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Surveyor, Town Hall, at which place tenders must be delivered before 12 o'clock on July 16.

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July 18.—COYCHURCH, etc.—BAIRDOS.—Glamorgan C.C. invite tenders for (1) improvement of Coychurch Bridge; (2) widening Coedwynn Bridge, over the Swansea Canal, on the Swansea and Pon-tarwain main road, near Cydych. Plans and specifications of the respective works may be seen, and copies of the bills of quantities obtained, at the following places:—Work No. 1, the County Surveyor's Office, Town Hall, Bridgend; work No. 2, Cydych Police-station; and for both works at office of Mr. T. Mansel Franken, Clerk of the C.C., Glamorgan C.C. Offices, Westgate-street, Cardiff. Sealed tenders, sealed and endorsed "Bairdos," supplied, are to be delivered to Clerk, together with the full names and addresses of two substantial sureties, not later than July 18.

to be sent to Mr. C. W. Young, Secretary, Nicholas-lane, London, E.C., marked "Tender for Bogie Carriages," not later than 12 o'clock noon on July 25. For each specification a fee of 1 l. 1s. is charged, which cannot, under any circumstances, be returned.

July 25.—Rainhill.—PLANT.—The Committee of Visitors of the County Asylum, Rainhill, invite tenders for the manufacture, supply, delivery, and erection complete at their electricity and pumping station of the undermentioned plant:—(a) One independent surface condensing plant, with electrically driven pumps, together with the necessary pipework; (b) one water softening and purification plant. Plans and works may be seen, and conditions, specification and form of tender may be obtained, from the Engineer's Office at the Institution. Tenders to reach Mr. J. A. Gornall, Clerk and Steward, Clerk's Office, County Asylum, Rainhill, not later than 5 p.m. on July 25, endorsed on the outside "Water Softening."

July 25.—Aberdeen.—STEELWORK.—The Aberdeen Harbour Commissioners invite tenders for the delivery and erection of about 350 tons of built steelwork for a two-story goods shed, to be erected at Regent Quay. The drawings may be seen, and copies of the specifications and schedules of quantities obtained, between 10 a.m. and 4 p.m., at the office of Mr. R. Gordon Nicol, Harbour Engineer, Harbour Engineer's Office, Aberdeen, on payment of 12 s. 6d. Tenders are to be lodged not later than 12 o'clock noon on July 25.

July 30.—Stanley and West Hallam.—PIPES.—Shardlow R.D.C. invite tenders for the supply and delivery of 6 in. pipes, 76 ft. long, and 35 tons of 3 in. pipes. Full particulars, with specification, bill of quantities, and form of tender, may be obtained from the engineers, Messrs. Elliott & Brown, Burton Building Engineers, Nottingham, on deposit of 2 l. 2s. Sealed tenders, addressed to Mr. J. W. Newbold, Clerk to the Council, Council Offices, Derby, and endorsed "Tenders for Iron Pipes" to be delivered on or before the first post on July 30.

July 30.—Stanley and West Hallam.—WATERWORKS.—Shardlow R.D.C. invite tenders from responsible contractors for the construction of water-works at Stanley and West Hallam, Derbyshire, including laying 4,466 yds. of 6 in., 3,050 yds. of 4 in., 1,000 yds. of 3 in., cast-iron pipes, with all appurtenances, and the construction of a brick service reservoir (capacity, 90,000 gallons). Plans may be seen, and specification and bills of quantities obtained, at the office of the Engineers, Messrs. Elliott & Brown, Burton Building Engineers, Parliament-street, Nottingham, on deposit of 2 l. 2s. Sealed tenders, addressed to Mr. J. W. Newbold, Clerk to the Council, Council Offices, Derby, and endorsed "Tender for Waterworks," to be delivered on or before the first post on July 30.

July 31.—Bangor.—PLANT.—The U.D.C. of Bangor, Co. Down, invite tenders for the supply and erection complete of a sulphate of ammonia plant. Full particulars can be had at the gasworks from Mr. B. Manganer, Mr. B. Mitchell, sealed tenders, endorsed "Sulphate Plant," must be delivered at the office of Mr. James Miliken, Town Clerk, Town Hall, Bangor, Co. Down, not later than 12 o'clock noon on July 31.

SEPTEMBER.—RECONSTRUCTION OF STEAM HEATING AND HOT-WATER SERVICE.—The date for receiving tenders for above work at County Lunatic Asylum, Lancaster, has been extended to September 4.

MISCELLANEOUS.

July 16.—Shotton.—STREET LIGHTING.—Shotton Parish Council invite tenders for street lighting (Acetylene) at Shotton Colliery. Particulars may be seen, and the bills of quantities at Milbank-terrace, Station Town, Wingham, until July 16.

July 17.—Cardiff.—RENOVATION AND REMOVAL OF PAINTINGS.—Cardiff Corporation invite tenders from local firms for the removal and installation of paintings from the old to the new Town Hall, and the renovation, etc., of such pictures. A print of the conditions and specification may be obtained at office of Mr. J. L. Wilesey, Town Clerk. Sealed tenders (on the proper forms), endorsed "Pictures," to be delivered to him on or before July 17.

July 19.—Dublin.—MACHINERY OILS.—The Corporation of Dublin invite tenders for (approximately) a twelve-month's supply of machinery oils for the Corporation Electricity Works, Pigeon House Fort, Dublin. Copies of the specification, price list, can be obtained from the Town Clerk, and tenders must reach his office not later than 12 o'clock noon on July 19, marked "Tender for Machinery Oils," and addressed to the Chairman, Supplies Committee, City Hall, Dublin.

July 19.—Furness.—FILLING IN QUARRY.—Liskeard District Council invite tenders for partially filling in a quarry in the parish of St. Michael, St. Cleer. The surveyor will be on the spot on Monday, July 16, from 11 to 4 o'clock, to point out the work proposed to be done, when conditions of letting may be seen. Tenders to be sent addressed to postpaid, and marked "Tenders for Quarry" to the Clerk's Office, West-street, Liskeard, on or before July 19.

July 19.—Falling.—OIL.—The Town Council of the Borough of Falling invite tenders for the supply to their electricity works of best cylinder oil, crank-chamber oil, paraffin, engine oil, best rope waste, and stoneware. Tenders for the above full particulars can be obtained on application to Mr. Albert E. Lewis, A.C.T.S., Business Manager, Electricity Department, Falling, and must be delivered not later than 12 o'clock noon on July 20.

July 20.—Hull.—COLLECTION OF NIGHTSOIL.—Hull Corporation invite tenders for the collection of nightsoil from the dry only (not districts Nos. 5 (Old Town), 10, 11, 12, 13, 14, 18, and 19, for a period of one year from October 1 next. Plans of the districts and specifications may be seen, and forms of tender, addressed to the Inspector of Nuisances, at his office, in Hanover square. Tenders, endorsed "Tender for Collection of Nightsoil," to be delivered at office of Mr. E.

Lavack, Town Clerk, Town Hall, Hull, on or before noon on July 20.

July 23.—Cleveland-street, W. SICK ASYLUM.—Tenders are invited for repairs to the gutters, parapets, etc., at the Asylum in Cleveland-street, W., for the Managers, Central London Sick Asylum District. Specifications may be seen by appointment, and bills of quantities obtained at the architect's office, Mr. William Lockwood, 12, Sherwood-street, W., on payment of 2 l. 2s. Tenders, addressed to the Board of Management, will be received at the Clerk's office, Cleveland-street Asylum, not later than 12 o'clock noon on July 23.

July 23.—Leeds.—GAS OIL.—Leeds Corporation Gas Committee invite tenders for the supply of 2,000 tons of gas oil for the manufacture of carburetted water gas, for a period of one year, commencing on September 1 next. Specification and conditions of tender may be obtained on application to Mr. B. H. Townsley, General Manager, Gas Offices, East Parade, Leeds. Tenders and samples, addressed to the Town Clerk, and endorsed "Gas Oil," must be delivered at the Town Hall, Leeds, on or before July 23.

July 25.—Titchhurst.—ROAD ROLLING.—Titchhurst R.D.C. invite tenders for steam rolling in their district as from the first week in November, 1906. The contractor will be required to supply one or more rollers with driver and mate to each, scarifiers, sleeping-vans, water-carts, with horse and man to each, and all necessary appliances. The work to be undertaken either by the piece or by daywork, as the Council may determine. Forms of tender may be obtained from Mr. W. N. Wood, surveyor, Titchhurst, on a stamped addressed envelope being forwarded. Tenders, sealed and endorsed "Steam Rolling," must be sent so as to reach Mr. C. L. Lane Andrews, Clerk to the Council, Wadhurst, Sussex, not later than July 25.

July 25.—Wansstead.—STEAM ROLLER.—Wansstead U.D.C. invite tenders for the supply of a 10-ton steam roller, with driver, attendant, fuel, etc., to work in the district during the months of September, October, November, and December, 1906. Forms of tender, with further particulars, can be obtained on application to the Surveyor, at the Council Offices, provided, are to be delivered at the Council Offices not later than July 25.

July 25.—Roxburgh.—FURNITURE.—The Roxburgh District Board of Lunacy invite tenders for the furniture and furnishings required for the new female wing of the asylum. Samples may be inspected at the asylum, and schedules of quantities and forms of tender may be had on application to the House Steward. Tenders must be lodged with the Medical Superintendent not later than July 25.

July 25.—Chard.—ROAD ROLLING.—(Sealed.) R.D.C. invite tenders for rolling the stones to be laid on main and district roads during the ensuing season. The contractor to provide two 15-ton steam rollers, fitted with Henderson's patent, detachable scarifiers, and two 10-ton steam rollers, to commence work early in September. Additional rollers to be provided if required. Invoiced charges at 10 p.m. and at per cubic yard rolled to be named, for the selection of the Council. Further information and forms of tender may be obtained from Mr. R. Stephens, District Surveyor, Ilminster, or Mr. F. Gordon Ross, Clerk, R.D.C. Office, Chard. Tenders, endorsed "Steam Rolling Tender," to be sent before July 25 to the Clerk.

NO DATE.—CLEVEDON.—ROOFING.—The Vicar and Churchwardens of St. John the Evangelist's Church invite tenders for new tile roofing. For particulars apply to Mr. Henry Taylor, C.E., M.S.A., Clevedon, at once.

PAINTING, etc.

July 16.—Cardiff.—PAINTING, etc.—Cardiff Education Committee invite tenders for painting, colouring, etc., the inside and outside of the Wood-street Council School. Specifications of the work may be obtained at the Education Offices, Howard-gardens, Cardiff. Tenders, sealed, and endorsed "Tender for Painting Wood-street Council School," must reach Mr. John J. Jackson, Director of Education, Education Offices, Howard-gardens, on or before July 16.

July 16.—Warrington.—PAINTING.—Warrington Education Committee invite tenders for the painting of the cemetery chapels, etc. Specifications and all further information may be obtained at the office of the Borough Surveyor, Town Hall, at which place tenders must be delivered before 12 o'clock on July 16.

July 17.—Bath.—PAINTING.—For painting and decorating work at the Grand Pump Room and Baths for the Hot Mineral Baths Committee. Particulars, copy of specification, and form of tender from Mr. Alfred J. Taylor, architect, 18, New Bond-street, Bath. Tenders to be in on forms and in endorsed envelopes, which will be provided, addressed to the Chairman of the Hot Mineral Baths Committee, Town Clerk's Office, Guildhall, and sent in not later than 10 a.m. on July 17.

July 17.—Manchester.—PAINTING.—Manchester Sanitary Committee invite tenders for painting Walton House, Harrison-street (interior). Specifications may be obtained at the office of the City Architect, Town Hall, upon payment of 1 l. 1s. Sealed tenders, enclosed in the official envelope, to be delivered at the above office not later than 4 a.m. on July 17.

July 17.—Manchester.—PAINTING.—Manchester Town Hall Committee invite tenders for painting new Kingston Public Hall (interior). Specification may be obtained at the City Architect's Office, Town Hall, upon payment of 1 l. 1s. Sealed tenders, enclosed in the official envelope, to be delivered at the above office not later than 4 a.m. on July 17.

July 17.—Stockport.—PAINTING.—Stockport Pals Committee invite tenders for painting (labour and materials) the whole of the wood and iron work at the City of Stockport, at the Heavy Norris Recreation Ground. Specifications and conditions and forms of tender may be obtained on application to Mr. John Atkinson, A.M. Inst.C.E., Borough Surveyor, Borough Surveyor's Office, Stockport. Tenders, addressed to "The Borough Surveyor, Stockport," sealed and endorsed "Tender for Painting at Parks," to be left at his office at or before noon on July 17.

July 18.—Bagthorpe.—PAINTING.—Nottingham Health Committee invite tenders for cleaning and painting at the Bagthorpe Hospital. Specifications, forms of tender, and bills of quantities may be obtained from Mr. Frank B. Lewis, City Architect, Guildhall, on payment of a deposit of 1 l. 1s. Sealed tenders to be delivered to Mr. Samuel G. Johnson, Town Clerk, Guildhall, Nottingham, at or before 10 a.m. on July 18.

July 18.—Leeds.—PAINTING, etc.—Leeds Education Committee invite tenders for painting and cleaning of schools during the mid-summer vacations. Specifications and full particulars of the work on application to the Architect's Department, Education Offices, or to Mr. W. Packer, Secretary, Education Offices, Leeds, to whom sealed and endorsed tenders must be sent not later than 12 o'clock noon on July 18.

July 18.—Stockton-on-Tees.—WASHING AND DISINFECTING.—Stockton-on-Tees Education Committee invite tenders for the washing and disinfecting to be done during the mid-summer holidays at the Higher Grade Schools. Specification may be seen and other particulars obtained at the Borough Engineer's Office, Town Hall. Tenders to be sent to Mr. M. H. Sykes, Borough Engineer, Town Hall, Stockton-on-Tees, before 10 a.m. on July 18.

July 19.—Haverstock Hill.—PAINTING, etc.—Haverstock Borough Council invite tenders for exterior painting and repointing of chimney stacks, etc., at the Town Hall, Haverstock Hill. Forms of tender can be obtained on application to the Borough Engineer, at the office of Mr. O. B. Winter, A.M.I.C.E., Borough Engineer, Tenders, endorsed "Painting," must be delivered to Mr. Arthur P. Johnson, Town Clerk, Town Hall, Haverstock Hill, not later than 4 p.m. on July 19.

July 19.—Huddersfield.—PAINTING.—The Corporation of Huddersfield invite tenders for the painting and decorating of the Huddersfield Technical College. Specifications and general conditions may be seen, and bills of quantities and forms of tender obtained, on application at the Office of the Borough Engineer and Surveyor, 1, Piccadilly, Huddersfield. Tenders, endorsed "Tender for Painting Technical College," signed in the handwriting of the tenderer or his agent, and addressed "Town Clerk, Town Hall, Huddersfield," must reach him not later than 10 a.m. on July 19.

July 20.—Chartham Downs.—PAINTING.—Works of painting, repairs, etc., and other works in connection to Section No. 5 of Kent County Asylum, Chartham Downs, near Canterbury. The specifications can be seen at the office of Mr. W. J. Jennings, architect, 4, St. Margaret's-street, Canterbury, and copies of the bills of quantities obtained there. Tenders, on depositing with him the sum of 5 l. Tenders to be delivered to the Asylum, addressed to the Chairman of the Committee of Visitors, not later than 10 o'clock on the morning of July 20.

July 20.—King's College, etc.—The Managing Body of Cossham Hospital, Kingswood, invite estimates for the installation of gas service and fittings. Specifications may be had of the architect, Mr. F. Higgs, 11, St. Basil's-street, Late Buildings, 58, Augustine's Parade, Bristol, on application at his office. Tenders, sealed and endorsed "Tender for Gas to Hospital," to be delivered to the architect not later than noon on July 20.

July 21.—Derby.—PAINTING.—Derby Education Committee invite tenders for painting and colouring at various Council and voluntary schools during the summer holidays. Tenders must be delivered not later than 10 o'clock a.m. on July 21. Specifications can be obtained from Mr. William Cooper, Secretary to the Derby Education Committee, Education Offices, Breck-street, Derby.

July 21.—Glenham.—PAINTING.—Lindsey (Lincolnshire) Education Committee invite tenders for painting, varnishing, and colour-washing, etc., of Glenham School. Tenders to be sent to Mr. Wm. Good, Glenham, Lincoln, by July 21.

July 23.—Bramley.—PAINTING, etc.—Bramley Education Committee invite tenders for painting and renovating the Board Offices, at 1, Green Hill-road, Army. Specification may be seen at the Clerk's Office on application. Tenders must reach Mr. A. Gault, Clerk to the Guardians, Union Offices, Army, not later than 12 o'clock noon on July 23.

July 23.—Huddersfield.—PAINTING.—Huddersfield Education Committee invite tenders for painting and other work at various schools. General specification and conditions may be seen, and forms of tender, and short specification for each school, obtained on application at the offices of Mr. K. F. Campbell, M. Inst.C.E., Borough Engineer, on and after July 16. Sealed tenders, endorsed "Tender for Painting Moldgreen School, or as the case may be, signed in the handwriting of the tenderer or his agent, and addressed "Town Clerk, Town Hall, Huddersfield," must reach him not later than 10 a.m. on July 23.

July 23.—Whittingham, Preston.—PAINTING.—Tenders are invited for labour and plant only, and a separate one for the materials (paints, oils, varnishes, etc.) for outside painting at County Asylum, Whittingham, Preston. Specifications, with forms of tender, may be obtained from Mr. Thomas Dilworth, Clerk and Steward, at the Asylum. Tenders to be in on or before July 23, at 10 o'clock in the morning.

July 24.—Birkenhead.—PAINTING.—The Corporation of Birkenhead invite tenders for painting the Woodside Ferry Buildings and Appurtenances. Further information, specifications, and forms of tender may be obtained on application at the office of the Ferries Manager, Woodside Ferry, Birkenhead. Tenders (which must be on the printed form supplied, sealed and endorsed "Tender for Painting Ferry Buildings," must be sent in to Mr. Alfred Gill, Town Clerk, Town Hall, Birkenhead, not later than 5 o'clock in the afternoon of July 24.

July 24.—Maldstone, etc.—PAINTING, etc.—For painting and repairs at Maldstone and Canterbury Sessions Houses, and Eham, New Brompton, Sandrich, Seabrook, and Sheerness Police Stations, the Standing Joint Committee. Bill of quantities and tender form for each or either of them, at the office of the County Architect, 86, Week-street,

JULY 16.—Dewsbury.—**MATERIALS.**—Dewsbury Corporation invite tenders for supply of the following materials, etc., during the year ending August 1907:—Broken granite, York stone kerbs and firemanhole and lamphole tops, gully grates, flue pipes, bricks, etc., pitch and creosote oil, coal, and steel iron castings, ironmongery, timber, pa-

and oils, lime, brushes, cement, teaming, stationery, etc. Further particulars and particulars of tender may be obtained on application to Mr. Henry Dearden, Assoc. M. Inst. C.E., Borough and Water Engineer, Town Hall, Dewsbury. Tenders, under sealed cover, endorsed "Tenders for [naming the material]," must be in hands of Mr. H. Ellis, Town Clerk, Town Clerk's Office Town Hall, Dewsbury, not later than 12 noon on July 15.

JULY 15.—Leamington Spa.—ROADSTONE.—Leamington Spa Corporation invite tenders for the supply of about 350 tons of roadstone. The tenders are to state prices per ton for hand-broken metal, machine-broken metal, chippings for road binding and chippings for footways. Any of these materials to be delivered carriage free in such quantities and at such times during the next twelve months as may be ordered by the Borough Engineer. Tenders (form of which may be obtained at the Borough Engineer's Office), endorsed "Tender for Roadstone," to be sent to Mr. Leo Rawlinson, Town Clerk, Town Hall, Leamington, before noon on July 15.

JULY 18.—Leeds.—MATERIALS.—Leeds Street Lighting Committee invite tenders for supply of the following articles for the ensuing year:—Copper lamps; lamp furniture; lamp pillars; glass lamp irons; carriages, etc.; sheet copper, etc.; glass for lamps. The Committee also invite offers for purchase of about a ton of clean scrap copper. Further particulars and forms of tender may be obtained on application to the Superintendent of Street Lighting, Springfield-street Depot, between 9 and 11 a.m. daily. Tenders, properly endorsed, to be delivered

at office of Mr. Robert E. Fox, Town Clerk, not later than July 15.

JULY 21.—Harrow.—GRANITE AND GRAVEL.—Harrow-on-the-Hill U.D.C. invite tenders for the supply of about 2,000 tons of 2½-in. or 1½-in. broken granite, and 1½-in. or ¾-in. granite chippings, delivered free in such quantities and at such times prior to March 31, 1907, as may be ordered by the Council's Surveyor at the Harrow Railway Stations (London and North-Western Railway or Metropolitan). Tenders are also invited for the supply of about 120 yds. of coarse gravel and 150 yds. of fine gravel. To be delivered from the Harrow Metropolitan Station, in such quantities and at such times prior to March 31, 1907, as the Council's Surveyor may direct. Samples of granite and gravel to be sent to the Surveyor's Office, carriage paid, before the date of the delivery of the tenders. Tenders, endorsed "Tender for Granite" (or "Gravel" as the case may be), to be sent to Mr. J. Percy Bennetts, Surveyor to the Council, Harrow, on or before July 21.

JULY 25.—Wanstead.—STONE.—Wanstead U.D.C. invite tenders for 2,000 tons (more or less) of Guernsey granite or Quenest stone, broken to 1½-in. cube, delivered to Sharnbrook Station (G.E. Railway) by such instalments and in such quantities as may be directed in writing from time to time by the Council's Surveyor, beginning September 1 next. Form of tender can be obtained on application to the Surveyor at the Council Offices. Tenders, sealed and enclosed in the envelopes provided, are to be delivered at the Council Offices not later than July 25.

AUGUST 1.—Litherland.—MATERIALS.—The Litherland District Council invite tenders for the follow-

ing materials, viz.:—About 250 tons of the best Welsh macadam, and about 25 tons of granite chippings, during the ensuing twelve months. The macadam and chippings to be delivered at the Alexandra or Langdon Dock at such times and in such quantities as may be required. Samples must be forwarded carriage paid to Mr. A. H. Carter, Surveyor, Public Offices, Sefton-road, Litherland, not later than August 1. Specification and form of tender can be obtained on application to the surveyor, as above, any morning between 9 a.m. and 11 a.m. Tenders, endorsed "Tenders for Macadam and Chippings," to be sent to Mr. Wm. Kirk and Mr. J. W. Allen North, Clerks to the Council, 15, Lord-street, Liverpool, not later than August 1.

AUGUST 2.—Ashford.—PLANT AND MATERIALS.—Tenders are invited for supply and erection on the premises at Ashford, Middlesex, of materials as under, for the Managers of West London District Schools:—(1) Pipework, and sundry apparatus for exhaust steam heating system; (2) pipe trenches and sundry builder's work; (3) chimney shaft economiser chamber and flues; (4) two 50 h.p. steam dynamos (high-speed D.A. vertical compound engines) and boilers, an electric motor, additions and alterations to switchboard, some 250 yds. of cable, etc.; (5) alterations and extensions to steam exhaust feed and drain pipes, and Green's economiser, etc. General conditions, specifications, drawings, and forms of tender to be had from the Clerk to Managers, at the schools, on deposit of 3s. 3s. for each section. Schools may be inspected between 10 a.m. and 4 p.m. Tenders must be delivered to the Clerk to the Managers, Ashford, Middlesex, not later than 5 p.m., Thursday, August 2.

Public Appointments.

Nature of Appointment.	By whom Advertised.	Salary.	Applications to be in
*INSTRUCTOR OF BUILDING CONSTRUCTION	East Ham Technical College	10s. 6d. per evening of two hours	July 23
*TECHNICAL ASSISTANT PARKS DEPARTMENT	London Council Council	150l.	do.
*SECOND CLASS DRUGGISTS	Metropolitan Asylums Board	125l.	do.
*ASSISTANT ENGINEERS (TWO)	Colombo Mun. Coun. (Ceylon)	Rs.5,000 per annum, etc.	July 24

Auction Sales.

Nature and Place of Sale.	By whom Offered.	Date of Sale.
*FREEHOLD BUILDING SITE, WARDOUR-STREET—At the Mart	Farebrother, Ellis, Egerton, Breach, Galsworthy, & Co.	July 17
*FREEHOLD BUILDING ESTATE, ISLEWORTH—At the Mart	Boyton, Sons, & Trevor	July 18
*FREEHOLD BUILDING ESTATE, NEW MALDEN—At the Mart	Douglas Young & Co.	do.
*FREEHOLD BUILDING LAND, GUYDON—At the Mart	Chesterton & Sons	July 19
*FREEHOLD BUILDING LAND, MILL HILL, HENDON—Adam Eve Hotel, Mill Hill	Frith & Morris	do.
*BRICK & TILE BUSINESS, STOKES-ON-TRENT—At the North Stafford Hotel, Stoke-on-T.	C. Butters & Sons	do.
*FREEHOLD BUILDING SITE, DALSTON-LANE—At the Mart	Joseph Hibbard & Sons	July 20
*FREEHOLD BUILDING SITE, ST. MARTIN'S—At the Mart	Mark Liel & Son	July 21
*FREEHOLD BUILDING SITES, RICHMOND BRIDGE—At the Mart	Ernest Pennington	July 24
*FREEHOLD SITE, HAGGERSTON—At the Mart	Farebrother, Ellis, Egerton, Breach, Galsworthy, & Co.	do.
*PLANT, MACHINERY, AND STOCK—103, Lavender-hill, Battersea, S.W.	Fuller, Horsey, Sons, & Cassell	do.
*BRICKMAKING PLANT, BERRIMONDSLEY—35a, Southwark Park-road, S.E.	Ventom, Bull, & Cooper	No date.

SALES OF PROPERTY.—Continued from page 56.

Forest Gate, —175, 176, and 177, Forest-lane, also the "Fox and Hounds" b.h., u.t. 12 yrs., g.t. oil, y.r. 177s.	£1,750	By DEBENHAM, TEWSON, & Co.	St. John's Wood, —Queen's-rd., L.g.t. 254, reversion in 64 yrs.	2,655	By GEORGE SYMONDS (at Bury St. Edmunds), Thetford, Suffolk,—"The Lodge Farm," 130 a. 2 f. 5 p. f.	£2,300
Battersea, —25 to 31 (odd), Orville-rd., u.t. 70 yrs., g.t. 234, w.r. 175s.	380	By R. A. ENRIGHT.	Cannonsburg, —36, Pyrland-rd., u.t. 43 yrs., g.t. 61, y.r. 46s.	375	Five freehold cottages and 26 a. 3 r. 30 p. f. Gillingham, Suffolk,—"The Potash Farm," 115 a. 1 r. 4 p. f.	1,140
Pinco, —2, Moreton-pl., u.t. 23 yrs., g.t. 81, y.r. 52s.	400	By OSBORN & MERCER.	85 Fetherston-rd., u.t. 45 yrs., g.t. 71, 76, u.t. 60s.	490	"The Green Farm," 86 a. 2 r. 4 p. f.	720
Tooting, —55 and 57, Cloudestale-rd., u.t. 84 yrs., g.t. 134, y.r. 76s.	780	Watford, Herts.—Ganton, a freehold holding, 23 a. 3 r. 10 p. f.	2,400	By ROGERS, CHAPMAN, & THOMAS.	A freehold cottage and 0 a. 3 r. 16 p. f.	130
St. John's Wood, —3, Springfield-rd., u.t. 31 yrs., g.t. 77, e.r. 65s.	380	By ST. QUINTON & SONS.	101, Belgrave-rd., u.t. 37½ yrs., g.t. 14½, p. .	1,060	"The Street Farm," 42 a. 1 r. 9 p. f.	570
Maida Vale, —71, Canterbury-ter., u.t. 53 yrs., g.t. 81, y.r. 60s.	475	By J. F. STONEHEWER & SONS.	City, —4, Goldsmith-st. (business premises), u.t. 50 yrs., g.t. 168s., y.r. 450s.	2,275	By W. BROWN & Co. (at Chesham), Charlridge, Bucks.,—"Little Friars Hill" and 50 a. 2 r. 23 p. f., y.r. 50s.	1,230
Hyde Park, —6 and 22, Titchborne-st., u.t. 14 yrs., g.t. 151, 7s., y.r. 100s.	510	Wandsworth, —132, Merton-rd., f. y.r. 23s.	415	Hawridge, Bucks.,—"Vale" or "Bottom" Farm, 38 a. 3 r. 27 p. f., y.r. 74s.	2,250	
Clapham, —1 and 3, Park-hill, f. y.r. 90s.	1,100	By C. P. WHITNEY (at Hastings).	Hastings, Sussex, —2, East-parade, f. y.r. 35s.	400	Health End House, cottage and 17 a. 0 r. 7 p. f., p.	300
Clapham Park-rd., a freehold building site	1,100	By H. J. WAT & SON (at Newport).	Carlisle, —etc., Isle of Wight,—"Vere Farm," 61 a. 0 r. 6 p. f.	2,350	By RUMBALL & EDWARDS (at St. Albans), Redbourn, Herts.,—"Bylands Farm," 62 a. 2 r. 19 p. f.	1,520
Wanstead, —1, Elizabeth-ter., and "Woodbine Cottage," f. y.r. 35s.	520	Broomfield, Essex,—"Patching Hall Farm," 195 a. 2 r. 23 p. f. (including the Manor of Patching Hall)	4,400	Various enclosures, 75 a. 0 r. 14 p. f.,	1,955	
Leighton, —L.g.t. 4½, 10s., reversion in 91 yrs.	110	Three parcels of building land, f.	530	Three pieces of common land, 4 a. 2 r. 2 p. f.	135	
Walthamstow, —18 and 20, Salisbury-rd., f. p.	600	By JOHN BOTT & SONS.	Tooting, —56, Trinity-rd., u.t. 73 yrs., g.t. 104, y.r. 23s.	315	Harpenden, Herts.—Enclosures of land, 14 a. 2 r. 23 p. f.	385
By W. M. HUGHES.		By DAVID BURNETT & Co.	Knightsbridge, —1, Rutland-gate-news, u.t. 234 yrs., g.t. oil, p.	260	By JAMES W. TAYLOR (at Chipping Norton), Salford, Oxon.,—"The Manor Farm," 342 a. 0 r. 31 p. f., y.r. 284s.	5,000
Wanstead, —1, Elizabeth-ter., and "Woodbine Cottage," f. y.r. 35s.	520	Shortlands, Kent, —13, Seabreeze-rd., f. y.r. 66s.	1,050	By PERKINS & SONS (on the Premises), Southampton—Shirley, "Westfield" and ½ an acre, f. p.	1,000	
Leighton, —L.g.t. 4½, 10s., reversion in 91 yrs.	110	By DOUGLAS YOUNG & Co.	Chalk Farm, —94 and 96, Belmont-st., u.t. 59 yrs., g.t. 134, y.r. 70s.	600	July 5.—By MILLAR, SON, & Co. Bideford, Devon,—"The Cleave" and ½ acres, f. p.	2,000
Walthamstow, —18 and 20, Salisbury-rd., f. p.	600	By WM. WESTON.	Twickenham, —34, Margaret-rd., a freehold building estate, 3 a. 3 r. 29 p. f.	3,800	St. John's Wood, —65, Boundary-rd., u.t. 68 yrs., g.t. 124, 12s., p.	355
By W. M. HUGHES.		Dulwich, —1, Lidsley-rd., u.t. 70 yrs., g.t. etc., 34, 17s. 11d., y.r. 40s.	320	By J. T. SKELDON.	Dalston, —24, Navarino-rd., u.t. 44½ yrs., g.t. 64, y.r. 43s.	500
By G. A. WILKINSON & SON.		Acton, —6 and 8, Hereford-rd., u.t. 87 yrs., g.t. 101, 10s., y.r. 72s.	600			

By SIMMONS & SONS.		
Fulham, -1 to 11 (odd), Armadale-rd., t., w.r.	404, 6s.	53,000
Camberwell, -16, Weymouth-rd., t., w.r.	300	
Norbury, -Pollards Hill South, t., w.r.	300	
By D. D. D.		
Bow, -18, Harley-rd., u.t. 27 yrs., g.r. 41, 10s.	320	
Stoke Newington, -19, Midland-rd., u.t. 54	320	
Stoke Newington, -19, Midland-rd., u.t. 54	320	
Peckham, -Shannon-rd., e.t. f.g. 17, revision	360	
in 364 yrs.		
Brockley, -91 and 93, Brockley-rd., s.t. 62	600	
Yrs. g.r. 12, 14s., v.t. 604.		
Wandsworth, -Garratt-ls., f.g. 7, revision	250	
in 40 yrs.		
Hackney, -59, 53, dnr-rd., u.t. 64 yrs., g.r. 64,	270	
Yrs. 301.		
July 6, -By BRADLEY, WOOD, & CO. & TOLLS		
Enfield, -Bush Hill-pk., Queen Anne's gr., a	245	
plot of freehold building land		
Village-rd. (near), a plot of freehold land	225	
By BUSH & DICK.		
Hackney, -3 to 8, Queen Anne-rd., u.t. 38 1/2 yrs.,	1,150	
g.r. 182, w.r. 234.		
Clapton, -19, Medford-rd. (s.), t., f.y. 401.	560	
By FULLER & SONS.		
Balham, -90, 92, 94, and 104, Bedford-hill (s.),	2,000	
u.t. 70 yrs., g.r. 46, y.r. 203.		
By DENT, DALLAS, & NORMAN.		
Fulham, -Cedar-rd., f.g. 45, u.t. 44 yrs., g.r.	590	
27, 10s.		
Regent's Park, -Park Village East, f.g. 301,	215	
u.t. 16 1/2 and 18 1/2 yrs., g.r. 74.		
By WADSWORTH & SONS.		
Highbury, -27, Northcote-rd., u.t. 82 yrs., g.r.	490	
72, 10s., e.t. 504.		
Holloway, -Fairbridge-rd., f.g. 314, 10s., rever-	780	
sion in 61 yrs.		
Walthamstow, -Forest-rd., f.g. 351, 18s., rever-	790	
sion in 88 yrs.		
Contractions used in these lists—F.g. for freehold		
ground-rent; l.g. for leasehold ground-rent; l.g. for		
improved ground-rent; g.r. for ground-rent; r. for rent;		
f. for freehold; c. for copyhold; l. for leasehold; p. for		
possession; e.t. for estimated rental; w.r. for weekly		
rental; q.t. for quarterly rental; y.r. for yearly rental;		
p. for unexpired term; p.a. for per annum; y.s. for		
years; l.a. for lease; s.t. for street; r. for road; sq. for		
square; p. for place; t. for terrace; c. for crescent;		
av. for avenue; g.s. for gardens; y.d. for yard; g. for		
garage; b.h. for beerhouse; p. for public-house; o. for		
office; s. for shops; c. for court.		

TERMS OF SUBSCRIPTION.

"THE BUILDER" (Published Weekly) is supplied DIRECT from the office to residents in any part of the United Kingdom at the rate of 19s. per annum (6 numbers) PREPAID. To all parts of Europe, America, Australia, New Zealand, India, China, Ceylon, etc. 28s. per annum.

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MEETINGS.

SATURDAY, JULY 14, TO SATURDAY, JULY 21.

The Junior Institution of Engineers.—Saturday, July 14: Reception by the Ex-Mayor of Southport at the Town Hall; visit the Corporation Gas and Electricity Estates and Tramways Undertaking. Monday: Reception by the Lord Mayor of Manchester at the Town Hall; visit the British Westinghouse Electric and Manufacturing Company's Works, the Municipal School of Technology, and Messrs. K. Schwabe & Co.'s Calico Printing Works. Tuesday: Excursion to Scarborough. Wednesday: Visit National Gas Engine Works, Cedar Mill and Atlas Mill. Thursday: Visit the Rose Bridge and Douglas Bank Colliery. Friday: Visit the local interest at Southport: Institution Summer Dinner in evening at the Queen's Hotel, Southport, to meet the Lord Mayor of Manchester and other guests.

SATURDAY, JULY 21.

Association of Municipal and County Engineers.—Western Counties District Meeting, to be held at Trowbridge and Devizes.

TO CORRESPONDENTS.

NOTE.—The responsibility of signed articles, letters, and papers read at meetings rests, of course, with the authors.

We cannot undertake to return rejected communications; and the Editor cannot be responsible for drawings, photographs, manuscripts, or other documents, or for models or samples, sent to or left at this office, unless he has specially asked for them.

Letters or communications (beyond mere news items) which have been duplicated for other journals are NOT DESIRED.

All communications must be authenticated by the name and address of the sender, whether for publication or not. No notice can be taken of anonymous communications.

We are compelled to decline pointing out books and giving addresses.

Any communication to a contributor to write an article, or to execute or lend a drawing for publication, is given subject to the approval of the article or drawing, when received, by the Editor, who reserves the right to reject it if unsatisfactory. The receipt by the author of a proof of an article in type does not necessarily imply its acceptance. The Editor cannot undertake to reply and consider letters offered for acceptance unless they are type-written.

All communications regarding literary and artistic matters should be addressed to THE EDITOR; those relating to advertisements and other exclusively business matters should be addressed to THE PUBLISHER, and not to the Editor.

PRICES CURRENT OF MATERIALS.

* Our aim in this list is to give, as far as possible, the average prices of materials, not necessarily the lowest. Quality and quantity obviously affect prices—a fact which should be remembered by those who make use of this information.

BLOCKS, &c.	
£ s. d.	
Hard Stocks	1 9 0 per 1000 alongside, in river.
Bough Stocks and Grizzles	1 6 0 " " "
Picked Stocks for Facings	2 15 0 " delivered.
Flettons	1 7 0 " at railway depot.
Red Wire Cuts	1 13 0 " " "
Best Farnham Road	3 12 0 " " "
Best Red Pressed	" " " "
Buson Facing	5 0 0 " " "
Best Blue Pressed	" " " "
Staffordshire	3 15 0 " " "
Do. Bullnose	4 0 0 " " "
Best Stourbridge	" " " "
Fire Bricks	3 14 0 " " "
GLAZED BRICKS.	
Best White and Ivory Glazed	" " " "
Stretchers	12 0 0 " " "
Headers	11 0 0 " " "
Quoins	16 0 0 " " "
Ends and Flats	16 0 0 " " "
Double Stretchers	19 0 0 " " "
Double Headers	16 0 0 " " "
One Side and two Ends	19 0 0 " " "
Two Sides and one End	20 0 0 " " "
Splays, Chamfered, Squints	20 0 0 " " "
Best Dipped Salt Glazed Stretchers and Header	12 0 0 " " "
Quoins, Bullnose, and Flats	14 0 0 " " "
Double Stretchers	15 0 0 " " "
Double Headers	14 0 0 " " "
One Side and two Ends	15 0 0 " " "
Two Sides and one End	15 0 0 " " "
Splays, Chamfered, Squints	14 0 0 " " "
Second Quality White and Dipped Salt Glazed	2 0 0 " less than best.
Thames and Pit Sand	6 9 per yard, delivered.
Thames Ballast	5 3 " " "
Best Portland Cement	25 0 per ton, " "
Best Ground Blue Lias Lime	19 0 " " "

NOTE.—The cement or lime is exclusive of the ordinary charge for sacks.

Grey Stone Lime 11s. 0d. per yard, delivered.

Stourbridge Fireclay in sacks 27s. 0d. per ton at rly. dyt.

STONE.

BATH STONE—delivered on road wag- a. d.	
gones, Paddington Depot	1 6 1/2 per ft. cube.
Do. do. delivered on road wagon	5 3 " "
Nine Elms Depot	1 8 1/2 " "
PORTLAND STONE (20 ft. average)—	
Brown Whitbed, delivered on road	" " " "
wagons, Paddington Depot, Nine	" " " "
Elms Depot, or Fimlico Wharf	2 1 " "
White Basebed, delivered on road	" " " "
wagons, Paddington Depot, Nine	" " " "
Elms Depot, or Fimlico Wharf	2 2 1/2 " "
ANCASTER in blocks..... s. d.	
1 10 per ft. cube, del. rly. depot.	
Beer	1 6 " "
Greenhill	1 10 " "
Darley Dale in blocks	2 4 " "
Red Corsehill	2 2 " "
Clooseburn Red Freestone	2 4 " "
Red Mansfield	2 4 " "

YORK STONE—Best Hood Quality.	
Scrapped random blocks	2 10 " "
6 in. sawn two sides land-	" " " "
ings to sizes (under	" " " "
40 ft. super.)	2 3 per ft. super., "
6 in. rubbed two sides	" " " "
ditto, ditto	2 6 " "
3 in. sawn two sides slabs	" " " "
(random sizes)	0 11 1/2 " "
2 in. to 2 1/2 in. sawn one	" " " "
side slabs (random	" " " "
sizes)	0 7 1/2 " "
1 1/2 in. to 2 in. ditto	0 6 " "
Hard York—	
Scrapped random blocks	3 0 per ft. cube,
6 in. sawn two sides land-	" " " "
ings to sizes (under	" " " "
40 ft. super.)	2 8 per ft. super., "
6 in. rubbed two sides	" " " "
ditto	3 0 " "
3 in. sawn two sides slabs	" " " "
(random sizes)	1 2 " "
2 in. self-faced random	" " " "
slabs	0 5 " "
Hopton Wood (Hard Bed) in blocks 2 0 per ft. cube, del.	
ry. depot.	" " " "
6 in. sawn both	" " " "
sides landings 2 7 per ft. super. del.	
ry. depot.	" " " "
3 in. sawn both	" " " "
sides random	" " " "
slabs	1 0 " "
2 in. do.	0 8 1/2 " "

SLATES.

In. In.	£ s. d.
20 x 10 best blue Bangor	13 6 per 1000 of 1200 at r. d.
20 x 12	13 6 " " "
20 x 10 first quality	13 0 " " "
20 x 12	13 0 " " "

SLATES (continued).

In. In.	£ s. d.	
16 x 8	7 5 0	per 1000 of 1200 t. r. d.
20 x 10 best blue Fort	12 12 6	" "
madoc	6 12 6	" "
16 x 8	"	" "
20 x 10 best Eureka	15 17 6	" "
fading green	15 7 6	" "
20 x 12	"	" "
18 x 10	"	" "
20 x 10 permanent green	11 12 6	" "
18 x 10	"	" "
16 x 8	"	" "
16 x 8	"	" "

TILES.

In. In.	£ s. d.	
Best plain red roofing tiles	42 0	per 1000 at rly. depot.
Hip and Valley tiles	3 7	per doz.
Best Broomley tiles	50 0	per 1000
Do. Ornamental tiles	52 6	" "
Hip and Valley tiles	4 0	per doz.
Best Euxon red, brown, or	"	" "
brindled do. (Edwards)	57 6	per 1000
Do. Ornamental do.	53 0	" "
Hip tiles	4 0	per doz at rly. depot.
Valley tiles	3 0	" "
Best Red or Mottled Stafford-	"	" "
shire do. (Parker)	51 9	per 1000
Do. Ornamental do.	54 6	" "
Hip tiles	4 1	per doz.
Valley tiles	3 8	" "
Best Rosemary brand	"	" "
plain tiles	48 0	per 1000
Best Ornamental tiles	50 0	" "
Hip tiles	4 0	per doz.
Valley tiles	3 8	" "
Best Hartshill brand	"	" "
plain tiles, sand-finished	50 0	per 1000
Do. pressed	47 6	" "
Do. Ornamental do.	50 0	" "
Hip tiles	4 0	per doz.
Valley tiles	3 8	" "

WOOD.

BUILDING WOOD.	At per standard.
Deals: best 3 in. by 11 in. and 4 in.	13 0 0 .. 25 0 0
by 9 in. and 11 in.	13 0 0 .. 25 0 0
Deals: best 3 in. by 9 in.	13 0 0 .. 25 0 0
Battens: best 2 1/2 in. by 7 in. and 8 in.	11 0 0 .. 12 0 0
8 in. and 3 in. by 7 in. and 8 in.	11 0 0 .. 12 0 0
Battens: best 2 1/2 in. by 6 in. and 3 in.	10 0 0 .. 11 0 0
Deals: seconds	1 0 0 .. 10 0 0
Battens: seconds	0 10 0 .. 0 10 0
2 in. by 4 in. and 2 in. by 6 in.	9 0 0 .. 10 0 0
2 in. by 4 in. and 2 in. by 6 in.	8 10 0 .. 9 10 0
Foreign Sawn Boards—	
1 in. and 1 1/2 in. by 7 in.	0 10 0 .. 10 0 0
2 in.	1 0 0 .. 10 0 0
At per load of 50 ft.	

Fire timber: best middling Danish	4 10 0 .. 5 0 0
or Menck (average specification)	4 0 0 .. 4 10 0
Seconds	4 0 0 .. 4 10 0
Small timber (3 in. to 10 in.)	3 12 6 .. 3 15 0
Small timber (3 in. to 8 in.)	3 0 0 .. 3 10 0
Swedish balks	4 10 0 .. 5 0 0
Pitch-pine timber (30 ft. average)	4 0 0 .. 4 15 0

JOINERS' WOOD.

White Sea: first yellow deals,	At per standard.
3 in. by 11 in.	24 0 0 .. 25 0 0
3 in. by 9 in.	23 0 0 .. 23 0 0
Battens 2 1/2 in. and 3 in. by 7 in.	6 10 0 .. 13 0 0
Second yellow deals, 3 in. by 11 in.	17 0 0 .. 18 0 0
3 in. by 9 in.	17 0 0 .. 18 0 0
Battens 2 1/2 in. and 3 in. by 7 in.	13 0 0 .. 14 0 0
Third yellow deals, 3 in. by	" " " "
11 in. and 9 in.	13 0 0 .. 15 0 0
Battens 2 1/2 in. and 3 in. by 7 in.	11 0 0 .. 12 0 0
Petersburg first yellow deals,	" " " "
3 in. by 11 in.	21 0 0 .. 22 0 0
Do. 3 in. by 9 in.	18 0 0 .. 19 0 0
Battens	13 0 0 .. 15 0 0
Second yellow deals, 3 in. by 11 in.	16 0 0 .. 17 0 0
Do. 3 in. by 9 in.	14 0 0 .. 16 0 0
Battens	11 0 0 .. 12 0 0
Third yellow deals, 3 in. by	" " " "
11 in.	13 0 0 .. 14 0 0
Do. 3 in. by 9 in.	12 0 0 .. 14 0 0
Battens	10 0 0 .. 11 0 0
White Sea and Petersburg—	
First white deals, 3 in. by 11 in.	14 0 0 .. 15 0 0
3 in. by 9 in.	13 0 0 .. 14 0 0
Battens	11 0 0 .. 12 0 0
Second white deals, 3 in. by 11 in.	13 0 0 .. 14 0 0
Do. 3 in. by 9 in.	12 0 0 .. 13 0 0
Battens	10 0 0 .. 11 0 0
Pitch-pine: deals	18 0 0 .. 21 0 0
Under 2 in. thick extra	0 10 0 .. 1 0 0
Yellow Pine—First, regular sizes	44 0 0 upwards.
Oddments	32 0 0
Seconds, regular sizes	33 0 0
Yellow Pine oddments	28 0 0
Kauri Pine—Planks, per ft. cube.	0 3 6 .. 0 5 0
Danish and Stettin Oak Logs—	
Large, per ft. cube	0 3 0 .. 0 3 6
Small	0 2 6 .. 0 3 0
Wainscot Oak Logs, per ft. cube.	0 5 6 .. 0 6 0
Dry Wainscot Oak, per ft. sup.	" " " "
3 in. do.	0 0 8 1/2 .. 0 0 8 1/2
3 in. do.	0 0 7 .. 0 0 7
Dry Mahogany—Honduras, Ta-	" " " "
bacoo, per ft. super. as inch	0 0 9 .. 0 1 0
Selected, figured, etc., super.	" " " "
as inch	0 1 6 .. 0 2 6
Dry Walnut, American, per ft.	" " " "
super. as inch	0 0 10 .. 0 1 0
Teak, per load	17 0 0 .. 22 0 0
American Whitewood Planks,	" " " "
per ft. cube.	0 4 0 .. 0 5 0
Prepared Flooring, etc.—	
1 in. by 7 in. yellow, planed and	Per square.
shot	0 13 6 .. 0 17 6
1 in. by 7 in. yellow, planed and	" " " "
matched	0 14 0 .. 0 18 0
1 1/2 in. by 7 in. yellow, planed and	" " " "
matched	0 19 0 .. 1 0 0
1 in. by 7 in. white, planed and	" " " "
shot	0 12 0 .. 0 14 6
1 in. by 7 in. white, planed and	" " " "
matched	0 12 6 .. 0 15 0

HENDON.—For private street improvements, Ebenezer road and new, Child's Hill, for the Urban District Council. Mr. S. Slater Grimley, Engineer, Council Offices, Hendon:—

	Finchley-road Sewer.	Finchley-road S.W. Drain.	Golders Hill-road Sewer.	Hemitage Lane S.W. Drain.	Ebenezer- road.	Ebenezer- meads.	
J. Mowlem & Co., Plinville	2,728	2,123	0	441	0	186	0
J. G. Brummell, Willesden	2,428	18	6	2,250	2	425	2
T. Adams, Wood Green	2,572	9	1	2,030	7	2	459
G. G. Rayner, Croydon	2,344	3	2,220	7	9	350	1
J. & W. Drake, Hammer- smith	2,242	7	3	1,959	1	4	435
J. Jackson, Plaistow	2,286	6	9	1,773	16	6	414
E. Ballard, Ltd., Chisle- hurst	2,161	15	11	1,859	2	6	379
O. T. Gibbons, Leyton- stones	1,955	0	0	1,750	0	0	340
							115
							367
							445
							4,973

LONDON BOARD OF EDUCATION TENDERS.

FOR PAINTING AND CLEANING CERTAIN SCHOOLS.
Camden, N., Creden-road, (Painting Interior and Exterior).

J. Scott Fenn	5978	E. Triggs	5782
J. J. Howle	5987	E. Proctor & Son, 326	
H. Groves	5975	High-street, Plum-	
J. Greenwood, Ltd.	5939	stead	723
W. Sawyer & Son	703		

[Estimate of architect (Education), £580.]

Fulham, Sherbrooke-road (Painting Interiors of School and Centres).

Lathey Bros.	5587	W. Brown & Sons	5518
Bristow & Batwell	597	0	Lole & Co., Trafal-
R. A. Jewell	587	0	gar-square
S. N. Soole & Son	593	0	Greenwich

[Estimate of architect (Education), £522.]

Levensham, Holbeck-road (Painting Interiors and Exterior of Main School and Iron Buildings).

J. Scott Fenn	5715	H. Groves	5558
T. G. Sharpton	590	0	E. Bulled & Co.
H. Kent	597	0	W. Hayter & Son
T. D. Leng	589	0	62, Banning-
J. & C. Bowyer	580	0	street, East
W. Young	563	0	Greenwich

[Estimate of architect (Education), £520.]

Woolwich, Bloomfield-road (Painting Interior).

Enness Bros.	5567	0	W. Hayter & Son
J. Scott Fenn	518	0	E. Proctor & Son
T. D. Leng	594	0	326, High-street
H. Groves	487	0	Plumstead

[Estimate of architect (Education), £500.]

Dulwich, Goodrich-road (Painting Interior).

T. G. Sharpton	5775	J. & C. Bowyer	5536
E. P. Bulled & Co.	590	0	and 2, Royal
H. Line	583	0	E. Triggs
J. Garrett & Son	521	0	chase, Clapham

[Estimate of architect (Education), £560.]

Dulwich, Heber-road (Painting Interior).

E. P. Bulled & Co.	5757	J. Garrett & Son	5562
T. G. Sharpton	712	0	W. Johnson & Co.
E. B. Tucker	594	0	Ltd.
H. Line	591	0	Maxwell Bros., Ltd.
Rice & Son	594	0	326, High-street

[Estimate of architect (Education), £600.]

St. George-in-the-East, Berner-street (Painting Interior and Exterior).

J. Scott Fenn	5778	10	Barrett & Power
A. E. Symes	740	0	H. Bousman
Vigor & Co.	682	0	and 2, Royal
G. Barker	679	0	Victor-place,
A. W. Derby	673	0	Old Ford

[Estimate of architect (Education), £630.]

St. Pancras, E., "Brynck" (Painting Interiors and Exterior of Boys', Girls', and Infants' Schools).

J. C. Richards & Co.	5583	12	W. Chappell
W. Cubitt & Co.	522	10	Stevens & Sons, 14
Cowley & Drake	594	0	Yates, Brompton
J. Stewart	598	10	Seven Sisters
Marchant & Hirst	574	0	road

[Estimate of architect (Education), £615.]

Southmark, W., West-square (Painting Interior).

A. H. Jims	5550	J. E. Ford	5915
G. Foxley	749	0	E. Triggs
T. Laphorne & Co.	725	0	Maxwell Bros., Ltd.
W. Sawyer & Son	647	0	310, Brixton-road
Rice & Son	636	0	

[Estimate of architect (Education), £560.]

Battersea, Battersea Park-road (Painting Interior).

Rice & Son	5565	J. Garrett & Son	5485
Martin, Wells, & Co.	550	0	W. Hornett
W. A. King	545	0	Holliday & Greenwood
E. Flood	544	0	Ltd., Brixton
Lathey Bros.	497	0	

[Estimate of architect (Education), £400.]

Bow and Bromley, Knapp-road (Painting Interior).

J. Haydon & Sons	5458	0	A. W. Derby
W. H. Lascelles & Co.	491	0	G. Barker
Co. Ltd.	498	0	Vigor & Co.
A. E. Symes	381	0	Newell & Lusty
W. Silk & Son	394	0	24and25, Wilson-
J. Scott Fenn	372	15	street, Poplar

[Estimate of architect (Education), £800.]

Clapham, Ponton-road (Painting Interior of Infants' School).

Rice & Son	5129	10	W. Johnson & Co.
R. R. Sims	114	0	Ltd., Wand-
Maxwell Bros., Ltd.	104	8	sworth-common
E. Triggs	95	0	

[Estimate of architect (Education), £70.]

Battersea, Surrey-lane (Painting Interior of Main School and Cleaning Interiors of Centres and School for Day Children).

Martin, Wells, & Co.	5854	0	S. N. Soole & Son
Co. Ltd.	580	13	R. S. Ronald
Lole & Co.	511	0	E. Triggs
Rice & Son	511	0	E. Flood
W. A. King	580	0	Maxwell Bros.
J. Garrett & Son	558	0	Ltd., 310, Brix-
W. Chappell	549	0	ton-road

[Estimate of architect (Education), £600.]

Camden, N., Southampton-street (Painting Exterior).

W. A. King	5510	0	W. T. Bennett
W. Fitch	495	17	W. Sawyer & Son
W. H. King	479	0	H. Raggs & Sons
W. V. Goad	455	0	Ltd., 19, Robert-
E. Triggs	441	0	street, Brixton-
H. Line	433	0	road

[Estimate of architect (Education), £368.]

City of London, School of Photo-Engraving and Lithography (Painting Interior and Exterior).

W. Horne	5245	0	H. Raggs & Sons
B. Harding & Sons	210	10	Ltd., 19, Robert-
			street, Brixton-
			road

[Estimate of architect (Education), £163.]

Clapham, Linden Lodge (Painting Interior and Exterior).

R. A. Jewell	592	0	W. Johnson & Co.
R. S. Ronald	70	0	Ltd., Wandsworth
W. A. King	68	10	Common
E. B. Tucker	62	15	

[Estimate of architect (Education), £75.]

Finsbury, C., Risinghill-street (Painting Exterior).

W. Reason	5299	0	F. W. Harris & Co., Ltd.
Patman & Fother-			Marchant & Hirst, 130,
ham, Ltd.	278		Highgate-road
G. S. Williams & Sons	273		

[Estimate of architect (Education), £260.]

Fulham, Fulham Palace-road (Painting Interior and Exterior).

C. Johnson	5677	0	Lole & Co.
J. C. Richards & Co.	662	0	J. Garrett & Sons
J. & M. Patrick	594	0	S. N. Soole & Son
R. S. Ronald	590	0	195, Uxbridge-
E. Triggs	546	0	road, Shep-
Spencer, Santo, & Co., Ltd.	540	0	herd's Bush

[Estimate of architect (Education), £490.]

Greenwich, Blackheath-road (Cleaning Interior of School and Painting Interiors and Exterior of Centres).

S. Murgrove	5285	16	0
W. Young	532	0	W. Banks, 18
T. D. Leng	515	0	0
H. Groves	500	0	0

[Estimate of architect (Education), £220.]

Hackney, C., Enfield-road (Painting Interior).

P. Robinson & Co.	5477	0	H. Willmott
McCormick & Sons	444	0	G. Barker
H. Bousman	378	0	Stevens Bros.
W. H. Lascelles & Co., Ltd.	372	0	W. Shurmer
J. Grover & Son	383	0	Sons, Ltd., River-
W. Silk & Son	347	10	side Works

[Estimate of architect (Education), £90.]

Hackney, C., Gayhurst-road (Painting Interior).

W. H. Lascelles & Co., Ltd.	5388	0	W. Shurmer & Sons
A. W. Derby	539	0	H. Willmott
C. B. Price	514	0	Newell & Lusty
Barrett & Power	511	0	Wilson-street
W. Silk & Son	299	0	Poplar

[Estimate of architect (Education), £300.]

Hackney, N., Northwood-road (Painting Interior and Exterior).

C. R. Price	5518	0	W. Silk & Son
J. Stewart	463	0	Stevens & Sons
Barrett & Power	406	0	H. Willmott, The
W. Shurmer & Sons, Ltd.	402	10	Triangle, Hack-
			ney

[Estimate of architect (Education), £360.]

Hackney, S., Berger-road (Painting Interior and Exterior of Special School).

J. Stewart	571	0	W. Silk & Son
W. Shurmer & Sons, Ltd.	571	0	H. Willmott, The
			Triangle, Hackney

[Estimate of architect (Education), £255.]

Hackney, S., Casland-road (Painting Interior and Exterior).

A. W. Derby	5359	0	Barrett & Power
J. Stewart	599	0	Newell & Lusty
W. H. Lascelles & Co., Ltd.	537	0	H. Willmott, The
			Triangle, Hackney

[Estimate of architect (Education), £396.]

Haggerston, Fellows-street (Cleaning Interior).

Staines & Sons	5120	0	J. Haydon
G. Barker	118	0	Sons Durham
M. F. H. & S.	103	0	dale-street
H. Willmott	103	0	Hackney-road
H. Bousman	99	15	0

[Estimate of architect (Education), £126.]

Hammermith, Brackenbury-road (Painting Interior and Exterior of the Special School).

R. S. Ronald	580	0	S. N. Soole & Son
C. Johnson	62	0	W. Brown & Sons
Spencer, Santo, & Co., Ltd.	45	0	Uxbridge-road, Shep-
			herd's Bush

[Estimate of architect (Education), £55.]

Hammermith, Saunders-road (Painting Interior and Exterior).

J. C. Richards & Co.	5538	0	S. N. Soole & Son
G. Foxley	456	0	W. Brown
A. H. Ians	431	0	W. Brown
G. Godson	405	0	Sons

[Estimate of architect (Education), £400.]

Hoborn, Tower-street (Painting Interior and Exterior).

W. Horne	5391	87	0
E. Triggs	377	0	0
Martin, Wells, & Co., Ltd.	340	0	0

[Estimate of architect (Education), £215.]

Islington, N., Duncombe-road (Painting Interior).

W. Reason	5295	0	J. Grover & Son
Staines & Son	330	0	J. Haydon & Sons
Parrott & Ison	296	0	Durham Works
H. Bousman	290	0	Tuesdale-street
W. Silk & Son	283	0	Backney-road

[Estimate of architect (Education), £260.]

Islington, N., Duncombe-road (Painting Interior).

Cowley & Drake	5732	18	Marchant & Hirst
Patman & Fother-			Stevens Bros.
ingham, Ltd.	728	0	J. Stewart
McCormick & Sons	717	0	West-green-road
F. W. Harris & Co.	712	0	Poplar
Aldridge & Sons	698	0	ham
T. Cruys	695	0	

[Estimate of architect (Education), £485.]

Kennington, N., Sinder-road (Painting Interior).

J. C. Richards & Co.	5571	0	E. B. Brown
G. Foxley	478	0	W. Brown & Sons
S. N. Soole & Son	444	0	195, Uxbridge-
A. H. Ians	415	0	road, Shepherd's
G. Godson	403	0	bus

[Estimate of architect (Education), £435.]

Kennington, S., "Fox" (Painting Interior).

H. C. Clifton	5257	0	T. M. Brown
J. Peattie	307	0	Beveridge
G. Godson	236	0	Brixton-road
Chinchen & Co.	249	0	63A, Lancaster-
A. H. Ians	242	0	road

[Estimate of architect (Education), £207.]

Levensham, Brockley-road (Painting Interior of Old and New Portions).

W. Young	5357	0	W. Banks, 18,
S. Murgrove	527	0	E. B. Brown
J. & C. Bowyer	525	0	Greenwich
W. J. Howie	577	0	

[Estimate of architect (Education), £325.]

Levensham, Hither-street (Painting Interior).

Enness Bros.	5402	10	H. Groves
W. Hayter & Son	395	10	W. A. King
H. Kent	396	0	Greenwich
W. Bank	374	10	W. J. Howie

[Estimate of architect (Education), £350.]

Limhouse, Broad-street (Painting Interior).

A. E. Symes	5575	0	J. Scott Fenn
T. D. Leng	528	0	G. Barker

PONTYPOOL.—For alterations to the Prince of Wales and Three Salmon, Pontypool. Messrs. Swallow & Baward, architects:—

	Prince of Wales.			Three Salmon.		
	Painting.	Alterations.		Alterations.		
	£ s. d.	£ s. d.		£ s. d.	£ s. d.	
Poulton & Whiting.....	13 13 4	88 8 7		295 0 0	305 0 0	
O. Roberts	17 0 0	86 0 0		112 10 0	295 10 0	
A. S. Morgan & Co.	13 0 0	95 0 0		180 0 0	238 0 0	
J. Bevan	10 6 6	91 13 0		175 4 6	277 1 0	
E. G. Williams		107 10 0		165 0 0	272 10 0	
J. Knowler	10 7 6	79 10 0		178 15 0	248 0 0	
G. Conkham	12 0 0	58 0 0		168 0 0	265 0 0	
E. G. Clarke Newport	10 15 0*	74 10 0*		173 0 0	258 5 0	
J. Jackson, Ltd.	10 0 0	81 0 0		166 0 0	257 0 0	
Clements & Co.	12 18 0	85 5 0		158 0 0	256 3 0	
F. W. Powles	11 10 0	74 0 0		165 0 0	230 0 0	
G. F. Lendexter, Newport	10 19 6	79 3 0		145 15 6*	237 1 0	

* Not Divided.

PENARTH.—For the construction of tinning lays, manholes, flushing tanks, and 580 lined yds. of stoneware pipe sewers, for the Urban District Council. Mr. E. J. Evans, Surveyor, Council Offices, Penarth:—

C. H. Evans & Co.	1,516 14 0	E. Bevan	2,750 0 0
Hatherley & Co.	1,265 10 0	Mackay & Co.	712 11 0
E. Powell	937 0 5	G. Butler	714 5 0
Barnes, Chapman, & Co.	763 6 2	W. Burton	543 7 0
		F. Ashloy, Cardiff	709 8 11

* Withdrawn.

[Surveyor's estimate, £700.]

PENRITH.—For sewerage works (Contract No. 1), for the Urban District Council. Messrs. Brierley, Holt, & Co., engineers, Blackburn and Blackpool. Mr. E. J. Knowlton, Resident Engineer:—

J. Jackson	£3,846 3 6	E. J. Hill	£2,444 5 6
J. S. Dawson	3,159 7 0	Hooper, Neary, W. Carr	2,343 2 5
J. Laing & Son	2,785 8 6	T. Egan & Sons	2,320 10 0
E. Taylor	2,061 11 11	J. W. Broad, Cleeg Bros.	2,379 1 11
J. Moore	2,707 15 0	W. Morley & Brebner & Co.	2,264 16 0
G. Read & Sons	2,520 15 3	J. Farrell	1,940 9 1
J. Mackay	2,017 17 6	J. Marley & Sons, Edinburgh	2,130 15 9
W. Grison	2,474 0 11	H. C. Buckley	2,443 11 6

RISCA.—For rebuilding the Rifleman Arms and Foresters Arms at Risca. Messrs. Swallow & Baward, architects:—

	Forsters Arms.	Rifleman Arms.
Clements & Co.	£1,400 0 0	£920 0 0
C. H. Reed	1,572 0 0	890 0 0
E. R. Evans & Co.	1,535 10 0	905 14 3
Hughes & Starling	1,502 0 0	935 0 0
F. W. Powles	1,467 0 0	867 0 0
J. Jenkins, Ltd.	1,447 0 0	940 0 0
A. S. Morgan & Co.	1,418 0 0	877 0 0
E. G. Clarke	1,390 0 0	860 0 0
G. F. Lendexter	1,387 0 0	885 0 0
Jerman	1,382 10 0	765 0 0
Poulton & Whiting	1,370 4 0	858 12 0
Newport	1,348 0 0	784 0 0
Herbert	1,150 0 0	750 0 0
Knowler		802 10 0
Cornham		847 0 0

SEAFOED.—For stabling, riding school, and house, for Seafoed West Co., Ltd. Messrs. Cooper & Cousens, architects, Eastbourne. Quantities by Mr. H. Curtis Card, F.S.I., Q.S.A.:—

D. Lee	£4,863 15 0	Pearless	
J. Barker & Co.	4,178 0 0	Dennis & Co.	£3,978 0 0
J. H. Smedley	4,163 16 8	Godfrey Bros.	3,936 0 0
W. F. Blay	4,100 0 0	Cook & Son	3,880 0 0
F. Gough & Co.	4,094 0 0	H. Brown	3,815 0 0
Kirk & Randall	3,993 0 0	W. Wilkinson, Seafoed	3,851 0 0

STONEHAVEN.—For erecting a workshop at livery-car, for Messrs. J. Jack & Sons. Mr. G. Gregory, architect, 24, David-street, Stonehaven:—

Brickwork: W. Smith & Co., Stonehaven	£854 6 0
Carpentry: R. Thomson & Sons, Stonehaven	
Slating: R. Brown, Stonehaven	
Plumbing: M. Cruss, Stonehaven	
Steelwork: J. Abernethy & Co., Aberdeen	
Glazing: Helliwell & Co., Brighouse	

TUPSEY.—For the erection of a villa residence on the Highfield building estate, Tupsley, Hereford, for Mr. James Clark, Gloucester, Gloucestershire. Messrs. Grooms & Betington, architects and surveyors, Palace-chambers, Hereford:—

E. J. Davies	£537 10 0	J. T. Jones	£455 0 0
E. W. Wilkes	510 0 0	Woolley & Sons	450 0 0
J. Hiles	475 0 0	W. C. Bolt, Hereford	450 0 0
C. Cooke	470 0 0		
W. Powell	470 0 0		

TYLDESLEY.—For alterations to hydraulic drains, etc., for the Tyledesley-with-Shakesley Urban District Council. Mr. R. H. Ginnian, engineer:—

URMSTON.—For flagging and kerbing of footways of Station Bridge, for the Urban District Council. Mr. J. Heath, Surveyor, Council Offices, Urmston:—			
H. M. Nowell ..	£137 2 0	T. W. Rigby ..	£89 7 2
W. Clarke	120 0 8	G. Clarke & Son ..	88 5 0
J. T. Hayes	120 0 8	Johnson & Hindley, Eccles* ..	85 17 4
W. Snape & Son ..	07 0 0		
W. H. Worthington ..	01 16 1		

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The Builder.

VOL. XCI.—No. 3311.

JULY 21, 1906.

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2. Elevation and Plans.....	
Church of St. Joseph, Bridgford, Nottingham.....	Mr. J. H. Eastwood, A.R.I.B.A., Architect.
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The Congress Exhibition.



VEN if there were no other object gained by the International Congress, it might at all events be recorded that it has furnished an occasion for getting up a remarkable

and most instructive exhibition of drawings illustrating the historical development of English architecture; an exhibition which should have been, and we believe was, of great interest to the foreign architects present, for we do not think that our national architecture and its characteristics are by any means so well known to Continental students as those of the principal Continental styles or schools are to us. And even to English architects this exhibition is of value, for it may be long before we see brought together again in one gallery so large and representative a collection of illustrations of English architecture. We only wish that it could remain open for three months instead of only for the present week.

The historical exhibition is divided into four sections: (1) Norman and Early Gothic; (2) Middle and Late Gothic; (3) Early Renaissance; (4) Later Renaissance; and the collection of drawings, which has been in progress for a long time back, was made by a division of labour, one or two architects undertaking to find the illustrations for each section. They have been admirably

hung in chronological order, under the direction of Mr. Harrison Townsend and Mr. Forsyth, to whose labours in their arrangement members of the Congress are much indebted.

In regard to the first section, it is a pity that the suggestion which we know was made by a distinguished Honorary Associate of the Institute, to include Saxon architecture and to start the first section with illustrations of the earliest indigenous work which could be classed as architecture, was not acted on. Considering that this was especially an illustration of the development of English architecture, it seems rather a mistake to have constituted the exhibition in such a manner as to give the impression that the old Anglo-Saxon race had no architectural ambitions, and to represent to our foreign visitors that we never had any architecture till we got it from the Continent.

Durham commences the series of Norman and Early Gothic, at least in the catalogue numbering, for the crossing of St. Albans (19), which comes later in order, is earlier and more rudimentary than the Durham work. Iffley Church and the south doorway of Barfreton take their places among these examples of the Early Norman in which the ruling characteristics of what was to develop into Gothic architecture are already recognisable. Some of the illustrations of St. Albans are shown in Mr. Neale's monumental drawings. Next comes Peterborough, the history of which, as in some other cases, is illustrated by a plan coloured to show the different periods.

Among these illustrations some are photographs, and one of these (31), a view in the south aisle, brings out curiously the effect of the rude and massive style of the architecture, with its jumble of lines and projections, and one thinks of the steps whereby the stateliness of Roman round-arched architecture had degraded to this almost rough-hewn work, to rise again into a refinement and finish of another type. The Cathedrals of Norwich, Gloucester, and Canterbury, as well as some others, are illustrated by the plans made for the *Builder* Cathedral series, and shaded so as to distinguish the dates of different portions. Mr. Harold Brakspear contributes historical ground plans of Fountains, Beaulieu, and Waverley Abbeys, and Watton Priory, the latter in conjunction with Mr. St. John Hope, and Mr. Hope contributes his very full and valuable historical ground plan of Furness Abbey. In connexion with some of the Abbey illustrations it is interesting to see some of the beautifully-drawn elevations made by or under the direction of the late Edmund Sharpe, who did so much towards the adequate illustration of Gothic architecture in measured drawings. Westminster Abbey closes the first section of the exhibition; among the drawings illustrating it is Mr. Micklethwaite's ground plan showing dates of work, and the large and fine measured drawing of one bay of the Sacrament, by Mr. E. Emlyn White, lent by the Architectural Association. Among the illustrations of Lincoln Minster is a fine photograph of part of the

triforium of the Angel Choir (121); this should be compared with that in the aisle of Peterborough (31) before referred to; the comparison of the two furnishes a striking illustration of the progress in refinement of line and detail which Gothic architecture had passed through during the intervening period.

The illustrations of the First period are almost entirely drawn from cathedrals and abbey churches; with the Second period we come into a selection which includes smaller churches, and the late mediæval mansion also puts in an appearance in the shape of such examples as Compton Wynvates and Oxburgh Hall, of the gate tower of which there is a very fine and effective photograph (263). One or two of the spire churches shown are of interest in relation to the proportion and design of spires; Shettisham, for instance (142, 143), with its tall slender spire with the very slightly emphasised lucarnes near the top of the spire, and (as one feels at once) exactly in the right place; and Shottesbrooke (250), with its perfectly plain spire, accentuated only at the angles by a roll moulding, shooting up from amid a collection of rather large lucarnes around the base, but with no break in its line above these. Both are examples of character in architecture obtained by a very severe treatment of line and the concentration of decorative features at certain points. In the illustrations of Exeter Cathedral one may observe the fine and satisfactory effect of the simple symmetrical lines of the nave vaulting (190), showing the last phase before the vaulting began to assume the plan which culminated in that of the fan vault. In the illustrations of Bristol Cathedral one notices the curious freak in vaulting, in the free ribs in the roof of the Berkeley Chapel vestibule (208), which nevertheless is a useful comment on the vaulting system of mediæval architecture, furnishing ocular evidence of the fact that the ribs are an independent structure. Heckington Sedilia (244, 245) carry us back to the days of our "Bowman and Crowther," in which Heckington and Ewerby churches were the *pièces de résistance*; and Mr. J. J. Cresswell's drawings are a little in the old style of draughtsmanship, too. Illustrations of Winchester, York, Lichfield, Beverley, Worcester, and many others of the great cathedrals and churches containing late work, find place in this section: some of the Norfolk and Suffolk churches, too, are represented; among the illustrations of these is a coloured measured drawing by Mr. Joass of the well-known remarkable roof of Knapton church. There is a fine view of the interior of King's College Chapel, and among the late work is the large and elaborate drawing by Mr. H. O. Cresswell of the screen of Henry VII's tomb, which, like a good many other drawings in the collection, has appeared in our illustration pages.

With the Early Renaissance Section we begin to get more decidedly into the region of secular and domestic work. One of the first things that meets us is the exceedingly fine elevation drawing (325), by Vertue, of the gate to Whitehall, once at the top of Old King-street, which many of our readers will remember

as the narrow back street parallel with Old Parliament-street, from which it was separated by a block of houses now removed to make way for the widening of Parliament-street. This drawing, lent by Mr. Walter Spiers, is one of the most interesting things in the Third Section of the exhibition, both in drawing and design. Illustrations of Cowdray House and Kirby Hall (331, 355 *et seq.*) illustrate finely the broad and bold treatment of large windows and pilaster orders found in various houses of Early Renaissance date; the less known example of Cowdray is so like Kirby in its general treatment and features as to suggest more than an accidental resemblance. Wollaton Hall, which has its own individuality of treatment, also comes into this section. With these more stately examples of early Renaissance one may contrast Moreton Old Hall, in date Renaissance, in character much more mediæval; and Movyns Park, Essex (424), an example of what one may call the bay-window style, the front showing three large semi-octagon bays, spaced at equal distances, the whole height of the front. Another example which has its own peculiar stamp is Lanhydrock (464), one of the many instances of an architectural taste in Cornwall peculiar to the county. In looking at this early Renaissance portion of the collection one cannot but be struck with the variety of treatment and uncertainty to be found among them; in the two previous sections we are continually in the presence of a development of architecture in one direction and in accordance with an underlying principle; in the Early Renaissance section development has been arrested, or if there is development in a sense, it is in an irregular and accidental manner, and the examples impress one largely as experiments.

And yet there is more of an instinctive life in this than in the Fourth Section, in which English architecture has settled down on a definite style, but it is for the first time a course which is to a great extent imitative and second-hand architecture. One value of this historical collection is that it brings out so forcibly the distinction between original and artificial or imitative development. The Early Renaissance can hardly be called imitative, for though it adopts or adapts features from classic architecture, it uses them in a manner for which there is no classic precedent. With the Fourth Section we are in the Inigo Jones and Wren era, and thence to 1850. The Institute has lent from the Burlington collection an interesting set of original drawings by Inigo Jones, not, as may be supposed, remarkable for their execution (except for what Jones and his contemporaries would have called a certain "brio" about them), but full of strange suggestions redolent of the taste for masque architecture in which the great architect was led to fritter away a genius meant for greater and more permanent things. The Institute lends also its two fine drawings, of comparatively modern date, of Wren's first design for St. Paul's; also Wren's original sketch for the Greenwich dome, with a skeleton plan over it. Kent's "Design for a Palace at Whitehall" (524-7) is a correct and not ineffective design in his rather timid

manner. Various London steeples by Wren come into the show; and Houghton Hall and Seaton Delaval; and so we go on to Burton's Constitution Hill arch with the quadriga on it as intended (a reminder that it ought to be placed there now), and St. George's Hall, Liverpool; among the illustrations of which is a poor little perspective sketch in water-colour by Elmes himself (that was before the days when the professional perspective "hand" assumed so large a sway). Cockerell's Liverpool Branch Bank of England, one of the most refined pieces of modern classic ever produced (669) is illustrated, and the architectural procession closes with the Houses of Parliament, illustrated by drawings and by models of the two towers and the central lantern (711).

Contemporary work is illustrated by a very numerous collection of framed photographs in the large room in the basement. Each architect made his own selection within a certain limit of size and number laid down; and the collection may be considered to be a fairly representative one. It was quite right to include the illustration of contemporary English work; there had, we believe, been some doubt at first as to the advisability of doing so, but we certainly think it would have been a mistake to have had a historical collection stopping at 1850, and then to have left the present day a blank, as if there had been no English architecture since then. But one contrast does strike one, in comparing the modern work with the ancient—a contrast that is not the fault of the modern architects; it is, the small amount of great and monumental buildings that are found among the modern work. We began with cathedrals and hardly anything else; as the history goes on the tasks of architecture seem to become less and less dignified and monumental and the part taken in them by pure architecture to become less and less, till we are landed at last in a collection mostly of comparatively small buildings for practical purposes, and in which architecture in the higher sense has become a secondary consideration, and can hardly obtain a footing. Architecture in modern days has become more practical; but where has her poetry fled?

The Octagon Gallery and the large gallery are hung with water-colours of architectural subjects; a proposal had been entertained to hang the large gallery with oil-paintings of this class, but it was abandoned on account of the difficulty which would probably be experienced in getting together a sufficiently large collection. The first numbered drawing in the Octagon is rather an architectural drawing than a picture; an elevation of Claydon House, Bucks, by Robert Adam; little more than a flat wall with rectangular openings cut in it. Probably there was (or is) a great deal of charming decorative work in the interior, but externally it is certainly a low standard of house architecture. Among the drawings in the Octagon is a fine example of the old Girtinesque school of water-colour, the drawing of the old Tower, West Gate, Gloucester (726), by Joseph Braddon. In the same room is Tite's painting showing various buildings

and designs by Inigo Jones combined into one picture, as Cockerell subsequently combined those of Wren in a similar manner. In the large room is a very fine series of water-colours, including a collection of drawings by Mr. R. Phegè Spiers, and a collection of the work of the late George Devey; three charming drawings of old bridges by Mr. Ernest George; interiors of St. Paul's and of two of Wren's churches by Mr. Fullevlove; interiors of Westminster and Ely by Turner, and a fine one of the east cloister of Westminster by Mr. T. M. Rooke. The collection is not exactly representative, for water-colour drawings of architectural subjects are (in this country) a vast field, but it is a very good and interesting one.

The furniture and silver sections of the exhibition should be of great interest to architects, both British and foreign. With regard to the former, one may say that so many exceptionally fine pieces have rarely been gathered together into so small a space. Ranged round the lower gallery in rough chronological sequence are to be found representative pieces of most of the styles prevalent in this country from the beginning of the XVth to the beginning of the XIXth centuries. Space has not allowed the inclusion of any large pieces, but as a whole the collection which Mr. E. Guy Dawber has brought together is a surprisingly good one, and should certainly afford our foreign visitors an insight into British furniture at its best. Mr. Seymour Lucas, M.A., lends some fine pieces of Gothic, a lady's chair in oak being of particular interest. Mr. Percy Macquoid's Queen Anne lacquered cabinet is a superb piece, though one must suppose that the whole work was probably not executed in England. Of the same date are three or four chairs, followed by certain specimens of Chippendale work. Most notable of these latter is a long-case clock, only surpassed by another in the Sheraton style which stands opposite. Both are the property of Mr. Alfred Davis, who also lends two Hoppelwhite chairs, an Adam arm chair, a delightful Pembroke table, and other XVIIIth century pieces. Mr. Burghard's two globes, belonging to the Adam period, are two of the most beautiful pieces of the kind ever exhibited. Mr. Cutler lends several pieces of satinwood, including a rather curious garden-seat; and last, but by no means of least interest, are five old musical instruments, including a spinet made by Thomas Hitchcock about 1710, lent by John Broadwood & Sons.

Mr. Starkie Gardner has been satisfied to show few examples of silver work, but each piece is of much individual interest. The two steeple cups, respectively lent by Mr. Leopold de Rothschild and Mr. Pierpont Morgan, are each unique; and two or three smaller pieces lent by the same gentlemen must appeal to all those who are interested in work of the kind. Sir Samuel Montagu's work by Paul Lamerie (c. 1620-1751) fills a whole case, and shows the artist at his best. Other lenders are Mrs. Percy Macquoid and Mr. B. S. Straus, M.P., whose tea-caddy, dated 1728, and coffee-pot, dated 1749, are perhaps the most interesting of the smaller pieces.

NOTES.

The Condition of Westminster Abbey. In consequence of reports by the architects to the Dean and Chapter, and to the Ecclesiastical Commissioners, an extensive scheme of restoration, or more correctly of repair, has been decided upon by the authorities of Westminster Abbey. The average annual expenditure on account of maintenance will be increased by about 4,000*l.* or 5,000*l.* a year during the next four or five years, with the object of refacing the greater part of the north front, where the stones are much decayed as the result of age and the deleterious effects of the London atmosphere. The suggestion has been made in the daily press that the vibration due to heavy motor vehicles is accelerating the destructive work of nature, and in support of this theory it is said that a large piece of stone, which broke off a few days ago owing to a flaw, was probably shaken down by motor traffic. Evidence of this shadowy kind really does not seem to be worth printing, and we think it would be difficult to find any newspaper readers willing to believe that substantial masonry structures are ready to fall to pieces on such small provocation as may be occasioned by the slight tremor arising from adjacent road traffic. Heavy motor vehicles, and especially omnibuses, have a good deal to answer for just now, and that is all the more reason why the attempt should not be made to saddle them with sins they have not committed.

The Salisbury Disaster. THE most satisfactory fact established at the coroner's inquest on the Salisbury railway accident is that this regrettable occurrence was not the result of defects in the rolling-stock or the permanent way, but was caused simply by the excessive speed of the train round the fatal curve. Mr. Jacob Hood, Chief Engineer to the London & South-Western Railway Company—described by one of our daily contemporaries as "Jacob Hood, Chief Resident Engineer"—stated that the curve was quite safe for a speed of 30 miles an hour, which is the maximum permitted by the company's regulations. Other witnesses estimated the actual speed to have been from 50 to 70 miles an hour. The only reason for this excessive rate was the disregard displayed by the engine-driver to the regulations issued by the company and posted up in all the running shops on the line.

The Collapse of a Warehouse in Liverpool. CAST-IRON columns are undoubtedly convenient, but being always liable to hidden flaws and places of unsuspected weakness, they present risks from which built-up steel columns are exempt. An unusually heavy load, or the extension of a flaw, may at any time bring about failure without the least warning, as happened in Liverpool last month, when a large warehouse belonging to the Corporation suddenly collapsed owing to the failure of a main column in the basement. The Coroner's jury, in returning a verdict of "accidental death," on Thursday last week, expressed the opinion that there should be stricter and more continuous inspection of warehouses, no matter

whether they belonged to the Corporation or not. That is all very well, but the most rigid examination will not reveal the presence of interior flaws, and the moral is that cast-iron ought not to be used now that we have at hand a far better material, and one that always gives timely warning of impending failure.

The Labour Market. THE Labour returns for June show, on a whole, slight improvement in the principal trades, the Trade Union returns showing about 3·7 per cent. of their numbers unemployed, as compared with 5·2 per cent. at the same time last year. All the same, the figures relating to trade disputes show an increase, since 36,170 workpeople were affected by disputes in June, 1906, as compared with 11,855 in June of the preceding year, showing a loss of 338,700 working days, as compared with 182,700 in the corresponding period last year. These figures will be watched with interest, as we have always maintained that the diminution in disputes was largely due to the responsibility attached to the funds of the unions by the Taff Vale decision, and we anticipate the proposed legislation will directly affect the number of strikes and disputes.

The Trades Disputes Bill. It appears that the Attorney-General has given notice that amendments will be moved during the Committee stage of the Trades Disputes Bill which will make clause 4 read, "An action against a trade union or against any members thereof on behalf of themselves and all other members of the trade union, for the recovery of damages in respect of any tortious act alleged to have been committed by or on behalf of the trade union, shall not be entertained by any Court." In plain language this means that the Government, despite the protest made by the Attorney-General against dangerous class legislation, have decided to climb down and accept the principle of non-liability on the part of trade unions for the illegal acts of their accredited representatives, which was aimed at in the Bill favoured by the Labour members. We recommend our readers to reperuse the eloquent terms employed by the Attorney-General in urging the House, in his introductory speech on the Government Bill, not to adopt the course which the Government are prepared now to recommend. That speech is the strongest possible comment that could be made on the clause now drafted by the Government.

Employer and Workman. A CURIOUS contention was raised in the recent case, *Devonald v. Prosser & Sons*. The defendants had regularly employed the plaintiff for many years as a rollerman at their tin works. The employment was regulated by certain rules, one of which provided that "no person regularly employed shall quit or be discharged without giving or receiving twenty-eight days' notice in writing." The plaintiff was paid by piecework according to the amount performed. Owing to slackness of trade the defendants shut down their works on July 20, but gave the

plaintiff notice the following August 3. The defendants contended that the contract did not compel them to find work for the plaintiff when it would necessitate the business being carried on at a loss, and that this was a risk taken on himself by the plaintiff. It is hardly necessary to say that this contention did not find favour either in the Court below or in the Court of Appeal, and the plaintiff recovered damages for this breach of contract.

Landlord
and
Tenant.

THE case of *Lewes v. Baker*, commented upon in these columns June 3, 1905, has been carried to the Court of Appeal. A certain publichouse was let "from May 13 last until such tenancy shall be determined as hereinafter mentioned at the yearly rent of 70l"—payable at quarterly intervals "in every year." The agreement provided that either party could determine this tenancy by giving the other party three calendar months' notice in writing. The question two Courts have had to decide is whether the premises were let on a yearly tenancy, in which case the notice could only be given three months before the end of the year, or whether it constituted a three-monthly tenancy. Having regard to other terms contained in the agreement, such, for instance, as that the tenant should repair, should pay the taxes, and be subject to ejectment in case of misconduct, the Courts construed this as a yearly agreement, but a study of the decided cases on this subject shows how fine the line has to be drawn, and we again urge lessors and lessees to avoid such litigation by a little care in expressing their intentions at the time when they enter into such agreements.

Motor
Traffic.

THE Kensington Borough Council have addressed representations to the Commissioner of Police drawing attention to the annoyance caused to the inhabitants of the borough and the serious depreciation in property caused by motor omnibuses and heavy motor traffic. In this representation it is stated that owing to this nuisance house property is being vacated with deplorable results from a trading and rating point of view. If the inhabitants of the borough are vacating their houses hoping to find a relief from this nuisance in the suburbs or in the country they will soon discover they have but changed Scylla for Charybdis. The heavy traffic is increasing in country districts, and the increased speed of the lighter motor vehicles in more open areas more than counterbalances the danger and annoyance caused by the omnibuses. Houses near highways are unlettable and unsaleable, and crops are ruined by dust. The plain fact will have to be recognised that our highways are not constructed for heavy luggage trains or expresses. The former grind the surface into powder, and the latter raise this in the form of dust. A motor-car travelling twelve miles an hour does not raise a serious amount of dust, but above that speed it is an intolerable nuisance. How long are householders to maintain roads for the destruction of their own property? That is a question owners of property are

beginning to ask themselves; yet the efforts to abate the nuisance cause increased expense in maintaining roads and experimenting with costly material, an expenditure which is not borne by the motorists who cause the nuisance, but by the landowners, householders, and fruit-growers who chiefly suffer from it.

The London
County Council
and Electric
Wiring.

THE London County Council Wiring Clauses, which were passed by a Committee of the House of Lords last week, confer full powers on the sixteen boroughs who supply the County of London with electric energy to wire their consumers' premises. This decision will probably affect, temporarily at least, the business of several wiring contractors. The London County Council is also authorised to lend the boroughs money to enable them to undertake the business of electric wiring on the hire-purchase system. The hardship inflicted on private enterprise by this decision is very slight. According to English law a contractor cannot remove his wiring if the tenant leaves, or if he does not continue to pay his instalments. The wonder is, therefore, that there are any contractors who are willing to run such obvious risks. It is only equitable that the London boroughs should have powers already possessed by some fifty local authorities. They are not allowed to manufacture fittings or apparatus, but they can supply on hire and set up any kind of electrical appliance. This will be greatly to the advantage of the small consumer. The usual basis for a charge for installing the electric light is a fixed price per lamp, and hence it is to the advantage of contractors to fix more lamps than are required. It was given on evidence that for plain fittings the usual price varied between 12s. 6d. and 17s. 6d. per lamp. So much, however, depends on local circumstances that we should have put the limits much farther apart. In our opinion the use of small electric motors for industrial and domestic purposes should be encouraged as much as possible. The Westminster Electric Supply Corporation stated that they had started a system of lending out motors and electrical apparatus, but had given it up, as the appliances rapidly became "artiquated." We do not attach much importance to this failure, as there may have been other causes at work besides the "antiquation factor." On the other hand, the hiring system has proved most successful in Bradford, where the power of the motors connected with the mains in everyday work already exceeds 6,000 horse-power. We would point out to small consumers that corporations and supply companies can buy motors on the best terms, and that the advice they give as to the best motor to use is disinterested.

Drains
and
Sewers.

In the annual Report from the Chairman of the Highways, Sewers, and Public Works Committee of the Borough of St. Pancras some statistics are given showing that a large proportion of the work carried out by the Borough during the past year ending March 31 has been necessitated by combined drains which have been converted into sewers, and the Report

contains some observations on the state of the law governing this question. These remarks are on the whole well called for, since, as we have so often pointed out in these pages, the law is in a most unsatisfactory state. We however venture to think the Report misstates the law in one respect. The statement that a drain can be converted into a sewer even by a surreptitious connexion with the drainages of some other house is correct, but the Report goes on to say that "thus contrary to a principle of English law a man is allowed to profit by his own wrongdoing." From a judgment of Mr. Justice Channell's, set out at p. 46 of Mr. Macmorran's book on "Sewers and Drains," it will be seen that learned judge says he knows of no such case where an existing owner has been so allowed to benefit by his own wrongdoing; and a study of the cases will show that the surreptitious junction has always been effected by some former owner. What is required is certainty in the law and an abolition of its many complications and anomalies in connexion with matters of everyday life. But when this branch of the law is made the subject of fresh legislation it has also to be borne in mind that the principal function of local authorities and the main object of the rates is that a good system of drainage should be maintained by the authorities out of the rates. The municipalities sometimes overlook this fact, and whilst levying rates are too anxious to throw the burden of repairing and maintaining drains on private owners, who thus pay out of two pockets at the same time. After all, privately maintained drains should be the exception and not the rule.

The future
of the Ouse.

IN a lecture delivered by Mr. Alfred Creer, City Engineer of York, before the Yorkshire Philosophical Institution, some interesting particulars were given relative to the past and present condition of the Ouse between Goole and York. The great drawback of the river is the large amount of suspended matter in the water, and which is deposited to such an extent as to form a serious obstacle to navigation, especially in the summer months. This has been the great difficulty of the last five hundred years, and in face of the continued accumulation of silt during long periods of drought, and in times of only ordinary rainfall, dredging would be futile. The evil is undoubtedly aggravated by the abstraction of water for the reservoirs of the Leeds and Bradford Corporations. Of course, these reservoirs are filled normally in the winter, but water is also taken in summer, and so the river does not get the occasional floods that would be so useful in July and August for scouring the Channel. Mr. Creer considers the project most likely to bring about a permanent benefit to the Ouse navigation, so far as York is concerned, would be the construction of a lock and weir below Kelfield, but at present he has no definite proposal to make as to the form of weir for adoption. As the value of the traffic now brought up from the Humber is no less than three million tons, the subject clearly justifies action on the part of the authorities.

DR. J. SPENCER LOW'S Report to the Local Government Board on the sanitary circumstances and administration of this district throws some special light on possible causes of insanitary conditions and consequent disease. For instance, while it is stated that the filthy condition of many of the houses is difficult to realise unless actually seen, it would seem that, however proper from a structural point of view may be the houses in which people of the class in question live, the occupants tend in a very short time by their habits and mode of life to degrade their habitations. Most of the dirtiest places Dr. Low saw in Merthyr and Dowlais were courts and back streets rarely traversed by the more respectable inhabitants of the district, public opinion being accordingly a matter which the inhabitants of such areas are not called on to consider; and he notes that after visiting a number of dirty houses he now and again came suddenly upon houses, not materially different in structure from the others, which were very well kept; while also it became often obvious that the centre of the street divided a sanitary from an insanitary area. The cause of these contrasts would seem to be a difference in ownership; some houses in Merthyr being kept clean because the landlord insists upon it, and some allowed to be dirty because the landlord does not take trouble in the matter. One of the worst features in the district seems to be the habit of disposing of the contents of ashpits and privies by tipping them on to refuse deposits in the district, of which seven existed at the time of Dr. Low's visit, in some cases very near to dwellings. A more insanitary practice can hardly be imagined. As Dr. Low rightly insists, all such refuse should be burned.

SOME property extending over 2,520 acres in the parishes of Minster, Eastchurch, and Leysdown, which is placed in the market, includes the Shurland, or Shorland, estate, with an interesting old house upon the site of the ancient castle. The place is mentioned by Samuel Scott, the painter, in his account of the tour which he, Hogarth, John Thornhill (Hogarth's brother-in-law), Tottahall, and Forrest made in North Kent in 1732. Hogarth made a drawing for Nicholls of the tomb in Minster Church, of Sir Robert de Shorland, with recumbent effigy and the head of his horse as swimming in the sea, whom Edward I. knighted at Carlarverock. In the church—locally known as Horse Church—is the monument of Sir Thomas Cheney, K.G., Warden of the Cinque Ports, on whom Henry VIII. bestowed Minster Abbey. Cheney rebuilt the manor-house, Shurlands, in Eastchurch, with materials brought, it is said, from Chilham Castle. Scott drew the reputed effigy of Cerenemo, the Spanish general captured by Drake, who died at the Nore and was buried there in 1591. The fine early XIVth century brass—conjectured to be of French workmanship—of Sir John de Northwode and his wife, Joan de Badlesmere, is cited by Boutell in his "Monumental Brasses and Slabs," 1848, and forms a notable study of

military costume; the mailed figure of Sir John has been restored, but so as to show him cross-legged: a departure from the original design. Ewan Christian restored the church in 1880-1; it consists of St. Katharine's aisle, built on the south side by William de Corbeuil, Archbishop of Canterbury (1123-1136), for some Benedictines whom he reinstated there, and of the church of the nunnery, founded in or about 668 by Sexberga, daughter of Anna, King of the East Angles, and widow of Ercombert, King of Kent, which during nearly two hundred years was the school of the princesses of that kingdom.

THE "Annual Exhibition of Works executed by students of the London County Council Central School of Arts and Crafts in Regent-street was open to the public last week. The exhibition is always an interesting one, and the present is no exception; as usual, the work comprises a great variety of subjects—design in various forms, book-binding, silversmiths' work and jewellery, engraving, stained glass, cabinet work, carving and gilding, lace embroidery, miniatures, lithography, modelling, etc. In an exhibition of so wide a scope it is difficult to say in which section the best work is being done, though some of the crafts naturally attract the clever and more ambitious student. The miniature section is the most disappointing; that of architectural design has but a very small following, though there is interesting work shown and good architectural sketching as well. The lithography is very interesting and of a high order of merit. There is good stained glass, and the gesso-work and carving are attractive for the suitability of treatment of design to the materials. Over 900 students have been enrolled during the session, being a great advance upon previous records. The new school in Kingsway is in course of construction. One of the features projected for next session is a day technical school for boys, preparatory to entering the silversmithing and kindred trades.

AT the Leicester Gallery is a collection of water-colours and drawings of the English School, among which are two very fine works by Collier (21 and 33). Copley Fielding's "Storm at Sea" (14) is amusing as recalling the ancient system of sea painting—thunderclouds in the rear and foreground sails bright against them, which Copley Fielding in particular employed so constantly that one hardly connects his name with anything else. There are some beautiful little works by Mr. Goodwin and Mr. Sutton Palmer, and a good example of James Holland (42), in which one sees Venetian buildings treated brightly and clearly instead of being reduced to smudges as by the modern practice. In an adjoining room is a collection of the works of two French painters. One of them, the late M. Boudin, attained a reputation which is borne out by this exhibition, especially in the two paintings, larger and smaller editions of the same subject, "Entrée du Port du Havre" (9 and 15); but his power in the

skies is over-rated in the "puff preliminary," affixed to the catalogue, which also very much over-rates the work of the other painter represented, M. Lebourg, a shadowy and somewhat blottesque landscape-painter with a sense of colour, best shown in No. 22, "Soleil Couchant au Printemps." We presume some purchasers are supposed to be influenced by these laudatory prefaces prefixed to catalogues, or they would not be inserted; but they are almost always exaggerations.

M. AUGUSTIN REY, who obtained the first premium in the Foundation Rothschild competition for the best designs for new artisans' dwellings in Paris, and who is now in London as a member of the Architectural Congress, shows by the exhibition of his collection of bold and powerful water-colour sketches at the New Dudley Gallery (169, Piccadilly), that he is an architect of very all-round ability. To produce the best plans in a competition for artisans' dwellings, and to fill a gallery with picturesque sketches of mountain scenery, is evidence of an unusual versatility of talent; and we recommend M. Rey's architectural colleagues at the Congress to look at his water-colours.

EGYPTIAN EXHIBITION AT UNIVERSITY COLLEGE.

AMONG the many interesting exhibits of the British School of Archaeology in Egypt now on view at University College are models of the town and temple of Onias and the Hyksos Camp. These sites lie on the eastern side of the delta between Cairo and Ismailia, and are contiguous. Although they are of widely different character, their historical relationship is very close. Professor Petrie has not only proved this, but has also proved, in the most convincing manner, their relationship to the upper and lower cities of Jerusalem.

The Hyksos or Shepherd Kings were a rude, uncultured, nomadic people of Semitic origin, with no knowledge of building. Their history and the nature of their unaccountable conquest have, up to the discovery of their camp, been veiled in obscurity, and the light now thrown upon these by Professor Petrie's last season's work is perhaps the only knowledge we have of this strange people. We are enlightened regarding their history by the chronological classification of more than two dozen kings of the Hyksos age during a period ranging from the XVth to the XVIIth dynasties. The nature of their conquest has been proved to have been the superior fighting value of well-organised archery over hand-to-hand fighting, which latter was the method of the Egyptians. We have only to look at less ancient history to find proof of this. The remarkable value of scientific excavation and careful analogy in deducing such facts is illustrated in Professor Petrie's work here. The camp measures about 1,500 ft. square, and is surrounded by a huge bank about 200 ft. thick at the base. The outside face of this bank is sloped back to an angle of 40°, and is covered with a thick coat of stucco. No stone or timber work is used; consequently there is no gateway. The entrance is by one sloping roadway 200 ft. long, rising to the top of the bank, the bank at either side of this point being strengthened in a manner which allowed of more effective flank defence. This defence was by archery, and its efficiency can be judged when it is understood that the steep stucco slopes surrounding the camp rendered assault by sudden rushes impossible, while the long steep road to the entrance, filled with fine sand and exposed to the arrows of the defenders on the flanking heights, made assault from that quarter equally difficult.

Soon after its construction the camp was

surrounded by strong walls of Egyptian character, evidently built by forced Egyptian labour. They are monumental evidence of the thorough nature of the Hyksos conquest.

The artificial mound which lies to the north-east of the camp was not formed until 150 B.C., when the Jews, led by Onias the High Priest, fled from the persecutions of Antiochus Epiphanes, and settled in Egypt. This mound is still known as Tell el Yehudiyeh (the mound of the Jews), and occupies an area of about six acres, rising to a height of over 70 ft., and crowned by buildings. Its form is in general a replica of the Temple Hill of Jerusalem on a smaller scale, and on it was built a temple after the model of the Temple of Zerubabel, which was built after the captivity. The dimensions are smaller, and in this respect correspond to the rather vague description of Josephus. The main topographical features have been maintained, and the curving Tyropoon Valley, which separates the Temple Hill and Western Hill of Jerusalem, is echoed in the flat which separates the artificial mounds of the Temple Hill of Onias and the camp of the Hyksos. The form of the Temple Hill has been observed, and the walls follow a contour closely resembling the original. Fragments of masonry discovered are of a type of bossed and margined stones which is common to Palestine, and which prevailed at that period. The reconstruction of the walls of Jerusalem by Nehemiah is of this character, and no such type is to be found elsewhere in Egypt. Architectural fragments show a debased Greek style, called by Professor Petrie "Greco-Egyptian." An exactly similar character can be seen in the remains of the Asmonean period in and around Jerusalem. It is unlikely that the Zerubabel temple, which was built about four centuries earlier, showed this characteristic.

There are many points of Jerusalem topography raised by this discovery, and we await with interest their future developments. The discovery is a striking example of the extraordinary tenacity of the Jews to the memory of their holy place and the sacred hill on which it stood, even to the point of building its fellow with their own hands and erecting thereon a temple which was a model of that from which they had been driven.

ANCIENT EARTHWORKS AND FORTIFIED ENCLOSURES.

We have received the Report of the Committee on Ancient Earthworks and Fortified Enclosures, which was presented to the Congress of Archaeological Societies on the 4th inst. The Committee, at the commencement of the Report, express their disappointment that the archaeological societies of the country have not yet been able to undertake the systematic scheduling of the ancient earthworks and defensive enclosures in their respective districts, and they urge the importance of the publication of such lists in *Transactions*, and as separate pamphlets, which can be distributed, not only to the owners and occupiers of the sites, but also amongst the county, borough, rural, urban, and district councils, whose members may be able to use influence to prevent the destruction or mutilation of the remains of many early fortresses, camps, and strongholds throughout the land.

In regard to the destruction of such works, so valuable in a historical sense which is still going on, the Report publishes the following tabular statement, which we reprint in full:—

"The destruction or mutilation of defensive earthworks, and even more of tumuli and barrows, is constantly proceeding in many parts of the country, but passes unnoticed or at least unrecorded in most instances."

Cases which have come under notice include—
Chalton, Kent—The hill upon which is the last remnant of the once important camp was long since quarried on the north-east, and now the south-western side is in process of rapid removal.

Grindon Hill, near Sunderland—The destruction of a double barrow on the summit of the hill is recorded in the *Proceedings* of the Society of Antiquaries of Newcastle-on-Tyne. (Ser. 3, Vol. II., 1905.)

Woodbury, Stoke Fleming—This fine prehistoric Devonshire work is being demolished for agricultural purposes.

Hem Hill, near Mountcave, Somerset—This large and important earthwork is threatened with mutilation by the extension of quarrying operations.

Quarry Wood, Loose, Kent—The rampart of the "Camp" is being further destroyed at its northern end by the extension of the quarry.
Tainswick Hill Camp, Glos.—Mr. St. Clair Baddeley writes:—"The ancient entrance (S.E.) is being vigorously attacked for ragstone. The quarrymen are taking the terminations of the two successive lower ramparts, and the fosse between these, and eating it up! This camp is triangular in form, stands 927 ft. above sea level, contains about 23 acres, and is still surrounded on two sides (W. and S.) by its double fosse. The N. side has severely suffered from quarrying in other days, and merely preserves its shape in the foundations of the quarried out ramparts." There is reason to hope that further destruction will not be permitted.

Leves Castle—Learning that a proposal had been made to erect a building for the accommodation of the Sussex Archaeological Society's Library in the fosse of Leves Castle, the Committee made an urgent appeal to that Society to spare the site, pointing out that it "is the only remaining open portion of the encircling fosse from which was thrown up the great mound of the Castle," and that any building would "inevitably destroy the characteristic features of this last remnant of a most important part of the original defences."

The Sussex Archaeological Society is to be heartily congratulated that, at a meeting held on May 25, it was decided by a unanimous vote not to build on the fosse.

The Committee have also been in communication with the Ordnance Survey with a view to obtaining more full and accurate delineation of ancient remains in the Ordnance maps; an object with which the Directors of the Survey are entirely in sympathy, but observe on the difficulty experienced by the surveyors in obtaining accurate archaeological information in regard to such remains.

Lord Balcarras is the President of the Committee, and Mr. I. Chalkley Gould, F.S.A., the Hon. Secretary. Communications can be addressed to the Royal Societies Club.

LONDON BUILDING ACT TRIBUNAL OF APPEAL.

THE METROPOLITAN RAILWAY COMPANY v. LONDON COUNTY COUNCIL.

ON Thursday last, at the Surveyors' Institute, Great George-street, Westminster, the Tribunal of Appeal heard an appeal by the Metropolitan Railway Company against the certificate of the Superintending Architect of Metropolitan Buildings, dated June 11, 1906, defining the general line of buildings on the south-east side of Euston-road, St. Marylebone, between Cleveland-street and Bolsover-street, and on the western side of Cleveland-street aforesaid, between Euston-road and Buckingham-street.

Mr. Macmorran, K.C., and Mr. Cunningham Glenn appeared for the Metropolitan Railway Company; Mr. Whateley for the owners of 365, Euston-road; and Mr. Ricketts for Watney, Coombe, & Co., who were interested in a public-house in the road. The London County Council was represented by Mr. Horace Avory, K.C., and Mr. Moresley White.

Mr. Macmorran, in opening the case for the Metropolitan Railway, said that his clients were owners of certain lands and buildings in Euston-road which they acquired under an Act of the year 1898 for ventilation purposes. The Company were now desirous of rebuilding on the site, which was at the corner of Cleveland-street and Euston-road. They did not take any objection to the building line laid down in respect of Cleveland-street, but they asked the court to say that the Superintending Architect was altogether wrong as to the line of building which he had laid down for Euston-road. As fixed, the line would cut clean through buildings belonging to the Company, and would go right through the middle of a public-house. His contention was that it was no part of the duty of the Superintending Architect to fix a building line—all he had to do was to determine judiciously where the line was. The existing buildings at the present time came up to the pavement, and his (learned counsel's) contention was that the general line must be determined having regard to the existing buildings. That had not been done in this case, and he therefore, asked the court to say that the Superintending Architect was wrong.

Mr. Whateley next addressed the Tribunal, and maintained that it was impossible to suggest that the building line in the block between Southampton-street and Cleveland-street was so set back as to form a recess or crescent. All that could be said about that block was that some of the buildings did not come as far forward as the general building

line in the street. It was impossible to argue that because one house was set back a little from a neighbouring house, that that one house altered the general building line of the street.

Mr. Matthew Garbutt, F.R.I.B.A., gave evidence in support of the appellants' case. He said there were certain houses that were set back between Bolsover-street and Southampton-street, but, in his opinion, the building line was the same as in the other parts of the street from Tottenham Court-road up to the pavement. If the certificate of the Superintending Architect was adhered to, it would mean that the building line would cut through part of 179, Cleveland-street, which was a three-story building; also adjoining premises of one story, and it would also cut into a corner building of three stories near the public-house. The line adopted by the London County Council architect ignored the existing buildings of the Metropolitan Railway Company.

In cross-examination by Mr. Avory, witness said he was not aware that 381, Euston-road was erected under a consent given by the old Metropolitan Board of Works in April, 1864. He admitted that, as regarded that portion of Euston-road between Southampton-street and Bolsover-street, all the buildings that were in front of the Superintending Architect's line were one-story buildings, mostly of corrugated iron.

Mr. A. R. Stenning, F.S.I., F.R.I.B.A., said that, in his opinion, the line determined by the Superintending Architect altogether ignored the buildings between Bolsover-street and Cleveland-street. In his judgment the general building line came up to the back of the pavement, and was substantially the line fixed by the Tribunal of Appeal for the Euston-road, some years ago.

Replying to Mr. Avory, witness said that, if it was a fact that 381, Euston-road was erected under a consent of the old Board of Works that would constitute the general building line, in his opinion. He admitted that there were breaks in the building line on the south side of Euston-road.

Mr. Rowland Plumble, F.R.I.B.A., in reply to Mr. Whateley, said he had resided in Fitzroy-square at the back of Euston-road for nearly forty years. In 1869 he made a survey of the buildings as they existed then from the forecourt of 365, and they were in exactly the same position as they were now. He totally disagreed with the building line as laid down by the Superintending Architect of the London County Council.

For the respondents Mr. Avory called Mr. F. J. Lancaster, a chief clerk in the Building Act Department of the London County Council, who put in the papers relating to the consent given by the Metropolitan Board of Works for the erection of the buildings in Euston-road, already referred to.

Mr. Avory, for the London County Council, said the contention of Mr. Macmorran really came to this: That it was improper for the purpose of defining a general building line between Cleveland-street and Bolsover-street to draw any line which cut through any existing building. A conclusive answer to that was that the Tribunal had, in many instances, defined a building line which cut through existing buildings. In the case in question they had the further fact that some of the buildings which were at present in advance of the line laid down by the Superintending Architect were either unlawfully there, or were there because they had been erected under a specific consent given by the Board of Works, which he (learned counsel) submitted was conclusive evidence that, at the time they were erected, they were in front of the general building line. Looking at all the circumstances of the case, he submitted that the Superintending Architect was entitled to take into account, in fixing the general building line, the buildings at the corner of Bolsover-street, the public house, and 177 and 179, Cleveland-street. It was a very plausible argument that the building line ought not to cut through buildings which had existed for years; but when that was done, and the owner was called on to rebuild, the London County Council was bound to pay him compensation under sect. 23 of the Act.

Mr. Macmorran, Mr. Whateley, and Mr. Ricketts, having again addressed the Tribunal, the President announced that the court would consider its decision.

The International Congress of Architects.

THE Congress commenced at ten on Monday morning by an "Informal Reception by the President" at the Grafton Galleries. The main object of this arrangement was to afford an opportunity for all the visitors to make the acquaintance of the President and to be able to inform themselves as to the arrangements of the bureau and find out from the commencement where to go for any information as to the proceedings. The arrangement answered very well; a large number of visitors, English and foreign, attended, and, after presentation to the President, were able to look about them, to meet friends or be introduced to those whom they knew by name but not by sight, and to inspect the manner in which the Grafton Galleries had been utilised for the purposes of the Congress.

The system has been to make the Grafton Galleries the headquarters for everything, the bureau being formed at the end of the large room, and the telegraph and post-office in the Octagon Room. The large room was the place for most of the sectional meetings, where papers were read and discussed; the lower end of it became unavoidably a passage, but owing to the size of the room this did not appear to cause any inconvenience to the proceedings at the dais end. The sectional meetings which were carried on simultaneously with those at the Grafton Gallery were held at the Institute rooms, which otherwise were not in use, everything else being concentrated at the Grafton Galleries. There could not have been a better place, both on account of its central position and its numerous and well-lighted rooms. It is satisfactory to record this, as we know that the choice of central quarters had given the executive committee a good deal of anxiety; various places were proposed and examined with this object and rejected as unsatisfactory, and we think the final choice could not have been better.

Of the various rooms at Grafton-street, besides the large gallery, the long galleries beyond it on the ground floor were hung with the remarkable collection of historical illustrations of English architecture, of which we have spoken more fully on another page; the large room in the basement was utilised for the illustrations of contemporary architecture, and the collection of old furniture and silver work; in the basement also was found place for the ladies' room, which we imagine must have been everything that the lady visitors could wish for, if we may judge from what we heard of the consultations and undertakings with reference to it. Various members of the ladies' committee also made themselves kindly serviceable to the foreign visitors at the first meeting by acting as interpreters to those who had no English, a service which was evidently appreciated in the most cordial manner.

At the Guildhall meeting on Monday afternoon, the President and members of the Executive Committee, and the Lord Mayor and his retinue, waited at the door of the side gallery for the Duke of Argyll and the Princess Louise, and on their arrival Mrs. Belcher presented the Princess with a beautiful bouquet on behalf of the Ladies' Committee. The whole party then passed up the staircase and through the picture gallery to the platform of the Great Hall, which was occupied by a crowded audience.

Inaugural Meeting at the Guildhall.

The inaugural meeting at the Guildhall was held by permission of the Right Hon. the Lord Mayor and the Corporation of the City of London, and a large gathering of members of Congress and ladies assembled at three o'clock, and H.R.H. the Princess Louise and His Grace the Duke of Argyll, K.C., were received by the Executive Committee and the Ladies' Committee. Among those present were the Lord Mayor and Lady Mayoress and the Sheriffs, the United States Ambassador, the Greek Minister, Sir L. Alnata-Tadema, R.A., Sir W. B. Richmond, R.A., Sir Aston Webb, R.A., Sir William Emerson, Professor Atchison, R.A., Mr. Alfred East,

R.A., Mr. Reginald Blomfield, A.R.A., Sir John Taylor, Mr. Mervyn Macartney, Professor Baldwin Brown, Professor S. H. Capper, Mr. H. T. Hare, Mr. John Slater, Mr. H. H. Statham, and many others, and, in attendance on the Princess, the Hon. Nona Kerr and Capt. Geoffrey Probert.

The chair was subsequently taken by the Right Hon. the Lord Mayor, who briefly welcomed H.R.H. the Princess Louise and His Grace the Duke of Argyll, and then surrendered the chair to the chairman of the meeting, the Duke of Argyll, who called upon Mr. John Belcher, A.R.A., President of the Royal Institute of British Architects, to deliver a

Presidential Address of Welcome.

Mr. Belcher said: Your Royal Highness, my Lord Duke, your Excellency, my Lords, ladies, and colleagues,—As President of the Royal Institute of British Architects I have the honour of being invited to preside over the work of this the seventh International Congress of Architects, and on behalf of the Executive Committee I take the earliest opportunity to heartily welcome the distinguished delegates and architects who have honoured this country by their presence, and to assure them of our high regard and esteem.

I feel sure that the members of the Congress will be gratified to know that His Majesty King Edward VII. has been graciously pleased to be the patron of the Congress, that the Prince of Wales has consented to be its Hon. President, and that the Royal family have in other ways shown an interest in our proceedings which has been, and will continue to be, a great incentive and encouragement to us.

The Royal Princess whose kindly and gracious presence we welcome amongst us to-day is not only herself a distinguished sculptor, but has shown a keen and discriminating appreciation of art in all its forms. The artistic tastes and interests of the Princess Louise are as well known to our countrymen as they are to us. I have every hope that our deliberations will prove of great interest and value, and will tend to the advancement of our beloved art throughout the world. It is by interchange of ideas, comparison of methods, and the statement of experiences under new and changing conditions that that advancement will be assured. These Congresses, therefore, may be expected to bring in their train fresh life and vigour, increased enthusiasm, broader views, and new ideas which cannot fail to benefit the community at large. I say "community" advisedly, because the fact is beginning to be recognised that architecture as a fine art is not, or must not any longer be, one of the luxuries of the rich, but is of vital importance to the physical and moral well-being of all sorts and conditions of men, especially in cities and large towns. Environment is a tremendous factor in education and development. A man's surroundings have enormous power over him, whether for good or for evil; a power that acts continuously, without cessation—almost, we may say, by day and by night. This fact is being more and more clearly recognised every day, and efforts, we hope, will be made to introduce a stricter supervision over buildings of every kind, that a better order of things may gradually be created.

But here, at the very outset, we are confronted by a popular misconception concerning the true nature of architecture. In past years public interest has been almost limited to the scientific side of the question, viz., that houses and other buildings should be well built, sound, and wholesome; that drainage and ventilation should be carefully attended to, and other so-called "practical" matters. Occasionally, and more frequently of late, a certain amount of ornament and so-called style has been demanded, and this has been thrown in or dabbed on afterwards, and the result dignified with the name of architecture. Such work is not true architecture at all. It is mere building—sound and good, perhaps, but still mere building—plus certain orna-

mental and decorative features. Now, if our architecture is to be an elevating and refining influence; if it is to be an enduring power for good; still more, if it is to be a witness to coming generations of earnest purpose and high aspirations, of moral power and intellectual greatness, the artistic element must not be something merely added; it must interpenetrate and blend with scientific knowledge and experience from the very first.

Architecture is both a science and an art, and the mathematical symbol of the relation between the two is not that for mere addition (+), but for multiplication (x). In other words, science supplies the facts and the laws which art takes and presses into the service of noble ideals. The scientific and artistic elements in a good building may perhaps to a certain extent be distinguished, but they cannot be separated; they are as inseparably connected as mind and body.

The primary motive for all building lies in the practical needs of life, in the demand for shelter and comfort; but the architect's work calls for a much wider range of thought and purpose than is necessarily implied in such provision. If the task entrusted to him is to be honourably as well as adequately fulfilled he must be an artist, with an artist's motives, aspirations, and ideals, as well as a man of practical skill and scientific knowledge. In this way the elementary necessities of life may be made to serve high and noble ends, and much that is elevating and refining may be brought into the lives of the people as a silent but continuous power for good. Their homes, the streets they traverse, and the buildings they work in may all be made, as Lord Leighton once observed, to contain "the fine germ of living beauty," quickening and invigorating the deep springs of health and joy.

The proceedings of this Congress and the publicity attaching to them will help, we trust, to bring this important subject into greater prominence; and we shall, I am sure, find, as we have often before found, the public Press most ready and most powerful in helping on anything that concerns the common weal.

It may perhaps be as well here to inform those of our honoured guests who are not yet aware of the fact that in this country we have no Minister of Fine Art or similar authority to watch over the interests of the public in this respect of the art, as distinguished from the science, of building. We have a "First Commissioner of Works," it is true; but, however able and enlightened he may be, tradition and custom limit his activity and his authority within certain fairly well-defined lines. There has been, however, of late, amongst the educated portion of the public, a wonderful awakening to the interest and value of architecture as a fine art. On all hands we discover a receptive spirit, a disposition to inquire, and a readiness to learn something of the mystery of our art—not merely to admire and study its past achievements, but, treating it as a living art, to ascertain its true functions and vital principles. Everywhere intelligent men are asking how they may distinguish between good and bad; and asking, too, *why* this is good and that bad.

We are taking steps to supply the public with some simple criteria of a general character which may serve as a basis for the formation of a critical taste and sound judgment, and the question of how best to carry this out is a subject that will come before the Congress for consideration and discussion. If we can thus give the public an insight into some of the living principles of our art—and here I beg to emphasise the word "living"—we shall unlock to them a veritable storehouse of interest and information. For no man has a richer field lying before him for exploration and research than the man who takes an intelligent interest in architecture, who can appreciate its points, and decipher its meaning. Everywhere, at every turn, he finds a new "subject" to exercise his perceptive and reflective faculties upon. Every

truly good work will be to him a fund of information, as well as a revelation of character and purpose. He will read the mind of a people in their buildings, and understand the social conditions that prevailed in each age. For all true architecture is instinct with life, the life of its people and of its age. We may study the thoughts and purposes of past generations, not only in their poetry and their prose, but also in the architectural work that they leave behind them. No historian's verdict is more reliable than that which is written with a pen of iron in brick and in stone.

How much have we learnt of the brilliance of Greece and the majesty of Rome from the monuments of their architecture that have survived! So also our buildings tell of our daily life and doings of our noble aims or our sordid interests, of our broad, large-hearted views or of narrow-minded selfishness. A private residence is an index to the character, tastes, and disposition of its owner. So, too, our public buildings will declare aloud to after generations the ideals and sentiments that govern our municipal and national life.

The educational value and historical interest and importance of architecture are enhanced by the fact that, unlike literature, architecture is cosmopolitan and universal in its language; its great works, its priceless treasures, are open to be known and read of all. Every nation, it is true, has its own accents and its peculiar idioms even in architecture; but this is to be counted for a gain rather than a hindrance by the man who visits other lands. As he travels from one country to another, or even from one city to another, he finds an infinite diversity of expression, throwing an ever-shifting light upon the various aspects and sides of human life and thought and feeling. Many a record of the past, too, is opened to his eyes, speaking of men and manners that have passed away.

The study of architecture may indeed be made one of the most entrancing of pursuits; but if it is to be delivered from that touch of pedantry, that archaeological flavour, that so often clings to it, the student must be brought into contact with living principles. The monuments of the past, as well as the work of to-day, must be read and judged in the light of those principles that hold good for every age and for every nation.

In addressing my brother architects from other lands—and I am proud to see so many distinguished men amongst them—I may venture to point out that our architecture, like that of other nations, has a distinctive character of its own, being of a severer and graver type than is found elsewhere. This is partly accounted for by the dull grey atmosphere which so constantly wraps us round, by the comparative rareness of clear and sunny skies, and our generally unfavourable climatic conditions; but I am afraid we must not throw all the responsibility upon nature. We are insular in character and disposition—there is no doubt about it—and more so perhaps as individuals than in our corporate life. Every man is his own island—a sort of moated grange, in fact, with the drawbridge habitually raised. We are reserved and apt to shut ourselves up within ourselves. In our rail way trains, and even in our clubs, we sit apart in silence, or merely throw remarks at one another over the top of the morning paper. We habitually repress our emotions and hide our feelings. Naturally, therefore, our buildings also are often stolid, even grim and forbidding, in appearance; they lack the charm and brightness which distinguish the architecture of other and sunnier lands. We hide them away, too, in back streets or (if they be in the country) behind high walls and as many trees as we can press into the service.

But let me hasten to add that I have a purpose in speaking of these external characteristics of British architecture, and that is to beg my illustrious *confères* from abroad not to stop at the external features, but to pursue their researches a little further, and they will find set forth in our buildings another characteristic of the people of the land they are honouring with a visit. Under a somewhat grave and sedate appearance it will be found that our people possess warm hearts. Once within the doors of their houses there will be no lack of a heartiness of welcome and a sincerity of goodwill which may be firmly relied upon. The many mansions and their beautiful residences with which our country abounds reflect this deeper element of our

hearts and lives, and will be found worthy of your notice.

I believe it is generally agreed that our modern domestic buildings present a noteworthy development of our art, and one that is almost peculiar to this country. We cannot show you streets leading to public buildings of such stately character as may be seen and admired in other great cities of Europe, and our public buildings themselves are consequently at a disadvantage. The new approach to Buckingham Palace and the memorial to Queen Victoria—designed by Sir Aston Webb—show what might be done if only such opportunities were more frequently given. Had Sir Christopher Wren been allowed to carry out his plans for laying out the City after the Great Fire, there would have been no lack of fine streets to show you, or of splendid vistas opening up to view every building of importance. But there was no Minister of Fine Arts to turn the scales in favour of an enlightened policy!

Having drawn attention to some of the features and conditions of British architecture, let me acknowledge, on behalf of my countrymen, how much we have learnt from, and how much we have profited by, the many splendid examples of architecture which are to be found and admired in your respective countries. We naturally and instinctively turn to the south for that which is bright and beautiful. The warmer temperament of the southern artist is favourable to productive fancy. We see that the nations amongst whom the love of beauty is a national trait, instinctive and inherited, seek it in all their works, and set forth their national greatness in their public buildings—an element in the education of the people which no Government can afford to despise.

The union of the arts in which we believe the secret of your success to lie is not so advanced amongst us as with you; but signs are not wanting even here of the growth of a closer bond between them, and architects and sculptors will be found collaborating on a building to present its distinctive purpose with greater clearness and beauty before the eyes of men. The utilitarian cast of mind, running ever in its one groove, may laugh or even sneer at this; but from a national as well as humanitarian standpoint there can scarcely be a greater mistake than to overlook and neglect the emotional side of man's nature. The greater the advance in civilisation, the more pressing the claim of the emotions of the people to due recognition and well-balanced development on true and right lines. Feats of engineering, appealing to the intellect, astonish but do not move us; but works of beauty, buildings of graceful proportion and appropriate design, lift the beholder above the vulgar and commonplace into a higher region, and fill the heart with lofty ideals and pleasurable emotions.

The aim and purpose of the Congress is the welfare of the people. This can only be accomplished by raising the ideal both of architects and the public, by setting a higher tone and proposing a nobler end for all work, and thus lifting that which would otherwise be blankly material, utilitarian, and commonplace into the region of the beautiful, the elevating, and the inspiring.

In conclusion, permit me once again to offer you all a heartfelt and most cordial welcome. I trust that the Congress will be a great success, and that your visit to London will prove both a profitable and an enjoyable one.

Vote of Thanks to the Lord Mayor.

At the conclusion of the Presidential address, Sir Aston Webb, R.A., proposed a vote of thanks to the Lord Mayor and the Corporation for their great kindness, he said, in lending that noble hall in which to hold the inaugural meeting of the Congress. That hall, as many of them knew, was first built in 1211; it was rebuilt in 1326, and once again in 1411. After that it suffered severely from the Great Fire of London, and once again it was restored. It suffered again somewhat severely when George Dance, the architect, added a Gothic front to it. George Dance, he might say, was an architect who did most admirable work at the Mansion House, and who also designed Newgate Prison, which would never be seen again. The hall had been the scene of many historic ceremonies,

the greatest sovereigns of the world and many of England's most distinguished sons having been received in it, and Gog and Magog had looked on at all these ceremonies unmoved. There was a tradition, he did not know how true it was, that when once Gog and Magog heard the clock strike one they would come out into that hall; but at present they remained where they were. It was because of the great traditions and the great associations that that hall had and with which no modern building could possibly vie, that they had been asked to meet there that day, and he asked them to pass a most hearty vote of thanks to the Lord Mayor and Corporation for their great kindness and courtesy in allowing them to do so.

The vote of thanks was then unanimously agreed to, and the Lord Mayor, in reply, said that he had, on behalf of the Corporation, great pleasure in receiving the vote of thanks. He need hardly say that it was a great pleasure to them to place the hall at the disposal of the Institute for the admirable work which had been inaugurated. He, the Lady Mayoress, and the Sheriffs had, unhappily, to take their leave in order to attend to other duties, but he hoped to meet many of them at the Mansion House the following evening.

The Lord Mayor and the Sheriffs then retired.

Report of the Secretary of the Congress.

Mr. W. J. Locke, secretary of the Royal Institute of British Architects and secretary of the Congress, then read the following report:—

Your Royal Highness, Your Excellencies, my Lord Duke, my Lord, ladies and gentlemen,

The Executive Committee has the honour to present to you the official report of their labours in the form of this programme, supplemented by a brief summary which it is my duty and privilege to lay before you as their executive officer.

The Permanent International Committee at their meeting in Madrid, at the close of the Sixth International Congress of Architects, decided that the seventh Congress should take place in London, and that the Royal Institute of British Architects be invited to undertake the task of its organisation. Nine representatives of the Royal Institute were appointed as members of the Permanent International Committee, and, the Royal Institute having accepted the invitation, appointed six other representative architects to join the nine, and thus form the Executive Committee of the Congress.

The work of organisation began by the Executive Committee asking the premier architectural societies of the world to issue circulars of propaganda to the architects practising in their respective countries. By their generous and loyal help over 25,000 circulars were distributed, the invitation to join the Congress was printed in every architectural journal, with the result that practically every practising architect the world over had the Seventh International Congress brought to his notice.

The Executive Committee have departed from tradition in according to ladies practically full privileges of the Congress at a special subscription.

The Committee are proud to record the fact that the number of members has reached the figure, unprecedented in these Congresses, of nearly 1,700. Of these 700 are from foreign European countries, America, and the British colonies.

The Executive Committee have to mention to their colleagues from other countries the fact that the British Government stands aloof from participation in the organisation of congresses of this kind. It neither subventions them nor invites foreign Governments to appoint official delegates. The guarantor of the Congress is the Royal Institute of British Architects, and foreign Governments have been approached semi-officially through the independent action of the Executive Committee acting under the authority of the Royal Institute.

The foreign Governments who have in these circumstances appointed delegates are as follows:—Belgium, M. J. M. Caluwaerts (Président de la Société Centrale d'Architecture de Belgique); Denmark, Etatsrædel

Vilhelm Dahlerup; France, H. Daumet and J. M. Poupinel; Greece, Nicholas Balanos and Anastase Metaxas; Holland, Joseph Theodore Cuypers; Hungary, Julius Berczik and Alexandre d'Aigne; Italy, Mariano Edoardo Cannizzaro and Commendatore Alfredo d'Andrade; Russia (Académie Impériale des Beaux Arts), M. le Comte Paul de Suzor and Léon Bénols; Spain, Richard Velasquez Bosco and Luis M. Cabello y Lapidra; Sweden, Professor J. G. Clason and Kaspar Salim; United States of America, Frank Miles Day, Francis R. Allen, Glenn Brown, George O. Totten, jun., William S. Eames, W. L. B. Jenney, and George B. Post. Besides these Government delegates, there are 101 bodies in Great Britain and abroad who have appointed 159 delegates, and these range from the Technological Institute in Sweden to the Institute of Architects of Japan. The list, whose recital would be tedious, is given in the official programme.

The programme of the Congress can be divided into two sections, work and social intercourse.

There are ten subjects to be discussed, carefully chosen by the Executive Committee as subjects of universal importance to architects, without regard to conditions peculiar to any one nation. Sixty-two reports on these subjects have been contributed by representatives of every country in Europe and America. The time at the disposal of the Congress will not allow all these sixty-two papers to be read, and the Executive Committee have had to make a careful selection. Printed abstracts, however, of all communications are in the hands of every member, and those which are not read will be printed in *extenso* in the Comte-Rendu. There will be discussions after the reading of the selected papers, and the committee hope that the result will be an invaluable exchange of thought between the members of the architectural profession of the civilised world.

The opportunities for social intercourse afforded by the Congress are numerous. The following may be specially mentioned. The Royal Academy are generously giving a reception to the Congress in their galleries to-night at Burlington House. The Lord Mayor is kindly receiving the Congress to-morrow evening. The Royal Institute of British Architects are entertaining the Congress at an evening garden party on Thursday.

The Executive Committee have organised visits to many places which they think will be of interest. The Athenæum, the Arts Club, the National Liberal Club, the Lyceum Club (for ladies), the Art Workers' Guild, the Zoological Society, the Royal Botanic Society, the directors of the Austrian Exhibition at Earl's Court, have all offered in their several ways their hospitable welcome to members of the Congress. There will also be a farewell banquet on Saturday, the 21st.

The Executive Committee therefore venture to hope that the arrangements they have been privileged to make for the instruction and entertainment of the Congress will meet with your approval.

In conclusion, I have the honour, on behalf of the Executive Committee, to call upon the representatives of the various countries to reply briefly to the President in the following order; after which His Grace the Duke of Argyll will deliver his inaugural address.

Replies of Foreign Representatives.

Replies by the representatives of the following foreign countries were then made:—

Austria, Prof. Otto Wagner; Belgium, Monsieur J. J. Caluwaerts; Denmark, Etatsraad Vilhelm Dahlerup; Holland, Monsieur J. T. Cuypers; France, Monsieur H. Daumet; Germany, Herr H. Muthesius; Greece, M. A. Metaxas; Hungary, Monsieur J. Berczik; Italy, Prof. d'Andrade; Japan, Mr. S. Chujo; Portugal, Senhor Ventura Terra; Russia, M. Robert Boker; Spain, Señor Don Velasquez Bosco; Sweden, Prof. Clason; United States, George B. Post.

Each gentleman in turn made a neat little speech of commendable brevity. The speakers mostly contented themselves by expressing the pleasure they felt in representing their various societies and countries on this occasion, the honour they felt it to be present, and concluded with expressing their best wishes for the success of the Congress. Several referred with enthusiasm to the excellence of the collections in our museums,

and others were not less favourably impressed by our modern English buildings.

Herr Otto Wagner (Austria) said he felt it an honour to greet the august assembly, and on behalf of himself and his fellow-countrymen, he expressed his pleasure at the opportunity afforded by his English *confrères* for the discussion of interesting questions both artistic and scientific relating to the art of architecture.

Monsieur J. J. Caluwaerts (Belgium) expressed his best wishes for the success of the Congress, and gracefully greeted all present, especially the foreigners. He hoped that the questions to be discussed might receive satisfactory solutions. He was pleased to know that many of his fellow-countrymen were present, and, in their name and his own, he wished to tell his English *confrères* how much Belgians admire English buildings, and he enumerated various specimens. He congratulated English architects on the modern buildings in which they showed themselves to be worthy followers of their great forerunners, and he laid great stress on the splendid collections in London museums.

Mynheer J. T. Cuypers (Holland) reminded the assembly that his own late King had been received many years ago in this same hall, and he welcomed the present occasion as a further sign of international fraternity. He called to mind that there are many bonds of sympathy between Holland and England, and that various points of similarity in the design of houses and furniture are an added proof of the community of feeling which exists between the two countries.

Monsieur H. Daumet (France) expressed his pleasure at representing not only his country in general, but the Ecole des Beaux-Arts in particular. He paid homage to King Edward, and pointed out how the presence of the King's sister was another sign of Royal sympathy for art. He laid great stress on how the importance of its architecture testifies to the greatness of a nation, and how the progress of civilisation is assisted by the buildings raised for the advancement of education, art, and science. He also congratulated us on the unrivalled collection of classic work in the British Museum, and the benefit which must accrue to students from the observation of those superb models.

Herr H. Muthesius (Germany), speaking in English, said that, in the name of German architects, he returned sincere thanks for the kind invitation which brought them there, and the kind words of welcome addressed to them. German architects attached considerable importance to the transactions of the Congress, and they looked forward to getting a greater knowledge of English work and art, and that had induced some of them to accept the invitation to the Congress. They all knew that English architecture was full of interest and merit, and of great international importance. They knew especially how much the world had to learn from England in domestic architecture from which ideas were emanating and revolutionising the whole world of architecture; and if he might be allowed to express a wish at the beginning of the Congress, it would be to suggest that foreign representatives should be shown specimens of the best English domestic architecture of the day. He hoped that the Congress would be as great a success in the architectural sense as in the sense of establishing a cordial feeling between all the nations represented there that day.

Monsieur M. A. Metaxas (Greece) expressed the thanks of the Greek Government for the honour of an invitation to attend the Congress, and cordially hoped for the success of the same.

Monsieur J. Berczik (Hungary) echoed the same sentiments.

Professor d'Andrade (Italy) brought the greetings of the Italian Government, and expressed his sense of the honour conferred on him as its representative. He said that the compatriots of Michelangelo and Bramante were looking forward with much pleasure to seeing the work of the English masters. He hoped that the Congress would contribute to the increase of friendship between the nations, no less than to the advancement of art and science.

Mr. S. Chujo (Japan) said it was a great honour to be present and to address the Congress. The Congress was international, and it showed the necessity for the common

brotherhood of the art, and of the human happiness of the world. Japan, like other nations, had its own national architecture, which was very different from the architecture of western nations; but western civilisation had brought a change in Japan in many respects, and architecture had to play its part in that change. They would watch the growth of architecture in their country, and would strive to influence it in the proper direction. He hoped to see a future Congress in Japan, and to see them all there.

Senhor Ventura Terra (Portugal) expressed the honour he felt it to address the meeting, reminded his hearers of the friendship existing between the Sovereigns of the two countries, and hoped that those feelings were shared by the nation at large no less than by his *confrères*. It was particularly agreeable for himself to voice these friendly feelings, and to acknowledge the pleasure he experienced at being in this country.

M. Boker (Russia), who spoke in excellent English, said he had the honour to convey to the Institute of British Architects the cordial greeting of the Imperial Society of Russia, and to return thanks to the Institute for the invitation to attend the Congress. Most respectfully he expressed their profound gratitude to His Royal Highness the King for consenting to become the President of the Congress, which showed the interest the King took in the progress of their art. He (the speaker) personally appreciated the privilege of meeting so many distinguished architects assembled from all parts of the world to discuss architectural questions of universal importance and interest, and he knew from past experience how warm-hearted and sympathetic was the welcome hospitable Englishmen invariably extended to all foreigners, and he could not help feeling impressed by the cordial reception in this the greatest city the world had ever seen. He wished prosperity and long life to the Royal Institute of British Architects.

Señor Don Velasquez Bosco (Spain), in a more lengthy speech than most of the others, said he found it a most agreeable task to bring the greetings of his society in particular, and of his *confrères* in general. He expressed a hope that the Congress would increase the friendship and kindness which had so long existed between our countries.

Professor Clason (Sweden) made quite the most flattering speech of all the representatives. He expressed his pleasure at being sent by the Swedish Government and his thanks to the Institute for their kind invitation. He was glad of the opportunity given him to voice his great sympathy with, and admiration of, the taste and skill displayed by the English in their architecture. He was sure that he spoke in the name of all the visitors when he gave expression to the pleasure they felt in observing how the designs were based on historical tradition, combined with rational construction. And he was sure that a Congress organised by such past masters could not fail to be an equal success.

Mr. George B. Post (United States) said it was a distinguished honour to represent his country on the occasion. He had lived long enough to see the development in America from nothing of the great profession of architecture. He well remembered the time when the architect in America was a man of no consideration—as a man of affairs, as an engineer, and, still less, as an artist. To-day architects in America were numbered by thousands—men engaged in all matters connected with building, and they were respected by the community. As representing for the time the architects of his own country he desired to pledge them to do their best for the advancement and the ultimate perfection of the art they loved—the most exacting and the most comprehensive of the arts.

Inaugural Speech by the Duke of Argyll.

The Duke of Argyll said he should emulate the brevity of the foreign delegates, whom, on their behalf—and the Princess associated herself with him—he most cordially welcomed, and he hoped they would spend a very pleasant time in England. The Princess had never been so greatly daring as to make designs and become the architect of any great building, but it had been her pride to interest herself in the sister art of sculpture. It was a very great pleasure to converse with

an architect, for in doing so one had a feeling as if one were building a house—one of the joys of this life. It was a joy if one built it with one's own gold, and so much the greater joy if one could build it with one's friends' gold, and if one could dip one's hand into the Treasury and build it with the money of the public purse, that was the supreme joy of all. Architecture was a great art, one which allowed of no shirking. There was no such thing as impressionist architecture. It was an art which was thorough, real, and earnest. He did not think they need be ashamed of what they could show their friends from abroad in the shape of English architecture, notably perhaps in church architecture. One of the greatest of American generals, when asked what he liked best in his recollections of the old country, said, after a pause:—"The seven lancet windows of York Minster." But in other buildings he thought we could hold our own, as we did in that Guildhall, and under the shadow of the fabrics erected by Wren and by Barry. We must, however, remember the country from which so much of our inspiration came—namely, Italy. It was, after all, not so very long since we were a province of Rome, and beneath the surface of this country, if one were to dig down, there would be found any amount of Samian pottery and other indications of the Italian people whence we got our inspirations. They, on their side, were indebted to the colonists who came to them from Egypt and also from Greece. When they thought of Italy, they must think of the magnificent mediæval fortresses and fortress houses in Genoa, in Florence, and in Rome. And then, again, when they thought of France, let them think of those marvellous châteaux on the Loire and elsewhere. Let them think again of the triumphs of Spain, of the Escorial, and of other magnificent buildings, not to speak of those in the Low Countries nearer home. In the future it might be surmised that, in our domestic architecture, we should be compelled by our motor-omnibuses and our traction engines to go back to a more ancient system of architecture—namely, rooms within a court. And there was another great development which he did not think had been alluded to—i.e., in buildings which could not strictly be called architecture—and that was in the curious fabrics arising here and in America—buildings in a steel cradle. We had had experience of the disastrous effect of earthquakes on buildings—recently in San Francisco—and such structures as these seemed to stand earth tremors better than others, and it might be that buildings would be built like the earth itself, with rock and with steel running through it, and buildings of this kind might become a feature of future architecture. He hoped they would meet the present company again—in another country, if not in this.

Mr. Belcher then proposed a vote of thanks to H.R.H. the Princess Louise and His Grace the Duke of Argyll for their kind interest in the Congress. They were grateful to the Princess for her thought and interest and sympathy in architecture as a fine art, and to the Duke for presiding, and for his remarks.

The vote of thanks, having been heartily agreed to.

The Duke replied, and mentioned that, by the courtesy of the Lord Mayor and Corporation, the Guildhall Art Gallery, containing a valuable collection of works of Belgian painters, was thrown open to members of the Congress.

The proceedings then terminated.

At the close of the proceedings the foreign representatives were successively presented to the Princess, who shook hands with each of them.

Soirée at Burlington House.

The reception given by the President and members of the Royal Academy at Burlington House in the evening was very largely attended, but calls for no special description; it was on the same lines as the usual Royal Academy Soirée—a band playing in the Lecture-room, a continual circulation of visitors through the galleries, and a liberal provision of refreshments downstairs. Every one arrived much at the same time, so that there was a crush at entering, but otherwise the rooms were at no time inconveniently crowded.

TUESDAY'S PROCEEDINGS.

The proceedings of the Congress were resumed on Tuesday, when meetings were held in the rooms of the Royal Institute of British Architects, No. 9, Conduit Street, and in the Grafton Galleries. At the Institute rooms Mr. Reginald Blomfield presided, and the first paper read was by M. Honoré Daumet, Membre de l'Institut de France, and the title of his paper was "Notice sur le Château de Saint-Germain." Signor Cannizzaro was the foreign chairman, and the hon. secretaries of the meeting were M. C. V. Bartaumieux, Paris, and Mr. Harbottle Reed, England.

In introducing the lecturer, the chairman said he had great pleasure in introducing to them a very distinguished architect, who had been good enough to be present that day. He was the doyen of the Institute of France, and fifty years ago he won the Grand Prix, and his career since then had amply fulfilled the brilliant promise of fifty years ago. Both as a scholar in architecture and as an architect he had done distinguished work. He had practically rebuilt Chantilly, and for a good many years he had been engaged on the great historical Château de Saint-Germain. That building was second only to Fontainebleau in historical interest, and it was of peculiar interest to Englishmen because it was the last refuge of the Stuarts, and for many years it was a rallying place for all the followers of that unfortunate family. M. Daumet had a great deal of interest to tell, and there was no one who knew more about the building than he did.

M. Daumet then read his paper, of which the following is an abstract:

Château de Saint-Germain.

The origin of the Château de Saint-Germain-en-Laye, one of the most important that France possesses, is not known for a certainty. The kings of the first two lines probably came to indulge in the pleasure of hunting in the vast forests which covered the hills at the foot of which flows the Seine, but there is no certainty that they had any buildings there. King Robert I., in the beginning of the eleventh century, founded a church on the high land which dominates the village of Pecq. It is only in the twelfth century that there are positive proofs that there existed a royal residence on the spot where stands the present castle. Louis VI., who reigned from 1108 to 1137, is the first sovereign from whom an authentic document makes known to us his presence at Saint-Germain. His successors made frequent sojourns there; Louis VII., for instance, who resided there in 1143, and held a conference with Henry II., King of England; Philippe Augustus, who made his will there and built the first chapel of the castle. Saint Louis resided there in 1247, the Latin Emperor of Constantinople, Baldwin II., who made him a present of relics of the Passion. In order to enshrine them the pious monarch gave orders to build the Sainte Chapelle of the Palace in Paris.

The castle of Saint-Germain was therefore already during the thirteenth century an important royal residence; it was then composed, besides a dungeon, of two blocks of buildings for habitation, placed one in continuation of the other, the foundations of which still exist, and which have been recognised as such by excavations. The chapel of Philippe Augustus being found insufficient, it was replaced in the reign of St. Louis, between 1230 and 1240, by a more sumptuous building, which has remained almost intact until the present time. This is a piece of architecture of remarkable beauty, the merit of which may perhaps be attributed to Pierre de Montereau, who during the same period built part of the abbey church at St. Denis, certain details of the two monuments being identical.

Inhabited successively by Philippe the Bold, Philippe le Bel, and Philippe of Valois, surrounded by a park, the first mention of which is to be found in 1331, the castle was burnt during the English invasion in 1346, but it was not completely destroyed. The chapel fortunately escaped the fire, and steps were soon taken to rebuild from its ruins and to enlarge a residence where the various successive sovereigns were so fond of staying. Charles V. seems to have been particularly fond of the place, and we know that he had

important work carried out there; it is to him that we owe the present circumvallation wall which incloses in its perimeter the big dungeon built by Louis VI., and the chapel by St. Louis. This wall, which is fortified in the manner of the period, had the form of an irregular pentagon; it was afterwards used as a sort of sub-basement for the building erected under the reign of Francis I., the castle was inhabited still by Charles VI., the castle was during several years occupied by an English garrison. Subsequently it remained uninhabited during the end of the fifteenth and the beginning of the sixteenth century.

Francis I. gave orders to rebuild it and to follow the surrounding wall of Charles V. The new buildings must have risen quickly, the simplest materials being used for them. The work of the Middle Ages disappeared almost completely, with the exception of the chapel, which was left standing, but which was partly hidden on the side of the apsis by new constructions, whilst the rose window was obscured and crushed by the wall of the Salle des Fêtes, a magnificent hall illustrated in Du Cerceau's precious work, *The Most Excellent Buildings in France*, the original drawings of which are now the property of the British Museum. Du Cerceau does not give the name of the architect who worked under the orders of Francis I., but it is safe to affirm that he was an innovator, because there exists no other type of architecture similar to the work he produced. To convince oneself of this it is sufficient to look at the very original aspect of the exterior, the beauty of the staircases and of the vaults which have been preserved, the majesty and the vastness of proportions of the salle des fêtes, called the Salle de Mars, where the great royal assemblies were held, as well as the festivals rendered so brilliant by the luxury and the elegance which distinguished the Court of the Valois. Henry II., like his father, was fond of Saint-Germain. Philibert Delorme changed the arrangements of the chapel, and Guillaume Marchant began to build the Château Neuf, whence an admirable view was afforded over the Seine Valley. Of the Château Neuf nothing but a pavilion has been preserved, called the Henry II. Pavilion, which contains on the ground floor a curious hall of rustic architecture. In order to put the two buildings, into easy communication, a door was made in the southern part of the Vieux Château building which was surmounted by a very fine piece of sculpture, now placed in the Louvre Museum, and which has been faithfully reproduced above the present entrance. The last Valois did not often stay at Saint-Germain so far as can be ascertained. Louis XIV. took refuge there during the Fronde, and there passed nearly all his youth. By his order James Hardouin Mansart added to the castle five large pavilions which completely altered its exterior aspect. The beautiful and original order invented by the master of works of the Renaissance period doubtless impressed the architect of the seventeenth century, who imitated him—a very remarkable fact for that time. Balconies in wrought iron supported by rich consoles were run all round, and the patrols' beats of the Middle Ages were converted into terraces. The castle with its wings built in this manner covered double the former area, and the Court of a luxurious king with his numerous retinue was able to be in residence there. Assemblies were held in the Château, and it is there that were celebrated especially the feasts on the occasion of the christening of the Grand Dauphin, the exact representation of which is preserved to us in engravings of the period.

Being deserted for Versailles, Saint-Germain, since 1689, gave refuge to an unfortunate king. The family of the Stuarts received there the hospitality of Louis XIV. James II. died there in 1701, and his wife Marie d'Este in 1718.

From that time onward the Vieux Château only plays a historic part. Its magnificent Salle des Fêtes was sometimes used for theatrical performances. In 1805 there was a project for establishing a hospital with 800 beds there; later on an cavalry school was established in the building; then it became a military barrack and a military penitentiary. It was only in 1862 that the architect Eugene Millet started the work of restoration which is still going on. The Museum

of National Antiquities, which has been installed in the Castle of Saint-Germain, is a guarantee for the preservation of a monument precious on account of the memories it recalls and for the material traces that French art of the best periods has left there in spite of the alterations and mutilations.

The chairman said they had listened to a most delightful paper, but he did not propose to detain them with any remarks of his own, for time was rather short and there were other papers to follow at eleven o'clock. Everyone would have liked to hear M. Daumet at greater length on a subject with which he was so thoroughly conversant.

There being no discussion on the paper, Mr. R. Phénix Spiers, who spoke in French, said he had been asked to propose a vote of thanks to M. Daumet for the valuable address which he had prepared, and he should have preferred to speak in his own natural language, but as the greater number of those in that room were, if not French, able to understand French better than English, he ventured to propose the vote of thanks in that language. It was not necessary that he should point to the fact, of which they had been able to judge themselves, that M. Daumet had put his heart in this work, which he had had in hand for some years, and some of his life had been passed in working out the problems connected with the buildings and reconstruction and the various changes which had been made in it. In the course of his work at the Château he had been able to make some remarkable discoveries—discoveries which would be of great interest, and he trusted it would be possible to publish a plan of what M. Daumet had found. He had the advantage of going through the building some two years ago with M. Daumet, and seeing all the drawings illustrating it. If a plan could be published it would render the description much more intelligible—a description which dealt with every historical point on which it was possible to throw any fresh light. They owed M. Daumet great thanks for coming there and giving them that discourse, and especially for the elaboration in it.

Signor Cannizzaro seconded, and said that they all knew the work of M. Daumet at Saint-Germain. M. Daumet had given them the best example of what ought to be done in a work of restoration. First of all he made himself familiar with the spirit of the time in which the building was erected, and thus, in carrying out the work of restoration, he was able to do the work as though it were being done by the original builders. That was the proper method to follow in restorations of this kind. He thanked M. Daumet not only for his architectural work, but also for his archaeological labours.

Mr. E. W. Hudson supported the vote of thanks, and said he agreed with what Mr. Spiers had said as to the one thing wanted to complete their satisfaction being a plan and some illustrations. It was very interesting to him to hear a description of this building, as he understood part of it was the work of Pierre de Montreuil. It seemed that there was some remarkable sculpture work in the keystones of the vaulting, especially the head of St. Louis in stone, and it would be most interesting to have illustrations of the sculpture for the R.I. Journal.

Lieut.-Col. Prendergast said he desired to associate himself with what had been said by Mr. Spiers. This was no ordinary occasion. It was an international congress of architects, and they were very grateful to those who had come long distances to help them in that which was the backbone of their existence, i.e., the love of architecture. Naturally enough, the first paper came from our friends across the channel, our nearest neighbours. We owe a great deal to France in our architectural work, and he associated himself with the thanks to M. Daumet for his most interesting paper.

The vote of thanks was heartily agreed to. M. Daumet briefly replied, remarking that he was going to issue a work on Saint-Germain with illustrations.

The sitting then concluded.

The Execution of Important Government and Municipal Architectural Work by Salaried Officials.

Another meeting was then commenced in

the same room, under the chairmanship of Mr. John Slater, when papers on this subject were read.

Mr. Slater said it was his pleasure and honour to share the chair with one of the most distinguished architects of Spain, M. E. M. Repulles y. Vargas, of Madrid, whom he had much pleasure in introducing to them.

Mr. Slater then vacated the chair for M. Repulles y. Vargas. The hon. secretaries were Mr. G. H. Fellows Prynn, England, and Herr Hans Peschl, Austria. Mr. Dircks of the Institute was also assisting at this and the previous meeting.

M. Repulles y. Vargas thanked the Congress in the name of Spain for the honour which they had done him in electing him to the chair, and asked Mr. Slater to read a paper by Herr Otto Wagner, Imperial and Royal Superintendent of Works and Professor of the Imperial and Royal Academy of Plastic Arts, on the "Execution of Important Government and Municipal Architectural Work by Salaried Officials."

Mr. Slater then read the following abstract of the paper in the absence of the author. The paper was on behalf of the Society of Austrian Architects:—

It will be convenient to give first a clear definition of the word "architect" and also some explanation of the process of development of the architect, because all the differences of opinion are more or less rooted in the wrongful acceptance of these conceptions.

With regard to the way in which the architect is developed, it must be taken into consideration that artistic capacities, such as manual proficiency, imagination, taste, individuality, and a certain gift for invention, are faculties which the architect must possess in his quality as an artist, but which cannot be learnt. On the other hand, there are a general culture and a technical and instructive knowledge, which the architect must also possess, but which can be acquired by study.

The amount of scientific knowledge to be acquired by the architect has reached such vast proportions that it has to be divided into parts, consequently into branches of knowledge. For this reason alone it is not possible for the young man who wants to become an architect to acquire full knowledge of all these special branches, since the time at his disposal, and the intellectual receptivity of the individual, are limited.

The architect, during the whole of his professional activity, will cultivate first of all the region of art, which nowadays even in literature has become of a very wide range. But as, at the same time, he is expected to have full knowledge of all technical innovations, his technical and scientific education should extend so far that he will be able to understand the essence of the sciences and their progress, and that this understanding will enable him in his practical work to put the results of human progress at the service of art.

His technical education must, moreover, enable him to choose the proper methods of construction and the most convenient materials to be employed. Nay more, his knowledge, aided by his inborn inventiveness, must enable him to combine new forms of construction, or to vary existing ones so that they shall answer fully the purposes for which they are required. From this it follows that the practical work and experience which the architect gains in the course of his career must be based upon a sufficiently wide knowledge.

Only after having acquired a complete technical education can the question be decided whether the aspirant to the profession of an architect possesses those inborn qualities from which may be anticipated success in following this career.

There is, therefore, a sharply-marked limit in the course of education of the architect. This limit, as already said, lies naturally between the acquired complete technical education and the entering into an academy of plastic art.

It is the duty of the academy, or rather of the professors teaching in such an institution, to examine and to decide whether or not the student possesses the inborn faculties enumerated above.

It cannot be too strongly recommended to such professors to use the utmost severity in this examination, because the result of it

will have a great influence upon the general artistic standard of the profession, and because it is only by this method that that class of pseudo-architects who in our days intrude on the profession, to the discredit of art as well as artists, can be made to disappear from the scene.

We take the liberty to advise those civilised States, the schools of which make it possible to every student who has gone through the technical studies to choose the profession of an architect, even if he has absolutely no artistic aptitude for it, to discontinue this practice.

We wish particularly to point out that for architects there can be only one school, viz., an academy of the plastic art; an academy for this reason, that art cannot be taught, and consequently cannot be admitted as a scientific subject in any course of studies, and because artistic education only consists in this, that the master shows to the art pupil the right way to perfection, and encourages him by his own activity to enter on this path.

It is, therefore, absolutely wrong for technical high schools and schools for artistic trades to admit in their plan of studies the tuition of architecture, because, owing to the students not being tested as to their aptitude for the profession, an absolutely inferior standard of architecture is created.

From what has been said so far it follows that the architect is an artist with a scientific education.

By the studies of technical matters successfully gone through by the pupil, and with the academical apprenticeship, the requirements for the architect are not yet, however, exhausted. The student is still lacking practical activity and the experience which results from it.

If the apprenticeship of the architect is an exceedingly long one, it will certainly be very considerably extended by the period he is acquiring practical knowledge in an architect's office.

In this section of the apprenticeship of an architect (his apprenticeship really ends only with his death), he stands once more at the parting of the ways in the progress of his education: that is to say, which way do his capacities lie? Circumstances, etc., lead him to the point either to accept the struggle for existence or to enter into the safe haven of a salaried position. Here his artistic capacity plays the main part, because the greater it is, the more easily will he be able to refuse the enticing bonds of a fixed position, unless it be a professorship.

The curriculum of education of the architect so far sketched is the normal one, but we would remark at once at this stage that it is certainly not the only one, and that there will be sufficiently numerous cases in which the inborn capacities of the architect, in other words his talents, are so great that a lack of scientific education is hardly of any importance.

This fact, as well as that other, that there is no limit of talent either in more or in less—further, the fact, which it is impossible to dispute, that the first architects in the world in a great many cases are not agreed on the question as to what constitutes an architect, give the certain proof that the title of architect cannot be protected by letters patent, and that a judgment of artistic qualities is possible only by the artists themselves, consequently by the grouping of the artists among themselves.

In the latter circumstance we find also the proof that municipal and State administrations are not even in a position to make the proper choice of an artist to fill an office.

Still another important factor comes into consideration for making such a choice. The architect appointed to an office will, while occupying it, certainly not play the leading part. His individuality, his taste, etc., must therefore subordinate themselves to the same qualities in his superior, or even of more than one superior. The works carried out under the supervision of the office would therefore not show the capacities, the taste, and individuality of the creating artist, but certainly the less valuable ones of his superiors, and as such superiors in most cases are laymen in questions of art, and often even in technical matters, it will be hardly necessary to give any more reasons why from such a combination no good can come.

variety of other buildings. The bureau employed a varying number of draughtsmen and clerks, from 125 to perhaps 250, depending on the work in hand. Congress this year had appropriated \$39,000,000 for federal buildings, which would go through this office. It was in order to try to place this enormous amount of work in the hands of the private architects that the Tarsney Act was passed. In connection with this subject he begged to recall to those members present at the Brussels Congress in 1897 that he brought up the subject of "Best Methods of Obtaining Designs for Government Buildings," that the Congress appointed a special committee to consider the matter, and presented the following resolution, which was adopted by the Congress: "It is desirable that the construction of public buildings shall be confined to private architects, chosen by public or private competition, or otherwise, and that the architects superintend the erection of the works, but under the direction of the Government." This was after the passage of the Act, but before any work was given out under it. As a delegate from the Government, recommended by Mr. Tynman J. Gage, the Secretary of the Treasury, he had the honour of presenting the conclusions of the Congress of 1897 to him, and he was informed it helped to influence him to put into effect the Tarsney Act as proposed and urged by the American Institute of Architects. He would give but a *resumé* of the work done under this Act; a more detailed account, prepared by Mr. Brown, might be found in the May number of the "Brick-binder" for this year. The American Institute of Architects as far back as 1875 formulated a bill to regulate and improve the federal practice; modifications were made to this until Feb. 20th, 1893, when it became a law. In brief, it gave to the Secretary of the Treasury the power, at his discretion, to obtain designs for federal buildings by competition, stipulating that at least five competitors should be selected in each competition, and that the general supervision should be under the office of the Superintendent Architect. This Act was passed in 1893, but through some misunderstanding with Mr. Carlisle, then Secretary, it was not put into effect until after his successor, Mr. Tynman J. Gage, held the first competition in August, 1897. It was interesting to note that since that date twenty-two competitions had been held for building, varying in cost from \$100,000 to \$4,000,000. It was a great gratification to the profession at large in America that these competitions had always been fairly and unbiassedly judged, and that in perhaps every case the best scheme submitted was selected. In addition to his remarks he should like to request that a list of the regulations of the competitions, which he would not read, might be printed in the Proceedings of the Congress. Further, this Bill had had a salutary influence upon other departments of the Government and municipal authorities, and is bringing about better results and placing.

Professor V. Nagy, Hungary, said he was a Professor of Architecture, and he felt that unless a young architect had an opportunity of cultivating his talents after leaving school much of his ability was lost. If the young designer who entered an office had no opportunity of acquiring that knowledge of his art which was necessary to make a good architect, he would become a superior in time so far as position was concerned, but he would remain what he was so far as matters of art and construction were concerned. He would be fitted to do only the work of the office. He agreed with Herr Wagner's conclusion that important Government buildings should be the work of eminent architects only, and not of officials. There was a danger of young architects entering a municipal office becoming indifferent to art. He agreed that officials should not make designs for public works.

Mr. F. E. P. Edwards, of Bradford, said it seemed to him that the title of the subject was just a little wrong. The title barred the way altogether to the possibilities of any good coming out of the work done by salaried officials as such. He took it that the real intention and the real ground upon which this subject was founded was the question of important municipal and public work being carried out by engineers and surveyors. He

should like that to be made clear from the chair, i.e., as to whether that was really the basis of the subject they were discussing or not. He might say at once that he was a salaried official, but before that he hoped he was an architect, and with regard to work which was done by official architects in this country as such, he ventured to think that a number of instances could be quoted, with out being personal in the matter, of most excellent work having been done by official architects. In north, east, south, and west in this country, and in the metropolis itself, there was excellent work being done by official architects, and therefore he ventured to ask that the subject be put upon a little clearer basis. They all knew that the style of work and the style of design and plan which was carried out by the municipal engineer and surveyor with a staff of two or three architectural draughtsmen was not what was aimed at all. They aimed at something very different. He had written to the secretary of the Institute before, asking that when this matter was discussed at the Institute that this should be clearly differentiated. He ventured to go a little further and to say that he thought that at the bottom of the whole thing was the fear that their living was being taken away from them. If the experience of a large body like the Architectural Department of the London County Council was that their work could be carried out at less than by the usual commission paid to an architect, that was a strong inducement to the employer when making such an appointment. He thought himself that the whole evil arose from the fact that there were too many young fellows taken into architects' offices as premium pupils, who, after two or three or five years, were turned loose and had to get their living somehow. Up North there were so many of these young fellows about that private firms who had architectural work to be done, and who did not care about the artistic side of such work, saw that their work—mills, boiler-houses, etc.—could be done cheaper by employing these young fellows. He knew numerous instances in Yorkshire where private firms employed architects on the staff—he did not know what salaries they paid; he presumed it was a living salary, and it might be a good salary. All this proceeded from the fact that there were too many pupils, and the parents of young fellows did not properly realise the responsibility which attached to them in putting their sons into a profession which they had not the slightest aptitude for. It was too late to reconsider the matter when the young fellow was twenty-two or twenty-three, and the result was that there were a good many architects—good, bad, and indifferent—and they had to make a living. He put that forward with all deference for their consideration, for he thought that the question they were discussing was intimately bound up with that of the present system of pupilage.

Mr. A. W. Weissman, Holland, said he was once an official architect, but now he was a private architect, and he did not know if it made much difference whether a man was an official or a private architect. It depended on the gifts a man had. If a private architect had no gifts, and if the official architect had, then he should prefer the official architect. There were architects in Holland who did not put a line on paper; their young pupils did that, and he hoped such practices did not take place in England. Perhaps they did, but in any case they did elsewhere. The thing was, if a man had talent it made no difference whether he was an official or a private architect. They could not say in general that no official architect should make great and important buildings; it all depended on whether the man had the gifts to make them.

Mr. A. B. Plummer, Newcastle-on-Tyne, said that as hon. secretary of an allied society to the Institute he might say that they in the provinces at all events in England felt that the subject was of the utmost importance. While he agreed with the last speaker that he would prefer an official architect with ability to a non-official architect without ability, he would still more prefer a non-official with ability to an official with ability. In many of our large centres we had non-official architects with ability who did not have much opportunity of carry-

ing out municipal work. He did not know whether the discussion was limited to important municipal buildings, but in the provinces it seemed to them that official architects and engineers and surveyors, who had no one to criticise or supervise, and who took private practice, could practically pass their own work; whereas the practising architect was criticised and had his work rejected by the gentlemen in question. In the provinces it was a temptation to people wanting to employ an architect to go to the official architect to do their work when they knew that that official would be able to pass that work. If the Congress could do something to make it illegal for salaried officials to practise as private architects it would have done good. The matter required serious consideration. They did not object to an able architect acting as a city architect, say, but they objected to the salaried official competing, in his private capacity, with private practitioners. That was what they complained of. As to it being cheaper for a large municipality or Government to carry out work by a big staff, that might be so in some cases, but in the provinces it was not so. Say an architect carried out a council school; when the work was completed the expense to the municipality ceased; whereas a municipality keeping up a staff had to keep that staff going when the work was finished, and whether there was work or not. Often a practising architect was an expert in some municipal work, and the municipal architect was not an expert in that work, and it was to the interest of the ratepayers that the various corporations and other public bodies should be able to obtain the best advice. We knew there were men who had made a special study of special work, and to have such work put in the hands of salaried officials because they were officials could not be to the advantage of the ratepayers. He hoped the question would be pressed forward. In the provinces the practising architect was suffering severely, and increasingly severely, in the matter.

Mr. G. H. Fellowes Pryne said the subject was one of the most important which could be brought before the Congress. It was a subject which touched every practising architect in these days, when there were so many public bodies in England and abroad. In England we suffered from the disadvantage of not having a Minister of Fine Arts, nor had we any sort of Jury of Fine Arts, and therefore in England perhaps more than in the Continent—and he trusted more than in the United States—we suffered from officialism. The matter had been so clearly dealt with in the three papers that it did not need much debating to see how detrimental the present system was. Mr. Oscar Simon summed up the whole matter when he said that there were two good reasons against the giving of important municipal architectural work to salaried officials, i.e., that it was neither for the good of the administration or for the good of the public. Those two reasons were very distinct, and they were absolutely true. There was a large amount of work which was good, and must be good, coming as it did from good men who had been appointed to official positions. At the same time, as Mr. Plummer said, these officials not only acted in their official capacity, but as to their own work they had a large staff of clerks who were paid by the municipality by whom they were employed; and, as had been said, a large amount of the work turned out was done by salaried clerks and not by the architects themselves. An official was too often taken up by his official duties. Think of the enormous amount of official work which had to be got through before the official architect could touch the artistic side of the work of architecture! And think of the amount of time one gave to one's designs when interested in even a small work, let alone a work of national importance! One's whole time was taken up in throwing oneself into the design, and this was utterly inconsistent with the carrying out of official duties of an important and complex character in addition. He would go even further. In large corporations in England, and he supposed elsewhere—take such a body as the Ecclesiastical Commissioners, for instance—where a man had the power of criticising and altering other men's plans, or even of throwing them aside (often rightly so and with great advantage), it was,

however, a dangerous thing to give this power where the official had the power also of taking private work, as well as the work connected with the body with which he was associated. It became a danger to the whole profession generally that it should be accepted as the right thing for salaried officials by right of their position to take up large public works of this character. Beyond that, it was surely bad for the art that the designs of an artist of any high instinct at all must be pulled about and altered by a number of men who, however willing to save the public purse, were not the least authorities on art; and it could not be denied that officials who, however good their designs might be in the first place, were terribly handicapped by the criticisms of this, that, and the other perfectly ignorant man, as to the artistic ideas in that design. He therefore hoped that the Congress or that meeting would not end without passing some definite resolution—a resolution put forward by that International Congress of Architects, and sent to the various Governments, expressing the opinion of the Congress. But, as had been said, it was all very well to pass such resolutions; they must go a little further and let it be known that these were the honest opinions of men working for the highest end, i.e., the advancement of the art of their country.

Mr. Maurice B. Adams said, as to what was intended by the words "salaried officials," he presumed that the majority of architects of the country would realise that the salaried officials aimed at were the engineers and road surveyors employed throughout the country by county councils and smaller bodies. If there were a fully qualified architect at the head of affairs of a big bureau or big institution, such as must be associated with a large county council, and if these public bodies found it was cheaper on behalf of the ratepayers to have such a bureau, it was useless for practising architects to protest against such an arrangement, except to point out in this regard to large bodies that it was scarcely possible, however great a man's artistic ability when he originally accepted such chief official position, for him to have retained that ability or have developed it; it must be knocked out of him by the various clerical and administrative detail work to do, and the original power as an architect or artist must necessarily be very much curtailed and injured by the process. Even if they agreed to the general tenor of what might be urged to the effect that the salaried architect was, or might be still, an artist it was scarcely possible to believe that he could produce such work as the man who was engaged as an independent architect, and who had produced works which would justify a Government or any other authority in inviting him to take part in a limited competition, or commission him to do the work as it was done in America. What they were desiring to impress upon the public was that it was not economical or good in any sense or form—quite apart from their individual interests as architects—for the ratepayers as well as architects that men trained as engineers and road surveyors were—in fact, by virtue of the very power they had to carry out those duties—to do the strictly architectural work they were constantly called upon to do. He thought that the Institute of Architects and the Congress should in the most unqualified way say that in the interests of architecture as a high art and in the interests of the ratepayers it was a bad thing that they should go on in this higgler-muggier way. The most expensive buildings were thus often erected by men for whom otherwise and personally one had the greatest regard. As architects they were not architects at all; such men employed, and were obliged to employ, young fellows who had a certain amount of artistic ability, but who had no practical capacity, and had failed to get into practice themselves. They were artistic ne'er-do-wells, who were thus employed from month to month, being kept on a long time at great public expense until all the details of payment, etc., were cleared up, because the engineer or the surveyor did not personally know anything about the matters in dispute. The extent of the expense was never known; it was impossible to know what the office

and establishment charges were. These young fellows were kept on until the whole work was cleared up, so that they could consult with the quantity surveyors as to extras and so on, whereas when a private architect was employed he was always available and the expense was curtailed. This matter was as a matter of fact mixed up with municipal trading; some public bodies could manage large establishments, labour bureaux, etc., but the rank and file could not; they kept on large staffs and actually created work at the expense of the ratepayers in order to keep the works department going. They must not, in considering the question, forget that there was a general tendency at the present time—at all events in England, he did not know how it was abroad—for municipalities to take on work which could more properly be done by private enterprise. He suggested that the meeting should clear up a little more definitely what they meant by "salaried officials," but he entirely sympathised with what Mr. Weissman said—if they had a good man, wherever you found him his personality would show itself. But he would go further and say that an architect in an official position with a personality was obliged to concern himself with some work which did not rightly belong to an architect as such, and that work would curtail his artistic work and hamper him to a considerable degree.

M. Jules de Berczik, Budapest, said that there seemed to be a hostile tendency towards architects occupying official positions. It would be undesirable if, in discussing the question, they were so unfortunate as to give currency to a view calculated to depreciate the general artistic ability and personal fitness of architects occupying official positions. It was well known that the artistic training of architects occupying official positions was the same as that of architects in private practice, and, seeing, as had been pointed out, that artistic ability was a purely personal gift, it would therefore be scarcely justifiable to deny all Government and municipal architects the right to take part as a private venture in artistic works. Nor, indeed, was this at all necessary in order to attain the object which he believed they all had in view. For it was not solely on administrative and economic grounds that the construction of important buildings by Government or municipal departments was to be objected to. It was eminently to the educational interest of the Government or municipality that monumental building should be as perfect as possible from an artistic standpoint, and should give impression to the educational progress as well as to the artistic education of the country. This object could, however, only be attained if all the best ability of the country was permitted to co-operate in the construction of these buildings. From this open competition no architect possessing formal and personal fitness should be excluded. He would therefore (in order to eliminate all personal considerations from the question) venture to propose that the Congress should pass the following resolution, i.e., that "Important municipal and Government buildings should not be constructed by municipal or State administration."

Mr. John Slater said that Mr. Edwards wished the particular wording of the question to be altered, but it was impossible, he was afraid, to do so, for Herr Wagner had submitted it as printed. But, as had been said, it was the principle they were fighting for, and it would be absurd to deny that in some cases, perhaps in many cases, the municipal architect was a man of knowledge and training and competent to carry out architectural work; but it was folly, and Herr Wagner had brought that out very clearly in his paper, to think that under ordinary circumstances an official architect could possibly have the time at his disposal for dealing with large municipal buildings which required an amount of thought and consideration in planning and arranging which his other duties made it impossible for him to give; and it was with that view that they were promulgating this question now, and he certainly agreed with Mr. Prymne when he said that they ought to endeavour to get an actual resolution passed and carried, which might have weight not only in this country but in all the countries represented at the Congress.

He called upon M. Poupinel to propose and Mr. Plummer to second such a resolution.

M. Poupinel then proposed the following resolution:—"That, in the future, in the interests of the administrations and the public, and in the higher interests of the art of architecture, public bodies, whether Government, provincial, or municipal, should entrust architectural works only to professional architects who may have special aptitude for the particular work or may have a renown which is incontestable, and that they should put an end to the employment of their own salaried officials in the subject under discussion."

Mr. Totten said that the subject under discussion was not put forward at the Brussels Congress, in 1897, as an official subject, but he presented it personally on behalf of his Government, and the conclusions adopted at that Congress, it seemed to him, were quite applicable to, and exactly followed, the lines of Herr Wagner's resolutions, and in accordance with what they should adopt that day. He suggested that the resolution adopted at the Congress of 1897 be accepted as the sense of this meeting. The resolution was that it was desirable that the erection of public buildings should be confined to private architects chosen by public or private competition or otherwise, and that the architects superintending the erection of the work shall be under the direction of the Government.

Mr. Slater asked if Mr. Totten could accept M. Poupinel's resolution.

Mr. Totten said not altogether. The two might be combined.

Mr. Plummer seconded M. Poupinel's resolution. He said they were agreed as to the character of the resolution.

Mr. Adams suggested that the last line would be better as an expression of opinion. The part as to officials engaging in private practice would come rather badly in connexion with the previous part. They were all agreed about it, but he thought it would be better put separately.

Mr. W. E. Riley said they were not all agreed about it at all. They wanted to hear what it meant.

A speaker said that in that case it would be better to put the latter part separately. It would only come as an expression of opinion. Several other gentlemen also expressed similar opinions, one remarking that the first part of the resolution would be carried unanimously and the second part not so unanimously.

M. Poupinel agreed to separate the resolution as proposed, ending the first resolution at the word "incontestable."

Mr. Prymne said the resolution was not quite happy yet. He thought they might accept as an addition, "by competition or otherwise," for they did not want to shut out the genius who might not be known and men who were really clever, otherwise men would not come forward at all.

Mr. Riley said he moved that the words, "by qualified architects," be inserted.

Herr Bodo Elhardt (Berlin) said that Germans had had long wars on this subject, and it was found impossible to say that an official architect could not have genius because he was an official, and they had agreed that a competition should be the way to find the man to plan a work, and that all big works should be submitted to architects generally.

Mr. Riley said that he would be disposed to accept that if it was the sense of the meeting, but he should like it made quite plain that officials should not be excluded. He did not know what the official had done to be treated in the way proposed. The official was what he was by circumstances. He was there in that way as was any architect in the same circumstances in the position he occupied. He begged the Congress not to come irrationally to the conclusion that because a man was an official that he should be excluded from the proper discharge of his work. He moved that the resolution should not exclude the qualified official.

Mr. Leverton seconded.

M. Poupinel said that his resolution did not exclude the official if Mr. Prymne's addition were agreed to.

Mr. Riley said that if that were so he would accept it.

Mr. Slater then read the resolution again, with Mr. Prymne's addition, i.e., "by competition or otherwise."

Mr. Riley said he had no complaint with that.

Mr. Totten said that they had lost sight of the main question, which was the method of executing public works of architecture. One side had presented that it might be done by salaried officials quite as well as by private architects, and the other side had maintained that public officials were occupied too much by other duties to have the time to give to designing works of art. According to what was now proposed, anyone could do these works so long as he had some reputation.

Mr. Riley: Only architects.

Mr. Totten: The general broad question of what was the best way for the art of having work executed—was it by entrusting it to men who occupied positions as officials or to men who had some authority in art? He did not think the resolution covered it, and he did not think the question should be settled by a small meeting, such as that had become. He moved that the matter be referred to a small committee to formulate the resolution, and that it be dealt with later on.

Mr. Riley asked if the motion was in order?

Mr. Slater said it was in order, but he did not see how the motion could be given effect for want of time.

Mr. Totten said the matter could be disposed of in half an hour the following morning if the proposed committee dealt with the form of resolution.

Mr. Prynn said that if they had to give a vote then, the words, "salaried officials," ought to be included in the resolution.

Mr. E. Harper moved that the discussion be adjourned until the following morning at 9.15.

Mr. Totten seconded.

Mr. Fawcett said that if they adjourned they would not get half the present audience, who had heard the arguments.

Mr. Slater: Quite true, but half the audience have left who have heard.

The motion to adjourn was then put and lost.

Mr. Slater then put the original resolution, as amended, i.e., "That, in the future, in the interests of the administrations and the public, and in the higher interests of the art of architecture, public bodies, whether Government, provincial, or municipal, should entrust works of architecture only to qualified professional architects either by competition or otherwise."

The motion was agreed to, and the proceedings terminated.

Steel and Reinforced Concrete.

This subject was considered at the meeting held at the Grafton Galleries under the chairmanship of Mr. Frank Miles Day (President of the American Institute).

The Chairman said that the subject for discussion was one of life interest. The subject of reinforced concrete was one which appealed to them from many points of view, whether it be from the economic view, the purely constructional view, or the yet more difficult of the appropriate expression of the material in the design. He was sure they had so many able speakers who would treat the subject from so many points of view that it would indeed be curious if they did not carry away with them much light upon the subject.

Mr. Searles-Wood read the report of the Joint Reinforced Concrete Committee as follows:—

The great and increasing use of reinforced concrete in buildings and other structures, and the need of having some authoritative pronouncement on the proper conditions of its use, have led the Royal Institute of British Architects, with the co-operation of other bodies, to appoint a Committee to inquire into the subject.

The members of the Committee are as follows:—

Nominated by the Royal Institute of British Architects:—Sir Henry Tanner, E.M. Office of Works; Professor W. C. Unwin, LL.D., F.R.S.; Charles F. Marsh, M.Inst.C.E.; A. T. Walmisley, M.Inst.C.E.; Max Clarke, F.R.I.B.A.; William Dunn, F.R.I.B.A.; H. D. Searles-Wood, F.R.I.B.A.; Colonel F. Winn, late R.E.

Nominated by the War Office:—Colonel C. B. Mayne, R.E., Assistant Director of

Fortifications and Works, War Office; Major E. M. Paul, R.E., Assoc.Inst.C.E., Instructor in Construction, School of Military Engineering, Chatham.

Nominated by the Incorporated Associations of Municipal and County Engineers:—A. E. Collins, M.Inst.C.E.; S. S. Platt, M.Inst.C.E.

Nominated by the District Surveyors' Association:—E. Dru Drury, F.R.I.B.A.; T. H. Watson, F.R.I.B.A.

Nominated by the Institute of Builders:—Benjamin I. Greenwood; Frank May, J.P.

The Committee has appointed Sir Henry Tanner as Chairman, Professor Unwin and Colonel Mayne as Vice-Chairmen, and Mr. H. D. Searles-Wood as Hon. Secretary.

It has appeared desirable to the Royal Institute that some statement be made before the International Congress of Architects in London as to the general scope and aim of the Committee, and the following outline is made with their approval:—

The aim of the Committee's deliberations is to prepare a report, stating their recommendations and conclusions as to:

1. What drawings and details should be prepared before work is commenced.

2. The nature of the materials which may be employed, and the standards to which these should comply; i.e.:—

(a) The metal in reinforcement.

(b) The matrix.

(c) The sand.

(d) The gravel, stone, clinker, or other aggregate.

(e) Water.

3. What are the proportions for concrete to be used in different cases.

4. How the ingredients for concrete are to be mixed and deposited on the work.

5. The distances to be allowed between the reinforcing bars and what covering of concrete is necessary.

6. What precautions are necessary in the design and erection of centring and false work, and how long the whole or portions of centring and false work should remain in position.

7. The rules which should be used in determining the dimensions of the several parts necessary for security, and what safe stresses should be allowed.

8. The supervision necessary and the special matters to which it should be directed.

9. The fire-resisting properties of reinforced concrete.

10. Its adaptability for structures where resistance to liquid pressure is essential, and what special precautions may be advisable under these conditions.

11. What are the necessary conditions for its permanence; resistance to rusting of metal, disintegration of concrete or effects of vibration.

12. The testing of the materials employed and of the finished structures.

13. What provisions are desirable in Building Laws or Government regulations relating to buildings and other structures, so far as these affect the use of reinforced concrete.

The Committee having been recently constituted, and only two meetings having been held, no conclusions have been arrived at, and members of the Congress are invited to send communications, either the results of experiments or other information or suggestions that may be of use.

Mr. E. P. Goodrich followed with his paper, of which the following is an abstract:

In choosing the subject of "Reinforced Concrete and its Relation to Fire-Protection," the writer had in mind the dual conditions necessary to the greatest immunity from fire in large building constructions, particularly where such have varied types of occupancy, together with correspondingly different manufacturing fire hazards.

The requisites are, first, the employment of the most incombustible materials and the assembling of these elements in such manner as will most effectively limit the spread of fire; secondly, the equipment of the building with such protective and extinguishing apparatus as a wide experience has determined most effective. Either of these essentials alone will accomplish a large measure of results, but to secure a maximum the combination is necessary.

An exemplification of such a combination is the tenant factory communal Company of Brooklyn, N.Y., U.S.A., for which reinforced

concrete has been adopted as the structural part of all buildings. These factories were especially designed to take advantage of all insurance regulations, and thus secure the minimum insurance rates on buildings and contents.

Associations of insurance companies in the United States have had the effect of standardising requirements. All the most important points thus developed were carefully considered in the design of the Bush Factories, which thus were provided with:—Special fire-walls, special stair and elevator shafts, waterproof floors, automatic fire-draws, a complete sprinkler equipment, windows of wire-glass in metal frames, etc.

The reinforced concrete design was prepared with special care as to the fire-resisting qualities of his (Mr. Goodrich's) system of reinforcement was devised, which proved effective and economical, not liable to derangement during construction, and especially advantageous because allowing of the use of special fire-resisting materials at points of greatest danger. The columns, even though built of concrete, were fire-proofed with cinder concrete-shells, which served at the same time as a vehicle for the steel reinforcement and as a mould for the construction of the main body of the column.

The building now completed enjoys the lowest rate of fire insurance, both as to structure and contents, accorded any similar risk.

M. Rey (Paris) asked two questions:—1. To what temperature have the experiments been carried as to the fireproof qualities of his (Mr. Goodrich's) system of ferro-concrete? 2. How far can this system be applied to the economical construction of big artisans' dwellings?

The time limit prevented M. Cloquet in the first instance from finishing his paper, but he subsequently read the concluding pages, which answered the questions put him as to temperature and decoration. In a few impromptu remarks, he recommended that external walls, elevations, etc., should be built double of two thicknesses of ferro-concrete. Hollow walls would give an increase of strength, and the enclosed air, while giving protection from the heat of summer and the cold of winter, was also of help as a non-conductor in case of fire. As regards decoration, no very satisfactory solution had, as yet, been found. Architecture and its decorative methods have been evolved from a reasoned use of stone, etc., though, at the present day, stone is frequently used in the most insane manner, and methods of engineering construction are often adopted by architects proper. We cannot graft old architectural forms on to ferro-concrete; all such added decoration is bad. Old ideas must give way to new, and we anxiously await this new development. What course will it take? Ceramic, mosaic, painting, or some plastic form? So far, our ideas on the subject are negative, rather than positive.

The one thing certain is that all the hitherto accepted architectural forms, based on the old methods of construction, will have to be banished from ferro-concrete if the new method is to occupy a dignified position as architecture, and is not to remain mere construction with its decoration applied. And again he reiterated: "Architectural forms must certainly not be applied as mere surface decoration." M. Augustin Rev (of Paris), as architect to the "Fondation Rothschild," spoke with authority of the help that ferro-concrete will be in solving the vexed question of the housing of the poor. He finds that ferro-concrete is a very economical method of constructing artisans' dwellings of three to five stories in height. The question of overcrowding is one of extreme and growing importance, and, in view of this fact, it is to be regretted that the Chairman of the meeting was unable to ask M. Rey to read the paper he had written on the subject. M. Rey considers that one room to be occupied by two persons should be the basis of calculation. At this estimate no less than 24 per cent. of the population of Paris are ill-housed in 41 per cent. of overcrowded dwellings; while in the whole of France the overcrowded population in cities amounts to 4,000,000 souls. This overcrowding constitutes a serious menace to the public health. If these figures cause M. Rey such concern, what would he say to our English statistics?

We hope that the economical use of ferro-concrete, as demonstrated by M. Rey, may be brought to the notice of those who are endeavouring to solve the burning question of the housing of the working classes.

Mr. E. O. Sachs asked to be allowed to make a few remarks on the very valuable paper read. In the first place, he wished to thank Mr. Goodrich for coming over and telling them about one of the biggest buildings in reinforced concrete erected in the United States recently. In the course of the paper the word cinder had been used constantly, and he would like to know the definition of cinder in the United States. Did it come within the term coke breeze, as used in this country, or was it more used in the definition of clinker.

Mr. Goodrich said that clinker was the more synonymous word.

Mr. Sachs said that reference had been made to the fact that the fire insurance companies' regulations specified the aggregate which had to be used. They heard constantly of rock and stone aggregates, but they had had experiments showing that clinker aggregates and slag aggregates seemed to have a far higher resistance than these aggregates.

Mr. Goodrich said that the experiments in the United States, as in this country, showed that clinker and coke breeze had a higher resisting point, but the insurance companies thought the rock and stone was equivalent.

Mr. Sachs asked where the aggregate was defined. The fire-office regulations in this country required, he believed, that every part of the aggregate should pass a 1-in. mesh. That was of the utmost importance, as they found in tests and in actual cases of fire that aggregates split and the larger pieces fell off, with the result that the metal became red hot and the beams deflected.

Mr. Goodrich said the rules did not define the aggregate except that it should be able to pass between the bars, and in no case be larger than 2½ in.

Mr. Sachs said the object of primary importance so far as fire resistance was concerned was the protection of all metal-work. The metal-work should be protected by a certain number of inches. The number of inches could not be exactly defined by the present state of science, but it would certainly be 2 in. or more. He would say, however, that it was of equal importance on this question of the thickness of the protecting covering that the aggregate should be defined. Further, as safeguards for the actual construction and the additional protection, which could be obtained at practically no expense, was the rounding off of external angles. He offered those three points as being most important ones in relation to fire protection and reinforced concrete.

Mr. Max Clarke said he would like to ask the reader of the paper what was the definition of clinker. Mr. Goodrich had told them that this was one of the aggregates which applied, and that cinder was another, but he wanted to get a hard-and-fast definition of clinker. He thought the material to form the aggregate of concrete was one of the subjects which was going to be considered by the Joint Committee on Reinforced Concrete, and, to him, it appeared that very serious investigation on the point was needed, and it could not be too thorough, as it was now fairly well known, from the experiments conducted by the British Fire Prevention Committee, that light and porous materials were generally the best in case of the outbreak of fire, but not the most satisfactory for strength-giving in construction. For the latter purpose most people would admit that gravel would be used from choice, but it was almost the worst from a fire point of view. Whether some happy combination could be thought of remained to be evolved from the deliberations of those who had the matter in hand, and he would ask the speaker whether such combinations had been worked out at all in America. The Fire Offices Committee in London excepted coke breeze from their list of materials for the aggregate of reinforced concrete, and he understood the regulations of New York were on the same lines. It was not used as one of the materials, but cinder was. He would like the reader of the paper to give a hard-and-fast definition as to what coke breeze was, and also as to what cinder was contrasted with clinker.

With regard to coke breeze, he knew the Fire Offices Committee objected to it on account of its having a small proportion of unburned coal in it, but, as a matter of fact, they had discovered from experience that unburned coal in the concrete, subjected to 1,800 deg. of heat for three hours, came out just as it was put in, and if any gentleman liked he was at liberty to see the specimens.

Mr. Goodrich said the definitions differed. They tried to exclude materials which were poor. Some engineers allowed soft bituminous coal ash or clinker to be used. Others required the use only of anthracite material. His personal opinion was that anthracite only should be used. In some cases he had required screening and washing of materials so as to exclude the fine material which would be nothing more than sand of poor quality, and which would serve to bring the cement into a hard material which would take the place, primarily, of gravel except that it was more porous. It was almost impossible to exclude unburned coal, and in some cases where tests had been made the unburned coal was 50 per cent. of the clinker, and this was found to be very little affected, except on the surface which was close to the fire. The use of 2 in. or 3 in. of covering was well where it could be done, but it seemed unnecessary in many cases, especially with small material. In any case, the use of a certain amount of unburned coal was almost necessary, and, in all probability, was not detrimental. Whenever the unit system was employed, if it was thought worth while, the lower portion of the aggregate could be made them. They all looked to the time when part on the top could be made of rock aggregate. This had actually been used in some cases, and he himself had made such a beam before Capt. Sewell brought the matter in a paper before the American Society of Engineers.

M. Augustin Rey asked what experiments had been made to show up to what temperature reinforced concrete was fire-resisting, and he also asked if Mr. Goodrich's system could be employed for industrial buildings several stories in height.

Mr. C. B. Post said it might be of interest to the gentlemen present to know that those in large practice as architects in the United States used ferro-concrete with considerable trepidation, from the fact that there were no established constants which could be employed in computing the strains. They did not know, under different conditions even, what the position of the neutral axis of the beams should be under different loadings. The material itself must be most carefully mixed, and all the ingredients must be perfect, as it was subject to failure. In fact, their opinion of the material was very much like that of the distinguished Mr. Veller with regard to veal piss—they were "very good things when you knowed the lady as made them." They all looked to the time when they would know more with regard to the subject. Those who were putting up work with enormous rapidity, and who were required constantly to build eight, ten, twelve, or twenty story buildings in eleven months, were looking forward to the time when they would have more scientific data which would enable them to use the material in a more scientific and less amateurish way. His object in speaking was to say that he had had the honour to be appointed, with Mr. Eames, by the President of the United States a member of an Advisory Board which had been instructed to make extensive tests of all building materials, as well as coal and fuel and various things of that kind. He had urged the Commission that very careful experiments should be made with regard to reinforced concrete, so that the same error would not be found in the calculations with regard to reinforced concrete which were found in the constants for wood which were determined from experiments and tests carried out on small sections. Fortunately for their country the errors in the loads required by the building laws almost exactly compensated for the deficiency in the constants in the building materials. He did not know whether Congress had made the necessary appropriation for the continuance of those experiments in the last session or not, but if the appropriation had been made he believed before the next Congress assembled that America would be able to furnish them

with valuable information with regard to the whole subject. There was one other point which was to have most careful and thorough investigation, and that was the question as to whether cement was or not an efficient protection of steel from corrosion. He had seen steel in small sections in the form of expanded metal used in tabular form construction which was exposed twelve months to the atmosphere, and which was absolutely destroyed by corrosion. This, of course, might have been an exceptional defect due to some curious ignites which could not be determined either by physical or chemical tests, but it was necessary for the safe use of the material that they should know how to protect steel. Another matter not mentioned in the regulations of the Committee which had been brought before them that morning, and which he thought should receive attention, was the danger of electrolysis from the huge free current of electricity in all their great cities.

Mr. Goodrich said the question asked was, "To what temperature have the experiments as to the fireproof qualities been pursued?" The actual temperatures found by the use of the melting point of building materials varied from 1,400 deg. to 2,000 deg. In the Baltimore fire the temperature varied from 1,400 deg. to slightly over 2,000 deg. It was between these limits the tests had been made. He believed that the United States Building Department required that a temperature of 1,800 deg. should be maintained for eight hours. In some cases the temperature was raised and had been maintained at over 2,000 deg., but the usual temperature was from 1,700 deg. to 1,800 deg. Fahr. for several hours. Then the question was asked whether the methods of construction referred to were applied to buildings several stories high, such as working-class dwellings, and so on, and he might say that he had at the present time an office building of eleven stories high, and also several dwellings from three to six stories high, and in San Francisco nearly \$1,000,000 worth of work of buildings from one to six stories high.

Mr. A. W. Ruddle (Peterborough) said he had been rather troubled by the statements of the speakers from America. He did not know whether he had made a mistake, but he understood Mr. Goodrich to say that it was unnecessary to use two rods in the reinforcing of steel work.

Mr. Goodrich: Under certain conditions.

Mr. Ruddle said he took it that there was no necessity to obtain any greater external area of the steel, because he understood that the concrete adhered to the steel work, and that the reinforcing in the members which were to give additional strength against tensile strains was given by the adhesion of the concrete to the steel. However, another speaker had raised a point as to whether cement was an adequate protection of steel, and if they coated their steel with any paint they lost at once the adhesion of the concrete to the steel which was to be of so much assistance.

The following papers were then read on the subject:—

Professor Louis Cloquet, on behalf of the Central Society of Architecture of Belgium, read a paper, the following being an abstract:—

The old style edifice was characterised by the separation between two distinct parts, the walls and the gable. There is a lack of solidarity between the two. At the point where the trusses of the frame rest upon the walls there is something like an articulation. The introduction of the metallic frames has not at once remedied this characteristic defect of buildings formed of stone walls and gables of wood. For a long time it was customary to combine trusses of iron similar to the wooden trusses. The solution of the problem of the large halls only made a decisive step in advance when the centred trusses were introduced, which have their starting point on the ground, like the trusses of the Dion pattern. From that moment the solidarity between the vertical and the inclined parts was secured. However, it is only the trusses which cannot be deformed. The solidarity between the vertical and the inclined parts is not realised in the inclosing surfaces. There is lack of homogeneity between the two parts of the building—that is to say,

its skeleton or frame and its wall. Logic claims a more radical solution, which would consist in establishing solidarity not only between the uprights and the trusses, but rather between the wall and the roof. This is what the use of reinforced concrete enables us to realise. The side wall may even disappear or be made one with the vault. The whole will show almost uninterrupted surfaces on the outside as well as on the inside, with the absence of the encumbering internal protrusions of the frames. The new arrangement has, therefore, as a result to save the trusses, and only to maintain a surrounding wall which supports itself without any assistance. Now experience has shown that buildings conceived on this plan do not cost more than those carried out in thick stone walls with metallic gables, and that they are solid.

If it is question of a building with stories, the floor of reinforced concrete takes with advantage the place of the old systems. The most characteristic consequence of the use of reinforced concrete is the suppression of the roof, as the uppermost ceiling can be used as a cover and constitute an inhabitable terrace. This kind of construction lends itself, moreover, to the boldest rakes or overhanging structures.

This system, if applied in a rational manner, is able to bring a change into the architectural forms. It simplifies the forms, it causes the cumbersome complexities of the frames and floorings to disappear, it simply carries out all the surrounding or separating surfaces. It makes disappear every distinction between the wall and the roof. It introduces an architecture consisting of so elastic surrounding walls that these can be given any dimensions required, according to the space it is useful to inclose. The habitations will take the shapes of parallelepipeds terminated by terraces, and the large buildings with curved vaults with visible estrades. We must be prepared to see sculptures and moulded relief work disappear and coloured ornaments to prevail. A radical change in the internal and external forms of the buildings will be the consequence of the substitution of a concrete, solidary, homogeneous structure for our former architectonic organism. All the forms proper for a combination of marked-out stones and covered over with plaster, which will henceforth no longer be used, would here be devoid of expression and aesthetic value. They must be given up and other methods must be found.

We have in mind three kinds of form: those of convenience, those of structure, and those of expression.

The forms of convenience, by which the building receives its complete usefulness and a character in harmony with its destination, satisfies the mind without causing pleasure to the eye. Those forms of convenience which are, if not the most pleasing, at least the most excellent, can be carried out to perfection by making use of the processes, so eminently practical, of reinforced concrete.

The forms of expression are those by which the architect and his assistants put their imagination and their soul into the building, in order to impart to it the eloquence of a pleasant aspect. The ideal is that they shall form an integral and inseparable part of the structures. In the buildings constructed of reinforced concrete there is little scope for the artist's talent, especially the sculptor's. There remains hardly anything except the superficial decoration by painting and some polychrome, ceramic, or other adornments, but for the artists in colour a vast field is opened for their creations.

The forms of structure, either real or fictitious, are the principal ornament of the buildings produced by the old methods. They are those organic forms which give life to the aspect of buildings with walls of marked-out stones.

In the old-fashioned conception a building is to be compared with a living organism where we can distinguish a skeleton, various members, and a sort of muscular system. Reinforced concrete does not afford these elements of interest and charm; it leaves the impression that the work has been carried out in too docile a material, on which the sacred labour of the workman and his traditional processes have not left the traces of the noble struggle between the artisan

and matter. We do not find the same beauty in this work all cast in one block in a dead and dull-coloured material, without apparatus, without organism, with which the best thing that can be done is to hide them beneath a superficial decoration.

In conclusion, the new processes, economic and powerful as they are, are precious from the point of view of certain bold and complex accomplishments. They are devoid of the charm of an artistic expression. Besides, economy is only a relative law and of a secondary character, and the boldness of the structure is not always required. A process which is prevalent from these two points of view does not impose itself to the exclusion of the others. Recourse may be had to it for the economic satisfaction of utilitarian projects, for the realisation of comfort, and for the solution of bold problems. But it will never eliminate from architectural practice the noble and artistic combinations of masonry work in marked-out stones, moulded and sculptured, of frameworks in wood and in metal, of superstructures with vaults, etc.

M. Gaston Trélat (Paris) also contributed a paper, the author's summary and conclusion being: Recapitulating, the buildings we may have to erect or to rearrange answer the requirements of the moment or of the future. What is required is knowledge and experience.

Teaching is not sufficient to develop the necessary capacity. Something more is demanded than a cramming of characteristic facts acquired by instruction. The latter must be completed by a personal training in the profession. It is to be recommended that the latter be not started too late, and that the simultaneity of the two operations be secured. The intellectual and the technical education combined generally carries with it a considerable widening of ideas. It may be infinite; not seldom even it lasts as long as life itself. There exists something like a stimulus to acquire new knowledge, the want of which is accentuated in intensity by the existence of personal ideas. But, above all, it is the true source of the original points of view as opposed to the knowledge acquired by study.

In the exercises offered by the workshop, the laboratory, or by that other vast workshop, which is the nation, education is ever active and imparts a particular course to the mind. Then it is that the capacity for hypothesis and for the ideal asserts itself in matters of science and in matters of art. And is it not correct to say that they are a basis of operation for the study and the solution of the requirements of to-morrow; that they are even the only agents to prepare the realities in relation with the new wants? In the workshop as in the laboratory, where the master always respects, when occasion allows, the point of view which guides the student, this education is accomplished and completed. It takes unexpected and infinite shapes which the personal values alone are able to measure.

These considerations would thus lead us to express the wish that, in art as well as in science, the same method should be put into operation from the intellectual point of view. The work in the laboratory and in the workshop would bring into evidence the variety of the points of view of the different minds. But, taking of course into account the vastness which science has reached at the present time, it is the individual and characteristic mode of action of the apprenticeship in the past that should lead us to the present.

In our times, after Claude Bernard, after Pasteur, to mention only two names borrowed from the nationality which I represent, art and science in the end get so near to each other that they appear to be very intimately related. In fact, from the circumstance of imaginative aptitudes which equally represent the ideal and hypothesis, it would seem that we should endeavour to make them one—at least in the aptitudes for initiative which open an unexplored field for new undertakings. The fact remains that art and science are in our days considerably nearer each other than they were in the past. They are two leading branches of human activity, each having no longer any right to remain indifferent towards the other.

The question of public buildings gives rise to a great many questions which interest our

societies. This is one of the general features of the mission inherent to the architect. He must therefore keep in touch with the time and constantly interrogate it about the requirements it may manifest to him.

Science and art enable a selection to be made of remarkable solutions. The consequence is a knowledge and experience which the different modes signalled will call forth. It is useful to propagate their habit.

Mr. Sachs thanked the readers of the papers, and said they had each brought out points which were of the utmost importance to them as architects if they were going to keep the building of reinforced concrete structures in their own hands. He meant chiefly the effect of these buildings upon the public. Reinforced concrete buildings at the present moment were being utilised, many for very utilitarian purposes of the factory and warehouse class, and if the material was to come forward, it was necessary for the architect to settle down and think how reinforced concrete buildings put up in cities were going to be dealt with from the architectural point of view—that was to say, how it should be clothed. It was surely one of those things which should come before their architectural societies and before the students of those societies. The problem was, how to deal with these large flat surfaces, which must necessarily form a reinforced concrete building, and anything which could be done to bring that before architects in the future would be most valuable to the profession, because it would mean that architects would be able to retain buildings of that material in their own hands, instead of such buildings being erected by the engineer.

Mr. F. E. Harris (Manchester) said that, having been instrumental in putting up a few ferro-concrete buildings in this country, it had been frequently asked him what were the qualities of the external walls in relation to non-conductibility. This was, of course, a matter which did not largely apply in connection with manufacturing premises, and up to the present ferro-concrete had been mainly used for such buildings only. If they were to use ferro-concrete for any purpose other than manufacturing buildings they would want to know amongst other things whether the walls were good non-conductors. Their colleagues from America and from the Continent would probably have used armoured concrete for domestic buildings, and would perhaps be able to tell them what the qualities of the walls were in this connection. There was one other point which struck him. The walls were all right, and the effect was all right for manufacturing premises. They could get sufficient effect from using armoured concrete purely and simply, but if they wanted to get any real architectural effect they wanted something more than they got in manufacturing premises. The only way in which they could seem to get that, so far as he had been able to weigh the matter up at present, was by the wasteful use of the material they had, or, as an alternative, to simply use the armoured concrete for the columns and floors. His view at present was that they must simply use armoured concrete for walls and floors, for he did not see how they could get any architectural effect such as would be agreeable to clients unless they limited their use of the materials for the purposes he had mentioned. There was a flatness about armoured concrete which would be objectionable unless they used an excessive amount of material, which, of course, would not be an economical thing to do. He would personally like to have an expression of opinion from their Continental visitors on two points: (1) As to the qualities of ferro-concrete walls for resisting heat and cold, and (2) Whether they found they got a good architectural effect not merely by decorating the outside of the surface, and if so, could they get it economically?

Mr. E. Warren said he would like to introduce a second question with regard to the possibilities of architectural effect, for he was much struck by Professor Cloquet's conclusion dealing with the aesthetic side of the subject. It seemed to him that if they were to deal with plain surfaces in which construction in the architectural sense was absent, they must resort to some merely plastic form of decoration or applied

decoration. To be honest, in dealing with this form of construction, he would like to ask those who had considered the use of the material whether any serious attempt had been made to give it a real constructive or architectural expression, because if there was no constructive or architectural expression in the building, it was not architecture at all. There could be no architectural inspiration, and no architectural enthusiasm could be aroused by dealing with a structure in which they could not give any external expression whatever, and in which no constructive problem arose. If any of the distinguished architects from the Continent would inform them as to what experiments had been made in the direction of the real architectural use of this material, they would all be very much the gainers.

M. Louis Clouet, replying to the points raised as to the architectural treatment of an armoured concrete wall, was opposed to the idea of placing ornament on the wall. It would, he thought, be a great mistake to place anything on the face of the building which was not part of the structure. With regard to the conductivity of the wall, they found it well to have two partitions with a closed air space in between. Reinforced concrete had been used on the Continent for domestic purposes to some extent. M. Clouet concluded by referring to the remarks he made in his paper, in which he pointed out that reinforced concrete would never eliminate from architectural practice the noble and artistic combinations of masonry work.

A paper by M. J. Bassegoda was here taken as read, as well as one by M. G. Trélat.

The following is the abstract of the paper by M. Bassegoda (Barcelona):—

Building in reinforced concrete does not solve any new problem either in art or construction; it is a composite building of stone and metallic materials, by means of which, profiting by the qualities of the two components, difficulties are more economically solved than could be done with either of them alone.

Economy in the use of reinforced concrete does not depend on the low price of the materials of which it is composed, which are comparatively dear, but on their accurate combination, which allows of the quantity being reduced. Economy, consequently, has a limit in the maximum coefficient of ironwork and concrete.

There is no reason why these coefficients, especially that of the concrete, should be higher than in homogeneous constructions, for there are many circumstances, all difficult to foresee, which may produce lower resistances than those which have served as a basis in the calculation; such as quality of the cement, the nature and size of the sand and gravel, and the manipulation and use of the different materials.

This consideration has produced various systems from which cement work has been almost completely eliminated, or in which, at all events, it has not been taken into consideration in the calculation; it is then considered as a simple exterior covering destined to protect the metal against agents which would tend to destroy it, such as oxidation and fire.

Security reaches its maximum in these systems, but, on the other hand, economy diminishes; it may happen that this kind of masonry may become less economical than other homogeneous kinds, such, for example, as brick laid with cement.

In countries where they have excellent brick which, according to an already established custom, they use in very reduced thicknesses, either in the parts which give support or in the parts which are supported (arches and horizontal floorings), one might introduce the system of fortifying these constructions, thus obtaining a greater economy in homogeneous masonry work and in fortified concrete work.

In places where construction in brick does not meet the conditions required, the use of fortified cement offers a real and effective economy over all other systems of construction; an economy which should not be exaggerated whilst admitting coefficients of work very superior to those which experience

found to be absolutely safe. One can recommend such systems in which the ironwork is adjusted to be able to resist all external force.

With regard to the artistic point of view of the question, reinforced concrete has no exclusive form; on the contrary, like every concrete, it takes that which is given to it. The supporting element, covering an empty space, may be straight (beam) or curved (arch); the length of the former is comparatively restricted; the length of the latter can be much extended, as is also the case in homogeneous constructions.

In the straight form, as in the curved, the theoretical limit of reinforced concrete requires, on account of the weight of the concrete itself, the use of a greater volume of iron in the ironwork than is required in homogeneous metallic constructions. The relation or proportion between the units of resistance and of weight is thirteen times greater in cement than in iron. It follows that in proportion as the absolute dimensions of the works in reinforced concrete are increased, so must the importance of the iron over the cement be increased also, and in consequence the forms then have the characteristics of metallic constructions, as may be noticed in the large bridges.

On the other hand, in architectonic works, in which it is scarcely ever desired to attain the maximum of possible dimensions, the artistic character must come from the lines, projections, and coloration. With regard to the first the architect can choose freely without any restriction; the second, whatever they may be—mouldings, ornamental decorations, etc.—can also be obtained with ease and comparative economy, but with the drawback that for their execution one must have recourse to moulding, which indicates a limitation of artistic effect to which architectonic art cannot bring itself. With regard to colour one cannot admit the only one, that of cement; but, on the contrary, this modern concrete must be treated as the ancients treated it, that is to say, by covering it either altogether or in part with other materials of which the varied coloration permits of obtaining the desired effect being obtained, as certain architects and engineers are already doing who have succeeded in using fortified cement in their works with a particularly artistic effect.

The summary and conclusion of the paper by M. Gaston Trélat (Paris) are as follows:—

To sum up, steel and reinforced cement are destined to see their use become general. They are fit to be easily and conveniently used together with other materials, such as burnt clay, and, above all, sandstone; and in this way can be formed a substantial body provided with solidity and of a nature to assure beauty, a quality not to be neglected.

Moreover, the walls built by this method are excellent with regard to the health of the inhabitants in consequence of the absence of dust produced by sandstone, and as offering no harbourage to disease germs, against which an incessant war must be waged.

The advantage of this particularly healthy kind of installation are, above all, to be appreciated when it is a question of buildings to be used as hospitals or refuges or as cheap lodging-houses.

In consequence of the easy disinfection of the walls, the number of dwellings placed one above the other in buildings of great height is considerably more free from inconveniences.

Conclusion.—Steel and reinforced concrete are materials with which it is possible to erect very high buildings, and, at the same time, to reduce the thickness of the parts such as walls and floors. Owing to the mechanical nature of these materials they are provided with resistance to compression and to bending which render it possible to gain useful spaces with regard to the total space covered.

From the plastic point of view they can form a body with the enamelled sandstone, forming walls which have a pleasing effect to the observing eye.

With regard to hygiene, the advantages are not inferior to those which may be expected from enamel in consequence of their delicacy of tone. The enamel of the flamed sandstone allows the construction of walls which are impervious to germs. Finally it

produces surroundings whose salubrity one cannot too highly extol.

Solidity, economy of space, plastic beauty, salubrity, are thus four qualities produced by the use of these materials.

Replying to Mr. Sachs, the Chairman said he would be prepared to entertain any resolutions which might be proposed.

Mr. Max Clarke said that in the papers which had been read before the Congress and elsewhere it seemed to have been accepted that the material or combination now known as reinforced concrete was satisfactory in every respect, and the only remark he saw bearing on this particular point was that by Mr. Henry Adams where he spoke of failures, and that "nothing succeeds like failure" was not a pleasant feature of the case. No doubt they would all like to learn something by failures, but they were naturally anxious that such failures should occur, if at all, in other people's buildings, and not in their own. Where they did take place they were not made as public as they should be. Of course, it was quite natural for a man not to let his failures be more known about than he could help, but, on the other hand, as Mr. Adams observed, it was only by such failures that they learned something about a full-sized experiment. They had a very large number of minor experiments, but not of the failures in a full-sized experiment, and that was exactly what they wanted. In Switzerland last month he heard a great deal of conversation with regard to the failure of a building at Basle, but he could not learn from anybody what the actual facts of the case were, and he did not suppose that if he went there now he would be able to find out the cause of this particular upset. Bearing all this in mind, it seemed to him that an inquiry in the direction of what failures had taken place and their causes would be desirable. Another matter to which he thought the attention of members connected with this class of construction should be called was whether any data existed as to the life of the steelwork in combination with concrete. Most people knew it was a most difficult thing to make concrete sufficiently close or homogeneous that it would not allow the passage of air or moisture. If not consolidated enough to make it impervious to these two agents, deterioration might take place in the reinforcing bars, and the structure would lose all the qualities on which its stability depended, and on which the calculations had been based. He took it that this deterioration might also damage the concrete itself, not only the steel rods, for once the steel rods began to rust the rust on them would damage the concrete by expansion, and it would be quite impossible to ascertain what was the nature and effect of the damage (he was assuming that his premises were correct) before the building was so seriously damaged that collapse might occur. They talked in a light and airy manner about adhesion, Portland cement, concrete, and steelwork. They also said that they had seen joints of hoop-iron and other sorts of iron taken out of buildings which had been there for twenty-eight years, and that they could see the original glue on them. That he had done himself; but, on the other hand, he had seen a considerable amount of experimental reinforced concrete, and he had observed that this concrete did not close itself up to the metal, and that there were a number of interstices which had never been filled. They must presume that they were filled with something, and, if it was not with liquid, it was with some vapour, and this vapour, he took it, would be either damp or dry, depending on the state of the weather. This particular phase of this particular type of construction seemed to him to be the one which wanted thoroughly going into. If they erected a building two stories high suitable for an agricultural labourer's dwelling, it did not make much difference whether it lasted fifty years or not; but if they built a building of the monumental type which was supposed to represent a very considerable sum of money, he took it that it was the duty of those who designed the building, or, at any rate, who advocated the use of this material, to be prepared to show what its life would be. So far as he had been able to ascertain no sufficient inquiry had been

devoted to this particular point. They were talking about reinforced concrete because a certain number of gentlemen, whom he called "patentees," and other people called experts, had put the thing on the market. He thought, as architects, they should not be carried away too rapidly. He would like to add that it was quite possible to stick stuff on to concrete, and he had seen it done abroad. They could cast moulds and place them on buildings, but it was not architecture. It was merely sticking a lot of stuff on to a concrete wall. If they were going to descend to that sort of thing in their architecture it would be very much better if they had nothing to do with reinforced concrete at all, for they were going to lose something. One other question he would like to ask, and that was on the subject of cost. No one was able to tell him what the cost of a reinforced concrete building was. If Mr. Goodrich would append to his paper the cost of the building he had described they would have an idea as to whether it was worth their while to depart from their present methods. He moved:—That it is the sense of this meeting that an inquiry into the cases of failure in reinforced concrete and their causes would be most desirable.

The Chairman formally seconded the resolution.

Mr. Sachs, in supporting the resolution, said it was really of the utmost importance that they should know what the failures were. He was with the mover in Switzerland a few weeks ago when the accident at Basle formed the subject of much discussion, and he made what effort he could to get hold of the actual facts of the case. The facts of that case were available in the form of a report by three Borough Surveyors of three of the principal Swiss cities. It was in the form of a confidential Report to the Basle authorities, but, although confidential at the time (for the accident occurred in 1901), the authorities were good enough to say that for the object of scientific research the Report could be seen. He had a copy of the Report, and he had no doubt but that copies of all such Reports would be at the service of a Committee dealing with the subject. There was a similar case in Alexandria, Egypt, and two or three cases in the United States, and if real independent Reports, and not *ex parte* Reports, could be put before an independent Committee, such as the Reinforced Concrete Committee of the Royal Institute of British Architects or any similar body, and the causes of failure arrived at and the results summarised, they would be the most valuable lessons they could learn from.

Mr. Henry Adams said that, as one who had suggested a new reading of an old proverb, he would like to support the resolution. They were all agreed that ferro-concrete to be satisfactory should be solid, but they had been told, in the first place, that the American practice allowed $\frac{1}{4}$ in. for the aggregate, while the English practice wisely brought them down to 1 in. But neither of these took account of what, to him, was the most important matter of all, and that was the grading of the material to various sizes. This was brought home to him very closely a short time ago, when, after the Fire-Prevention Committee had discovered that broken brick was one of the best, if not the best, materials which could be adapted, a firm in London commenced to manufacture broken brick and screened it to pass a 1-in. mesh. All the smaller material was done away with. They thus threw away what was the most valuable part. If they had simply removed the dust and retained the particles, from $\frac{1}{4}$ in. to 1 in., he believed they would have obtained a sounder material. When there were alterations and pulling down of buildings and ferro-concrete was exposed, they all knew that spaces did show in the material, and they should not show. If they wanted proper adhesion to the steel they had the concrete solid. He believed that more than one of the failures would be found to arise from the improper mixing of the aggregate, and he looked upon the grading of the material as one of the most important points in connexion with it.

Mr. Brownhead asked whether, in discussing that question, they really knew what the subject was before them. They knew what concrete was because they had no tests to show what cement was, but when someone said "reinforced concrete" he did

not know what it was. He did not know what concrete was because they had no standard, and they could not tell by results what would happen with a particular standard because they had no reliable information on the subject, and if there was to be an inquiry he would suggest that an endeavour should be made, if possible, to define what concrete was, because concrete might be honestly described as "adulterated cement." That was a very vague term, but all their discussions on the subject were very ethereal and very vague. They wanted some substantial scientific knowledge as to what was the strength of concrete, for at present it was such a vague term. He had heard concrete described as one of good cement and two of other material, and he had also heard it described as one of cement and twenty of another material. Before they could enter on a scientific discussion on concrete they must define what concrete was.

The Chairman said that from something which had been said it might be in the minds of those present that good practice in America justified the use of $\frac{1}{4}$ -in. stone in armoured concrete. It was perfectly true that certain building laws and certain underwriters' rules might permit of such construction, but it was very far from proof that the best architects in America permitted any such construction. The building laws in many States and cities were diverse, but in the principal cities the building laws were coming rapidly to a form in which they prescribed 1 in. or smaller and $\frac{1}{2}$ in. and smaller of those portions of the concrete which were reinforced with iron. Naturally, in massive concrete, larger stones were permitted. In his own practice, and he thought in that of the majority of architects in America who used armoured concrete, it was the absolute rule that in the portions that were reinforced in the girders especially the size of the concrete should be 1 in. or less and preferably $\frac{1}{2}$ in. and less. It was not at all to be assumed that because certain building laws permitted the use of other materials that they were generally employed. It always seemed to him that there were so many sources of possible failure in the use of reinforced concrete that it ought only to be employed under the most favourable conditions—that was to say, it must be designed by an expert very capable of calculating the strains, and knowing as much about these strains and the way of meeting them as it was possible to know in the present state of the art. In the second place, the drawings and specifications must be of the most rigorous character, and designed in as great detail as was possible before actual construction. In the third place, the materials must not only be wisely chosen, but they must be submitted to rigorous tests, and, in the last place, the depositing of these materials must be done by persons under the most skilful direction and careful supervision. Only under such conditions could they hope to secure a construction in which they could have faith, and with regard to which they could rest with the assurance that it would be what they hoped it would.

The resolution was then carried.

Mr. Sachs said that, as the subject of fire-protection and reinforced concrete had been so frequently touched upon in the course of the previous discussion, he would propose a resolution which might perhaps seem a little out of place to those who were conversant with the failures of reinforced concrete in fire, but which he thought might serve as a safeguard to many architects in practice. It was:—"That where reinforced concrete is intended to be fire-resisting the greatest possible care must be taken in the selection of the aggregate, its size, and in the protection of the steel; further, that the aggregate does not exceed what will pass through a 1-in. mesh, and that the thickness of the protection never be less than 2 in." The size of the aggregate was of importance—more important to his mind sometimes than the actual mixture of the aggregate. The protection also was of importance, and the reason why he suggested that 2 in. should be put in the resolution was because so many tried to scamp that protection, and they came across reinforced concrete buildings in which the protection to the steelwork was supposed to be $\frac{1}{2}$ in., but where they could scrape it off and find that there was not $\frac{1}{4}$ th of an inch

covering. He would like to add one word as to the fire test. It had been mentioned that 1,400 to over 2,000 degrees were the conflagration temperatures. That was right in America and on the Continent. It was further stated that in the New York rules the test required was 1,700 degrees. People had asked why it should be 1,700 degrees. The standard in this country arrived at at the Congress held about three years ago was 1,800 degrees, and in arriving at this figure the point brought out was this—that in all test-pieces great care was taken to make the test-piece an excellent piece, but in ordinary practice the work could not be of the same quality as the work carried out for a distinct purpose, so both in temperature and time there must be a margin for bad work. There was a consultation between London and New York on the subject, and that was why the high temperatures and long hours were hit upon.

Mr. E. Sewell (Cardiff), in seconding the resolution, said his more particular object in rising was to speak to a portion of the subject which did not seem to have been touched upon. While a good deal of reference had been made to the failure of ferro-concrete, he did not know whether any real experience of such failures had been given. If not, he would like to give an experience of his own of failure in the use of ferro-concrete. He might preface the reference to the failure by the statement that it was a very happy failure and did nobody any harm. In that sense it might tend to illustrate what seemed to him very important possibilities in connexion with the use of ferro-concrete by the architect. In passing, he might say that he had two buildings under construction with that material largely in use, but he recognised a very important disadvantage in using it was that most methods of ferro-concrete seemed to be surrounded by the difficulties of royalties and patents. No doubt, that was a very excellent reward to those whose ingenuity had devised the methods, but, at the same time, one could not help feeling that in practice it was a restriction upon the free and extensive use and applicable use which any building material should have in the architect's mind and on his drawings. To refer more particularly to this question of failure, he might say he had to deal with a building where there was an ordinary street frontage. He decided to use ferro-concrete for the main construction for one reason, which was that the party walls belonging to the neighbours, and for business purposes, it was impossible to interfere with them. He found the convenience very great of being able to construct the girders within his own building instead of having to swing girders and cut into the party walls. This being his first experience of ferro-concrete, he did not think it would be a proper thing to put the front on to a main street of this material. He thought there were chances, architecturally speaking, in the immense advantage they got from the great cantilever methods. He thought the ferro-concrete cantilever and its treatment might possibly in the future become a feature for architects to give their serious attention to, but in this case he had nothing of that chance; and simply dealing with a flat frontage he came to the conclusion that the frontage of the building must be of hard stone. Then came the question of how the side walls and the girder construction should be legitimately united to the front portion of the building, and he decided to have some steel anchors and anchor the frontage of hard stonework into the ferro-concrete. They found one morning that the ferro-concrete had taken care of itself. They finished their ferro-concrete 8 in. or 10 in. from the front itself, and the anchor was to unite it. But on this particular morning the floors got heavily loaded. A very zealous foreman had removed a certain number of struts in the front, and the whole mass was in just that state that it exerted a pressure towards the front. On examination, he found they were something like 8 in. or 9 in. out of their true plane. The whole of the front of the building. He did not think they were removed by human agency, but, at any rate, this happy accident had the effect of throwing the girders right into the cavities, and so quite accidentally

they got a united building. It suggested to him that there might be great possibility in the architectural adaptation of the material. It was in that sense waxy; they could alter its contours; and he thought by the use of vertically-curved surfaces there were architectural chances. He did not think at this stage ferro-concrete was sufficiently mobile for their requirements, but it was a great field for architectural study. The application of surface decoration was, of course, quite easily done, and the fact that ferro-concrete was made in wooden sheeting might lead to the sheeting containing some relief which might become decorative.

Mr. E. W. Fritchley (Bombay) said that in India he had used armoured concrete and crushed-stone concrete for the last three or four years. They sieved their stone. It was crushed basalt, and when powdered was as good as sand. They had three or four grades—one between 1 in. and 1½ in., another between ½ in. and 1 in., and a third was almost a powder; and in no case had he had a failure. They had used it in reinforcing girders, and for three years had used nothing else for floors, because the rat had to be considered, and they found that rats' teeth would not go through armoured concrete.

A delegate suggested that it would be better if the resolution was taken under two heads.

The Chairman said he would accept the suggestion and divide the resolution.

Another delegate expressed the opinion that, as there was a Committee sitting dealing with points such as those discussed, it would be better if both this and the first resolution were referred to that Committee to deal with.

Mr. Sachs said that if the suggestion in the resolution of the 1-in. mesh was not accepted, he would suggest that the motion be taken on general lines, and therefore he amended it so as to read:—"That, where reinforced concrete is intended to be fire-resisting, the greatest possible care must be taken as to the nature of the aggregate and its size and also as to the protection of the steel."

The resolution, as amended, was then put to the meeting and carried.

In answer to a suggestion that the resolutions should be referred to the Reinforced Concrete Committee of the Royal Institute of British Architects, Mr. Sachs said the Committee would be dealing with that, and a special resolution was not needed.

Mr. Ellis Marsland remarked that the Romans reinforced with brick and tile, but they did not leave the brick-concrete bare. They covered it up with stone and marble and other materials. He thought they were going away from the fact that reinforced concrete was constructional material, like ordinary stonework used for building, which was, as a rule, covered up, and he felt that it would be perfectly legitimate to cover up this reinforced concrete by either stone or brick or concrete.

M. Augustin Rey proposed:—"That this Congress considers that reinforced concrete may profitably be employed in the construction of economical buildings of several stories or working-class dwellings."

Mr. Sachs pointed out that this was rather a wide resolution after all they had heard as to the possibilities of reinforced concrete in general. They had to be satisfied that ferro-concrete was suitable for buildings in general before they tried them on the working classes.

The resolution was defeated.

Mr. Peter B. Wight, F.A.I.A. (Editor of *Fireproof Magazine*, Chicago, U.S.A.), contributed a paper on "The Use of Burned Clay Products in the Fireproofing of Buildings in the United States of America. He said:—

The purpose of this paper is to treat of the actual use of burned clay in building construction according to the present practice in constructing fireproof buildings in the United States.

Historically, burned clay is the most ancient of building materials, and natural clays can be found almost everywhere. Kinds of clay referred to. Refractory clays most useful, and generally within the reach of all.

Natural variation in qualities of clays treated of, showing universal standards of quality cannot be maintained. Improper clays are often used, the result of ignorance

and want of principle. The best can be had where the disposition is to pay for their full value.

Properties of burned fireclay described. Methods of fabrication. Porous terra-cotta and semiporous terra-cotta preferred. Cellular terra-cotta.

Use dates from 1878, but had been used in form of brick-floor arches from the introduction of I-beams in 1855. Flat, hollow arches invented in France by Garcin in 1868. Same used in the United States, 1871 to 1878.

Inventions were numerous from 1870 to 1880, but few were practicable or brought into use. Invention of sewer-pipe press gave great impetus to manufacture. Same is still the means of cheapening product. Very few patents now in force.

Porous terra-cotta first made at Chicago in 1872. First used for roofs and afterwards for protecting cast-iron stanchions at Chicago and Milwaukee. Method described. Flat arches of hollow porous terra-cotta used in Patent Office, Washington. Girders and roof trusses protected with porous terra-cotta at Milwaukee and Washington.

General interest in the necessity of fireproofing the iron constructive members in buildings was first elicited as a result of investigations of effect of fire on incombustible buildings in the Chicago conflagration of 1871.

Greatest building revival at Chicago in 1880 caused demand for fireproof structures to replace earlier buildings. High buildings were demanded, and the main problem to be solved was how to build them fireproof and light enough to stand on elastic clay soil, which could only sustain 4,000 lb. to the foot. Solved by making flat floor arches very light. Foundation problem solved by first using iron rails in concrete with increased offsets. Invention of grille foundations followed. Structural steel I-beams first made in 1885, and steel for columns with complete steel skeleton construction perfected in 1888. All steel in these buildings was protected by tiles of various kinds. Several methods for building floors and roofs employed.

Grill foundations on yielding soils are now superseded by concrete piers, built in tubs, down to hard pan or rock.

The first fireproof ten-story office building in Chicago, fireproofed on modern method, has already been removed to make room for a larger and more expensive structure, eighteen stories high, which embodies all the improved methods of fireproofing used at the present day.

Thin-walled, hard, hollow tiles have been superseded by thicker-walled, hollow, porous, and semiporous tiles for all purposes. Machine-made material only is used. Limits of practicable thickness described.

Burned clay fireproof materials classed under two heads; one of materials used constructively under pressure, such as floor arches, and all other arches and partitions; the other comprises all the forms used for the protection of the steel constructive members.

Floor construction described in detail. Flat arches formerly used on the side-pressure principle are now used on the end-pressure principle.

Protection of soffits of I-beams described. Same used for all forms of arches. Segment floor arches described. Compared with flat arches. Flat terra-cotta floors with steel tension members described. The Johnson system. The Bévrier system. The Kahn system.

Hollow-tile partitions are described. Defects in former methods, and methods of setting and trimming described. Partitions take the place of brick division walls. Underwriters' laboratories at Chicago referred to. Their great strength to bear loads.

Fireproofing constructive steel members is next considered. Fireproofing iron and steel stanchions the most important. Many methods described and illustrated.

Girder protection is next described and illustrated.

The Guastavino "cohesive system" of fireproofing with fireclay tiles described. Especially adapted to construction of domes; is monolithic; a laminated combination of flat tiles and concrete.

Fireproofing in the Pittsburgh Terminal Warehouse described. Construction is on a similar principle to that of Guastavino.

Construction of grain-storage tanks for

"elevators" with hollow tile described. The construction of the old style of elevators with wood and brick bins perfected by Geo. H. Johnson, and the modern fireproof elevator perfected by his son, E. V. Johnson.

Difficulty in covering the subject intelligently in brief time given. Statistics omitted. Modern methods have proved to be saving methods.

Conclusion.—The American system is not impracticable in any other country on account of cost. Experience, as well as fabrication in large quantities, will reduce cost. High price of labour in the United States should naturally make it more expensive there than elsewhere. Reduction in cost of transportation an important economic item. The whole subject especially pertinent to the present occasion. We are here to learn as well as to teach each other at the same time; to contribute what we know to the fund of information to be here accumulated for the benefit of our brethren throughout the world.

A contribution on the subject was made by Professor Henry Adams, M.Inst.C.E. —

So much has been written during the last four or five years upon the use of concrete and steel in combination that there is practically nothing new to be said. Those who have studied the literature of the subject will probably have been struck with the number of different terms used to express this mode of construction. "Bréton armé," and the English equivalent, "armoured concrete," are perhaps the least appropriate. "Reinforced concrete" gives undue prominence to one element to the total exclusion of the other; "concrete-steel" is less open to objection, but the writer prefers the term "ferro-concrete," as being self-explanatory of the intimate combination between the two materials, the more important one coming first. A superficial criticism might allege that *ferrum* is iron, and therefore not applicable to steel, but steel is generically iron, and the term is therefore quite appropriate.

In early designs no provision whatever was made to resist the shearing stresses, which were either overlooked or ignored, and it is interesting to observe the gradual recognition these stresses obtained in the hands of the designers, until in recent construction they receive nearly as much consideration as what are called the "direct" stresses of tension and compression. The importance of considering shear was brought prominently under notice by the failure of experimental beams which had no special provision for meeting the shear stress towards the ends, where, of course, it is greatest. Various methods are employed in the different systems, but the Kahn trussed bar seems peculiarly suitable, the fin on either side of the core being left attached throughout the middle portion where the tension is greatest, and separated and bent upwards towards the ends to take the shear where the tension is least.

The question of adhesion between the concrete and the steel at one time caused some anxiety. It was naturally supposed that with increase of temperature the steel would expand more than the concrete, and it was thought that this would be sufficient to impair, if not to destroy, any adhesion that might be otherwise obtainable. As a matter of fact the linear change for a given variation of temperature is about 15 per cent. less for concrete than for steel, but when the actual figures are compared the difference is very trifling. Taking the range of temperature between summer and winter as 70 deg. Fahr., the change of length in 100 ft. produced by this variation of temperature will be for steel 0.546 in., and for concrete 0.464 in., the difference between the two materials in a length of 1 ft. being less than a thousandth of an inch.

With equal care in mixing the concrete the adhesion varies with the condition of the surface of the steel. When coated with red oxide paint it is extremely slight, and even a bituminous paint reduces the adhesion below that due to a clean unprepared surface. It is, however, found that the best adhesion occurs when the steel is rusted all over before being embedded in the concrete. This appears to be due to the formation of some chemical compound, or salt of iron and lime, which may not be detrimental in the absence of further moisture, but the final result is doubtful in such cases as reservoir walls,

tanks, and dams. Painting the steelwork over with cement wash is a simple method of commencing the contact, and this would seem to prevent further rusting, on the principle of the pail of lime-water into which the Sheffield grinders dip their small galls to resist the tendency to rust when left wet.

Professor Bauschinger found the ultimate adhesion to be from 569 lb. to 668 lb. per square inch, but Mr. J. S. Costigan found it not to exceed 65 lb. per square inch. Probably, in the former case it was measured by the resistance of a rod to withdrawal, and in the latter by the insertion of small plates in a briquette. At any rate it is not safe to reckon upon more than 50 lb. per square inch as a working load for adhesion. Allowing 16,000 lb. per square inch as the working load on steel, the embedded length that would make the strength and adhesion equal would be 16,000 times the sectional area of steel in square inches divided by fifty times the surface area per inch in length, or, briefly, $320 n \div \pi$; so that a 3-in. square bar embedded for a length of 20 in. would be equally strong against tearing or slipping, and similarly a 1-in. square bar would need to be embedded for a length of 80 in. There are many different constructions in which this fact may be of importance; for instance, in a simple beam, if the span is less than twice the above lengths, there will be a tendency for the rod to draw before the tensile strength is utilised, unless the ends are turned up to form cleats. In the edge of a circular ferro-concrete tank, instead of overlapping the ends of the rods, for which the above distance would be a minimum, it would clearly be more economical to turn up the ends and slip a welded link over them. There are several specially-prepared bars giving greater resistance to withdrawal, e.g., the Ransome twisted bar, the square corrugated bar, and the Columbian bar, which relies for efficiency upon its large surface area compared with its sectional area, but plain rods which can be obtained everywhere should be adopted whenever possible, on the score of economy and avoidance of delay.

Ferro-concrete does not at first sight lend itself readily to architectural effect; the warehouses and coal stores constructed of it can hardly be called visions of beauty, but some of the recent arched bridges have a decidedly pleasing effect, and when the adaptability of the compound material becomes better known we may confidently look forward to the expression of taste as well as utility in the designs.

Perhaps the greatest departure from existing models occurs in the construction of ferro-concrete retaining walls. Hitherto we have looked upon weight as the essential element of such walls, and stability has been secured by leaning this weight against the bank of earth to be supported. We are now confronted with a new type in which added weight bears no part; the only weight employed is that of the earth itself. The construction consists of a skin of concrete reinforced with steel rods, securely and continuously attached to a similar base and forming with it two sides of a triangle. The face wall is then kept in position by rods protected by concrete, tying the inner edge of the base at intervals to the face at one or more points of the height. It does not follow that, because the centre of effort of the thrust occurs at one-third of the height, that that is the proper place for the connexion to be made; it would be if the wall were disconnected at the bottom, but, being firmly secured there, the point of attachment should certainly be higher than one-third. If the stiffness throughout the height be uniform the point of attachment should be about 58 per cent. of the height. There are some other rather nice points of calculation about these walls which the writer does not propose to go into now; he would only point out that, apart from strength, the stability is obtained by the weight of earth resting on the base. Other examples of these walls have reinforced counterforts 6 in. to 9 in. thick extending to the whole height at intervals of 8 ft. to 10 ft. in length, and others again have reinforced buttresses at similar intervals, and in one case the writer has seen the base of the wall extended in the front instead of at the back, so as to react by pressure at a considerable leverage, but this method does not


appear to be so economical as that previously described.

There are, no doubt, many other uses to which ferro-concrete systems may be applied. Englishmen are naturally conservative; they like to feel that in their adoption of any new system they are not running too great a risk, and a novel form of construction such as this must undoubtedly have some failures, but, paraphrasing the old saying, the writer would urge that "nothing succeeds like failure." It is from failures that the greatest knowledge of true principles can be obtained, and therefore we should be grateful to those pioneers who do venture to take risk, even at the sacrifice of some reputation.

Mr. E. Warren proposed a vote of thanks to the Chairman, and the sitting of the Section was adjourned.

Visit to Hatfield House.

Some excellent arrangements were made for the excursion to Hatfield, when a large party of ladies and gentlemen, numbering about six hundred, availed themselves of the opportunity for seeing this historic house. The visitors were welcomed upon arrival by Colonel Eustace Balfour, himself an architect and member of the illustrious Cecil family, who discoursed upon the features of the great park and gave short addresses upon the history of the buildings. Much interest was taken in the brick Tudor buildings standing to the west of the great house, now used as stabling. Here stood a palace belonging to the Bishops of Ely, where Elizabeth and Edward VI. were frequent visitors; but the three sides of a great quadrangle were demolished when the new mansion was finished, leaving the fourth, consisting of the banquet hall and offices, now used as stabling. The former magnificence of this palace is indicated by the fine brickwork of the exterior and by the beautiful open timber roof of the interior.

Hatfield House, commenced in 1607, may be taken as a typical example of the many great houses which were erected in England in the peaceful times of the Early Renaissance which followed the reign of Queen Elizabeth. The foreign intercourse existing at the time influenced the trend of the arts of Britain, and the architecture of Italy in particular has clearly affected the English work at Hatfield. The long, low buildings gave place to houses of many stories, with apartments of great height, while provision for defence almost disappeared. The plan here is the  type, the favourite form of the period, with the principal front facing south, in the centre of which is an open colonnade with portico, built in 1611 of Caen stone. The depth of the main building and of the wings is greater than usual considering that the floor and roof spans are those of ordinary timber limits. The façades have considerable breadth of treatment, and the numerous bays and turrets are generous in scale. The north elevation is perhaps the simplest front, and is yet far from appearing severe. The brick-facing shows to its fullest advantage in colour and depth of joint, but the completeness of this façade is rudely interrupted by the unpleasant scale of the large plate-glass windows. Surely this otherwise perfect specimen of an historic English mansion should not be found wanting in such a matter of detail as windows, which are here crying out for lead-glazing.

A peculiar feature is the flat roofs; parapets become necessary, and add to the height of the walls. The pipes and heads for taking off the rain-water are of much interest, as also are the chimneys, built of brick, arranged in heavy groups.

The extensive accommodation of the house may be best understood when it is remembered that there are eleven staircases. The great hall is 50 ft. by 30 ft., two stories high, and has a musicians' gallery at the east end. The drawing-room is in the east wing, and is approached from the grand staircase, one of the finest of the period. Oak is used throughout the landings and great wide flights; newels are plentiful, enriched with great armorial and other finials, and are generally carved throughout their full height. The folding-gates at the foot of the stairs were intended to keep hounds and other interlopers from the private apartments. The cloister, or colonnade, now called the armoury, is immediately below the great gallery, which measures 163 ft. by 20 ft.

The great chamber, the library, and the chapel are other noteworthy apartments.

Hatfield House was one of the first mansions to possess a basement story, and here the domestic offices are to be found. The interior generally is of great interest. There is a remarkable wealth of oak-panelled walls, elaborate marble chimney-pieces, and ornate plaster ceilings, gilt and coloured with armorial decoration. Pictures of great value, chiefly portraits, furniture, and objets d'art play important parts in the finishing of the interiors.

Hatfield is beautiful in its setting. Avenues of trees lead up to wide walled courtyards on the north and south fronts, while pleasure gardens are to be found on the east and west sides. Upon the latter aspect is the old privy gardens, measuring 150 ft. square, inclosed by pleached lime alleys, which afford welcome shade. A circular pond, with fountain, occupies the centre space, and is surrounded by flower parterres and yew hedges, while the remainder comprises grass lawns in pleasing proportion. Here, adjacent, is a charming sunk rose-garden, laid out in geometric form, and upon the present occasion the roses were at the height of perfection. On the east side is a fine walled terrace, with flights of steps leading to a tennis lawn, while beyond this is the maize. This quaint feature of the Elizabethan Period is rectangular in form, varied in a zig-zag manner, and consists of narrow alleys between yew hedges. The top of the hedges is level with the tennis lawn, which is interesting from the fact that the general line of the ground produces the terraced treatment of the lay out. The gardens give the general impression of being too small in area and in part for the big scale of the house.

The visit concluded at 5 o'clock, and after refreshment had been partaken in the village the members of the Congress returned to town fully interested in all that had been seen during a most successful afternoon.

The programme of the Congress also included a visit by other members to Hampton Court. In the evening the Lord Mayor gave a conversation at the Mansion House, which was very largely attended, and where there was excellent singing in the large hall.

WEDNESDAY'S SITTINGS.

Conduct of International Architectural Competitions.

Dr. H. Muthesius (Germany) presided at the sitting held at the Rooms of the Institute on Wednesday morning, when papers were read on the "Conduct of International Architectural Competitions":—

M. J. Guadet, Inspecteur-Général des Bâtiments Civils, Professeur à l'Ecole Nationale des Beaux-Arts, Membre du Conseil Supérieur de l'Instruction Publique, read the first paper, the following being an abstract:—

The Advantage of International Competitions.—These competitions are legitimate in certain circumstances. It would be dangerous to have recourse to them without advantageous motive.

Examination of this question:—

The possible scope of the Competition.—The result of every competition is only a preparatory scheme, the preliminary design with estimate of expense. It cannot produce a definitive design; this must be elaborated afterwards.

The cost of the competition should be kept distinct from the cost of the execution of the building.

In international competitions especially it is dangerous to promise the execution of the work to the author of the first premiated design.

Conditions of the Competition, Regulations, and Programme.—These conditions contain two elements: regulations and programme. For both the advice of experienced architects is indispensable.

The regulations must allow the same time to all competitors.

Programmes must be given out simultaneously in every country.

The programme should be issued everywhere in the language in which it is drawn up and not in translation.

Every further communication should be addressed to all the competitors.

During the competition no change should be made in the regulations governing it.

The same date for sending in designs should be obligatory everywhere, and designs should be sent in to a place specified for each country.

The premiated designs should become the

property of the promoters, but without prejudice to the laws of artistic copyright.

An exhibition of designs before and after adjudication is necessary.

The regulations must indicate whether the designs should be signed or distinguished by a motto; signature is best, but the adoption of a pseudonym should be allowed.

No envelope containing an author's name should be opened without his consent, except in the case of premiated designs.

The technical programme should be clear, precise, and drawn up under the advice of experienced architects. It should avoid directions which cannot be followed, and should not impose excessive work by means of drawings that are useless or too large a scale.

The competitors' personal expenses should be reduced to a minimum.

Assessing the Competition.—The jury should only consider justice.

The conditions constitute the contract; a matter of law between the parties.

Every design, no matter how attractive, which violates the conditions should be disqualified.

The jury, necessarily competent, should be composed of architects.

The promoters who are interested should be present in a consultative capacity.

The jury should classify the designs and allocate the premiums.

The jury should be formed of architects of each nation represented in the competition in the proportion of one assessor to ten competitors or fraction of ten afterwards.

Every nation represented by less than ten competitors, with a minimum of five, should have the right to one assessor.

The architect assessors should be elected by the competitors of each nation, each name receiving an absolute majority of votes.

Study of the Working Arrangements.—To obviate non-acceptance the competitors should elect simultaneously an equal number of supplementary assessors.

The jury should elect their president, secretaries, and reporters.

The jury should be master of their procedure, but they should not be able to modify the distribution of the premiums, nor the total amount.

Vote by proxy should be forbidden.

The judgment of the jury should be final and without appeal.

Competitions in Two Stages. Special conditions for these competitions.

The first and second competitions are different things, and should not be confused one with the other.

For the first stage a large sketch plan is sufficient.

The chosen competitors should be indemnified for the cost of the first competition. They should not be classed, and the premiums should be reserved as an extra matter for the final competition.

It is preferable that the first competition should not be exhibited, all the sketches being preserved so as to be exhibited with the final competition.

The regulations ought to specify that the competition be in two stages. This decision should not be taken afterwards.

The regulations should fix all the dates.

They should prescribe the minimum number of accepted competitors who, after the first competition, should receive the stipulated honorarium. They should make known the premiums granted in the final competition.

The jury in the first competition should also judge the second, latitude being given to the accepted competitors to add additional assessors.

The regulations should be final for the two competitions, but the programme should be given for the first alone, subject to modifications for the final competition.

The following rules, proposed by the Society "Architectes d'Amsterdam," were read by M. Berlage.

The Society "Architectes d'Amsterdam" (Amsterdam) proposes to the Committee of the Seventh International Congress of Architects the following rules to serve as a basis for "the organisation of public international competitions for architecture." These propositions having been made by a special commission of the members of our Society, they have been decided upon as definitely approved at the meeting of April 18, 1906.

ART. 1.—The International Congress of

Architects frames some regulations in accordance with which permanent competition commissions are constituted, representing the architects of a country or also of various nationalities combined, which will act as representatives of the profession of architects in the preparatory measures at the international competitions. The commission of the country in which the competition is to take place will assume the management of the business. The presidents of all these commissions constitute together a Central Council, to which is entrusted the control of the international regulations and the eventual propositions made to the International Congress concerning alterations to be made in these regulations.

ART. 2.—The international competitions shall by preference take place in two sections. Preliminary competitions shall be opened in the various countries, or groups of countries, through the medium of the permanent commissions of the competitions. The admission to the final competition will be limited to those who earn distinction in the preliminary competitions. An honorarium shall be distributed to all the competitors in the final competition, the number of whom is limited for each country or group of nationalities by the International Congress.

ART. 3.—The conditions of the competition must be the same for all competitors. Exceptional conditions, no matter under what form, are prohibited. The delivery of the designs must be made anonymously.

ART. 4.—The date of the sending on, proved by the stamp of the stations of departure, which must be delivered to the jury, shall be taken as the final term for the closure of the competition. The programme of the competition shall be published or placed at the disposal of the applicants in all the countries, or groups of countries, at the same date.

ART. 5.—The jury of an international competition will in principle be formed by half the number, less one, of the members of the nationality of the country in which the competition is opened. Architects must form the majority of the members of the jury. The names of the members of the jury and of their substitutes, with the declaration which contains the approval of all the conditions, shall be inserted in the programme.

ART. 6.—The jury of the country in which the competition is held forms the information bureau. The publication of announcements relative to the competition will be made in such a manner that it may be considered to have come to the knowledge of all interested parties. These announcements shall have the same value as the conditions of the programme.

ART. 7.—The programme must express in precise terms the conditions made, making a distinction between the absolute requirements and the optional requirements. It would, however, be preferable that optional conditions should not figure in the programme of the competition.

ART. 8.—The number of drawings to be sent is to be limited to the quantity absolutely necessary in order to avoid all useless work and superfluous expense. For the provisional competitions, sketches, eventually accompanied by approximate estimate of costs, will be asked for. Any drawings sent in which have not been asked for in the programme will not be submitted to the judgment of the jury. The programme prescribes a uniform manner of treating drawings to enter into competition. Every delivery must be accompanied by a declaration that the project is the artistic property of the competitor.

ART. 9.—Should the sum available for the execution of the design be absolutely fixed, the programme must indicate the necessary particulars for the uniform working out of the estimate of costs either in detail or approximately. The expenses for the foundations will not be included in these estimates. The programme will have to contain very precise indications with regard to the character of the soil, the site, the foundations, and the surroundings.

ART. 10.—The total amount of the prizes to be distributed shall be at least equal to double the amount which would be paid for the architectural part of the work carried out to an architect who had been entrusted with the execution of the design. It must be admitted as a principle that the execution of the design shall be entrusted to the successful architect, under the conditions which are in force in the country of such competition. The amount of

the prize shall not be deducted from the amount of the honoraria to be paid. Should the promoters of the competition desire to reserve to themselves the option to dispense with the services of the architect declared to be the author of the best design, the programme must set out the terms of indemnity. Should the work not be carried out, the same indemnification should be paid to him. In all cases the designs sent in shall remain the artistic property of the competitors.

ART. 11.—All the designs shall be publicly exhibited for a sufficiently long period in order that the competitors may be able to visit this exhibition, which shall be announced beforehand in the architectural publications. The complete and detailed report of the jury shall be published in the architectural periodicals before the opening of the exhibition, so that all the parties interested may have knowledge of it. The report of the conclusions of the jury of the preparatory competitions shall be communicated to the successful competitors sufficiently previous to the definite competition.

The following are the summary and conclusion of a paper by Gaston Trélat (Paris):—

The argumentation of the previous subject bore, in the first place, on the spirit which in general dominates architects. Contrary to the intentions of a generous application of art, the architect often seems too pre-occupied about not doing certain things. And one spends a good deal of time in learning those things which must be avoided. Wasted years! it seems: how much more preferable would be an education which faced the realisations to be deduced from contemporary science? This would adjust itself to the standard authorised by experience.

Competitions, as they are now held, have not the scope they ought to have. Conventions take up too much place, one has a sense of things learnt: book-keeping of a kind and without influence on the mind of the masses. Public beauty, like public health, corresponds to the contemporary movement of democracy, of which these two capitals are a momentary crowning. The architect has no right to separate himself from it if he wishes to fulfil the function expected from the social competence it is his duty to show.

Internationalism and publicity will give to competitions a youthfulness and a vitality which they have not had up to now, and which are a part of the movement of contemporary effort.

These competitions should have exclusively in view the services of which they are the object. It must be so, in order to insure to the operation a normal rectitude which would keep it above the paltrinesses which are too well-known and are lowering to art, causes lowering alike for competitors and judges, and injurious to the solutions to be gathered.

The competitions being international, the nations taking part in them through their artists will all include the same number of judges.

In this way the competition agents, whom the judges represent, will doubtless be less inclined to look upon themselves as a delegation having to represent the interests of compatriots, or the idea in fashion currently admitted in their country. The jury will be more particularly engaged in selecting and bringing about a solution, while the competitors themselves, in consequence of the absence of preconceived ideas represented with a show of authority, will strive to elaborate and present different sides, to the exclusion of all party spirit. And, in these days, if one wishes to respect personalities alike useful in art and in science, it is impossible to be sufficiently on one's guard against these fatal influences. In effect, whatever may be the interest of contemporary evolution, with its abundance of curious observations and generous comparisons in their knowledge, ill-luck will have it that, in revenge, we must endure the narrow ideas of little groups and clans, which bring confusion into the service of the human collocation. It is, however, to this that all our efforts should directly refer, free from this impediment, very regrettable socially.

To bring this *résumé* to an end, with regard to competitions I must again say that the spirit of argumentation followed in these lines endeavours to ensure the supremacy of the decision, uniting the choice of the work and the choice of the artist charged with its execution. The author of the first idea ought to complete the studies and accomplish its realisation. And

the same spirit which the decision has intended to make clear will be found in the accomplished work. This is how things should go, if one would keep to the rectitude that the situation demands and respect the responsibility that the decision imposes on the jury.

And the organisation, as sketched here in its characteristic features, would perhaps be destined to give results still unforeseen. But this would be on condition of always keeping in the path that would normally be deduced therefrom, once agreement was come to on the ideas which support the solution I submit to the Congress.

Conclusion.—Without consciousness there is neither art nor artist. It is only by a wide comprehension of things, all leading to the consciousness of his time and of humanity, that the artist can do a useful work. In these days the widening of science serves as a basis to this consciousness. And the applications of the art take a special character in order to supply the needs and aspirations of the period.

The organisation of international competitions showing a greater amplitude of intellectual horizon would be in accordance with the ideal of the day.

Again, these competitions would have the advantage of extending the character of educations which up to now have remained restricted to present requirements.

But measures would have to be taken to ensure the entire liberty of intellectual expansion amongst the artists entering into competition, to afford the jury an unlimited independence and to enlighten the conscientiousness of the verdict they would give.

M. Weeldenburg (Holland) also read a short communication on the subject as follows:—The Society of Bouwkunst et Vriendschap of Rotterdam, while recognising the great initiatory value of the propositions made by the Society "Architectura et Amicitia" of Amsterdam, for the regulation of International Competitions, considers—

That the suggestions made by the above-named Society should be more widely extended. This opinion is based on the experience acquired at the last International Competition for the Peace Palace at the Hague.

This last competition has clearly proved that it is necessary to paraphrase the principal duties of the jury of competitions in general, and of International Competitions in particular. The Society Bouwkunst et Vriendschap of Rotterdam is of the opinion that it is preferable that the new conditions (*rédaction*) be drawn up by a Special Commission, and that a motion (conclusion) be presented to the next, the eighth, International Congress of Architects. In order to give a wider scope to the propositions made by the Society of Architectura et Amicitia of Amsterdam, the Society Bouwkunst et Vriendschap has the honour to present to the seventh Congress the following motion:— "That in view of the fact that the proposition of the Amsterdam Society of Architectura et Amicitia, presented to the seventh International Congress, deserves to obtain greater scope, therefore the Permanent Committee of the Congress shall choose a preliminary (*préparatoire*) commission, on which the Amsterdam Society of Architectura et Amicitia shall be represented. This Commission to consist of seven members."

Signor M. E. Cannizzaro (Italy) seconded the motion.

M. Georges Harmand (France) said the subject was a most important one, and he thought the various records ought to be collected and sent to the Permanent Committee of the Congress; that Committee might study them and present a report to the next Congress. He moved as an amendment, "That the papers be sent to the Permanent Committee of the Congress, who shall get out a special report on this topic for the next Congress."

Mr. Totten seconded the amendment, and said he would like the Committee to be instructed to suggest the method of the selection of the jury.

Signor Cannizzaro spoke in favour of sending the matter to a special committee of seven members elected or to be elected by the nations who constitute the Congress. He objected strongly to the matter being sent to the Central Committee, because that Committee was only at the beginning of its experience—it was a Committee started at the last Congress, and its real duty was the organisation of the Congress. It was not a Committee which had to go over the

topics discussed at the Congress, or to deliberate on matters which affected the profession all over the world. He thought the Special Committee, as suggested, should be selected, and that they should get to work and prepare a report which might be sent to the Central Committee printed and distributed all over the world.

M. Harmand said that the Permanent Committee was established at the Paris Congress to choose the place of conference, and also the topics which should come before the conference. If they chose a Special Committee in the manner suggested what would become of it? They would only have until Saturday to do the work, and that was altogether too short a time in which to deal with it. When the Congress was closed it was only the Permanent Committee which was left. He thought the matter should be sent to the Permanent Committee and dealt with by them. He moved an amendment that the matter be sent to the Permanent Committee.

Mr. Totten said the Committee to deal with the subject should not consist of seven but of one representative of each country associated with the Congress.

Signor Cannizzaro pointed out that this was the same thing as asking the Permanent Committee to take the matter in hand.

After some further discussion, Signor Cannizzaro appealed to M. Harmand to accept his motion.

M. Harmand thought it would be better to discuss the question the following morning.

The Chairman said the original proposition was to elect a committee of seven members, and the amendment of M. Harmand was to transfer the work to the Permanent Committee. There was, however, a way of uniting both parties by allowing a selected committee of seven to do the work until the close of the Congress, and they could submit their work to the Congress on Saturday, and it could then be transferred to the Permanent Committee. He suggested that this was the best thing to do.

M. Harmand agreed to the suggestion.

Mr. Middleton said he thought the amendment of M. Harmand was a very reasonable one, and they ought not to appoint any Special Committee to go over the Permanent Committee.

The proposition was then put as follows, and carried:— "That the Congress, taking into consideration the reports submitted, recommends them to the examination of the Permanent Committee of the Congress in order that they may submit a special report to the next Congress."

A delegate asked if the Permanent Committee would appoint a Special Committee or would they do the work themselves?

The Chairman said that they had just decided that the work be referred to the Permanent Committee, and it would be for that Committee to consider whether they would appoint a sub-committee.

Finally it was decided to refer the whole question to the Permanent Congress Committee.

M. Rey (Paris) proposed the final resolution:—

"That the Permanent Committee of the Congress should appoint a Special Committee of seven members to examine thoroughly the whole question of competitions, and that the latter committee should present their report to the next Congress."

On behalf of many vitally interested *confrères*, he urged that "the programme shall declare that in view of his position on the jury, no member of the same shall have any direct or indirect material interest in the execution of the work put up to competition. It is important that the jury, which is a tribunal without appeal, shall be able to give a full moral guarantee in this respect. All the more so, because at the present day many eminent architects of all countries refuse to take part in public competitions, when this essential claim is omitted from the programme."

Mr. Middleton said he could see no reason for such a motion. If the matter was referred to the General Committee he did not see how they could tie their hands as to the way in which they thought best to deal with the subject. At present they would be left a free hand as to what sub-committee they would appoint.

The Chairman remarked that that was exactly his own view.

Mr. Hare suggested that it would be better to send the matter forward as a recommendation from the meeting rather than as a resolution.

Mr. Totten then moved that the motion be sent forward as a resolution, and it was seconded by M. Harmand, and carried.

Ownership of Architects' Drawings.

Mr. W. S. Eames (United States) succeeded Dr. Muthesius in the chair when this subject was discussed, and Mr. H. Heathcote Statham read a paper of which the following is an abstract:—

The question is distinct from that of architectural copyright in designs, with which it must not be confounded. It turns on the question whether the drawings and specification made by the architect in order to carry out a building are to be retained in his custody or to be handed over to his client. In France and Germany no legal question is raised on the subject: the architect retains the drawings as a matter of law. In England the custom has been almost universal in the same sense. But in the case of *Ebdy v. McGowan* (1870), the Court ruled that, the building not having been carried out, the drawings must be handed over to the client on his paying for the time expended on them. In the case of *Gibbon v. Pease* (1904), the Court, to the surprise of architects, ruled that the precedent of *Ebdy v. McGowan* covered all cases, whether the building had been carried out or not, and that the client had a right to demand all the drawings, the Court refusing to hear any evidence on the side of the architect, whose drawings and specification can therefore, in England, be legally claimed by the client, although he already has what he really paid for—viz., the building itself. It is pointed out that an architect is not paid for making drawings, but for producing a building, the drawings being only his necessary instructions to the workmen; under some circumstances he might even dispense with drawings altogether. To require him to hand over to the client drawings and specification, which represent the result of his professional experience over many years, for the client to use as he pleases is a manifest injustice to the architect. Moreover, the custom in the profession of handing over the drawings to the client when the building has been planned, but not carried out, is a mistake on the part of the profession; as in such a case an unscrupulous client has only to say that he has changed his mind in order to get possession of the drawings and use them as he pleases, with no further compensation to the architect. The wording of Clause I. of the Institute Scale of Charges is most unfortunate, as it appears to state (though not so intended) that the architect's commission is for producing drawings of a building. The wording of this clause should be amended. The author moved the following resolution:—

"That, in the opinion of this meeting, the Royal Institute of British Architects, having revised the wording of its paper on the professional practice as to the charges of architects in the sense indicated above, should as early as possible take steps to get a Bill introduced into Parliament for securing the adoption of their scale of charges, so amended, as part of the law of the land."

M. Harmand expressed the opinion that the matter could be dealt with in association with the subject of copyright.

Mr. Hudson seconded the resolution moved by Mr. Statham.

A discussion arose as to whether or not the question of the ownership of architects' drawings and that of artistic copyright should be taken together.

M. Harmand thought it would be a mistake to separate the questions, for copyright gave a right to keep the drawings. What Mr. Statham said as to this being an English question was very true, but they all hoped that the British Parliament would pass a law which would settle the copyright question.

The Chairman thought they had better consider the question of the ownership of drawings apart from the question of copyright. The resolution of Mr. Statham would not interfere with any similar resolution with regard to copyright law; but while one measure might pass and have a good result, yet a combination of the two subjects might mean a failure of both.

Dr. H. Muthesius (Germany) said that the question raised by the reader of the paper was not one which concerned England only, but it was one of international importance. He would rather like to have it such a way so that the Congress might be concerned with it as an International Congress, and not as an English Congress. To his knowledge the circumstances were entirely

the same in Germany where in any law case this uncertainty arose as to whom the drawings belonged. Their judges, however, were inclined to take the conclusion arrived at by professional bodies, and if an International Congress gave as its firm opinion that the charges of architects did not refer to any drawings, but only to the executed building, that would help them forward in any country. This would state the case that the client did not pay for the drawings, and if he changed his mind during the course of the erection of the building, he would have no right to get the drawings from the architect. In their German charges they had a phrase to the effect that the drawings did not belong to the client but were the property of the architect, but it was stated that the client must be provided with a set of copies of the drawings if he desired to have it. That clearly showed that the original drawings belonged to the architect, but at the same time he took it that they would have difficulties in any law case over the point. Therefore, he would like that International Congress to give its opinion that an architect was only paid for the actual carrying out of the building as a work of art, and that the drawings had nothing to do with the design, and were the property of the architect himself.

Mr. Middleton said he would like to move an amendment. He was very sorry to find himself in opposition to Mr. Statham on the matter, because he thought that generally on the whole ground he was in the right, but further than that, he thought if the resolution was carried it could not be carried out until architecture, like the law of medicine, was a definitely legalised profession; which was a course of policy on which Mr. Statham and he differed. There was another question as to the scale of charges of the Institute being made a portion of the law—that was not only this portion of the scale of charges but the whole of it. He felt that if the scale of charges was once taken into the House of Commons they would find that Parliament would consider it from the point of view of the public, and not from the point of view of the architects, and they would prevent architects charging too much as against the public. That would certainly not make a scale in favour of architects. They would make the present scale a maximum scale, while now it was the minimum scale, and they would probably get just the reverse of what they wanted. He felt that a legal scale would be very harmful to architects. The only profession which had a legal scale was the law, and that scale was forced upon the lawyers to prevent them from robbing the public. The scale was not given to the legal profession to enable them to obtain their charges, but to prevent them from overcharging. He felt that this was the view that Parliament would take in regard to architects' charges, and he moved as an amendment:—"That in the opinion of this meeting the Royal Institute of British Architects should revise the wording of its paper on the professional practice as to the charges of architects in the sense indicated above." He thought the resolution should stop there. That would do away with the question of forcing it on the House of Commons or the House of Lords as matter of law, and would only be asking the Royal Institute of British Architects to revise its scale. That scale was very well accepted as the general custom when cases came before the courts at the present time, and if they altered it in the sense indicated, he thought it would become very generally recognised.

Mr. Prentice, in seconding the amendment, said he fully believed with the last speaker that if the matter was brought before Parliament an endeavour would be made to make the scale of charges and the ownership of drawings in the interests of the public rather than in the interests of the architects. He was a delegate from Tasmania, and in that country they felt very keenly upon this subject. He might say that in conversation with one of the vice-presidents of the Royal Institute of Victorian Architects before he left, the desire was expressed that everything possible should be done so far as the legalising of the retention of drawings by the architect was concerned. In the old scale of charges they had a clause which definitely set out the minimum charge of 5 per cent., and it was stated that all drawings prepared by the architect should remain the property of the architect, and were simply to be used for that particular work. Now, in spite of that he had had clients who had really claimed the drawings, and more particularly of works which had not been carried out, and he had felt that it was so

problematical whether or not the law would support what was stated on the printed matter placed before the client with the charges that he had never felt disposed to fight it in a court of law. On one occasion he was compelled to give up the working drawings, but in other cases he had endeavoured to appease the client by giving him such tracings as would meet the requirements of the case. Under those circumstances he thought it would be a wiser course to follow the amendment, and let the Institute so alter the wording of its paper, rather than to take it to Parliament, where he was afraid they would have a verdict against them.

Mr. A. H. Kersey said that he had another amendment in his mind, but he thought they were losing sight of the nature of that meeting. This was an International Congress, and as Dr. Muthesius had suggested, they ought to consider the matter from an international point of view. Mr. Statham's resolution was one distinctly affecting English architects only, but he (the speaker) asked the Congress to follow rather the suggestion of Dr. Muthesius. The English architects were quite capable of passing a resolution themselves with regard to what they wanted, but what was required was for the Congress to give a sign manual that the architect's drawings were his own, and that the architect was not merely a workman for providing so many sheets of paper, but was a man for producing an architectural building. It had been pointed out there and elsewhere that the architect had to spend laborious hours and much money, and have the natural gift, before he could do this. He would read the resolution he intended to move, and then if it was carried Mr. Statham would no doubt move that the Institute should do what was wished. He proposed:—"That this Congress is of opinion that the architect is paid for the production of a building, and that the drawings and paper prepared by him to that end are undoubtedly the property of the architect, and that this is the universal practice in other countries." He proposed that, but would be prepared to accept any alterations which would carry out the object they had in view.

Mr. Middleton appealed to Mr. Statham to withdraw his resolution in favour of that of Mr. Kersey, and then he would withdraw his amendment.

Mr. Hudson asked if Mr. Kersey would substitute the words "should be" for "are undoubtedly the property." There was no doubt at present the judges were against them.

Mr. Kersey said he was speaking universally, but he was quite prepared to accept the suggestion. His only desire was to get a strong resolution by the Congress which would show the English people that they were the only country where the architect was not entitled to retain his drawings.

Mr. Statham said he would withdraw his resolution, and Mr. Middleton then withdrew his amendment.

Mr. Read suggested that they might get the foreign delegates to say what the law was in their countries, so that they might have the weight required in the resolution.

Mr. Kersey moved his suggested amendment as a resolution.

Mr. Berry, in seconding the resolution, said he was very glad that it had been substituted for the original one. He quite agreed in sentiment and theory with all that Mr. Statham had stated, but they had a very much sterner law than theory and sentiment, and the law had laid it down emphatically that they had not the right to the ownership of their drawings. It was no use them standing there and saying what they wished, or what they believed, or what they liked. They were in the position of the men in the stocks, and must get out as best they could. He thought the resolution proposed by Mr. Kersey was an excellent one, as it would enable them to express what they would like without fighting against the laws that be. He took that opportunity of deprecating most strongly any attempt to alter or tamper in any way with their existing schedule of charges of the Institute until the law was amended. That schedule of charges was now used as their sheet anchor in this matter. It was the only ground upon which they could stand, and they had always based their contention with regard to charges upon the fact that it was the custom. They had no stronger ground, and that schedule of charges showed their custom. Immediately they began to tamper with it and turn it about they lost the value of that plea of custom, and he thought

it would be a most dangerous precedent. They had for many years past recognised the fact that they had no ground to stand upon in claiming the ownership of drawings. They used to have on their schedule of charges a footnote stating that it was not law but it was the custom. They were advised to withdraw that note because it was misleading their professional members, and it was withdrawn accordingly. That was a very significant fact. The profession recognised that under the law as at present they were not entitled to the ownership of drawings, and it was no use their attempting to enforce it. Mr. Statham had made some remarks deprecating the inaction of the Royal Institute of British Architects in the case of *Gibbon v. Pease*. He (the speaker) contended that the Institute were perfectly justified in the course they pursued, for if they had taken the matter further they would have landed themselves in a great deal of expense for nothing at all. He had much pleasure in supporting the resolution, and trusted it would get such unanimous support for it as would show not only the feeling of architects in this country, but in all other countries.

Mr. E. W. Fritchley (India) asked to be allowed to say a word from the point of view of the client. It was, he thought, well to put themselves in the client's position, and see how the thing affected him. An architect might have put up a building for the client, and at some future time the client might want to make an extension of the building. Well, the architect who had prepared the original drawings might have died, or he and the client might have fallen out over the building of the first building, and the client might not want to retain him again. It did seem rather hard upon the client that he should have to break away portions of the construction in order to find out what the construction was like, which he might have to do if the architect retained the drawings. Therefore he would suggest some alteration of the resolution to the following effect: "That all drawings shall be the property of the architect except such constructional drawings as are necessary to give an idea of the original construction."

Mr. Statham said it was perfectly open for the architect to give copies of these drawings without parting with the originals.

Mr. Kersey said it was almost a universal practice with London architects when a job was finished to supply the client with a drawing which gave him all the details he wanted to know, such as the positions of the drains, bells, hot water and other pipes, and all information which was likely to be required to prevent the pulling about of the building.

Mr. Harmand pointed out that it would be a most dangerous thing for them to say that they were paid for putting up a building, for the natural question would be, if they did not build, "What are you going to be paid for?" He thought they would all agree that the drawings should be the property of the architect, but he thought that they ought first to deal with the question of copyright, and then come back to this matter.

The Chairman, in reply to Mr. Harmand said the opinion of the members present seemed to be in favour of the separation of the two questions, and the discussion must be confined to the ownership of drawings.

Dr. Muthesius said he hardly liked the wording of the proposition saying that this was the universal practice in other countries. In the first place it made it a purely English matter whereas they wanted to make it an international question, and in the second place it was not quite true.

Mr. Kersey said he would delete the last words of the resolution.

Mr. Hudson suggested that the resolution should read: "That in the opinion of this meeting the architect is paid for the building or for the opportunity of building, etc."

Mr. Kersey said if that were done the client would certainly claim the drawings. The lawyer would arrive at once to the conclusion that the client should have the drawings.

The Chairman read the amended resolution as follows:—"That this Congress is of opinion that the architect is employed for the production of a building, and that all drawings and papers prepared by him to that end are undoubtedly his property."

Mr. Fritchley said that according to this wording the client would not be entitled to any drawings, and his clients would greatly object to that.

The Chairman pointed out that Mr. Kersey had explained that the usual practice was to supply drawings showing the location of the drains and wires and so on.

The resolution was then carried and the Congress adjourned.

On Wednesday afternoon visits were made to Buckingham Palace Gardens and Westminster Abbey; and subsequently to Messrs. Holloway's and Messrs. Doulton's Works, the two latter being alternative visits, arranged for the same hours.

The Conservation of National Monuments.

M. E. V. Dahlerup (Denmark) presided at the Rooms of the Institute in the evening, when the subject of "The Responsibilities of a Government in the Conservation of National Monuments" was discussed.

Before the commencement of the discussion Commendatore Alfredi d'Andrade, on behalf of the Italian Government, presented a number of books to the Royal Institute of British Architects dealing with the conservation of ancient monuments, and described some of the methods of conservation adopted by the Government.

Mr. Alex. Graham, on behalf of the Royal Institute of British Architects, offered sincere thanks to the delegates of the Italian Government for the valuable publications, and said he only wished that in the near future the British Government might follow the excellent example of the Italian Government. He also thanked Commendatore d'Andrade for his excellent explanation.

Commendatore d'Andrade said that if the Congress wanted any further information as to the way of his Government in preserving monuments he was always at their disposal.

Government Action on the Continent in the Interests of National Monuments.

Prof. G. Baldwin Brown, M.A., read the first paper. He said that the question of the proper treatment of ancient monuments has engaged the attention in previous years of the International Congress of Architects, and at the last meeting, held at Madrid in 1904, various resolutions were passed on the subject, one of which was to the effect that "a society for the preservation of historical and artistic monuments should be established in every country," and that all such societies "might be grouped for common effort and collaborate in the compilation of a general inventory of national and local treasures." It is the aim of the paper to give a succinct account of the measures actually in force on the Continent for the furtherance of the cause of monument protection, with a view more particularly to advance the cause in Great Britain and Ireland.

The buildings and works of art that have come down to us as a legacy from the past represent national assets which can never be increased, and the problem how best to deal with them is the same in all European countries, though it has been approached, grappled with, or evaded in different fashions. A knowledge of the principles and practice that obtain abroad must necessarily be of value to those interested in this question in our own country.

A comparison of British arrangements for the safeguarding of ancient monuments with those that exist in Continental countries gives the following results. Almost everywhere abroad the initiative has in this department been taken by Governments, while in Britain private individuals and societies have practically done all the work. The British Ancient Monuments Protection Act of 1882, though actually passed as a Government measure, had been due to private initiative. More recently, however, there have been encouraging signs that British Governments are coming to recognise this protection as a suitable matter for State care, and the Ancient Monuments Protection Amendment Act of 1900 represents a distinct advance.

Continental Governments have expressed their solicitude on this matter in various fashions, the most common and one of the most effective of which has been the establishment of State Commissions charged with the upkeep of national treasures of architecture and art. Some of these commissions have been at work for the best part of a century, while others, as in Holland, have only recently been appointed. They exist in at least a score of European countries. Apart from the maintenance of State Commissions, Continental Governments have shown their care for monuments by issuing numerous rescripts, royal and ministerial, some of which date back to the seventeenth century. The Prussian and other

German Governments have been especially active in this department, and about fifty Prussian rescripts of the kind were promulgated between 1815 and 1881.

In most cases these rescripts, and the regulations issued by the State Commissions, have not possessed the binding force of law. They have worked well, and been generally obeyed by intelligent and docile citizens, but have not possessed the power of actually controlling the recalcitrant. The formal Monument Act, with its penal sanctions, is something different and more cogent. Such Monument Acts exist in more than a dozen European States, and Great Britain is one of these. British legislation differs, however, from that of other countries in that it confers no compulsory powers over monuments in private or corporate ownership. In the case of all other Monument Acts the proper authorities are given the power to expropriate, on grounds of public utility, any ancient monument of great value that is in danger under its existing ownership. The British Act has no compulsory clause of the kind, and only contemplates a friendly contract between private owners and the public authorities. The contract is voluntary, though while it is in operation the law enforces its provisions.

The work of Continental Monument Commissions, whether or not this is carried on under a formal Monument Act, is generally based on a list or schedule of national monuments which are worth preservation either on artistic or on historical grounds. This implies a process of inventorisation. Such a survey of the national assets in this department is in progress in almost all European countries, and here again Great Britain is conspicuously behind her sister nations. In our own country there is a precedent for State action of the kind in the Department of Historical Manuscripts, on the cataloguing of which a Royal Commission has been at work since 1869. Nothing of the kind has yet been attempted for works of art and historic buildings. There is, however, a growing demand for some State action of this kind in the British Islands; and it is suggested that the International Congress should strengthen the hands of those who are working in this direction by a memorial in favour of a Government scheme for the survey and inventorisation of the vast treasures in ancient monuments and works of art which this country possesses, and for which there is practically no legal protection. It is generally acknowledged that the British Government owes something in this department to the country, and the appointment of a Royal Commission for the purposes just indicated would be the most practical measure that could be adopted.

M. A. Besnard (architect, Paris) followed with a paper, of which the following is an abstract:—

For a long time past the question of the preservation of national monuments has occupied the minds of enlightened persons. In fact, the Congresses of Architecture, of the public arts, or of archaeology, which have succeeded one another for some years past, have been called upon to discuss this important problem without, however, up to the present any palpable result having been obtained.

On the other hand, the efforts made on various sides by the Governments show their benevolent solicitude, but they prove at the same time the necessity of having recourse to a uniform programme, the elements of which it is necessary to find out.

It is with this object in view that we have made a list of the different measures which in our opinion should contribute in the most useful manner to obtain this result, and we submit it to the judgment of the Congress.

First of all, it is absolutely important that the Governments should have the power to bring about the obligatory expropriation in every case where a monument which presents an historic, artistic, or archaeological interest shall not be kept in proper repair by its owner.

That never, unless it be absolutely and immediately needed, should administrations be allowed to carry out, or to authorise private persons to carry out, works which may cause the disappearance or the ruin of a monument the historic or monumental interest of which is recognised by all.

That everywhere where the site shall form the natural frame of the monument it shall be prohibited to touch it in any way whatever.

That in the formation of streets and sewers the administrations shall be bound to respect

the ancient monuments which happen to stand in the line of the laying-out plan, and that in certain cases these monuments shall be made the basis of such laying-out plans.

That in case it should be found absolutely impossible to preserve a monument, it shall be the duty of the administrations, before any demolition work be started, to take photographs, and make faithful abstracts and casts to be deposited in the local museums, and that the fragments of architecture, sculpture, and locksmith's work coming from the demolition of such monuments be distributed among the local or regional museums.

That particular instructions shall be issued as to the mode of proceeding in these demolitions.

That encouragement shall be given to such municipalities to suppress any parasitic structures which hide from view the monuments of the past.

That, wherever it is possible, the monuments shall be preserved for their original purpose, and that for the others measures of hygiene and salubrity shall be taken which will allow them to be utilised. A considerable number of old houses which are interesting from a monumental point of view could thus be preserved to posterity.

That at no time shall the municipalities be authorised to entrust with such work agents of the local public service, but always architects appointed by the Government.

That in the case of enlarging a town the public authorities shall be obliged to preserve its primitive aspect in the main outlines, and thus make it possible to perpetuate its original character.

That advertising shall be strictly prohibited on and around the monuments.

That archaeological inventories made on a uniform plan shall be compiled everywhere, so as to secure the perfect and complete knowledge of all the national art treasures.

That in cases where the credits will not allow the immediate execution of the work of restoration of the monuments, measures of protection shall be imposed (particularly with regard to sculptures); and, as a first consequence, that in all buildings devoted to religious services the tumular flagstones shall everywhere be taken up and placed against the internal walls of the buildings.

That in the case of restoration, instructions based on a standard programme, shall be the rule for the architects appointed to carry them out. Among these rules we would mention especially the obligation of preserving to each monument, for all the parts to be restored, records of the previous state. To use (in all cases where this will be possible) the original materials, and to respect the dispositions of the ground plan, these dispositions being elements of the characteristic features of the different styles.

That previous to any restoration a very accurate report on a large scale of the actual condition shall be taken, with casts of the sculptures and the most characteristic profiles.

That general rules shall be established for the placing, the maintenance, and the restoration of painted glass windows.

As the mission of the Government is not only to think of the present, but also and above all to make preparations for the future, they must try to surround with a sentiment of art their programmes for the general instruction of the masses, so that there may be created in the latter a respect for monuments of which at present they are too often devoid. To take one instance, we should see that good reproductions of the masterpieces of monumental art have their place among the list of scholastic pictures, and that in the large towns museums of casts be established on the lines of our admirable museum in the Trocadero.

The Governments should encourage with the greatest care the public and private schools of apprenticeship in order to preserve the taste and skill of the workman and the artisan, without which the work of the architect could never become perfect.

The Governments should also encourage the private societies which have for their purpose the preservation and the defence of monuments, especially by granting them privileges which will enable them to usefully carry out their mission.

They should also encourage the publication and the diffusion of private monographs, such as the one in France entitled *The Church of Our Lady, Cathedral of Amiens*, by G. Durand,

published under the auspices of the Society of Antiquaries in Picardy; also those treating of the local influences, such as the *Religious Architecture in the Ancient Diocese of Soissons in the Eleventh and Twelfth Centuries*, by Lefèvre Pontalis; and finally those of collective documents such as the *Collection of the Archives of the Commission for Historical Monuments*, published under the patronage of the Administration of Fine Arts, by MM. de Baudot and Perrault-Dabot, which contains no fewer than twelve thousand documents, and the interest of which, being admitted by everybody, forms a collection of the very greatest importance.

Professor W. R. Lethaby then read a paper on the subject. He said that the systematic study of ancient art has led to the perfecting of a second method of research, the history of civilisation by its monuments—and at the same time a conscious love of old works of art has been awakened. These, the poetic and historical aspects of old buildings, are dependent upon their authenticity. Such monuments are not mere records; they are survivals, while they preserve the handiwork of the men of old. On the historic side nothing else is a valid document, and on the side of feeling nothing else can touch our imagination.

While the science of archaeology was being being built up experts were betrayed by their knowledge and enthusiasm. They did not think of the difference between the mere form of an old monument and the living building of itself. Even when they did not make all new, they refused to see how they wounded the old by placing their conjectures by the side of it. Restorers acknowledge that harm was done in the past, and then with professions of sympathy they go and do likewise, taking the new word "repair" in place of the old word "restoration," but with similar result.

Renewal is going forward with quickened rate all over Europe, and the most ancient and beautiful buildings are those which are passed through the mill of restoration and left desolate. St. Front, Perigueux, excited so much interest that it was made over again. The Dom at Aachen is being covered up with fashionable marbles and mosaics; Murano Cathedral looks as if it had been supplied from a factory, and so with many others.

In every country protests have been made—in France lately by Emile Horelque, in Germany by Strzygowski, in Italy by Boni, in England by Ruskin and Morris—but the custodians of ancient buildings and their architects make a few verbal concessions and go smiling on their way.

The alternative to this method of dealing with old buildings is persistent care and repair, as of national treasure to be guarded. As fragmentary works in a museum seem all the more precious for showing a history of antiquity and loss, so it is with an old building; and if it be cared for in this spirit of proud guardianship no necessary strengthening and upholding will harm it.

It is usual to object that old buildings are not in museums, and have to be maintained for use; but no proper use is hurtful. The use and stability of our cathedrals have been sacrificed to the caprices of ornamental decoration. If the principle is accepted that our object is the preservation of the integrity and authenticity of a monument, we can hardly go wrong in carrying out needful repairs. Much experience is stored up in the papers issued by the Society for the Protection of Ancient Buildings.

If architects must restore, let them do it on paper only, without impairing the evidence of the building itself, evidence which disappears when they actually build their theories, so that we have not even the satisfaction of being able to prove them wrong.

We can hardly go to any famous building in Europe without finding extensive works in progress and unless there is soon some great change of policy there will be little left that is truly old to hand on to posterity.

M. Joseph Artigas y Ramoneda (Barcelona) also read a paper. His conclusion was—

From my determining the "nature of national monuments," deciding "to whom they belong," and fixing the "advantages of their conservation," it follows logically that the only way of preserving them is incumbent on peoples and Governments, on the latter resting principally the sole responsibility for their loss, for the reason that they alone have the active authority to avoid it, and the charge of the necessary

public moneys to preserve them from the natural decay which the parts must suffer both through the action of time and from the destructive hand of man.

The following is a summary of the essay presented by the Tuscan College of Engineers and Architects—

The late engineer and architect, Professor Giuseppe Poggi, of Florence, Honorary President of the Tuscan College of Engineers and Architects, and Correspondent of the Royal Institute of British Architects, in some memoranda and articles which are now being collected by his family into a single volume, together with other documents concerning art, on several occasions expressed his views with regard to the responsibility of the Government for the preservation of national monuments. This College now submits to the Seventh International Congress of Architects in London the extract from the volume bearing on this subject, which has been presented by the family, together with an epitome of the opinions expressed by a person of such universally recognised authority.

As early as 1845 Professor Poggi had written a paper "Concerning the Respect which we owe to the Antique Monuments," and in 1864, in a memorandum read at the Royal Academy of the Friends of Geography, "On the Project of Expropriation with a view to the Preservation of the Monuments," he summed up his impressions about the law presented in the Italian Parliament, concluding with these words: "The spirit of that Government is provident which intends by the means of expropriation to secure the preservation of the monuments of art and of natural history which are of an immovable character, and the preservation of which would be in danger if they continued to remain in the possession of private individuals or of corporations."

"In our opinion, such a wide and generic law cannot be productive of the beneficial effects which it is intended to achieve, by reason of its own excessive vastness, because neither the State nor the communes could support the immense expense which the wide application of the law would entail.

"In order to obtain the desired results it would, in our opinion, be convenient that the law should be assisted by preventive measures and by arrangements which would render its application less frequent.

"Among these arrangements we should consider the following to be of great efficiency:

"1. The compiling of an illustrative list which would indicate those monuments of national interest, compiling it with so much discretion as not to register without good reasons any except those immovable monuments which are really worth preservation.

"2. To make appeal to the citizens and corporations, owners of such immovable objects of art, with a view to revive in them the ancient sentiment of the beautiful and to encourage them to make the necessary sacrifices; further, to animate the whole nation and the municipalities with a sense of gratitude and esteem towards those who fulfil such a noble and patriotic duty.

"3. In those cases where this appeal should remain of no effect, it would be necessary, with regard to immovable monuments of practical usefulness, to order the restoration within a given period, and in case of failure to have it done by the commune at the expense of the owner. Should this appear to be too harsh, the property should be expropriated and sold by public auction with the prescriptions adapted to the case. For those private properties used for religious purposes, the patronage should be ceded to families who would undertake to keep them in proper repair. In the case of those properties used for religious purposes and belonging to corporations, orders should be given for their restoration or their keeping in repair, and should they be too poor to do it, expropriation should not be declared, unless there is a certainty of a better preservation. Finally, for those which are neither among the number of the properties put to a private use nor among those used for religious purposes, it might, in the case of bad preservation, be convenient to declare for them only the permanent expropriation, this course, for the reasons indicated, not being a burden either to the State or to the communes.

"4. In conclusion, to form a fund, not so much for the purchase of immovable monuments which may come under the law of expropriation for permanent preservation, as for the purpose

of covering the losses on the price of those which must be sold at once by public auction, and to furnish the funds for the necessary repairs."

In another memorandum, read at the second Congress of Engineers and Architects in Florence in the year 1875, bearing the heading, "On the Preservation of the Monuments of Art and Archaeology," at the time when it was proposed that the Government should lose a time in passing a law for such preservation Professor Poggi set forth his conclusions as follows:—

(a) That it would be necessary to render it obligatory, in cases of important restorations of national monuments, to obtain the previous decision of the consulting provincial commissions.

(b) That the monuments belonging to private individuals should be submitted to the same law of preservation, adopting the course which shall be deemed most convenient. In any case it should be ruled that the private monuments should form part of the general inventory of the monuments of the nation.

(c) Before the consulting provincial commissions enter upon their duties, the foundation and the principal evidence for the preservation and restoration of the architectural monuments in question, and for the formation of the inventories of those which must be declared to be of national interest, should first be discussed and established by architects and other artists, as well as by archaeologists and other competent persons. These inventories should be accompanied by the plans, sections, and perspective views considered necessary to give a clear idea of the present state of the monument, and of the necessity of its restoration and preservation.

(d) Appeal should be made to the Government itself, with a view to steps being taken to constitute a fund or a revenue which will furnish the means for carrying out and observing the law in a convenient manner, either by the Treasury making return of such part which it might have unlawfully appropriated and which was to be used for the preservation of works and monuments of art, or by issuing such measures as will be considered most to the point. And there being among these measures that of the entrance fee for visiting the museums, art galleries, antique monuments, &c., it is to be hoped that the receipts therefrom will be entirely destined for the above purpose.

On later occasions Professor Poggi expressed the view that the means at disposal should be put into operation at once for the restoration and the preservation of the large number of architectural monuments which suffer, and the importance of which becomes known on the occasions when new excavations are opened and when searches are made for remains of Etruscan, Greek, and Roman monuments.

"Italy," he wrote, "is already recognised by the whole world as a great country on account of her numerous and varied monuments which have been uncovered. It is not urgent to excavate the buried remains, because in the state of preservation they are in now they will be found unaltered in a couple of centuries; but we cannot say the same of those which are visible objects of admiration and of study, and of which it behoves us to arrest the decay without delay, unless we are to see them pass away from us for ever."

A paper by M. Gaston Trélat (Paris) was taken as read. His summary and conclusion were as follows:—

If the State is a chief synthesis of collective interests the Government is the effective agent of the measures which these interests demand.

Now, monuments are important elements of national beauty. As such they form part of the preoccupations which in our days public art would tend to claim and bring within its compass.

This new institution has already taken a place in Parliamentary deliberations with regard to the preservation of sites; and finally Governments have no longer the right to be indifferent to it. National monuments are important elements of public beauty. They have, therefore, a conspicuous place, with this inherent and distinctive feature, that they were included in the former classification of the Fine Arts.

If Governments should be indifferent to their preservation and maintenance, it would be going against the great fact which becomes more and more evident and which takes a character of social progression, to at least honour our time.

Conclusion.—Monuments are a source of public beauty, and their preservation ought to

be submitted to the deliberations of competent persons representing the collectivities interested. Consequently it involves in the highest degree the responsibility of Governments.

To facilitate the double operation, as well as to effectively instruct the public as to the results expected, there is reason to desire that, whenever it is shown to be useful, the custom of making temporary models before any definite execution should be extended.

M. Besnard moved:—"That the Government should be empowered whenever a case arises to expropriate a monument which is historical." Commendatore d'Andrade seconded the motion.

Mr. W. D. Caröe said this was a very general resolution, and there could be no objection to it. If a monument was in bad hands and likely to be destroyed, somebody should step in and save it. Therefore he was very ready to support the proposition.

The resolution was carried.

Mr. Alex. Graham moved:—"That this International Congress of Architects recommend that the British Government be approached with a view to appointing a Royal Commission to control and to extend the operations of the Ancient Monuments Protection Amendment Act of 1900, and to prepare an accurate catalogue of the ancient monuments of the British Islands, taking similar action to that of the Department of Ancient Manuscripts and in agreement with the measures adopted in other countries."

M. Besnard raised the question of what was an ancient monument?

Mr. W. D. Caröe said he had great pleasure in supporting the resolution, but would ask Mr. Graham to accept a slight modification. A gentleman had been discussing what was an ancient monument, and as a matter of fact in England they were rather disposed to consider that an ancient monument belonged to the prehistoric period, and, therefore, in the resolution it was very necessary that they should make it clear that they included not only prehistoric monuments, but also historic monuments, and he suggested that the resolution should read:—

"And prepare an accurate catalogue of all ancient monuments in the British Islands, whether historic or prehistoric."

Mr. Graham said he would accept that.

Mr. Caröe said they were told, as Professor Lethaby had said, that their ancient monuments were being destroyed, and really the first thing they had to do before handing over their monuments to the Government was to educate the Government. Upon that point he must express himself frankly, and his feelings were entirely with Professor Lethaby when he said that so far on the Continent—and he begged the pardon of their visitors if he said anything that they might feel harsh—the result of placing monuments under Government had been disastrous. It had not been intentionally so, but he felt it had been actually so. Therefore, in seconding the resolution, which he believed was a necessary one, he felt they ought to act with caution and that their friends from across the seas should think with them a little as to what they felt in the result of the restorations which had been going on in Europe. It was very easy to give cases, and perhaps he might give one instance of a case of restoration taking place in the Chairman's own country. When he was a small boy of six or seven he was interested in ancient monuments, and he was travelling in Zealand and came to a little village where he saw the first round church he had ever seen. He did not know whether he was more interested in the storks than in the church, but at least he recollected the church. He visited the place for the first time since about two years ago, and before going there he drew a picture of the church as he remembered it as a little boy. He drew the tower, but when he got there his wife chafed him and told him he could not rely on his memory, for the church had no tower. Well, they got hold of the old verger, and he told them that the tower was pulled down because the church belonged to the Xth or XIth century, and the tower belonged to the XVth century. That was an excellent example of the kind of restoration which had been going on all over Europe. He could give them other instances. He could tell them how he saw some beautiful ancient carvings pulled down because the figures were drawn out of proportion, and an admirable artist put back the same subjects, but in designs which he thought worthy of the XIXth and XXth centuries. That had been going on in many places. After all was not

only the forms of their ancient monuments that it was necessary to preserve if they were to be of value to them, but it was their spirit, and he could conceive no case where the form had been preserved and the spirit lost more completely than that remarkable restoration which had taken place at Carcassonne in Northern France. It seemed to give them everything that restoration ought not to be, and yet Viollet le Duc had produced the most remarkable monograph, which showed his extreme erudition in everything but the spirit of the Gothic architecture, which he did not understand in the least, and had wiped out of the city. He hoped that Professor Lethaby's paper would be translated into the various languages of those attending the Congress, and although they might not agree with it *in toto* (and he did not himself, because he felt in some cases it went a little too far), yet he trusted it would be read, marked, and digested, and considered by their friends across the seas.

Professor Baldwin Brown said that in supporting the resolution he thought they should not confuse the issue by saying too much about this great question of restoration. It really did not depend upon the action of the Government. They had committed the sins which Mr. Caröe had spoken about in England just as they were committed all over Europe. The present aspect of Salisbury front was as bad as that of Carcassonne or of the interior of Notre Dame. What they wanted to do was to educate the public who were not official, and they had also to educate those who were in official charge. He agreed very largely on what had been said as to restorations, although not to the full extent enunciated by Professor Lethaby in his paper. He did not mention the question of restoration in his paper, for he thought it stood apart from what they were really dealing with, which was the necessity of some Government care of monuments, and that did not necessarily take the form of restoration.

Com. d'Andrade and M. Besnard spoke in favour of passing a resolution in more general terms.

Mr. Caröe pointed out that they had already passed a general resolution, and they wanted this particular one to apply to the country in which the Congress was being held.

After some further conversation,

Professor Baldwin Brown said there appeared to be some feeling that the motion was not international enough because it concerned the British Government. He thought it was international, for the International Congress asked the British Government to fall into line with other countries. That he thought was an international matter, and was a demand which such a conference might make to one nation which was out of line with others. It was a matter which affected the whole community, that all nations should be engaged in the common work of caring for these monuments.

Further discussion took place on the question of enlarging the scope of the resolution, but no amendment was moved, and it was carried.

A vote of thanks to the Chairman, on the proposition of Mr. A. Graham, concluded the sitting.

How Far Should the Architect Receive the Theoretical and Practical Training of the Craftsman?

On Wednesday morning at the Grafton Galleries papers on this subject were read and considered. The chairmen were Herr Otto Wagner, of Austria, and Mr. R. S. Balfour, of England. The secretaries were Mr. H. O. Tarbolton, Scotland, and M. Gustave Wickman, Sweden.

Mr. Balfour, in opening the proceedings, said he proposed to call on the various gentlemen to read their papers, and any resolution that might be proposed would come at the end of the discussion.

Herr Wagner also made a few opening remarks, and gave the conference a cordial invitation to make Vienna the next place of meeting.

Architecture and Craftsmanship.

Mr. Reginald Blomfield, R.A., read a paper on this subject, the following being the abstract: *Object.*—To ascertain how far craftsmanship is necessary to an architect: (1) by tracing the development of the idea of the architect craftsman; (2) by consideration of the architecture.

The practice of the earlier Renaissance, specialisation of the architect. Draughtsmen's designs at end of eighteenth century. Loss of

tradition. Sham mediaevalism. The last stand of classic. The great exhibition of 1851. The pre-Raphaelite brotherhood, not a purely artistic movement. Their idea of reforming architecture by the study of nature. Mr. Ruskin. William Morris: his view of architecture, his passion for craftsmanship; his hatred of classic. The Arts and Crafts Society; the value of its work in regard to the minor arts; neglect of architecture. The pre-Raphaelites and their successors conceived of architecture not as the art of building, but as the ornamentation of buildings.

The Province of Architecture.—Buildings the only "nature" it can study. Its appeal by disciplined design, its analogy with music, space composition. The architectonic art. This view repudiated by Morris. The anarchy among the crafts; and l'Art Nouveau, the result of the withdrawal of the crafts from the control of architecture. Need of thorough training in technique for architectural students. Need for architects to resist the tendency to disregard architecture and absorb it in the crafts.

The Relation of Modern Architecture to Craftsmanship.

Professor W. R. Lethaby also contributed a paper, of which we give the following abstract:

The practice of modern architectural design is based on custom. In some countries there seems to be a more general agreement than in others, and in the former there is a nearer approach to the existence of style. Beyond this what are the possibilities by which modern architecture may enter on a course of development, and how can we attain to reality in building?

The styles of the past were shaped by a growing mastery of craftsmanship, and only this will produce art akin to the old, an art which is discovered rather than willed. The architect's store of forms is for the most part degraded memories of the discoveries made by ancient craftsmen. Whence is new energy in modern architecture to be derived? In part it may come from the investigations of science, but even so it will require a resourceful craftsmanship to deal with the new material.

At present the architectural profession is isolated from workmanship, and is thus imprisoned within a small sphere of ideas. Architects have aimed at bringing back the appearance of masterly craftsmanship, but this outward appearance has no vitalising force.

A closer contact with labour may mean at least three things. We need, first, to be in closer touch with the executants of our buildings, and to be anxious to learn from them what they think is good work. In the second place, it may mean the acceptance by the scientifically trained directing architect of more help from independent workmen of a high order, painters, sculptors, metal-workers, modellers, and the like, while giving up the commonplace offices of office-designed ornament. And, thirdly, it may mean the practical training of architects themselves. This idea is liable to two misconceptions, as if it were proposed that the architect engaged on important work should make his own mortar, or as if the claim might be satisfied by receiving lessons in enamelling or wood-carving. The crafts essential to an architect, of course, are masonry and carpentry, while they remain the principal factors in construction, and so understood, craftsmanship should form the basis of architectural education. The student should cut stone, frame up wood, and handle bricks. Often, of course, he could not afford much time for this, but even a month's practice with materials and tools would be better than nothing.

A short course should form part of the education of all students, but some would probably become much more interested in this side of things, and could follow it out further. Thus we might train architects of varying capacities for various requirements. It is the mistake of all systems to form men of one pattern. However desirable it may be to train some men to the highest degree of academical skill, these are best fitted to deal with the complicated problems of practice in a big city, while the humbler works of the country require equal devotion, but of a different kind. A basis of craftsmanship in architectural education should open up channels for diversities of gifts which may correspond with the diversities of requirement.

M. Fr. Van Gobbelschroy read a paper on behalf of the Central Society of Architecture of Belgium—

The importance of the mandate of the

architect is great, because it expects from him extensive knowledge, without which the artist cannot consider himself to be at the height of his mission.

The great drawback the profession suffers from is due to the fact that the title of Architect may be assumed by persons who have neither obtained a diploma nor received a special education, and that this unjustifiable tolerance places in the hands of inexperienced persons an art which they will never be able to understand, and still less to practise.

All who desire to make serious study of architecture should be made to acquire the large amount of indispensable knowledge necessary to enable him to carry out a project.

The education should be more complete, because to the art of making ingenious plans the architect must add not only the qualities required to have them carried out as a whole, but also those which the contractor and his sub-agents must possess.

The architect must be able to judge, as a real expert, of the most minute details of the construction—in a word, he should possess the technical knowledge of all the trades which he employs, and this to the extent of being in a position to discover, and to have put right without hesitation, any part of the work badly done. And in the presence of this vast knowledge, which one should expect him to possess, there is no doubt that the architect would recover the prestige he always used to exercise in the building industry.

Besides, it must be stated that this perfect knowledge of the technical part of the crafts which we ask the architect to possess is not an innovation. In fact many architects of the Middle Ages, and men of science, such as Galileo, Newton, Leibnitz, Stephenson, and others, were, at the same time, manual labourers. They knew how to manipulate matter in order to put their ideas into practice.

Of course it is not necessary that the technical knowledge of the architect should enable him to perfectly handle the tools of all the crafts—this would be useless; but it is necessary that his knowledge should enable him to carry out everything in accordance with the rules of art; and for this purpose it is necessary that he should himself, within the limits of possibility, have practised under the eye of an experienced master all the kinds of work which later on he will have to carry out in his projects.

Besides, this practical knowledge will enable him, with the aid of the superior education he has received, to contribute to a rational and practical improvement of the methods of execution adopted, and it will have not only a direct effect upon his authority, as we have already said, but also on the interests of the proprietors, of the substantial contractors, and of the workmen. For, as one would see disappear, for the honour of the profession, that species of so-called colleague, we should also witness the diminution of the credit of those not over-scrupulous contractors who not only injure the interests of their clients, but who frequently endanger the lives of many workmen.

Thus far is it that the architect—that is to say, the man who surveys buildings in the way of construction according to the rules of art, who makes the plans and estimates—in a word, this is how far the master of the work, as he was so properly called during the Middle Ages, must be an artisan.

To sum up, the architect must be able to work well himself in order to be able to command well.

This education, which would form part of the whole, would not require more than two years of supplementary studies, because it would only be a question to extend in a practical and convenient way a known programme.

The present programme followed for the studies of the architect could remain, with a certain revising, and there would have to be added to it that which is wanting for the training of the artisan.

In imitation of what is being done in Germany and in Austria, we should thus have academies where technical engineers for the building industry would be educated, with the advantage that these special studies would be imposed, not upon manual labourers, but upon individuals who would already have gone through the superior studies of architecture. With our neighbours these studies have for their aim to form technical engineers who have a perfect knowledge of the materials; the students learn there to distinguish between materials of good and of bad quality, and to render to themselves

an account of their qualities, in order to be able to make a judicious choice. They study there the handling and the working of the tools used by the workmen and by the contractor; in short, they carry out all the working operations which may occur, making use of all the special tools which have to be used in the finishing of any given work.

The complete school for architectural education which we should like to see created in Belgium would necessitate, as we have already said, the combination of the principles adopted in Germany and in Austria with artistic and scientific education, but basing nevertheless the technical teaching upon that of the English technical schools, which are essentially practical and in which the oral lessons and the manual work are taught by the methods which develop in the pupil the spirit of investigation, determination, and initiative.

This summary does not allow us to enter into details of the programme of the lessons, but it cannot be denied that the result of the elements recommended for adoption in a programme of studies would be, after the lapse of a few years, the decisive element in the ever-growing competition among architects, because it would contribute to make disappear mere routine and empiricism, which put into a real inferiority a large number of our young colleagues.

Being given the superior and practical tendency of the studies at such a school, we are convinced that the young artists, the owners of a diploma for having finished their studies, would have capacities which would be appreciated by the artistic, scientific, and industrial world.

We indulge the hope that our work will contribute some elements to the solution of the very important question as to what extent the architect must be an artisan, and it will have shown the undeniable necessity of a complete education, which must always be kept at the level of progress with a view to the improvement of the career of an architect and the recognition of its value, its rights, and its authority.

Herr Otto Wagner, Imperial and Royal Superintendent of Works, Professor of the Imperial and Royal Academy of the Plastic Arts, read a paper on behalf of the Society of Austrian Architects, the following being the abstract—

Concerning this question we beg to make the following observations:

Reference has repeatedly been made in our previous communications to the scientific education of the architect, and stress has been laid on the fact that he has to learn such a vast amount of facts, and that, for the reasons given in the beginning, this learning cannot embrace everything. In going through the technical studies of the architect, what is required is a good grounding, which will enable him to acquire what is further needed in the course of his subsequent period of activity.


The actual work of the architect, and a number of artistic matters, such as the cultivation of the allied arts of painting and sculpture, the keeping pace with the professional literature, etc., cannot fail to induce him to be very economic with the time he is able to give to these occupations, and moreover he will have to reserve a very considerable part of his time to the supervision of the works to be carried out by him. It will therefore not be wrong to sustain that these matters can hardly receive much attention, from sheer lack of time. To this must be added the loss of time which is caused by the fact that the desire to create and consequently the capacity to create, are faculties which the artist cannot command at all times.

A further accumulation of work by learning one or more trades (to learn them all is utterly out of the question) certainly exceeds that measure of time which the architect has at his disposal to devote to such work. If besides it is taken into consideration that handicraft of the kind in question sometimes requires considerable physical strength, and may therefore be injurious to the steadiness and the fine touch of the hand, it is to be discontinued to penetrate so far into the manual work of the architect's craftsman. The knowledge how any given part of a building is to be made belongs to the sphere of practice, which the architect will acquire in the course of his career all the more readily because his innate gift of invention will serve him as an auxiliary.

(Continued on page 95.)

Illustrations.

COMPETITION DESIGN FOR PEACE PALACE AT THE HAGUE.

 IN this design it was considered that, as the large Court of Justice is the *raison d'être* of the whole group of buildings, it should be approached centrally in order to give it dominating importance, and this consideration largely governed the setting out of the plan.

Nor was the schedule of accommodation given considered as being absolutely final in all particulars. Knowing what accommodation in the way of consultation-rooms are considered necessary in connexion with an ordinary Court of Law, it did not seem reasonable to assume that two small rooms would suffice for the use of people having business in the two Courts. For this reason six rooms are shown, and the plan is enlarged.

The reading rooms, for the same reason, were increased in area, and the hatched portion on the site plan was considered rather as indicating the position of the required buildings than as fixing their size.

It would seem fitting that an architectural monument placed in a park should have façades of almost equal importance, the only difference made is that the principal feature, placed as it is over the hall, gives a greater relative emphasis to the entrance front.

It seemed essential that the buildings should be treated in a somewhat severe classical manner in order to be in keeping with the international character of the building; and that anything suggestive of the architecture of any one particular country would be a mistake.

WILLS & ANDERSON, and H. W. COTMAN, joint architects.

(CHURCH OF ST. JOSEPH, BRIDGFORD, NOTTINGHAM.

THIS proposed church is planned with a nave, 28 ft. wide, divided into five bays, with side aisles 5 ft. wide for procession, with seating accommodation for 400. There are also two chapels on the Gospel side, with priests' sacristy and choir sacristy on each side of the sanctuary, and over these the choir and organ chamber with arches opening into same.

The entrances are through the two towers at end of the building.

The presbytery, which adjoins the choir, is planned for two priests, with access to sanctuary.

The materials of the construction are to be local stone, with stone face for the Ashlar work and Ketton for the tracery and moulding.

The roof to be covered with Delabole slating. J. H. EASTWOOD.

ADDITIONAL OFFICES FOR THE BOROUGH COUNCIL OF HOLBORN.

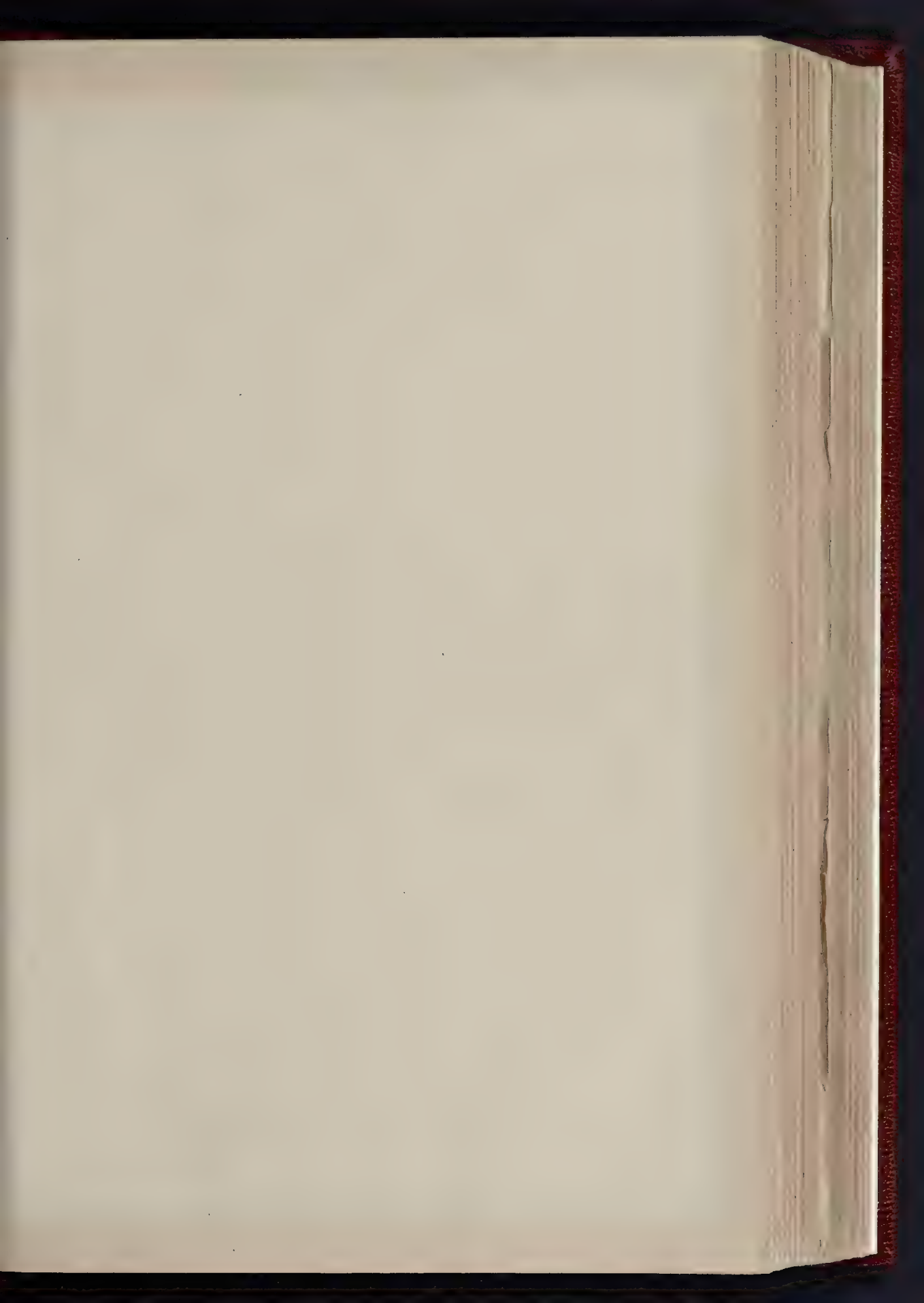
THE design, of which we give the elevation and plans, is the one to which the first premium has been awarded in the competition for additions to the Holborn Municipal Offices.

Messrs. Warwick & Hall, the authors of the design, send us the following summary of their intentions in working it out:

"In preparing the accompanying design, particular importance has been attached to the retention of the present offices with the least possible alteration; so that they may be in use during the carrying-out of the works, and obviate the necessity of the Council acquiring temporary premises elsewhere.

The additional accommodation is provided in as economical a manner as is possible with convenience, and every part of the building is well lit and easily accessible. The work is restricted to one-half of the available site, so that the remainder may be let for future letting purposes, with a frontage to Goldsmith-street of 95 ft. The existing library levels have been followed in the elevation, and the character of the front made to harmonise with the present one. The back elevation is unaltered.

The cost is estimated at 19,205¹/₂, this sum being thought adequate to carry out the work in a satisfactory manner, with the exception of any special interior fittings and decoration that may be required."





COMPETITION DESIGN FOR THE PEACE PALACE

PERE

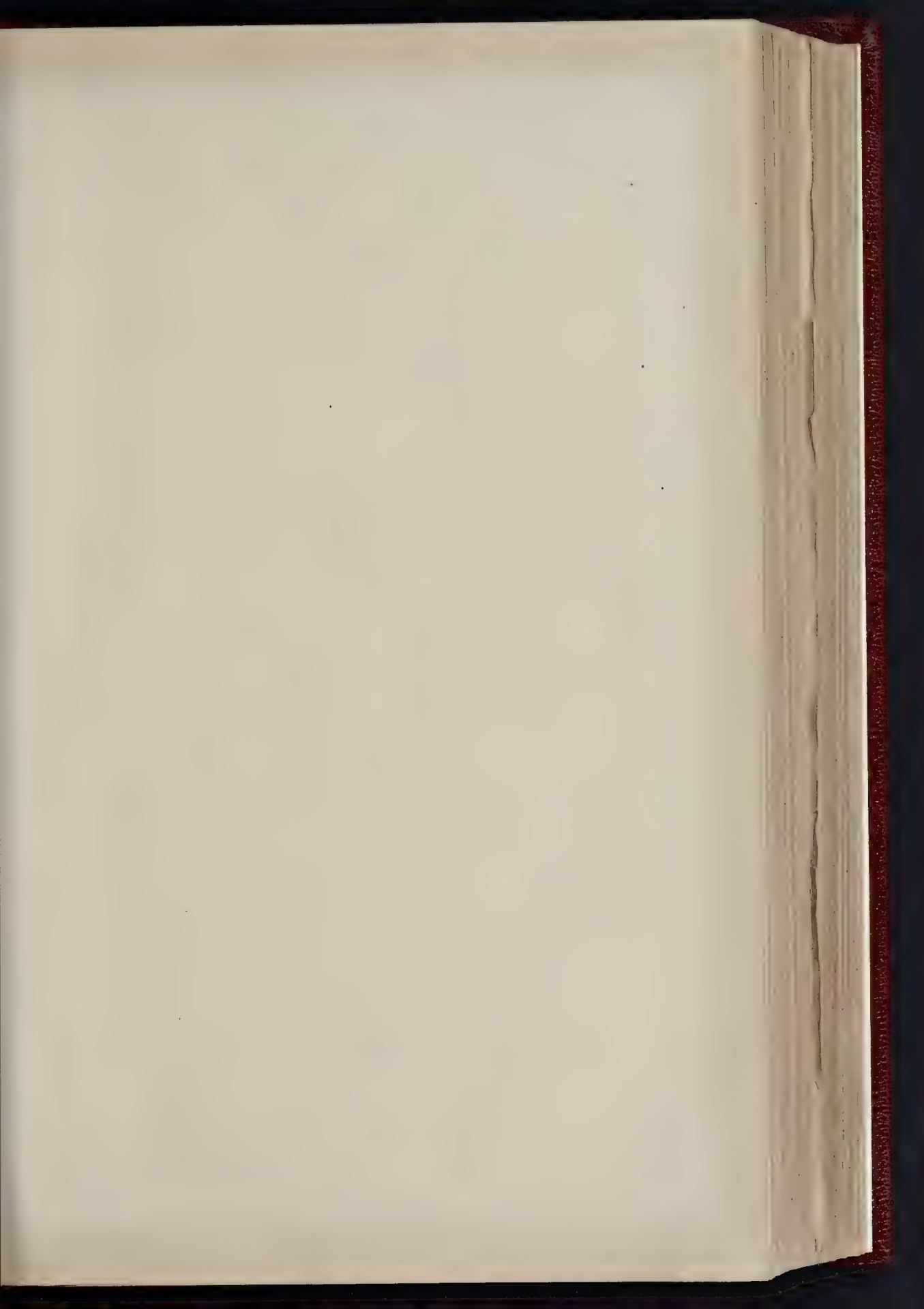


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AT THE HAGUE.—BY MESSRS. WILLS & ANDERSON

WE VIEW.



THE BUILDER, JULY 21, 1906

PALAIS DE LA PAIX
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FACADE PRINCIPALE

CHURCH OF ST. JOSEPH

BRIDGFORD

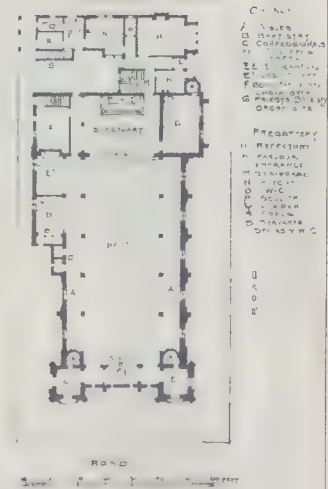
NOTTINGHAM

J. H. EASTWOOD - ARCHT.

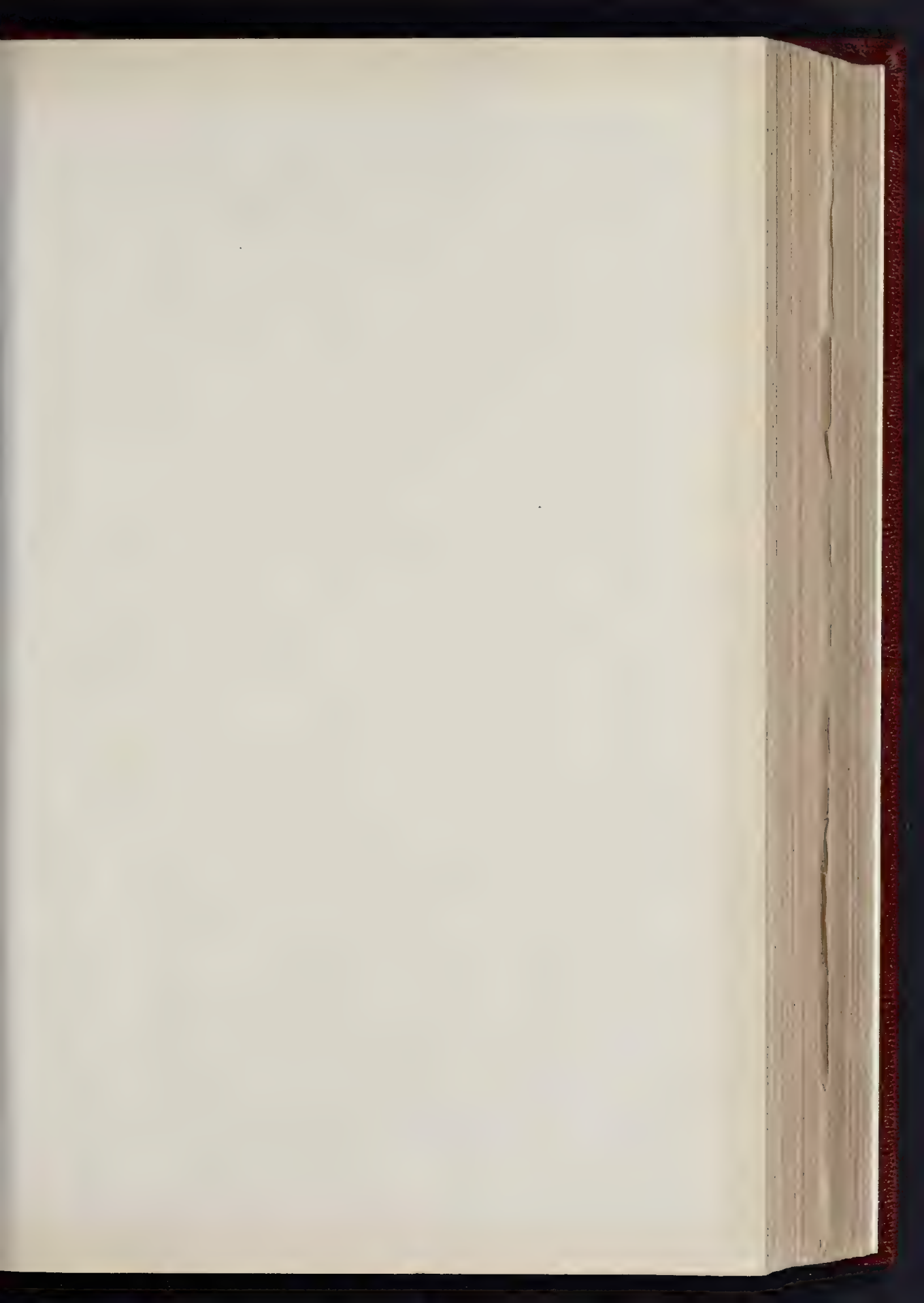
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H. C. CHURCHILL - LANDSCAPE

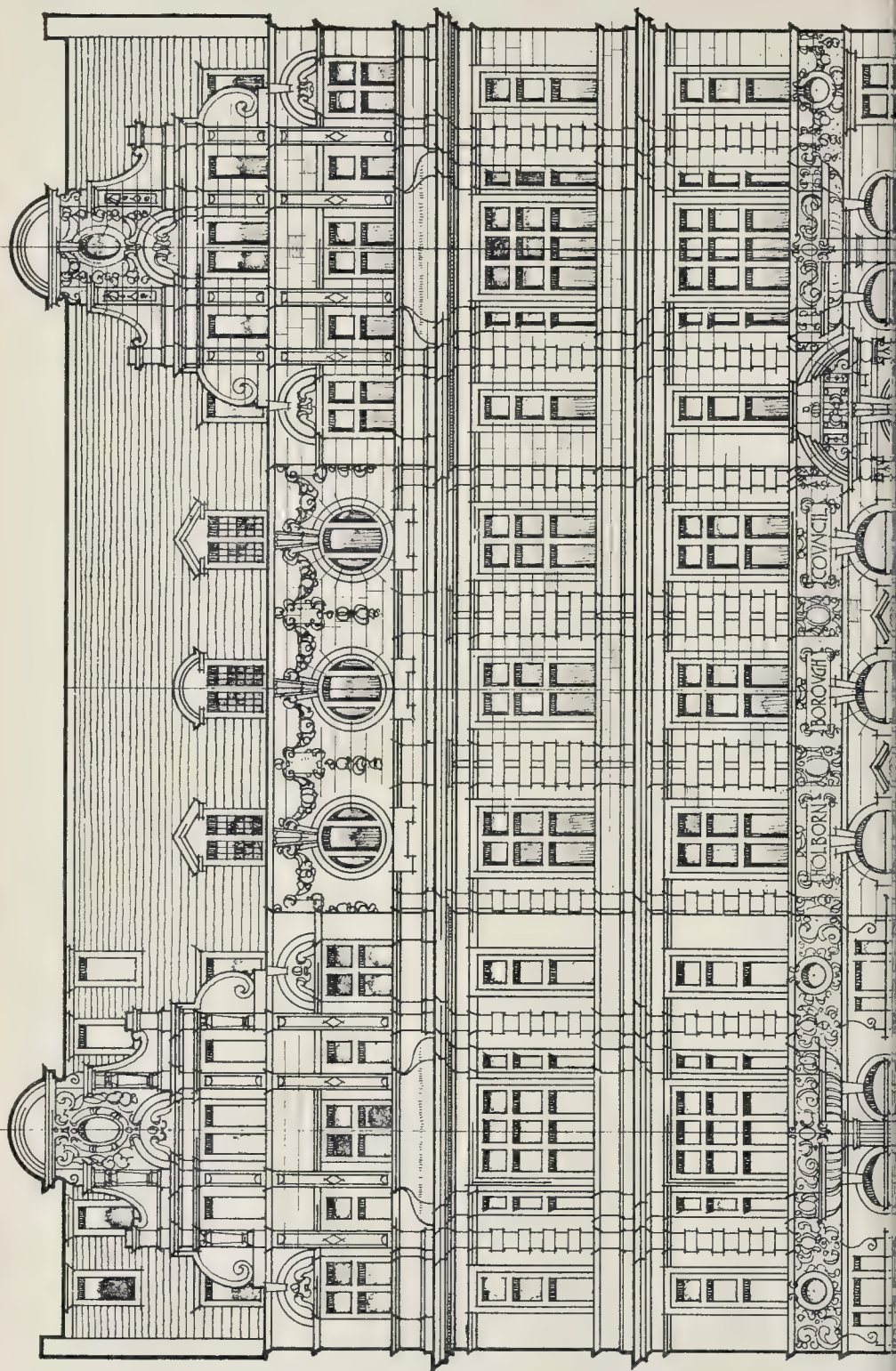
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1906



THE BUILDER, JULY 21, 1906.



THE INTERNATIONAL CONGRESS OF ARCHITECTS.

(Continued from page 94.)

The question under consideration, Number 6, can therefore be correctly answered in the sense that the architect must know in a theoretical relation, and with regard to intuition, every trade and the qualities of the materials which he uses in his constructions, but that it is not necessary that he should become proficient in the manual skill belonging to the handicraft.

M. Gaston Trélat (Paris) also contributed a paper, and the author's summary and conclusion were as follows:—

The theoretical and practical education of artisans can certainly become an abundant source of development in art. But then it must be judiciously led. Otherwise it would have dangers which would soon show themselves in the work produced.

I wish to say at once that it ought to be consistent with the direction which the professional life takes. And this latter entails the general affinity with all the trades which contribute to the execution of the architect's works. From this results a real *theoretical and practical education*, which latter embodies itself in an extension of *consciousness* in the artist. Hence a vivacity of spirit which shows itself in the particular character of the elements conducing to the harmony of the *ensemble*, to which they remain subordinate—without which would be exceeded the taste and proportion taught us by a certain philosophy drawn from manners of arrangement to which matter is subject. As can be seen it is an education to which one consecrates one's life.

But for that there would be no reason to rely on an initiation from the commencement of life. Before all else, it must endeavour to show the disadvantages of making the different elements that the variety of trades represent dominate too much in a work. For this would expose one to a cause of incongruities which should be avoided in architectural conception and execution. Certain masters, whose memory is surrounded with the respect which is due to them for the harmony of their lives, and certain schools could supply evidence of this, if the thing needed to be supported by material proofs. But this is not the case.

Therefore, in order to prevent confusion in the mind, this education will be carried on by the fact of the career itself. For the architect it will result exclusively from the experience he will gain from all the trades contributing to the execution of his buildings.

Conclusion.—The education of an architect-artisan is sufficiently gained by the routine of a life practically absorbed in the applications of the art.

With regard to a theoretical and practical education at the commencement of the career, the advantages would in no way make up for the time spent; and the disadvantages of it would predominate.

M. Robert Lesage (Paris) gave the following summary of the question:—

We thought that under the heading "The Architect-Craftsman" the organisers of the Congress proposed the study of the question of "the professional training" of the architect, of the technical teaching completing the general teaching, and in particular that of the art of architecture.

Our colleague, M. Poupinal, will treat of the history of this question in the Congresses, whilst in this report we shall study a programme or technical teaching of the various building trades.

We shall divide the report into two chapters.—I. The general programme. 2. In particular the programme from the French point of view.

Part I.—The General Programme.

What has been done in Europe.—1. By the State. 2. By private initiative.

In particular, what has been done in France.—For the building trades the State has organised workshops and professional schools in which workmen only are trained; it has not yet created any technical school for the training of chiefs of enterprise, directors of work, contractors, and architects.

In this direction private enterprise has already produced, enumerating them in chronological order:

The Trélat School.
The courses of lectures of the philotechnic, philomatic, polytechnic and other associations.

The courses of lectures by M. de Baudot at the Trocadéro.

The courses of lectures of the Syndical Chambers.

The School of Public Works.

The school of construction of buildings.

The school of mutual teaching of arts.

The characteristic Features of these Schools and Lectures: Their Insufficiency. Programme of a School of Technical Teaching for Architects and Contractors.

Method of Teaching:

The lessons;

The exercises of application;

The practical works (workshops, laboratories, visits to edifices, factories, workshops, building yards).

The courses of lessons would include the study of the work from the point of view of its practical execution, and from the point of view of the settlement of accounts.

The teacher, in the analysis which he would make of the work, would treat separately: *The materials, the tools, the machines, the workmen, the organs.* He would deduce from the knowledge of the resources which the materials offer, from the means offered by the tools, some general principles which must be the guides of the builders for the logical and economic composition of the various parts. The teacher would also make the pupils conversant with the new industrial products; he would study the catalogues with them and discuss the value of the various brands.

The exercises of application.—To the technical lessons on construction would correspond some exercises in detail drawings calculated as if they had to be practically carried out; to the lessons of measurement and verification would correspond exercises of book-keeping, making out estimates, memoranda, drawings to accompany memoranda, &c.

The practical work would consist in the handling of the various tools, some manual work, testing of materials, the making-out of reports of all kinds, and even surveys.

To this school a library and a museum would be annexed.

Relations between the Technical Schools and the Schools of Architecture.—Should technical teaching be given at the schools of architecture and at the Fine Art school, or should it be given in a school absolutely independent of these?

It is impossible to answer this question in a general manner. The organisation of a technical school for the crafts of the building trade, complementary to the schools of architecture, will of necessity work in unison with them.

To each special case will correspond a special and adequate solution.

The same answer must be made to the question: Is the technical training to precede, to accompany, or to follow the teaching of the art of architecture?

II.—The Programme from the French Point of View.

Short Summary of the Official Teaching of Architecture in France.—1. L'Ecole des Beaux-Arts. 2. The regional Schools of Architecture. 3. The regional Schools of Fine Arts.

The characteristic Features of their Teaching, the Aims they Pursue, what they Neglect, and Why they Neglect it.

L'Ecole des Beaux-Arts is not a school of architecture, but a special school of the Fine Arts in which the art of architecture occupies a place similar to those held by the arts of painting, of sculpture and of engraving. The aim of the Ecole des Beaux-Arts is to train the mind of the architect, to put him towards art, and not to teach him a trade, or to prepare him for the exercise of his profession. It chooses its pupils by competition, and only admits men of superior intelligence and aptitude. The results which it has obtained force it to do this; it dominates all that is produced in architecture in France; it even makes its influence felt in other countries in the South of Europe, and especially in America. The technical instruction of the architect, the preparation of the practical architect for the part he is to act in society does not come within his province.

The examinations and competitions in mathematics and in construction which it imposes on its students from the very beginning of their studies of art have no other motive than to eliminate at once those who would be absolutely unfit for the study of the sciences of the building art, and consequently to become true masters of work. But the technical

knowledge the pupils must go elsewhere to acquire, and they must, above all, obtain it from experience in the building yards.

It is now beyond any doubt that this instruction left to the chance of experience should be given in a methodical manner, and give rise to a regular course of teaching; in this way our architects would undoubtedly be sooner and better prepared to defend the interests of which they are in charge.

This idea has been the cause of private undertakings which we have just mentioned; but in France the State has not yet done anything in this direction.

What can be done in France.—On the occasion of previous Congresses Mr. J. J. Pillet has already pointed out the programme for such a school; for him the technical teaching would have to form the secondary teaching of architecture, the Ecole des Beaux-Arts having to give the superior teaching only accessible to a very select few.

At the time when this project was submitted it might have been easily put into practice by means of creating regional schools of architecture, absolutely independent, and the property of the provinces. This would have been a good piece of decentralisation.

In our days the circumstances are altered. By the initiative of M. J. Guadet, the French Government has just established in the provinces some regional schools which are branches of the Ecole des Beaux-Arts. The same courses of lessons, the same examinations, the same exercises, are made there at the same time as in Paris, where the work of the students is sent and judged by the ordinary jury of the Ecole des Beaux-Arts. These schools give the same diploma as the school in Paris.

In the presence of this expansion of the Ecole des Beaux-Arts there only appears to remain one solution to the problem of the technical teaching, viz., the creation, side by side with these schools, of some schools of application for practical building, the teaching in which would be absolutely specialised, and which, in connexion with the Ecole des Beaux-Arts, would be in an absolutely analogous position to that occupied by the schools of application for artillery, the military engineers, the mines, the bridges and roads, etc., in connection with the Ecole Polytechnic.

Like these latter they would admit four categories of students:

1. The students of architecture, former pupils of the superior class of the Ecole des Beaux-Arts.

2. The day students admitted by way of competition.

3. The students from foreign countries.

4. The free students attending the classes.

The programme for their courses of lessons would be the one we have indicated just now. Each of them would be taught, under the supervision of an experienced architect with diploma, by assistant teachers from among contractors, artisans and accountants.

The duration of the studies should not exceed two years. The lessons would be arranged in such a manner that the students could attend them while they are preparing for their final competition and for their diploma. The lessons could be given exclusively during the forenoon. The practical exercises would keep the students busy during three months of the year; for instance, from May to July.

At the conclusion of the papers M. Lesage proposed the following resolution:—

This Congress, considering that the architect, the master of the works, having under his immediate direction workmen and artisans of the most varied bodies of the State, and utilising the services of the most varied industries, has no means of acquiring in each of these trades and in each of these industries the complete knowledge of a specialist; considering that there exist already in the majority of European countries training schools for artisans, schools for practical application and laboratories for engineers where specialists are trained, expresses the desire that there should be created specially for the architects and for the general contractors schools in which, in the limited space of two years, they could acquire in a general but exact manner the technical part of the various trades and industries of the building trade, without claiming to practise these trades and industries. It also expresses the wish that between these schools international and continuous relations may be established.

Dr. Joseph Cuypers, Amsterdam, said he

appreciated very much the papers that had been read, and he thanked the various readers for the time and consideration they had given to the subject. Generally speaking, he was in accord with what the speakers had said, but he would like to have the meaning of the resolution defined a little more clearly. In his view it was very essential that at the very outset of his career the architect should be taught to practise some of the crafts, such as joinery, brickwork, etc., while his theoretical training would continue all his life.

Mr. Maurice B. Adams said it appeared to him that it would be a pity if they could not raise a discussion on the subject which had been introduced by the readers of the papers, and therefore he would venture to say a few words. He had not had the pleasure of hearing the papers in full, particularly that of Professor Lethaby, but he had read the extract that appeared in the printed report, and he need scarcely say that he was entirely in sympathy with the views which he expressed. But much as he admired what Professor Lethaby advocated, the difficulty with architectural students was the vast field which their labours had to cover—the art or arts which he had to supervise had been multiplied in a most enormous degree during his (the speaker's) own time, and although he realised the necessity of architects handling materials, as materials were handled by the practical artificer, he did not see where the time was to come in for the architect to devote to such a purpose. He (Mr. Adams) had himself worked at the joiner's bench for some two or three years before he was articled, and he had never regretted it, but he was not quite sure that that was the sort of thing they should advocate nowadays with the material advantages which had accrued from the various schools which had come into existence. He was enabled, no doubt, to acquire a good deal of knowledge which he would not otherwise have acquired, but he could not help thinking that he wasted a considerable amount of time in acquiring that elementary knowledge, which he did not wish to deery for one moment. It seemed to him that in dealing with a question of this kind they had to realise the exacting conditions under which the architect had to work, and not only the architect had to work, but the builders, and also the system of building which was adopted. Professor Lethaby's advocacy seemed to refer to a more elementary stage of existence than that which we enjoyed to-day. If they had one or two small or even a large country houses to build, they could devote a great deal of time to them, but the remuneration was somewhat limited when it was restricted to a small amount of works of that kind. The architect had to compete, as they realised yesterday in the discussion which took place at Conduit-street—the architect had to compete very largely nowadays. Very few men came into the world favoured by circumstances which enabled them to depend on private clients, and therefore the architect had to fight his way by competition, very often against adverse circumstances for a long time, and then when he succeeded in his work he had to fall into line with the ordinary methods of competition amongst the builders and contractors, and it would be an extremely difficult thing for any individual architect to interfere with the progress of an undertaking commenced and carried on on those lines. Further than that, there seemed to be a growing disposition to go in for direct labour by large municipal authorities, and others insisted upon employing their own men, and thereby emphasising to an enormous degree the amount of labour each architect had to carry on as supervisor or architect-in-chief of the proceedings. It seemed to him they must recognise the conditions under which architects had to work, and, looking at the schools as they were at present existing, it seemed to him that the school of the Architectural Association went about as far as they could reasonably and practically go in the matter of enabling the student to acquire a more practical and technical knowledge of building operations, and that was carried on by enabling him to go on to the buildings in progress and to make reports to his master of what he saw there. One of the first necessities of an architect was observation—that he should observe and note all the things on a building; that he should state his difficulties to his master, and have them explained to him. Of course, if they assumed, as Professor Lethaby appeared to assume, that the modern architect's position was radically wrong from beginning to end—that

there should be no such thing as the professional architect at all—then one was able to follow his argument more closely, but he (the speaker) took it that we were obliged to take the world pretty much as we found it, and, of course, even then the architect's work could only be appreciated by the amount of mind which he was able to put into it. No work of art could possibly be a work of art unless it had the full impression of the person who conceived it. If they could leave it to the various arts and crafts to conceive the various parts of the building—the brick and roof work, the masonry, etc.—much on the lines that the old medieval work was done, that would be extremely good; but he could not see how it could be done, and he did not see what object there was in utilising the student's time for so long a period as would be necessary to teach him those things. He noticed that Professor Lethaby in one part of his paper spoke of a very short time being devoted to craftsmanship as being better than no time at all. His (the speaker's) own experience was that the main advantage in going to work at the bench was that it enabled him to realise how builders handled materials—how they cut up the materials and utilised them; but, as for becoming an expert joiner or an expert metal-worker himself, that was impossible. It seemed to him that they might take up some of those things as a hobby, and have a smithy or a small furnace and go in for enamels and carry on metal-working to a higher form. They did not want to make all architects exactly in the same mould, and, in his opinion, they must deal with that question in a general sort of way. He understood from the resolution that it was proposed that there should be some sort of school arranged with contractors or builders. In that connexion they must remember that builders were ceasing to be builders; they were gradually becoming mere financiers. A builder in the old acceptance of the word was a man that studied, as they wished architects to study, every branch of the building business, but nowadays it was a very rare thing to find a builder that had served his time at the bench as they used to do and had acquired a knowledge of the minutiae of the various trades. Under the present contract system—whether it was good or bad, there it was, and it had been brought about by modern circumstances—all the builders did was to appoint a manager of each department, and to look to the manager of each department to show a profit on that department's working. So they had not the co-operation of the builder in the sense that they used to have it, and he thought he was correct in saying that there were very few builders—unless they remained in the country in quite a small way of business—there were very few builders who could afford to devote the time, or did devote the time, in the course of their apprenticeship to the business of acquiring that knowledge which was advocated as so necessary for all of them. Therefore, it seemed to him, that what they should do would be to multiply schools like those of the Architectural Association—that the various schools should take that as a basis of their operations, and they should bring the students more into contact with the actual work, and if a man was articled to an architect that he should afford the pupil every possible facility of visiting buildings in progress, and possibly in some cases becoming clerk of the works—although he was not quite sure that it was a fair thing to the owners of the buildings that a pupil should be employed as clerk of the works. He thought it was perfectly clear that they should do something not only to exclude students who had no natural ability for architecture more rigidly than they had done from those schools, but having got the right material in the schools, one of the best things they could do was to take them as much as possible to the buildings in the way he had advocated.

Professor V. Nagy (Budapest) said it seemed to him that it was very difficult to talk about a question of this kind from an international point of view, as the conditions of things varied in different countries. In his opinion an architect ought to be a man of wide technical knowledge, one who was able to construct everything that his fancy conceived, and he must be an artist to give a pleasing form to that which he was able

to construct. The knowledge and requirements of the architect covered such a vast field that they, as professors, knew that it was only possible in a short time or a few years to give an architect the foundation of the theoretical as well as the technical education in his profession. He thought that the resolution which had been proposed by their French friends went too far in many respects. It was like sending a wanderer from home and charging him with so many things that he would be obliged to drop, as it were, necessary things in order that he might be able to go on his way. What he meant was—let them confine themselves to teaching the necessary things, and other things the student could pick up on his way as he went along through life. What he personally felt was that the architect's work was endangered by something else than a lack of exact knowledge of the different crafts. It was the engineer's work which endangered the architect's work. The progress of technical studies, especially in iron buildings had, he considered, not only in his own country but all over the world, taken architecture out of the hands of the architects, and the result would be that the architect would no more be the constructor or the constructor of his ideas, because he could not follow them out. Therefore, if there was time to be spared on the education of architects, he would rather that it should be spent in acquiring a knowledge of those things which could not be picked up on the road when he was in practice. On the other hand, as regarded the crafts, it was easier to pick them up by practice rather than at a school. His idea was that two years was far too long to devote to acquiring a technical knowledge of the different crafts. The architectural student was already over-charged, and a short time, just to get a fundamental knowledge of the different crafts, would be sufficient. He would therefore propose that the resolution read as follows:—"This Congress, considering that the architect, the master of the works, having under his immediate direction workmen and artisans of the most varied bodies of the State, and utilising the services of the most varied industries, has no means of acquiring in each of these trades and in each of these industries the complete knowledge of a specialist, expresses the desire that opportunity should be given to architectural students to acquire in a general but exact manner the technical parts of the various trades and industries of the building trade without claiming to practice their trades and industries. It also expresses the wish that between these schools international and continuous relations may be established."

Professor Lethaby asked Professor Nagy if he would consider two years too long if it was understood that the student was to be instructed in his profession from the highly scientific and engineering point of view. The speaker's idea of the meaning of the resolution as it stood. The school he had in his mind should not merely concern itself with handicrafts but should be a technical polytechnic.

Professor Nagy said that if the idea was to include theoretical and technical studies then he was quite satisfied.

Professor Lethaby said that was his meaning.

Mr. Blomfield remarked that such a school as outlined by Professor Lethaby would meet a want which was much felt in England, and that was the want of training in expert building. Professor Nagy had pointed out that the engineer was rather taking charge of the work of the architect. The right way to meet that was to train the architect to obtain some knowledge of those problems of engineering which at present were handed over too much to the engineer. The resolution seemed to him to deal with that difficulty, because both M. Le Sage and Professor Lethaby had made it plain that their idea was that the two years' training should be devoted to those higher problems of building to which he had referred. He should therefore support the resolution.

Professor Nagy said that what he understood by craftsmanship was the handling of tools, and therefore he thought that two years was too long to devote to such an object. He would rather that the resolution were carried as he had proposed to amend it, because under it each country could teach

what trades they liked. England could take up the science of engineering if so desired, but in France perhaps that would not be necessary, because, there, architects were trained in engineering work, and in Austria and Hungary it would simply mean that the students would get a certain training in the material part of their crafts.

Mr. Lesge was understood to be willing to accept the amendment.

Dr. Cuypers remarked that, in his opinion, instruction in practical work should be at the beginning of every architect's education, and their theoretical education would come afterwards.

Mr. C. Walker (Boston, U.S.A.) said that their custom in America was somewhat different to that of other countries. He was a director of the Mass. Institute of Technology, and a director of the Department of Design of the Museum of Fine Arts, and it was his experience from having pupils in his office, and in each of those Departments, that where there was marked specialisation on any one thing, that the pupil became so enamoured of that particular thing that it hampered him in his after work. The general education—both theoretical and practical—should run side by side, and it should always be recognised that the architect was primarily a man of affairs, and one who planned—he was essentially a man who planned if he was to be an architect of ability and of large work and who controlled a large number of men. Every attention paid to small details crippled him, to a certain extent, in the carrying-out of his large work, and while it was absolutely essential that he, as the chief builder, should understand the general manipulation and character of his material, any special attention paid to that for any length of time was certainly, in his (the speaker's) opinion, and in the opinion of the schools that he represented, work which it was not wise to undertake. They should be carried on correlatively, and special attention should always be paid to the larger project, and that was the handling of men and the beautifying of the plan. In his office he had had men educated in different ways, and the ones who were educated in technical perfection were inefficient in the larger problems. The ones who were educated in technical perfection of any kind, whether it was in engineering or any crafts, did not in their later life become men of affairs—they did not become the leaders of the profession in America. Therefore, in his opinion, it was inadvisable to name any definite period for the instruction of architectural students in technical matters.

Mr. H. G. P. Manlo said that his knowledge was derived from practical experience of seeing how much students were capable of taking in. He agreed with every word that Mr. Blomfield said in his paper. It seemed to him that there had been one point that had been entirely forgotten in the discussion, and that was that an architect was always a student—he remained a student as long as he lived, and if they remembered that, and if they took into consideration the very few years in which he could be definitely trained, it seemed to him that they must confine themselves during those years to a great extent to the principle, and not go into a great mass of detail. They must, he thought, endeavour, during that short period of training, to instil into the student principles which would guide him all his life, and by which he could go on improving his education. It seemed to him that if they bore in mind the principles which Mr. Blomfield had enunciated, and if they also bore in mind the great advantage of knowing something of the crafts, it only rested with the student or the young architect to go on adding to and completing his knowledge for many years. If they attempted to overburden the student in his early years, they would simply confuse him. There was no greater danger in education than confusion, and if they confused a student they ruined him. Therefore, keeping in mind the international point of view, he would ask them always to keep in mind that they had to train in principle rather than in detail, and if they endeavoured to do that he thought they would raise the whole status of architecture throughout the world—they must teach the student to educate himself by his own initiative and his own observation.

Dr. Cuypers (Amsterdam) observed that

they wanted to get back to the practical principles of every-day life in regard to the education of the architect.

Professor Lethaby said that, as there seemed to be considerable difference of opinion as regarded details, it occurred to him that the needs of the case would be met if they were to pass a resolution merely agreeing to the principle that architectural education should be founded on the basis of practical construction in the building trades. If some such general proposition could be agreed upon, without entering into details, he thought that would be sufficient.

Mr. Blomfield said it seemed to him that the proposition of Professor Lethaby that training in architecture should be founded on a training and knowledge of the building crafts was unassailable, and he would be very pleased to support that proposition provided it was understood that that was not supposed to be the whole of the training of an architect. He thought they would all agree that no man could claim to be a competent architect who had not got more than an amateur knowledge of the building trade. He was rather inclined to question the view of their American colleague respecting the architect. They did not consider that the man who would be called a leader in the profession was the ideal to which they should direct the attention of architectural students. They heard very constantly that the architect was an artist—he might be successful or not—they could not control the future. What they wanted was to turn out the best architects, and by the best architect they understood an artist in bricks and mortar, and stone, and wood in building forms. Before they could arrive at that they must understand those forms, and that knowledge could only be gained by the handling of the tools and the materials. He agreed with what Mr. Manlo said, that, after all, what they gave to the student was only the groundwork of his training. They endeavoured to give students the real rudiments of the technique of the work, and the student himself must add to that the transformation of his work into beautiful forms and get into it some of the quality that they all admired in great architecture. That was the point of view he had endeavoured to put before them in his paper, and he thought that his paper and that of Professor Lethaby should be taken together. He very rightly insisted on training in what he might call a building sense, and he (Mr. Blomfield) wanted it to go still further, and to continue it in the sense of architecture.

Mr. Maurice B. Adams said he was really quite in a fog as to the way in which Professor Nagy had amended the resolution, and he would be glad if the Chairman would read it in its amended form. Mr. Blomfield said that it did not go far enough. If that was so, why should they not make it go far enough—they had met for that express purpose. They were apparently all of the same mind, and it seemed to him that it would be far better for them to pass something practical. As he understood the resolution in its present form it was simply a pious opinion.

The Chairman then put the resolution as amended by Professor Nagy, and it was carried unanimously.

Mr. Adams, in proposing a vote of thanks to the Chairman, said that the vast experience of Herr Wagner in all that belonged to their art was well known to all of them. It was a great satisfaction to them to meet their conferees from all parts of the world, and to realise that they were all working towards the same common realisation of beautiful buildings under, very often, the most adverse circumstances.

Dr. Cuypers seconded the resolution, which was carried with enthusiasm, and the Chairman having replied, the proceedings terminated.

The Planning and Laying Out of Streets and Open Spaces

In the evening a good audience assembled at the Grafton Galleries to hear the various papers which had been prepared on this subject. The chairmen were Sir W. Emerson and M. Ch. Buis, of Belgium. The Secretary was Mr. Perkins Pick, England.

After a few opening remarks from Sir W. Emerson, the papers were read, that of Dr. J.

Stübben, of Berlin, being illustrated by a number of excellent lantern pictures.

M. Ch. Buis, Hon. President of the Société Centrale d'Architecture de Belgique, read a paper on behalf of the Société Centrale d'Architecture de Belgique, of which the following is an abstract:

Streets.—If it is desired to lay down the rules to be followed for the creation of streets and squares, the following three hypotheses must be considered:

First, an entirely new town to be founded. This is a rare occurrence in Europe; an instance of it is Zeebrugge, in Belgium.

Secondly, a quarter of an old town to be transformed into a modern quarter. In this case it is necessary to leave untouched the picturesque aspect of the quarter, to preserve the historical monuments, while endeavouring at the same time to satisfy modern requirements.

Thirdly, a new suburb to add to an old town. Establish the plan of the principal directions of circulation, adapt it to the topography of the place, determine the character of the quarter according to its destination; i.e., whether to be of a commercial, industrial, administrative, popular, university, middle-class or aristocratic character.

Servitudes to be established to preserve to it the character it is intended to have. Expropriation by zones or participation of the owners of the land in the management expenses.

Forms of the Streets.—Straight or almost straight principal arteries; sinuous secondary streets. The straight streets must not be too long; after every thousand metres they must be deviated or end in a monument.

The squares arranged in these streets must not be circular, but oval. They can besides be varied by not giving a uniform width to the whole street.

Intersection of the Streets.—Avoid converging the circulation to a single point: it must, on the contrary, be distributed over the whole town.

Cross-shaped intersections should be avoided.

Open Spaces.—In ancient times the public squares were the forum as the political centre, and the market-place as the commercial centre. In the North, in the Middle Ages, there was the open space in front of the church and the large market-place in front of the town-hall.

1. *The Squares for Circulation.*—The star-shaped squares are to be condemned: they lead to congestion in the circulation and form a too cut-up picture.

The streets must end in the corners of the squares.

2. *Markets.*—The centre of the market-place must be free, the streets leading to it must not be numerous, and must end in the shape of turbine paddles.

3. *Garages.*—Squares outside the railway stations: there the circulation must be divided by open spaces, fountains, and statues. Towards the town there should be a monumental entrance. Within the town spaces must be reserved for cab-stands.

4. *Ornamental Squares.*—Squares planted with trees. They can be made of any shape.

5. *Monumental Squares.*—Squares created to produce an artistic effect.

(a) Proportions of the squares.—The height of the houses should be in harmonic proportion with the dimensions of the squares. Rules established by M. H. Martens.

(b) Shape of the squares.—Rectangular ones in the proportion of 1-3, trapezoidal and triangular ones. Circular and octagonal shapes to be condemned. Oval shape admissible.

(c) Framing of the squares to be recommended; dissimulate their openings by grates, arcades, &c. Streets opening into them in turbine-paddle shapes.

(d) Grouping of the squares produces a picturesque effect. These squares may surround an edifice.

(e) Decoration of squares. Sometimes symmetrical, but as a rule the absence of symmetry is preferable. It is better not to place the statues and fountains in the centre of the square.

(f) Levelling of the squares. The concave surface is to be preferred for æsthetic and practical reasons.

Conclusions.—The principles which we have

just exposed are the result of the research of practical means which can make a modern town comfortable and hygienic, and impart to it a beauty which renders a sojourn in it pleasant.

A town must not only be a commercial store and an industrial factory, but also a home for human beings.

Since the towns are no longer formed by the slow increase of centuries, they have lost their picturesque charm and their national character.

To the unconscious work of the builder of ancient times must be substituted the conscious work of the modern builder. The mission of our town architects must therefore be to adorn the towns with a new beauty, the elements of which will be furnished by the wants of a heavy traffic, of a healthy life, by aesthetic principles, derived from the study of the laws of artistic enjoyment.

Town builders, trustees, and architects must be inspired by the fine verse of Terence:

Homo sum, et humani nihil a me alienum puto!
(I am a man, and no human feeling is indifferent to me)

The following is a summary of the report by M. Eugène Hénard, architecte diplômé par le Gouvernement, Paris:—

Definition of the various kinds of locomotion in the large towns. Household circulation, professional circulation, cheap circulation, general circulation, holiday circulation, and exceptional popular circulation. Corresponding ways of circulation and width of the streets. Necessity of increasing their width on behalf of motorism. General distribution of the net of public thoroughfares. Geometrical distribution of the new towns. Rectangular system, radiary system, mixed system. Insufficiency of these systems. Search for a principle for laying down the net. Comparative study and plans reduced to the same scale of the four large capitals, Berlin, London, Moscow, and Paris.

(Plate I.) Description of the plan of Berlin. Theoretical idea of this plan (Plate II.). Description and theoretical idea of the plan of London. Description and theoretical idea of the plan of Moscow. New notion about the perimeter of radiation drawn from the comparison of these plans. Description and theoretical scheme of the plan of Paris. Insufficiency of the radiating streets of Paris. Idea of what a modern town must be. Advantages which men must find in the large towns. General distribution of a large town. Centre of activity, centre of business. Periphery of dwelling-houses. Consequences from the point of view of the ways of circulation. Circulatory net analogous to that of a living organism. Necessity of directing the streets towards a closed uniting centre or perimeter of radiation, making the central nucleus less congested. Abnormal situation of the present public streets in the large European towns in consequence of their business development. Necessity for widening the two narrow streets of the central nucleus. Presence of the most ancient historical monuments in this centre. The duty of leaving them untouched. Inconvenience of tracing in a straight line the new streets, if it is too strictly adhered to. Usefulness and beauty of spacious or widening streets.

The open spaces, parks or gardens. Respiratory organs of the large towns. Objections of the speculators. Usefulness of parks for the education of children. Aesthetic influence of the parks and gardens. Comparative studies of the parks and gardens of the four large cities, London, Berlin, Moscow and Paris. Total surface of the agglomeration built over, population and surface of the interior and exterior parks in those four large cities. Usefulness of the outside parks. Necessity of the interior parks. Comparative plans of the interior parks (Plate III.). Difficulty of the comparison. Selection of a common surface of comparison. Surfaces of the parks and open spaces of each of those large towns compared with their area. Superiority of London. Diminution of the open spaces in Paris. Reason for this diminution. Measures to be taken by the municipalities to remedy it. Proportion to be observed between the open spaces and the areas covered with buildings. Good and bad distribution of the parks and gardens. Idea of the garden cities. Advantages and

drawbacks of this system. Means of rendering the clusters of houses less compact. New type of boulevards, called *redans*. Formula of the boulevard and its description. Plan and perspective of a boulevard *à redans* (plates IV. and V.). Its advantages from the hygienic point of view of the houses. Comparative plan of a fragment of a boulevard *à redans*, and of part of an ordinary boulevard from the point of view of the utilisation of the land (plate VI.).

Application of the foregoing theories to the study of the transformation of Paris. Present defects of the plan of Paris. Project of the proposed distribution (plate VII.) and central nucleus. The new system of the eighteen radiating streets. New streets and old streets utilised. Creation of new parks. Distribution of these parks. The twelve peripheral parks put into communication with each other by the grand circle of the boulevard *à redan*. Estimate of cost. Delay necessary for its execution.

Conclusion.—Usefulness of the putting together and comparing the graphic documents of the large towns. Proposal by Sir Edwin Cornwall to assemble a Congress of the capitals. The part which the architects could play in this Congress. Proposition to constitute by a uniform method, and with plans reduced to the same scale, the technical documents of all the large cities.

A paper by MM. B. Polles y Vivó, J. Majó y Ribes, and Bertrand de Quintana was also read. It was stated that in laying out open spaces account should be taken of various circumstances, those especially which are attendant on the climate of the locality, though varying according to latitude, altitude, direction of dominant winds, and the greater or less distance from the sea and great rivers, the position of neighbouring mountains, frequency of rains, nature of soil, etc.

Of all these circumstances, those which have a preponderating influence are the direction of the dominant winds and the latitude.

What evidently demonstrates the importance of the direction of the dominant winds is the position of edifices included in the category of insanitary buildings, which, on account of the many emanations affecting the atmosphere, should not be so situated that the currents of air may carry these insanitary emanations into the open spaces of a city, thus converting into a focus of infection the air which our dwellings receive from outside.

In consequence of this, one ought to study conscientiously the situation of a cemetery, a crematorium, an establishment for the filtration of infected water coming from a system of sewers, a hospital, a lazaretto, certain industries, &c.

With regard to the latitude, or distance from the equator, and setting aside the differences of temperature, consequent on the greater or less distance from the poles, and following the geographical points which are under consideration, one of the most important factors in the solution of the problem, and one on which we ought to fix our attention, is the consideration of the angle formed by the solar rays with the plane of the horizon of each locality, an angle which diminishes as the latitude increases.

According to the reports of the International Congresses of Tuberculosis, and of Salubrity and Hygiene, held recently at Paris, it cannot be doubted that one of the essential points to be secured is to place the dwelling in hygienic conditions, and that its façades should be so exposed as to receive the rays of the sun and pure air for as long a time as possible. To obtain this result it is obvious that we ought to orientate the streets, determine their width, and fix the height of houses, so that the access of the sun's rays should be assured.

As our limited scope does not permit us to trace geographically the course of the solar rays for each of the latitudes corresponding to each degree (a method which would give a precise idea of the matter), it will be enough for us to consider the distinctive latitudes corresponding to the equator, latitude 0 deg.; the tropics, 23 deg. 27 min.; an intermediary point, for instance, Madrid, 40 deg.; the polar circles 66 deg. 33 min.; the poles 90 deg.; to demonstrate clearly that the maximum angles which the solar ray corresponding to twelve o'clock

that is to say, the hour at which the sun passes over the meridian of the locality, forms with the plane of the horizon at the time of the summer solstice, the equinoxes, and the winter solstice, are the following for the said latitudes:

	Latitude	Summer Solstice	Equinoxes	Winter Solstice
	deg. min.	deg. min.	deg. min.	deg. min.
Equator	0 0	113 27	90 0	66 23
Tropics	23 27	90 0	63 33	41 31
Madrid	40 0	73 27	50 0	26 31
Polar Circles	66 33	45 54	23 27	0 0
Poles	90 0	23 27	0 0	23 27

From the preceding it is evident that the various open spaces for each city, streets, squares, promenades, etc., and those by analogy reserved as courtyards to facilitate the access of air and light to houses, ought to increase in breadth as the latitude of the locality increases, whilst the heights of the houses ought to lessen as the latitude increases; in other terms, to avoid one façade casting a shadow upon another, the breadth of the streets must increase proportionately with the latitude of the locality, and the heights of the houses must lessen in the same proportion.

To give to the subject we have just sketched all the development that it deserves would take a volume filled with scientific and learned explanations, and as these notes are intended for an audience composed of experts we would like to avoid falling into this error, and we will conclude our remarks on the portion of the hygienic problem intimately allied with the title of the theme we are discussing, with the following conclusions:

1. That the means of communication in cities should be laid out so that in no case should they serve as a canal to conduct the impurities coming from unhealthy industries, which necessarily exist in all centres of population; that is to say, that strict care must be taken that the situation of these buildings be fixed in such a way that the dominating winds can never carry into inhabited localities the unhealthy emanations from them.

2. That the dimensions of open spaces in a city should be subordinate to the density of the population as well as to the latitude. In other words, the more populous a city the greater should be the area of its open spaces; a condition which can be obtained through the means of communication and the courtyards belonging to houses. Considering besides that the sun is essentially the purifying element, in order to obtain its presence for the longest time possible in the fronts of buildings it is necessary to increase the area of open spaces and to diminish the height of constructions as the latitude of a city increases.

Dr. J. Stübgen, Berlin, read a paper on the subject, which was arranged under three headings:

1.—Planning of Streets.

Traffic.—The direction and width of streets depend on the claims of the traffic to be accommodated. Traffic must everywhere and in every direction find a clear view and an unimpeded path. In main thoroughfares the width desirable may be 50 metres or more; in bye-streets, where the traffic is solely for the service of the residents, the width may be reduced to 8 metres. All intermediate widths depend on the circumstances of each case.

The gradients of streets should be as flat as possible. In level districts gradients of more than 1 in 70 should be avoided as far as may be, because they interfere with the asphalted of the road surface. In hilly districts gradients up to 1 in 20 are permissible in the case of main thoroughfares, and up to 1 in 10 in the case of side-streets. Where steeper inclines have to be dealt with stairs or footways should be provided. The latter should be employed more frequently than is at present the case on mountain slopes and for diagonal crossings of long blocks.

Health.—For hygienic reasons, streets running due east and west should, where possible, be avoided, because the houses on the south side during the greater part of the year do not receive direct sunshine. The width of a street should be at least equal to the height of the houses in it. Broad streets should be

planted with rows of trees and garden plots. Forecourts in front of the houses favour the access of light and air, and often allow a reduction of the width of the roadway. Very wide and bare streets are to be avoided, owing to dust clouds and lack of shade. The same remark applies to long straight streets, especially when they lie parallel to the direction of prevailing winds.

Beauty.—On purely æsthetic grounds there is as much to be said for straight streets as for crooked ones, and for a regular as for an irregular building line. In hilly districts curved streets facilitate traffic and the laying out of sites. In level districts the adoption of straight or crooked, regular or irregular lines depends both on practical considerations and also on the artistic intentions of the designer. Straight streets of great length should be avoided; the remedy is to curve or change the direction, also transposition of the direction or building lines. Transpositions are, however, only permissible in so far as they do not interfere with a clear view of the traffic. Convex changes of gradient are to be avoided in straight streets as far as possible. Concave levelling is to be preferred. Unavoidable stopping-points ought to be treated artistically as terminal points. Every street ought as far as practicable to be planned individually. A change of width in different parts of the same street may serve to add to its beauty. Self-contained street pictures are everywhere to be aimed at.

II.—Planning of Open Spaces.

Traffic.—Open spaces are required for dealing with streams of traffic at points where streets converge, at railway stations, bridges, city gates, &c. For practical reasons, it is desirable that the various lines of traffic should not intersect one another at one point. Spaces devoted to traffic lack, as a rule, one quality of artistic importance—viz., the setting of a proper frame. They can, nevertheless, be made to present a pleasing appearance. The lack of a suitable frame may be to some extent compensated by so arranging the lines of the streets that the eye travels over the open space and rests on a boundary wall. Useless traffic areas resulting from the unnecessary meeting of streets are to be avoided.

Market-places should be near to some main thoroughfare, but their main area should not be open to vehicular traffic.

A considerable number of open spaces are desirable in the interests of fresh air. They should occupy at least one-tenth of the total area of a town. Spaces planted with trees and flowers, such as gardens and recreation grounds, are important to health, as are also public parks and promenades.

Beauty. The chief artistic quality of open spaces lies in their being as far as possible enclosed in a proper setting. This applies to market-places and garden, but especially to spaces of a purely architectural character, i.e. spaces intended as sites for monumental buildings. The preferable position for these buildings is at the side of the open space rather than in the centre. In this latter position the necessity of a framing for the remaining portions of the space holds good. Porticoes and porches, which can be carried out into the street openings, help to close in the frame. Errors in scale, especially unduly large open areas, are to be avoided. Convexity of the open space is inadmissible. Concavity is preferable. Each open space should, as far as practicable, be laid out individually.

Combinations of spaces are subject to various requirements, according to the purpose for which each is intended, e.g., whether it be for purposes of traffic or as a site for monumental buildings. The grouping of several separate spaces can be made to produce fine effects from an artistic point of view.

III.—Planning of Cities.

Historical Development.—It is instructive to pass in review—The formal cities of ancient Greece; the formal and informal cities of the Romans; the irregular cities of the earlier Middle Ages; the regularly laid-out towns of the later Middle Ages, of the Renaissance, and of the Baroque period; the systematically designed cities of America; the improvements in towns carried out during the nineteenth century, for the most part geometrical in character; and, finally, modern ideals.

Traffic, Hygiene, Beauty.—Modern ideals are

in the main based on the principles given above for the design of streets and spaces. We cannot simply imitate the cities of an earlier age, since the requirements of the traffic and of hygiene have altered. That the ground plan of a city should be clean and orderly is of importance. The task of the artist lies in a perfect adaptation to use, combined with beauty of form. In other words, the arrangement of the open-air space shall satisfy æsthetic demands, while at the same time it must provide, as completely as possible, for convenience of locomotion and health.

Economic and Social Requirements.—In addition to the claims of traffic, health, and beauty, economic and social considerations require attention. The streets and blocks of buildings must, in their character and dimensions, conform to the economic and architectural necessities of the inhabitants. Broad main thoroughfares must be provided for the bulk of the traffic, narrow side-streets of private houses serve to divide the area to be built on into separate blocks. The various parts of the city ought, even in the first rough plan, to be divided up in accordance with the purpose they are intended to serve, viz., into rows of houses or detached and semi-detached buildings; into tenements or private houses; dwellings for the upper, middle, or working classes; shops and retail or wholesale manufactories, etc. Attention should be paid to their relative position in regard to the centre of the town, the surrounding country, the railways, and the harbour. As in the case of isolated thoroughfares and open spaces, so too in the case of whole quarters of the city individual character should be aimed at.

Cure of Monuments.—Ancient monuments of all kinds, as well as fine existing streets and views, ought not only to be preserved, but should be taken advantage of in order to secure a characteristic development of the city on artistic lines. (Forty lantern slides were shown to illustrate this paper.)

A paper was read by M. Gaston Trélat (Paris), the author's summary and conclusion being as follows:—

Streets are never wide enough to allow the traffic in the roadway to develop without leading to obstructions. These latter occasion loss of time inconsistent with the rapidity which the means of locomotion tend to insure; again, they lead to a confusion in the streets which is not in harmony with objective beauty. The leading fact of the day is a more and more accentuated rapidity of movement from place to place, thanks to which the former suburbs of capitals or towns are joined, or can immediately be joined, to the centres of the agglomerations. Hence the possibility of assimilating the new localities to the old districts where the urban employments are centralised. Thither, then, should be transferred the dwellings which up to the present have crowded the centre of the towns, where they tend to spread transmissible and preventable diseases.

The enlarged agglomerations would gain considerably in healthiness and brightness, in contrast with these faulty concentrations of dwellings, cramped and one above the other in comparatively restricted spaces.

Uninhabited areas could take the form of parks, squares, gardens, avenues planted with trees; and even private squares could be made on pieces of ground large enough, so that the buildings would line the public roads. And all this should be planned and settled before it is too late. This necessary preliminary work should be carried out under the ægis of the municipal authorities independently of the exigencies of execution, which should be effected according to financial possibilities and intentions. Nothing should be executed which is not in accordance with general harmony, of which it is expedient at once to have some idea, in order to ensure the realities, such as present knowledge bids us consider them.

This would, therefore, be a technical focussing of the progress that science faces in our days. From this would follow later the prescribed realisations in accordance with the views that our intellectual life may well admit of.

It is necessary to get away from the antiquated methods which up to now have served as the bases of the regulations of the highway

authorities. In order to do this it would be expedient to appeal to competent meditations and deliberations, all having as their primordial object the health and well-being of the community. For it is in the exclusive interest of the community that such regulations ought to be made.

Conclusion.—Consequently there is reason to express the desire that for all important agglomerations plans should be studied without delay. They would have to take into account the conditions inspired by science and which interest health, such as rapidity of movement from place to place.

These plans would, therefore, require a focussing of the technical solutions to be drawn from science. They would be carried out according to local requirements and budgetary possibilities. But nothing would be done which was not in accordance with an ideal in keeping with the knowledge of the age.

The Planning of the Residential Districts of Towns.

The last paper was by Mr. Raymond Unwin. He said:—

While towns in England are growing as rapidly as those of other countries, we have not studied the question of town development, as many of the other countries have. In Germany, for example, there is a large literature and at least one good periodical devoted to the subject. German municipalities have extensive powers, and are in the habit of making plans to regulate the development of their towns. The English haphazard system of allowing towns to grow has only to be compared with this to be condemned. It is necessary for our municipalities to secure additional powers; probably the best way would be to begin by forming committees in each town to watch over and criticise town development from the æsthetic point of view, and these committees should work for the appointment by each municipality of a professional expert whose special duty it should be to examine and criticise all development from the point of view of its effect on the appearance of the town.

It is important for us to study what is being done in other countries, but we must not necessarily accept the conclusions they have arrived at as indicating the best methods for our own development. This is eminently work for architects, who alone have received the necessary practical and artistic training.

It is the regulation of the vast growth of residential districts around our towns which is most required in this country. Valuable suggestions may be obtained quite as much from old English villages and towns as from the ancient Continental towns which the school of Camillo Sitte have taken so much as their model.

Both alike suggest the great importance of defining and limiting suburban areas. Old towns were often defined by their walls with beautiful effect. We need to replace with some more comely girdle the ragged edges and rubbish heaps which surround our modern suburbs; belts of park land, meadow, wood, or orchard, often of quite narrow width, might be used with good effect.

In suburban areas the larger buildings will be few, but should be grouped, so as to produce some enhanced effect and some definite centre for the life, as well as for the plan, of the suburb or district. The judicious use of planting may help to link together buildings in centres where there may not be enough fine buildings to make an adequately large enclosed place. The growing desire for greater space and more openness of outlook is an important and difficult element in our problem.

Before attempting to lay out a new area the site must be very carefully studied, a contour plan must be made, and a survey of trees and many other features of interest. Even well-grown hedgerows may sometimes be helpful; anything that will break the naked newness of a suburban area should be preserved. The plans should be thought out on the ground and committed to paper afterwards. It is impossible to study too thoroughly a site and its conditions; the proper directions for the main roads, the various centres, factory areas, etc., should all be settled on the site. A symmetry which will look nice on the drawings is of no value; but definiteness of

figure in the main framework formed by the chief roads of a town or district is certainly valuable to enable people easily to find their way about. The whole of the plan should be based on definite reasons rather than abstract rules, and one cannot be too willing to consider suggestions from the site. Rules cannot be laid down in favour of straight or curved roads; each form has its beauty and use; the mere aimless meandering road will be quite as monotonous as the straight road. The contour of the ground or existing features having curved lines springing from natural causes may suggest very beautiful curved roads, but straight roads opening up a beautiful view, or affording fine avenue effects, may be equally satisfactory. Each road should be given some distinctive character, which may be enhanced by planting it with a special kind of tree. Greater variety than at present should be allowed in the width of roads, in their construction and decoration, according to the purposes they will serve; bye-laws need revising in this respect. Great care is needed in decorating roads with trees or gardening; everything must be kept very simple and broad in effect. The dignity of many fine streets and parks in Continental towns has been destroyed by the introduction of wriggling lines, of beds of variegated foliage, and such like.

The best direction for roads to take for residential purposes depends so entirely on the designing of the houses that no rule can be laid down. Roads running east and west may give a south aspect for all houses provided only that the superposition that a house must have a tidy front to the road and an untidy back away from it can be exploded, and houses for the south side of the road be designed with their living-rooms facing from the road and their so-called backs made tidy and presentable to face the road (Diagram I.). The advantage of roads running north and south, or thereabouts, is that both sides of the houses get an equal amount of sunshine. An important improvement required in suburban districts is the better grouping and arrangement of the houses. Endless repetition of detached or semi-detached buildings becomes quite as monotonous as the endless rows of houses. Valuable suggestions may be obtained from our old village greens, cathedral closes, and college quadrangles. Even the throwing together of a few front gardens may help matters, but where smaller houses can be built in groups, and the groups be designed as a whole, and where such groups of houses can be arranged on two or three sides of an open garden or green, or even where they can be set back from the road at varying distances, not only more variety and beauty be given to the road, but greater openness of outlook may be provided for the houses, and very often some small distant view may be given.

Variety of effect in the streets is very desirable, but it must never be forgotten that mere variety is not in itself necessarily pleasant, in fact is seldom really satisfactory unless it is variety within some enclosing unity. For the town-planner it is most necessary that he should understand wherein consists what we call natural beauty, and while he should seek every opportunity that the site may afford of pleasant natural beauty and the interest and picturesqueness of happy accident he must never forget that he cannot design happy accident or natural beauty.

Mr. Buls said he took exception to M. Hénard's paper because he said it was not always convenient to have garden squares in cities. Certainly they prevailed in England, Germany, and Scandinavia, but in the formation of new centres, and the reconstruction of them it was important to note before the architect made his plans to what the quarter was to be devoted. For instance in a commercial centre garden squares would be out of place.

Mr. Albert Kelsey (Philadelphia) said that the tendency throughout America where gardens were in front of houses was that when the locality changed, the gardens were built over with shops.

Sir W. Emerson, in proposing a vote of thanks to the readers of the papers, said he regretted that time would not allow of a discussion. From the papers that had been read, it was evident that the writers had given great pains and attention to their tasks. The

way in which large towns and cities should be laid out was a most interesting one at the present moment, and, especially to Londoners, for the Metropolis was increasing every year, and was stretching out in all directions, and this question of the laying out of extensions to large cities was one that met them every day. They were exceedingly indebted to Dr. Stubben for the time he must have taken in getting out the plans he had shown them, and they were also indebted to M. Hénard for a most interesting paper. The remaining papers, which time had not permitted to be read would appear in the printed proceedings of the Congress.

The resolution was carried with acclamation. Mr. Frank Miles Day, of Philadelphia, President of the American Institute of Architects, obtained the chairman's permission to show a few pictures of American cities to illustrate the ideas which had been advanced in the papers. He explained that, to take Cleveland as an example, the problem of the plan of the city was always bound up with the plan of the city's parks, and in the picture he showed the relation which the park system bore to that portion of the city where the new entrance was now being constructed. The new entrance occupies the central part, and the park system extends to the outskirts. A number of public buildings had to be constructed in Cleveland, and instead of scattering them about the city, it was found better to create a new hall extending to the heart of the city and flank it with the various public buildings. Those public buildings were now being constructed. The hall was partly constructed and the Government building was very well advanced. The whole scheme was a very interesting one, especially in view of the fact that the rearrangement of the buildings in this monumental fashion would only cost about 10 per cent. more than if they had been sprinkled about the city. Many other cities in America had taken their cue from Cleveland and had proposed group plans. In Buffalo they had a radiating system. St. Louis had a need at the present time for the construction of public buildings, and it had been proposed to carve out a certain area for the purpose; placing at one end the public library and at the other end certain municipal buildings. The town hall had already been constructed and it was proposed to place the court house at the other end, the whole having the wall in the centre. The twin cities of St. Paul and Minneapolis had a curious and interesting park system, which it was proposed to extend very largely. The picture he had showed the proposed arrangement in connection with the new State capital which had just been finished. Mr. Burnan was not long ago commissioned to study the plan of Manila, and he had made certain important proposals, and he proposed to overlay the city with a system of diagonal roads, so that the straight roads of one portion of the city became a diagonal road—an ingenious solution of a city on a diagonal plan. Mr. Day then showed a picture of a recently completed plan for the re-erection of San Francisco, which was now under consideration. In the plan the city was laid out in a rectangular system, differing slightly in different parts, but consisting almost entirely of diagonal avenues. It was, he said, proposed to cut diagonal avenues in various centres and to take the high portion of the city and make a great park extending down to the sea, although there were already vast park areas. Washington was another city having a large park area and it was proposed to erect all the public buildings in a certain way: the building for legislative purposes being placed around the capitol, those for executive work around the White House, and those for municipal purposes along the Mall. In the four years since that scheme had been proposed at least ten important buildings had been placed in accordance with those proposals.

Mr. Max Clarke in proposing a vote of thanks to the chairman said they were especially indebted to those gentlemen for allowing Mr. Day to exhibit his photographs. From the little he had heard of the papers they might have been more or less theoretical and perhaps problematical, but Mr. Day's contribution had clearly brought home to them that such a

thing could be done if it was only treated in a large way.

The resolution was carried with acclamation, and having been acknowledged by the Chairman, the meeting terminated.

[Our Report of the Proceedings of the Congress will be concluded next week.]

THE BUILDERS' BENEVOLENT INSTITUTION.

The fifty-ninth annual general meeting of this Institution was held at 51 and 52, Bedford-street, Strand, W.C., on the 11th inst. Mr. J. W. Chessum presiding.

The minutes of the last annual general meeting were read and confirmed, and the Committee of Management submitted the following annual Report, which was adopted—

The Committee has the pleasure to submit its fifty-ninth annual Report. Thanks to the kind support of old and new subscribers, the funds of the Institution for the past year did not suffer quite so much as was feared through the continued depression in all branches of the building trade. The appeal of the President (Mr. Benjamin Hannen) in November, 1905, was responded to so generously that Mr. Hannen had the satisfaction of announcing a record list of benefactions at the last annual dinner. The President and Committee take this opportunity to tender their sincere thanks to the donors and subscribers, and would much like to see the names of many more master builders among them. The Committee exercises the greatest care and economy in administering the funds of the Institution, and investigates thoroughly all claims upon them. Elections of pensioners were held in November, 1905, and in May, 1906, at which four men and four women were placed upon the list. Contested elections were again avoided, and the Committee is still of opinion that, in the interests of all concerned, this is the wisest policy to pursue. There are now thirty-three male and thirty-four female pensioners who receive respectively 42s. and 50s. per annum in monthly payments. Seven pensioners died during the past year, and burial allowances of at least 5s. were granted in each case. Widows of pensioners, if eligible under the rules, are placed on the pensioners' list. The Committee wishes to place on record its sincere regret at the loss by death of two generous contributors in the persons of the late Mr. Benjamin Hannen (father of the President) and Mr. George Jas. Lough. The warmest thanks and gratitude of the Committee are due to the President (Mr. Benjamin Hannen) for his generosity and that of his personal friends: to the Trustees (Sir Arthur Charles Lucas, Bart., Mr. J. Howard Colls, Mr. T. Stirling, Mr. F. J. Dove, Mr. J. T. Bolding, and Mr. T. F. Rider); to the Honorary Auditors (Mr. R. J. T. Bolding and Mr. R. J. Ward, F.C.A.); and to the dinner stewards for their services; and to the Worshipful Company of Tylers and Bricklayers for placing one of its almshouses at the disposal of the Committee for the benefit of one of the pensioners. The Committee is glad to announce that Mr. J. W. Chessum (Messrs. J. Chessum & Sons) has accepted the Presidency for the coming year. The annual dinner will be held in the Whitehall Rooms, Hotel Metropole, on Thursday, November 22 next, when the Committee hopes the friends of the Institution will give the Chairman their heartiest support.

The audited accounts for the year ending July 7, 1906, were read and adopted, and the following officers, etc., were elected:

President, Mr. J. W. Chessum (Messrs. J. Chessum & Sons); Treasurer, Mr. J. Howard Colls; Executive Committee (re-elected), Messrs. C. Ansell, W. Brass, T. Hall, Hy. Holloway, J.P., W. Nicholson, Alfred E. Parker, Joseph Randall, F. Shenherd, T. Stirling, and Col. G. Haward Trollope, V.D.; (elected), Mr. Benjamin Hannen and Mr. H. Arthur Bartlett; Hon. Auditors (re-elected), Mr. Robert J. Ward, F.C.A., and Mr. J. T. Bolding.

Votes of thanks were then passed to the Past-President, Mr. Benjamin Hannen; the Hon. Treasurer, Mr. J. Howard Colls; the Trustees, Sir Arthur C. Lucas, Bart., and Messrs. J. Howard Colls, F. J. Dove, T. F. Rider, T. Stirling, and J. T. Bolding; the Committee of Management and dinner

stewards; the Vice-Presidents; the Hon. Auditors, Mr. Robert J. Ward, F.C.A., and Mr. J. T. Bolding.

A vote of thanks to the Chairman closed the proceedings.

THE ARCHITECTURAL ASSOCIATION SUMMER VISITS.*

VI.—OXFORD.

THE sixth and final visit, which took place on Saturday, 7th inst., at Oxford, was in every way a fitting conclusion to an excellent series of summer outings. On this occasion the members of the Architectural Association were received by the Mayor at the Town Hall and shown over this important modern municipal building. Readers of the *Builder* will remember the competition for designs held some years ago, of which the selected plans, by Mr. H. T. Hare, were illustrated in our pages; and, later, some photographs of the executed building, on September 11, 1897. At the conclusion of the present inspection the Corporation mace and loving cup were produced, and unanimously admired. The former is a beautiful specimen of XVIIIth century English silversmith's work, said to be the largest of its kind, while the cup is solid gold of simple, yet interesting, form, presented to the borough by Charles II.

The remainder of the morning was spent in viewing various parts of the principal colleges, by courtesy of the Wardens, particular attention being paid to Christchurch Cathedral.

The afternoon was devoted to the study of modern work, and the party was driven to see the University new golf club-house. This is a pleasing building, designed by Mr. Alfred, of Oxford, having on two sides a wide verandah. The principal room is a large hall, with a barrel-vaulted ceiling, and is lighted by lunettes. The effects of light and space are most satisfying. Continuing the journey, Radley College, one of the leading present-day public schools, was next visited, and here the guests were received by the Warden. The old and new buildings were described by Mr. Ryan Tension, who is now making extensions to the school premises. The Warden's house is the original of the many scattered buildings, and dates probably from the earlier part of the XVIIth century. A fine oak staircase and other decorative features are excellent examples of the period.

The chapel, by Mr. Jackson, R.A., has a magnificent Flemish altar-piece.

The schoolroom is a large tiled barn, erected from an adjacent site, and enlarged by Mr. Tension; it is a most interesting place, although perhaps the lighting is insufficient. Radley Church was finally visited, and is chiefly remarkable for a heavy oak nave arcade. The XVth century woodwork is beautiful, and extremely delicate.

The return journey was made *via* Oxford, and thus ended a most instructive day.

THE LONDON COUNTY COUNCIL.

The usual weekly meeting of the London County Council was held on Tuesday in the County Hall, Spring-gardens, S.W.1, Alderman Evan Spicer, Chairman, presiding.

Loans.—On the recommendation of the Finance Committee the following loans were approved of: Battersea Borough Council, 4,392l. for paving; Camberwell Guardians, 2,010l. for Poor Law purposes; Finsbury Borough Council, 2,500l. for street improvements; Islington Borough Council, 3,987l. under the Housing, etc., Act, 1890; Wandsworth Borough Council, 2,000l. for underground conveniences; and Woolwich Borough Council, 7,000l. for the acquisition of a wharf.

Rebuilding of Regent-street.—On the recommendation of the Building Act Committee, the Council approved of plans for the proposed rebuilding of Regent-street. The report of the Committee was given in our issue for the 7th inst.

Special Works—New Standing Order.—The General Purposes Committee recommended that the following be a standing order of the Council:—

"Any committee contemplating the execution of any work shall, before coming to a decision as to how the work shall be carried out, obtain an estimate from the proper officer. If the committee on receiving the estimate shall decide to recommend

the Council to have the work carried out without the intervention of a contractor, they shall, before reporting to the Council, refer such estimate, together with the full plans and specifications, to the Works Committee for consideration. If the Works Committee express their willingness to carry out the work at the amount of such estimate, the executive committee shall thereupon take up a recommendation to the Council, at the same time submitting the full plans and specifications, and estimate of the proposed work, and such estimate, if approved by the Council, shall be called the 'accepted estimate.' Provided that, in the case of (1) petty works of current maintenance, (2) special works of a limited nature, (3) emergency repairs, which, if delayed, would cause accident to or deterioration of the property of the Council; and (4) the manufacture of special articles under the direction of committees of the Council, it shall be competent for the committee concerned to agree that such work shall be carried out under their own management by the direct employment of labour, on condition that they report the facts to the Council at the same time as the Works Committee make their half-yearly report to the Council.

This was agreed to.
Tenders for Painting.—A long list of tenders for painting schools was agreed to. The following recommendations were also agreed to: (a) That the resolution of July 10, 1906, so far as it relates to the acceptance of the tender of Maxwell Bros., Ltd., amounting to 619l., for painting the interior of the Heber-road School (Dulwich), be rescinded.†

(b) That the tender of W. Johnson and Co., Limited, amounting to 623l., for painting the interior of the Heber-road School (Dulwich), be accepted.

Additions, etc., to Selected List of Contractors.—The following recommendations of the Education Committee were agreed to:—

(a) That the names of the undermentioned firms be added to the selected list of contractors for new schools, alterations, structural alterations, repairs, cleaning, and painting, subject to the condition specified in each case:—Thomas J. Hawkins & Co., 103, Victoria-street, works not exceeding 10,000l.; Everett, Windmill-road, Croydon, works not exceeding 5,000l.

(b) That the names of the undermentioned firms be added to the selected list of contractors for structural alterations, repairs, cleaning, and painting, etc., subject to the condition specified in each case:—J. W. Drake, 195, Hammersmith road, works not exceeding 3,000l.; J. Mills, Slobert Works, Westcombe-hill, Blackheath, works not exceeding 5,000l.; A. J. Staines, 154, Great Titchfield-street, works not exceeding 2,000l.

(c) That the names of E. J. Wallis, 3, Clarendon-road, Lewisham; and Randall & Ball, 66, Drayton-park, Highbury, be added to the selected list of contractors for small contracts for cleaning and painting for one year or probation.

(d) That the names of the undermentioned firms be added to the selected list of contractors for heating apparatus, subject to the condition specified in each case:—Lee & Warren, 7, Victoria-street, Oxford; Healdy & Pattison, Ltd., 11, Hills place, Oxford street, works not exceeding 500l.; Cannon & Hefford, 77A, Stanbury-road, Beckham, works not exceeding 500l. for one year or probation.

(e) That the name of Boulton & Paul, Ltd., of Rose Lane Works, Norwich, be added to the selected list of contractors for the erection of iron buildings.

(f) That the name of M. V. & Co., of 383, Kensington-road, be added to the selected list of contractors for providing and fixing iron staircases.

(g) That the name of Chubb & Roberts, Ltd., of 85, High-street, Stoke Newington, be added to the selected list of contractors for the supply of plumbers' goods.

(h) That the name of the Reservists' Employment Corporation, of 44, Pentonville-road, be added to the selected list of contractors for window cleaning so far as small contracts only are concerned.

(i) That G. A. Dean, of Dulwich Village, be allowed to tender under the style of W. J. Mitchell & Son for building works, including cleaning, painting, etc., not exceeding 5,000l. in value for one year or probation.

(j) That W. G. Cannon & Sons, Ltd., 107, London-road, be allowed to tender as hitherto for heating and the supply of gas services and fittings.

(k) That F. & H. F. Higgs, of Station Works, Hinton road, Herne Hill, be allowed to tender for any new works estimated to cost over 10,000l.

Insanitary Non-Provided School Buildings.—The following report of the Education Committee was carried:—

"We regret to report that the question of the sanitary condition of certain non-provided schools has now become so urgent as to require immediate and serious action by the Council. The Council on May 30, 1905, required the managers of 351 non-provided schools to carry out alterations and improvements to their buildings at dates varying in different circumstances, but in most cases fixed at December 31, 1905, July 31, or December 31, 1906. At the same time the Council decided that 108 non-provided school buildings were unsuitable for the purposes of elementary education, and that they could not be made suitable.

The position of affairs now is that the requirements have been carried out in about thirty instances, that part of the Council's requirements have been carried out in about 300 schools, and that fifty schools have been or are about to be closed. With regard to about 275 of the 469 schools concerned, we have no information that any portion of the requirements has been carried out, although in a large proportion of these cases the date assigned

* See our tender columns.

† At the firm's request.

for the conclusion of the work is past or has been nearly reached, and the Council is still maintaining the schools. The Council has no legal power itself to incur any expenditure whatever on the improvement of non-provided school premises, and has no legal remedy in case of default by the managers in carrying out its reasonable requirements, except by refusing further to maintain the school.

We do not think that the Council will desire to refuse at once to maintain the large number of non-provided schools concerned, if only for the two reasons that the Council has not made provision by new accommodation for the tens of thousands of children who would be displaced, and that the introduction of an Education Bill has brought about a situation in which the Council will desire to avoid anything like extreme action. The Council has during the last few months foreborne to press for general improvements to non-provided school premises, however desirable in themselves.

The situation is, however, much more difficult in those cases where the sanitary condition of the schools is such as to constitute an immediate danger to the health of the children concerned. A report has been prepared by our direction on these schools, where the survey of 1904 showed that the officers and drains were in a seriously insanitary condition. This report shows that the cases may be divided into four main classes (omitting those in which we are making further inquiries). The first class consists of ninety-eight schools where such a report was made as to the dangerous condition of the sanitary arrangements as to throw a heavy responsibility on the Council if it permits their further continuance. The second class consists of thirty-seven schools, in which the sanitary condition disclosed by the survey, though less serious, is still such as to make it imperative to press on the managers the necessity for taking immediate steps to remedy it. The third class consists of nineteen schools, the sanitary condition of which the Council was not able to ascertain at the time of the survey, owing to the refusal of the managers to permit the inspection required by the Council. The fourth class consists of schools where the sanitary repairs, though desirable, are not so urgent as to prevent them from being treated in the same way as are the other improvements required by the Council.

The first class consists of ninety-eight schools with a roll of 43,252 children, or 20,346 on the average, can be found by filling the halls of the neighbouring London County Council schools, but this will put a strain upon the accommodation of the districts concerned, which must be seriously and generally educational work of the Council. The second class consists of thirty-seven schools, with a roll of 17,351, 5,414 of whom by similar means can be accommodated. The third class consists of nineteen schools, with a roll of 8,667, of whom 1,655 can be accommodated. If, therefore, all the schools in these three classes were closed, 69,800 children would be displaced, of whom only 27,417 could be accommodated elsewhere, leaving 42,383 children for the continuance of whose education no provision would have been made. The Council is faced with a choice of evils. Either these children must be deprived of any education whatever, or their education must be carried on in insanitary premises.

In these circumstances we think that the Council will be unwilling to take the extreme step of turning out children for whose accommodation elsewhere no provision has been made, unless the danger to their health involved in continuance in their existing premises is both serious and immediate. We think, therefore, that in dealing with schools in the first category the Council should only announce its intention of withdrawing maintenance in such cases where a further examination of the premises by the smoke and chemical tests shows actual and dangerous contamination of the air breathed by the children, and where such notice has been given to the managers of this inspection as shall enable them to make the repairs most urgently required. The managers alone are legally entitled to make such repairs, and we hope that an appeal to them may not be without result. In cases where nothing is done we shall be compelled to recommend the Council to close the schools in the autumn, however great may be the moral and educational loss involved.

With regard to the third class, we think that the Council should at once communicate with the managers, pointing out the seriousness of the situation, the character of the tests with which it is proposed to meet the emergency, and announcing its intention to use these tests. If the managers refuse to permit these tests, we think that the Council should report the matter to the local sanitary authority, and leave with that authority the responsibility of dealing with the situation, whether by closure of the school or otherwise. Should the Council adopt our proposals, it will be necessary to authorise the engagement of additional temporary assistance to carry out the work of testing at an expenditure not exceeding 250l. sufficient provision for which has been made in the maintenance estimates, 1906-7.

(c) That in the case of the schools named in the statement separately submitted by the Education Committee, the urgent and immediate attention of the managers be drawn to the requirements of the Council sent to them in 1905 with regard to the sanitary condition of their schools, and that they be informed that without prejudice to any of such requirements the Council proposes to apply after the summer holidays the smoke and chemical tests to the chimneys and drains of their schools, and that if after the application of these tests it is found that the condition of the chimneys and drains constitutes an immediate danger to the children, the Council will cease to maintain the schools after October 19, 1906.

(d) That the attention of the managers of the non-provided schools enumerated in the statement separately submitted by the Education Committee, be drawn to the requirements sent to them in 1905 and that they be informed that, unless the work required of them by the Council in connexion with the chimneys and drains is carried out during the summer holidays, 1906, the Council will consider whether it shall cease to maintain the schools as from October 19, 1906.

(c) That the managers of the non-provided schools shown in the statement separately submitted by the Education Committee, be informed that the Council proposes to apply the smoke and chemical tests to the drains and offices of their schools, and that if permission to do so be refused the Council purposes to report that fact to the local sanitary authority in each case.

(d) That, subject to monthly reports by the architect (Education), as to their number and rates of pay, additional assistants be temporarily employed in the architect's (Education) department, in connexion with the inspection of officers and drains of non-provided schools, and that expenditure not exceeding £200, be sanctioned therefor.

Having transacted other business, the Council adjourned.

APPLICATIONS UNDER THE LONDON BUILDING ACT, 1894.

The London County Council at their meeting on Tuesday dealt with the following applications under the London Building Act, 1894. The names of applicants are given between parentheses:—

Lines of Frontage and Projections.

Fulham.—Erection and retention of projecting porches and balconies in front of Talgarthmansions, Talgarth-road, Fulham (Mr. A. Blackford for Mr. Marwood).—Consent.

Greenwich.—Buildings on the south side of Westcombe Park-road, Greenwich, between Mycena-road and Westcombe-hill. (Messrs. Crickmay & Heath for Mr. C. Johnson).—Consent.

Lewisham.—A one-story building at the rear of No. 2, Springbank-road, Lewisham, to abut upon Duncrivie-road (Messrs. Jarman Brothers, Sons, & Co., Ltd., for Messrs. Abbott Brothers).—Consent.

Norwood.—Buildings on the western side of Tubeshill, Norwood, northward of No. 6, with a one-story portion in front (Messrs. Goodwyn & Sons for Messrs. Higgs & Son & Mr. E. Tewson).—Consent.

St. Pancras, South.—That the application of Mr. W. Flockhart for an alteration of the periods within which the construction of cellars in the forecourts of Nos. 15, 17, 19, and 21, Euston-road, St. Pancras, was required to be commenced and completed, be granted.—Agreed.

Hampstead.—A conservatory building at No. 24, Queer-road, Hampstead, to abut upon Nutrix-road (Messrs. H. G. Lancaster & Co.).—Refused.

Kensington, South.—Buildings on the southern side of Brompton-road, Kensington, between Nos. 2 and 12 (Mr. H. Chaffell Clarke for the Metropolitan Estates Company, Ltd.).—Refused.

Strand.—Three cranes at Messrs. Spalding & Hodges' premises, Russell-street, Strand, two of such cranes to abut upon Drury-lane and one upon Crown-court (Mr. R. Waygood & Co. for Messrs. Spalding & Hodges, Ltd.).—Refused.

Wandsworth.—The retention of four one-story shops in front of Nos. 65, 67, 69 and 71, Westcote-road, Streatham (Mr. J. Harding).—Refused.

Width of Way.

Poplar.—A shed at the rear of No. 113, West Ferry-road, Poplar, at less than the prescribed distance from the centre of the roadway of Tooke-street. (Mr. E. B. Ellis for Mrs. Padwick).—Consent.

Lines of Frontage and Space at Rear.

Hackney, North.—Four buildings on the western side of Wordsworth-road, Stoke Newington, and with an irregular space at the rear of the northernmost building (Mr. J. H. Mellenfield for Messrs. J. Stapleton & Sons).—Consent.

Lines of Frontage and Construction.

Norwood.—An iron and glass shelter of a temporary character in front of No. 160, Knight's Hill-road, Norwood (Messrs. Parr & Sons for Mr. Carl Hentschel).—Consent.

Lewisham.—The retention of a cycle house at the side of No. 2, St. Fillan's-road, Catford, abutting upon Elmer-road (Mr. F. Diss).—Refused.

Space at Rear.

Chelsea.—A modification of the provisions of sect. 41 with regard to open spaces about buildings so far as relates to the proposed erection of a building on the eastern side of Tite-street, Chelsea, on land belonging to Rayleigh House (Mr. G. Sherrin for the Hon. R. Strutt).—Consent.

Lewisham.—A modification of the provisions of sect. 41 with regard to open spaces about buildings, so far as relates to the proposed erection of No. 27, Crofton-terrace, Brockley-road, Lewisham, with an irregular open space at the rear (Messrs. Tompkins & Connew for Mr. G. Dean).—Consent.

Marylebone, West.—A modification of the provisions of sect. 41 of the Act as to as relates to the proposed erection of an additional story to No. 42A, Great Cumberland-place, St. Marylebone (Mr. J. H. Ball for Mr. Gustav Aguet).—Consent.

Formation of Streets.

Wandsworth.—That an order be issued to Messrs. Milner, Son, & White, sanctioning the formation or laying out of three new streets for

carriage traffic upon the Furzedown-park estate, Tooting.—(Consent).

Woolwich.—That an order be issued to Mr. A. E. Habershon sanctioning the formation or laying out of a new street for carriage traffic to lead from Heathfield-terrace to Swingate-lane, Plumstead.—Consent.

Hampstead.—That an order be issued to Mr. R. J. Worley, refusing to sanction the formation or laying out of a street for carriage traffic to lead out of the eastern side of West End-lane, Hampstead (for the Midland Railway Company).—Refused.

Buildings for the Supply of Electricity.

Wandsworth.—For the construction of an accumulator house at the generating-station, The Causeway, Wandsworth (Mr. C. Thompson for the County of London Electric Supply Co., Ltd.).—Consent.

Alteration of Buildings.

St. George, Hanover-square.—The formation of an opening in the party-wall between a shop on the ground-floor of No. 1, Albemarle-street, St. George, Hanover-square, and the staircase leading to the upper floors of such building (Mr. F. T. Venty for Messrs. Gresham, Barber, & Co.).—Refused.

The recommendation marked † is contrary to the views of the local authority.

THE ROYAL SANITARY INSTITUTE CONGRESS.

In addition to the papers and discussions at the Royal Sanitary Institute Congress at Bristol last week, the following subjects were dealt with at the second sitting of the Engineering and Architecture Sections held at University College on Thursday under the chairmanship of Mr. A. P. I. Cotterell (Bristol):—

Rural Water Supplies.

Dr. E. F. Willoughby (London), in a paper on "Rural Water Supplies," first dealt with the law on the matter, and, passing on to the inadequacy of the supplies in many places, said there are countless villages in all parts of the country on pervious soils, alluvial, tertiary, chalk, sand, or limestone, where shallow wells yield an abundant and perhaps a constant supply. Each cottage has its well, but each has also a privy within a few feet of the well, in more or less pervious soil, so that the liquid soaks downwards into the ground water or directly into the well. Such pollution, if poured on the surface of the ground, would, in percolating through the upper soil, undergo complete nitrification, but starting from a point 6 ft. or 10 ft. below the surface, where the earth is devoid of bacteria, or what Dr. Poore called "dead," it is, though clarified, not purified, and makes all such wells a source of danger. The greatest difficulty is encountered in places where the soil consists to a depth of from 100 ft. to perhaps 400 ft. of dense homogeneous strata, in which there are no water-bearing layers. Such are frequently met with on the formations known as the Gault and the Kimmeridge and Oxford clays. Here it is necessary to go beyond the immediate vicinity, which neither the owner nor the local authority can do, and the only remedy lies in a resort to the County Council, on which rather than the local authority the supreme responsibility should devolve. The County Council should be empowered to authorise or compel the formation of water boards for the supply of combined districts devoid of means of supplying themselves. Shallow wells will always be a source of water for a large part of the population, and if cesspits were abolished and the wells raised 12 in. or 18 in. above the ground-level so as to prevent the entrance of surface drainage, vermin, etc., there is no reason why they should not be perfectly safe.

Mr. W. Whittaker opened the discussion, and said that the great difficulty in connexion with water supplies was want of money. It was comparatively easy to devise a scheme for a large city where a few thousand pounds more or less did not matter, but a very different thing in a rural district, where the rateable value was low. In many cases they must be content with shallow wells, and he agreed with the author that they might be made very good. If they were built up somewhat from the surrounding ground a great deal of pollution would be avoided. He was afraid the author went a little too far in advocating the abolition of cesspits, for, while theoretically it would be a good thing, yet it could not be done, and all they

could do was to see that the cesspit was put in such a position that it could do no harm. What could be done more in rural districts was for several villages close together to combine to get a supply. One source of supply was the rain, and rain-water was not so bad. It was not always pleasant to drink, but it was wholesome, and it was certainly far better than a pond supply.

Mr. A. F. Somerville (Wells) pointed out that a great grievance with rural districts was that large cities came and took their supplies from a country district and drained the whole area. Wells were drained, and the whole source of supply taken away. If the present law was enforced by the Local Government Board a great many of the difficulties that rural districts suffered from would be avoided. He had supplied cottages with a rain-water supply by having a tank over the door which served also as a porch, and there had been no difficulty at all.

Miss Cochrane (Rural Housing Association) observed that the Rural District Committee had neither the means or the knowledge of undertaking water supplies, and she suggested that it should be placed in the hands of wider authorities—either County Councils or a State Department.

Mr. Lea (Turro) remarked that there was a little difficulty in determining what was wholesome water, and said that in a number of samples sent for analysis a large proportion of nitrates were found, and yet there were no evidences of zymotic disease, although it was evident that there was water pollution.

After some further discussion the Chairman said that rural authorities were much more alive to the necessity of improving the water supplies of their districts, and such discussions as that must be a help to the community. The fact that the death rate in the country was higher than that of the towns was no doubt due to the water supply. If more powers were given to the County Councils and more energy shown by those who had to do with the health of the community, he thought the health of county districts would be much improved.

Dr. Willoughby, in reply, expressed his view that deep wells were more in danger from percolation than shallow ones. A deep chalk well within his knowledge was one of the most suspicious he knew of. It was the percolation through fissures at great depth which was dangerous.

Light in Dark Rooms.

This was the subject of a paper read by Dr. S. Davies (Medical Officer of Health for Woolwich), in which the author pointed out that, although the fact that light is necessary to health is so generally recognised, yet there is no definite provision in the Public Health Acts for ensuring that dwelling and work-rooms are properly lighted. The only way in which dark rooms can be dealt with is by declaring them to be in such a condition as to be a nuisance or injurious to health, and the Woolwich Borough Council had enforced this section and obtained a conviction. Having touched on the principal causes of darkness, Dr. Davies gave instances of how light has been supplied in his own borough. These were (1) the use of whitewash for the surface of areas, adjoining and opposite walls, and interior surfaces, although for areas coating with glazed bricks are preferable; (2) the use of certain kinds of glass which are highly refractive; (3) where there are forecourts slope off the area at a larger angle; (4) the enlargement of windows; (5) removal of trees, etc. The London County Council had been considering and has proposed amendments to the Building Act which will remove some of the difficulties, but it appeared to him that the only satisfactory way of ensuring that the dwelling-rooms of new houses are sufficiently provided with the means of lighting by daylight is to enact that no new house shall be occupied unless each habitable room is certified to be properly lighted by daylight. As regarded old houses, what was wanted was a further definition of nuisance as "any dwelling-room not provided with sufficient and proper means of lighting by daylight."

Mr. Osborne Smith (London) said they frequently saw in new buildings, as well as old, windows 1 ft. or 2 ft. below the ceiling, and any room in which that occurred would be infinitely better from the health point of view if the windows were against the ceiling.

Mr. Thomas (Mountain Ash) mentioned that a difficulty in his district was that to get the superficial area the windows were made wide instead of high.

Mr. W. Duck (Folkestone) advocated the passing of by-laws by which the size of back additions to houses should be restricted to, say, one-third of the width of the house.

Dr. Davies, in reply, said he believed that on the large Corbett estates and on other estates recently developed around London they had no back additions, and he hoped the time would come when such additions would never be erected.

Cremation; Its Bearing on Public Health.

Mr. Albert C. Freeman submitted a paper on "Cremation; Its Bearing on Public Health." He remarked that the object of placing a dead body beneath, rather than upon, the surface of the ground, is that the earth may absorb and neutralise the products of gradual decomposition. This result is very imperfectly accomplished. Investigation showed that the earth does not purify the body placed in it, but that, on the contrary, noxious gases escape into the atmosphere, and germs of specific diseases are incorporated with the water which percolates from a cemetery, so that the air and the water are polluted, to the serious danger of the living. Sanitary science has taught us truths so important as to the pernicious effects of placing the bodies of our dead in the earth, that, if we were not in daily contact with the blind conservatism of the human race, we should be surprised that this method was not long ago supplanted by some other system which would effect quickly and advantageously that which goes on in the grave slowly and mischievously. The author proceeded to trace the history of cremation, and said that there are at present in operation thirteen crematoria in this country. With regard to the preservation of the ashes, if such preservation served no good purpose it could not possibly do any harm. If the urns are deposited in our churches they will decorate the building, and also lead to the adoption of the old custom of bringing the remains of the dead within the Church of God.

Isolation in Fever Hospitals.

Mr. T. W. Aldwinckle dealt with the question of isolation in fever hospitals, and gave particulars of the new departure which is being made by the managers of the Metropolitan Asylums Board. This new departure relates to the isolation of patients suffering from, or suspected to be suffering from, scarlet fever, diphtheria, or some other infectious disorder. The Board have decided that the cubicle system of isolation in incoming patients is the most suitable. The author proceeded to deal with the cubicles at the South-Western Hospital. These are arranged on each side of the two existing wards, having a corridor in the centre. The ward is 100 ft. long, 28 ft. wide, and 14 ft. 6 in. high. The ward originally contained eighteen beds, and, as there will be sixteen cubicles, there will be a loss of two beds, or 11 per cent. As a rule, the loss of beds under the new arrangements will work out at about 15 per cent. Each cubicle will have a floor area of about 120 ft. The partitions are 7 ft. high, and go close down to the floor. The raising of these partitions a few inches clear of the floor for the purposes of air circulation has this serious disadvantage, that children (who are the majority of patients) might pass articles to each other through this space. The partitions are of 2-in. steel framing, the lower portion filled in with asbestos panels, the upper portion, commencing about 2 ft. from the floor, being glazed with 32-oz. sheet-glass. Plate-glass would be preferable. The partitions will stand upon hard-wood fillets, rounded on both edges so as to avoid a bad angle against the floor. The finish against the walls will be similar. The cubicle partitions are therefore absolutely fire-resisting—a matter of vital importance where patients are individually isolated. The doors will be dwarf doors 3 ft. 2 in. high, sufficiently high to prevent a child from getting out of the cubicle, and low enough to admit of a free current of air. Gilmour doors will be used, which, being of hard wood, are practically fire-resisting. The doors are so placed that the door of one cubicle is not opposite that of another cubicle. Each cubicle has one large ward window with double-hung sashes,

and hopper sash over. As the floors of these wards are of deal, thirty-five years old, we are replacing them with teak floors. There are hot-water heating pipes running round the wards which will be sufficient to warm the cubicles, while the corridor and the general air space above all will be warmed (in addition) by the central fireplaces, which will also act as exhaust ventilators. There are fresh-air inlets in the external wall of each cubicle. There will be ample cross ventilation by means of the windows. The arrangements for ensuring a condition of perfect asepsis on the part of the doctor and nurse will be upon the same lines as those at the Pasteur Hospital. The author next dealt with the proposed cubicles at the South-Eastern Hospital, where the arrangements are similar to those at the South-Western Hospital, except that there are no central fireplaces. It is estimated that the cost, including the spray lavatory, will not exceed 30l. per cubicle.

Isolation Hospitals in Rural Districts.

Mr. J. Cooke Hurle (Somerset County Council) had prepared a paper on "Isolation Hospitals in Rural Districts," which was taken as read in which he pointed out that, owing to the small rateable value of country districts and the fact that an isolation hospital was often without patients for a considerable time, the type of hospital which the Local Government Board endeavoured to force on country districts is a type which the country districts will seldom voluntarily agree to erect. The author described in detail an isolation hospital of a different type erected in a rural district in North Somerset thirteen years ago. A case of small-pox occurred in 1893 in the capital of the district, a county town of 3,000 inhabitants. The sanitary authority erected, as rapidly as possible, an iron block with kitchen and nurses' room, and two wards designed for six patients each, water-closets, and bathrooms; a detached iron cottage, and a third building (also detached) to house a steam disinfectant and ambulance, and to serve (if necessary) as a mortuary. Gas and water had to be laid on from some distance, and sewage disposal was effectually provided by sub-irrigation, solids as well as slops being thus dealt with. In the first instance, six beds for patients were provided; and the total cost up to this point was 732l., which included road-making and fencing. There was no payment for land, as the field in which it was erected was already the property of the guardians. Soon afterwards a small iron building for laundry purposes was erected, and from time to time beds were added until the number reached twenty. These brought the cost to about 900l., or about 45l. per bed. The present staff consisted only of a caretaker and his wife, who looked after the building when it was unoccupied and kept it in readiness for immediate use. Arrangements were made with a local medical practitioner to give medical attendance when the hospital was occupied and a nurse or nurses were obtained. The hospital has been most successful in stamping out several epidemics, and no death has yet occurred in the wards.

The discussion of Mr. Aldwinckle's and Mr. Hurle's paper was taken together.

Mr. Saxon Snell said that he had had occasion to study the plan of the Pasteur Hospital pretty closely a year or two ago, and was not much impressed with it. The French and Germans, and, indeed, none of the Continental countries, seemed to have grasped the details of sanitary work as they had in England. It was one of the few points in which we were in advance of them. The staircase in the plan seemed to him to be in the wrong place, for two people might be passing one another and infect one another. In Mr. Aldwinckle's case, he supposed he had to alter old walls, and therefore had a central passage, the same as in the Pasteur Hospital. The most ideal plan on the surface appeared to be that adopted at the Walthamstow Hospital, where the wards were entered from the balcony outside. He would like Mr. Aldwinckle to say whether, if he were building a new hospital, he would adopt the Walthamstow plan. Reference had also been made to the Hospital for Sick Children in Paris, where the partitions only came down to within 2 in. of the floor, and he would like to know if they had an exhaust fan powerful enough

to draw out the air without it passing from one room to another. Further, he would like to know how Mr. Aldwinckle arranged in his wards so that the air did not pass from the cubicles into the corridor, and from the corridor into another room.

Dr. Neech (Halifax) considered that the arrangements being made by the Metropolitan Asylums Board were a step in the right direction. He had been much struck by the way in which at the Pasteur Hospital they nursed diseases of various kinds next to one another. That the hospitals in this country as at present arranged were a success could not be said. At the same time he doubted if the cubicle system were universally adopted if they would be able to stamp out scarlet fever. In the Pasteur Hospital they were not cubicles but cells, and he considered this a more efficient means of isolation.

Mr. J. Pearson (Folkestone) quoted the experience of various towns in proof of his contention that the hospital system had proved a complete failure to stop the spread of infectious disease.

Mr. Brownridge (Birkenhead) did not see why the Local Government Board should not give short-period loans for corrugated-iron buildings, for he knew from experience that if properly attended to they would last twenty years. He favoured the cubicle system in infectious hospitals.

Mr. Lambie (Lanarkshire), Dr. Martin, and Dr. Vallentine all spoke in controversion of the suggestion by Mr. Pearson that the system of infectious hospitals was a failure.

Mr. Windley (Leicester) said that corrugated-iron buildings in his town had been in existence and used for hospitals for over thirty years.

A number of delegates have spoken on the purely medical side of the question.

Mr. Aldwinckle, in reply, said the question of whether cells would be better than cubicles was decided by the ten medical superintendents of the Metropolitan Asylums Board hospitals, and it was their opinion that the cubicle system was the better one. Cubicles were not only more economical in the first place, but they could be adopted in an existing ward. It was easy to ventilate the cubicles, but difficult to ventilate the cells, each one of which would have to be ventilated on its own account. As to the point raised by Mr. Saxon Snell, whether he would adopt the planning at Walthamstow in the case of a new hospital, in that institution the cellules were placed back to back, and the admission to each was from the external verandah. In adopting such a course they considered they lost the advantage of thorough ventilation, which in this climate was, after all, about as complete and satisfactory a way of ventilating wards as they could possibly have. Further, it was a bad thing for the nurses to have to go outside continually from a temperature of 62 to a temperature possibly of 40 during some months. The wards they were adapting to the cubicle system were thirty-five years old. His experience was that they could put up corrugated-iron buildings at an economical cost for isolation wards, if they took care that they were not inflammable. They would last twenty-five or thirty years, and for all practical purposes the hospital was as efficient as one built of brick and stone.

Conference of Sanitary Inspectors.

On Wednesday a conference of sanitary inspectors was held at University College, presided over by Mr. A. E. Hudson.

The President in his address said there could be no doubt as to the necessity of the systematic supervision of dwellings and workplaces by sanitary officials, and local authorities through their officials could put into force the powers they possessed to provide against overcrowding, to secure good ventilation, access of light, and freedom from damp in all dwellings or workshops. In the houses of the people the efforts of the sanitary officials had been directed to securing for the inmates sweet, clean, healthy houses, and he felt that the best results of their work was to be found here. The housing of the poor was far from being satisfactory in any town or city. Bad housing was recognised as one of the principal causes of the existing vice and wretchedness of the poorest poor. He did not suggest that there was

no housing question in respect of the artisan, but his experience led him to think that the urgent problem which faced them had reference to the housing of the poorer labouring classes. This could only be made by some sacrifice on the part of the ratepayers. The dwellings of the poor required to be improved in several particulars, but the main particular was in regard to size. The limit of air space generally agreed upon as that below which legal action should be taken to abate overcrowding, viz., 300 cubic ft. of sleeping space for an adult and half that for children under ten years of age, was not sufficient for habitual occupation if they were to expect good health. What was required was to build good sized houses with three or more bedrooms to accommodate families consisting of four to eight children, and to let them at rentals of 1s. 6d. to 3s. per week, and to meet this real want local authorities must be prepared from the outset to subsidise such properties from the rates.

On the motion of Mr. Wilkinson (Derby), seconded by Mr. W. Jackling (Maidstone), a vote of thanks was passed to the President.

Practical Training for Sanitary Inspectors.

Mr. W. W. West (Walthamstow) contributed a paper on "Practical Training for Sanitary Inspectors before Certification" in which he reviewed the opinion which has been expressed in the past on the subject. He pointed out that an authority requiring a clerk, surveyor, or accountant looked for him amongst those who had not only a theoretical knowledge but who had also acquired practical experience as a subordinate in one of those departments, and there could be no objection to a similar arrangement for those who have to be certified as qualified for inspectors. If examining authorities were determined to bring this about it could be done, and if both of them insisted that only those shall be certified who have the training indicated arrangements could soon be made to that end.

Sanitation: Past and Present.

In a paper under this title Mr. T. J. Crofts (Bristol) said that, although sanitary progress and the advancement of public health have made great strides under existing Acts of Parliament, there still remained a great work to be performed by sanitary reformers. It was unfortunate for the community that sanitary authorities in provincial towns are still without any definite power to compel those who are responsible for the execution of drainage works to give them notice before proceeding to execute work necessary for the abatement of nuisances. We also urgently required by-laws to regulate the construction of drains for existing buildings. The London County Council has power to draft by-laws for regulating the construction of drains in new and existing buildings, and to require notice and plans, together with particulars of any proposed works. By-laws of this description are required throughout the country, which would raise the standard of sanitary work in our dwellings; we wanted by-laws which would secure uniformity of sanitary inspection throughout the kingdom. The important duties which sanitary inspectors are now called upon to discharge demand that only qualified persons should receive these appointments. There was no class of public officers who require protection in the performance of their duties more than the sanitary inspectors. Many appointments are held during the pleasure of the sanitary authority, and, owing to the insecurity of tenure of office, renders it difficult in many instances for inspectors to discharge their duties satisfactorily; all appointments should be permanent, and only be dismissed for misconduct or proved incompetency, with right to appeal to the Local Government Board. The public had learnt to appreciate and have grown into sympathy with sanitary inspectors, and he was regarded as the friend and adviser of the people amongst whom he moves.

Status of a Sanitary Inspector.

Mr. J. A. Sutton (Nottingham) in the course of a paper on the above subject, pleaded strongly for more technical training on the part of those who were entrusted with the duties of a sanitary inspector, and, speaking as one who was formerly a mechanic,

said he knew how objectionable it is for an incompetent person in authority to come round and make absurd and impracticable suggestions, and nothing tended to increase the contempt and lack of respect on the part of the practical workman than a display of ignorance by those placed in authority above them. A still more important aspect of the question was this. Their work very often called for joint action between the inspectors and other public officers, viz., engineers, surveyors, architects, and others who were men who had to qualify for their position by an apprenticeship extending over a number of years. If sanitary inspectors were to hold their own with the members of allied professions, both as regarded social standing and qualification, it was desirable that some different system of training should be formulated whereby they might hope to secure that position which was desired by all members of the profession. At present the sanitary inspector's certificate was held by many persons who had never served an hour's apprenticeship to a trade connected with building construction, which, in his opinion, was a most necessary qualification, for how could they expect such a person to superintend and carry out any duties in connexion with drainage, plumber's work, and so on.

Public Health Act.

Mr. C. Machonon (Torquay) discussed the question of the definition of "drain" and "sewer" in a paper on "Some Amendments to the Public Health Act, 1875." He suggested that perhaps a more practical meaning might be suggested to the section "Drain," as "any drain used for the drain of one or more buildings which runs under buildings or through private lands or premises to which the local authority has no right of entry, and which drain was laid for private profit."

Uniformity in Sanitary Work.

Discussing the want of uniformity in the carrying out of sanitary work, Mr. A. E. Bottomley in a paper treated the subject under the heads of (1) Administrative Bodies, (2) Officials, and (3) The Practical Side of their Duties. He suggested that a new Public Health Act is required to consolidate former Acts and to meet modern requirements; that a Minister of Health is needed, a protection period for sanitary officials, and appointments to depend on merit and examination; and that, with regard to the practical side of the official's duties, the by-laws of the London County Council would form a good basis.

Physics, Chemistry, and Biology.

This Section met on Thursday and Friday, under the presidency of Mr. W. N. Shaw, when papers on a variety of subjects were discussed.

Influence of Dust on Health.

Dr. P. Boobbyer (Nottingham) introduced the above subject, and to mitigate the undoubted and dangerous dust nuisance of the cities he suggested, amongst other things, that the streets should be paved, as far as practicable, with smooth and cleanable material; dry sweeping of the streets should be stopped, and closed carts used for scavenging purposes; the pursuance of a vigorous campaign against the smoke nuisance; the enforcement of the use of closed bins for the storage of domestic refuse; and the construction of buildings of such materials and upon such principles as should obviate, as far as practicable, the accumulation of dust beneath the floors.

Pollution of Water Supplies.

Dr. S. Rideal read a paper on "Prevention of Growth of Algae in Water Supplies." He pointed out that the fouling of reservoirs and conduits in waterworks by various growths is a problem that has frequently to be dealt with by the water engineer, and, although it has not attracted general attention in this country, in America, and especially in tropical climates, this contamination of large volumes of water is often a serious matter, and on the Continent several State Commissions have had to deal with this subject. The contamination frequently consists of one, or several, of the very numerous algae, many of which, besides causing the clogging of valves, etc., and an unsightly appearance, are capable of imparting disagreeable odours and tastes. Trials have been made to destroy or inhibit the

growth of the plants by the addition of a minute quantity of a germicidal substance to the water. The author proceeded to consider the successful attempts to deal with the nuisance at Newport and Gloucester by means of crystallised sulphur copper, and suggested that the use of electrolytic chlorine solution gave indications of success, and the advantages of such a solution over that of a poisonous element, such as copper, were obvious.

Mr. Read (Gloucester) said that in his town the growth of algae at the bottom of the reservoirs produced a fishy taste to the water. The author proceeded to consider the successful attempts to deal with the nuisance at Newport and Gloucester by means of crystallised sulphur copper, and suggested that the use of electrolytic chlorine solution gave indications of success, and the advantages of such a solution over that of a poisonous element, such as copper, were obvious.

Mr. Smith (Kettering) asked whether, after the treatment, there was less difficulty in succeeding months in keeping the filters free. It appeared to him that such a treatment might be most economical.

Mr. Read said they had no open sand filters, but used a mechanical filter, which had been in action for five years. They found that after the treatment by sulphate of copper in the reservoirs these filters required much less cleaning than before.

Dr. Willoughby remarked that he had used sulphate of copper where there was a great deal of growths in an ornamental pond, and the growths had not returned since. He asked for some idea of the cost of using chlorine solution.

Dr. Rideal said if only one treatment a year was required it would probably be more economical to use sulphate of copper. For applications of chlorine most waterworks had the power available. A small electrolytic plant would cost about 100l., and could be easily connected up with the power available at a waterworks, and, of course, they would always have it.

Medical Officers' Conference.

At the Conference of Medical Officers on Thursday it was agreed, on the motion of Dr. H. Meredith Richards (Croydon), "That in the opinion of this Conference it is desirable that the County Councils be empowered to form Joint Water Boards and Joint Drainage Boards on similar lines to the powers already possessed in connexion with isolation hospitals."

"Drain" and "Sewer."

Dr. John Robertson (Birmingham) moved: "That, in the opinion of this Conference, the time has arrived when the definitions of the words 'drain' and 'sewer' in the Public Health Acts and the Metropolitan Management Act should be amended." Dr. Robertson said the difficulties in defining what was a sewer and what was a drain gave almost daily trouble, and in a recent book by Mr. Macmorran, 800 pages were devoted to legal decisions on the subject. The speaker hesitated to append to his resolution a definition, but said his own feeling was that owners of drains ought to look after drains or sewers which existed in their properties, while the local authorities looked after drains or sewers which were under the public streets. That seemed to be a fair give-and-take arrangement.

Mr. Snaith (Birkenhead) contended that the decision of the High Court was absurd.

Dr. Davies observed that they had solved the question in Bristol by a section in a recent local Act, and no difficulty had arisen. The resolution was carried.

Certifying New Houses.

Dr. S. Davies (Woolwich) discussed in a paper the desirability of forbidding occupation of new houses until certified to comply with certain sanitary conditions. He suggested that it was worthy of consideration whether it is not desirable and practicable

to enact that no house shall be occupied until it is certified to comply with certain sanitary conditions, e.g., in addition to having a proper and sufficient water supply, that the habitable rooms are sufficiently lit and ventilated, and that the house is properly protected from dampness; that the walls and floor are actually dry, and that due provision is made for sanitary conveniences. There is no doubt that the requirements of such a certificate would be a great advantage from the public health point of view. It is not necessary at present to decide what officer shall give the certificate; this might be left to each district to settle. It might be arranged that the Surveyor, in the first place, should give a certificate that the house complies with the building regulations in force in the district, and the Medical Officer of Health might certify that in other respects the sanitary conditions are satisfactory. If the Surveyor charged with the enforcement of the building regulations were required to give a certificate that the sanitary provisions had been carried out, he would no doubt be careful in supervising the plans of the house submitted to him, and in seeing that these provisions were carefully attended to. If a certificate were refused, the owner should be informed what works were required, and if he was unable or unwilling to do them, he should be allowed an appeal to a Police Court. If the Court considered that the requirements of the Sanitary Officer were unreasonable they would have power to permit the occupation of the house. The Court might also have power to allow occupation of the house in an emergency, but, at the same time, to make an order that the works required should be carried out. No doubt there are practical difficulties in the way of the suggested certification, but, in the opinion of the writer, the advantage to be gained is so clear as to outweigh any possible objection.

A resolution in favour of the author's suggestion was carried.

Other Conferences held during the Congress were "Women on Hygiene," "The Hygiene of School Life," and by the Veterinary Inspectors.

Competitions.

ANNFIELD PLAIN FREE LIBRARY.—A meeting of the General Committee for the establishment of a free public library for the Urban District of Annfield Plain was held recently at the Council Offices, Hare Law, to consider the competitive plans submitted for the proposed building. The sealed envelopes were opened, when it was found that the design approved was that of Mr. Edward Cratney, of the firm of Davidson & Cratney, Willington-on-Tyne.

Mr. T. E. Taylor, Lanchester, was second, and Messrs. Boyd & Groves, Newcastle, third.

JOINT ISOLATION HOSPITAL, STONE, STAFFORD.—The assessor, Mr. William A. Pite, F.R.I.B.A., has issued his award in this competition, placing the design submitted by Mr. J. J. Chapman, of Stone, Stafford. The award has been adopted. The following is a list of the remaining competitors, in alphabetical order: "Æsculapius," Messrs. Jones and Hilton (Burslem); "Buscotte," Mr. R. Arrowsmith (Stone); "Economy," Mr. A. P. Miller (Hanley and Stone); "Fresh Air," Mr. J. S. Redman (Stoneleigh).

BRANCH LIBRARY AT HITHER GREEN.—The Libraries Committee of Lewisham Borough Council are to invite local architects to send in designs for the erection of a new branch library at Hither Green. The building is to contain reading and news rooms, and a separate room for juveniles, but no reference library nor caretaker's apartments. The total cost, including fixtures, fittings, architect's and quantity surveyor's fees, is not to exceed 4,500l.

BOOKS RECEIVED.

THE MANUFACTURE OF CONCRETE BLOCKS AND THEIR USE IN BUILDING CONSTRUCTION.—By H. H. Rice and W. M. Torrance. (Archibald Constable & Co. 8s.)

CLASS LIST AND INDEX OF PERIODICAL PUBLICATIONS IN THE PATENT OFFICE LIBRARY. Second Edition. (Patent Office. 6d.)

THE ANNUAL OF THE BRITISH SCHOOL AT

ATHENS.—No. XI. Session 1904-1905. (Macmillan & Co. 21s.)

THE SMALL HOUSE: ITS ARCHITECTURE AND SURROUNDINGS. By Arthur Martin. (Alston Rivers. 2s.)

Correspondence.

BOARD OF EDUCATION EXAMINATION.

SIR.—I am directed by the Council of the Association of Teachers in Technical Institutes to forward to you the following resolutions which have been passed by the Council respecting the examinations held by the Board of Education in "Building Construction":—

"1. That in view of the extensive character of the syllabus of 'Building Construction,' the questions set in examination papers in this subject should be fairly proportioned to the various sections of the syllabus.

"2. With regard to the compulsory tracing which is set in Stages 1 and 2 and 3, it is urged that, whilst tracing in Stages 1 and 2 is necessary and valuable, the tracing in Stage 3 might reasonably be omitted, and a question of greater value substituted.

"3. That in the Honours Stage where questions are set in highly specialised buildings, as hospitals, asylums, etc., one month's notice should be given to the type of building to be set, in order that the students may have an opportunity of studying the various regulations and requirements as set forth in various Blue Books, Building Acts, and By-laws."

Our Council are of opinion that the adoption of the above recommendations with reference to future examinations in "Building Construction" will greatly enhance the value of these examinations, and the Council earnestly desire the Board of Education to give the recommendations careful consideration.

J. WILSON,

Hon. Secretary Association of Teachers in Technical Institutes.

HOVE LIBRARY COMPETITION.

SIR.—I read with a certain amount of interest, mixed with wonder, the criticism in last week's *Builder* on the Hove Library Competition. The notice contained a statement that "the award could be considered sound, and that the necessary air space in the rear of the building had been duly provided." This, I am sorry to state, is quite untrue. Allow me to give a short history of the competition. A year ago the Borough of Hove advertised for designs, but would not fix on or promise an assessor, therefore the Chairman of the Competitions Committee of the Royal Institute of British Architects advised all members to have nothing to do with it. However, nearly a hundred designs were submitted, and, to everyone's surprise, Mr. J. Belcher, President of the Royal Institute of British Architects, was chosen and accepted as assessor, who after a careful examination of the designs, stated that no design was worthy of an award, and that the best had violated by-law 62. After a considerable delay ten designs were chosen, and competitors asked to reconsider their schemes. A few weeks ago the awards were announced, but I still saw the successful design I never for a moment doubted, but the moment I saw the design I was amazed, stupefied, and confounded. The successful design has broken the by-laws, and, therefore, easily got a plan which was no secret, and but for by-law 62 (which states that if a building exceed 35 ft. in height the space at rear must be 25 ft. across the whole width of the site; in the successful design the nearest point is 12 ft.) at least one other design would have had a similar plan. Can you or any of your readers give me light?

JAS. B. FULTON

*** Our reviewer writes:—"I scarcely think Mr. Fulton has a grievance. I took careful notes of all the plans, and I still think the winning design has a solution on a fair and legitimate interpretation of the by-laws, and that the award as regards first place is sound. This matter of air space is the more evident to those who may have had the advantage of studying the sections and plans together, as with the pyramidal form of the buildings in the winning design there would be no possible question of 'air space.' This would be most effectively demonstrated in a model.

I tried to get hold of a copy of the conditions of the competition when at Hove, but—as noted in the review—without success. So I cannot, of course, say what emphasis was put on following the letter of the by-laws."

THE INTERNATIONAL BUILDING TRADES EXHIBITION.

SIR.—My attention has just been called to a paragraph in your issue of the 25th ult., headed "International Building Trades Exhibition,"

and stating that the Crystal Palace Company have under consideration the opening of an exhibition with that title next spring.

It so happens that I am opening next spring—in April, to wit—the International Building Trades Exhibition of 1907 at Olympia, and as this will be the seventh of the biennial series I have been conducting for the past twelve years under that title (at the Royal Agricultural Hall, Islington), I must protest against a use of the said title in connexion with other persons that is obviously likely to lead the public to think that the Crystal Palace exhibition is mine.

I have no wish to interfere with the projects of any persons who may believe the Crystal Palace to be a suitable centre for an exhibition connected with the building trades, but I cannot allow them to use a title which I have made my own.

H. GREVILLE MONTGOMERY.

*** Mr. Montgomery should address his remonstrance to the Crystal Palace Company rather than to us. If he can induce them to use another title, of course we should report it accordingly. We cannot select their title for them.—Ed.

The Student's Column.

ROOFS: STRUCTURALLY CONSIDERED.—II.



N this article we continue the consideration of materials employed for the outer covering in roof construction.

7. Zinc.

The statement has been made that zinc is a valuable material for covering roofs in consequence of its lightness, strength, and durability.

This view cannot be characterised as incorrect, but it should not be accepted without qualification.

For instance, taking account of specific gravity and tensile strength, zinc is stronger weight for weight than lead, tile, slate, and glass, but weaker than wrought-iron, mild steel, and copper. Comparing zinc with wrought-iron, its specific gravity is about 7. as against about 7.7, and its tensile strength about 7 tons per square inch, as against about 21 tons per square inch.

Again, it cannot be said that zinc is more durable than lead, copper, tile, slate, and glass, although it is not liable to breakage like the three last-mentioned materials, and is less affected by atmospheric action than iron.

Still, zinc, in the form of plain and corrugated sheets, is an excellent and convenient roofing material, whose use has been gradually extending for many years past in this country.

When zinc is exposed to the atmosphere a thin coating of oxide (ZnO) or basic carbonic (8ZnO. 3CO₂) is formed, which protects the metal beneath from further change, and does not scale off like the zinc oxide formed under similar conditions on galvanised iron. Consequently, zinc employed in roofing need not be protected by paint.

Zinc of inferior quality is very susceptible to deterioration by the products of combustion of coal, coke, and wood, and zinc generally is prejudicially affected by soot.

Zinc should never be laid in direct contact with iron or copper, as in the presence of moisture electrical action will be induced leading to the rapid destruction of the metal. Contact with lead is also undesirable. Zinc suffers when in contact with lime or water containing calcium compounds, and is liable to deterioration if laid on oak boarding or on other timber that has not been thoroughly dried.

As the coefficient of expansion for zinc is relatively high, being 0.000163, as compared with 0.000065 for wrought-iron, all joints should be formed so that the metal shall be free to expand and contract with temperature variations.

No joints should be soldered, and the use of nails ought to be avoided entirely, except for fixing clips and other fastenings which do not interfere with the free movement of the sheets.

The melting-point of zinc is 735 deg. Fahr.

In view of the fact that zinc sheets are rolled to two different standards—the old Belgian zinc gauge and the new gauge of the Vieille Montagne Company—it is always desirable that the weight of metal per square foot should be stated in specifications. The difference between the most generally-

used sizes of the two gauges is shown in the subjoined table:—

TABLE II.—COMPARISON OF ZINC GAUGES.

Old Belgian (O.B.G.).			(Vieille Montagne (V.M.G.)).		
No.	S.W.G.	Oz. per sq. ft. (%)	No.	S.W.G.	Oz. per sq. ft. (%)
10	24	132	10	25	114
11	23	134	11	24	133
12	22	138	12	23	135
13	21	144	13	22	137
14	20	151	14	21	142
15	19	159	15	20	152
16	18	168	16	19	164

(1) Approximate. (2) Subject to slight variation.
For temporary roofs, No. 13 O.B.G. or No. 14 V.M.G. may be used, but for permanent work Nos. 14 and 15 O.B.G., or Nos. 15 and 16 V.M.G. should be adopted.

Corrugated zinc sheets are usually made of the dimensions stated in Table III., and are chiefly used in covering curved roofs. When curved and lapped, 5-ft. sheets cover a width of 2 ft. 6 in. each.

TABLE III.—CORRUGATED ZINC SHEETS.

V.M.G.	Approximate S.W.G.	Thickness in inches.
No. 10	25	0.0180
11	24	0.0217
12	23	0.0254
13	22	0.0290
14	21	0.0366
15	20	0.0464
16	19	0.0540

Flat zinc sheets are usually applied to roofing in accordance with the roll-cap system on boarding. If iron nails are used for securing the boards, their heads should be punched well into the timber, and the holes filled with putty.

Wood rolls of square or rounded section are laid upon the boarding at intervals of about 2 ft. 10½ in. apart, centre to centre, in the direction of the roof slope, and held in place by zinc clips passing under the rolls, spaced 3 ft. apart, in the length of the latter, and secured to the boarding by zinc nails.

The sheets of zinc are laid between the rolls, their sides being turned up against the rolls and tucked into the flaps of the clips. The joints are completed by zinc roll-caps fastened by holding down clips, and finished with stop ends.

Zinc-covered flats should have a fall of not less than 1 in 80, and inclined roofs a slope of not less than 1 in 15.

When the slope is less than 1 in 8 the timber boarding of a roof which is wider than about 10 ft. should be laid in steps from 7 ft. 6 in. to 9 ft. 6 in. wide, parallel to the ridge of the roof, to provide for the drip formed at the lower end of each sheet of zinc. The height of the steps must be sufficient to permit the upper end of each roll to pass beneath the projecting lower end of the sheet above. For plain roll-caps a drip of about 2½ in. is sufficient, but roll-caps drawn on wood require a drip of about ¾ in. The lower end of each roll-cap is finished with a solid folded saddle-piece and stop end.

When the slope exceeds 1 in 8, drips are not necessary, and the ends of the zinc sheets are connected by double folded or *welted* joints, permitting expansion and contraction of the metal, but effectively preventing the penetration of water between the sheets.

Zinc sheets corrugated on the "Italian" system have flutes 15 in. apart, centre to centre, the intervening parts being flat. Such sheets can be laid directly upon rafters of suitable spacing, and fixed by holding down clips, the flutes at each side of the sheets being overlapped as in the case of corrugated iron sheets.

Plain and corrugated sheets, roll-caps, ridging, gutters, flashings, nails, and all the requisite accessories for completing zinc roof coverings are obtainable in great variety from the leading firms of metal-workers.

3. Lead.

At ordinary temperatures lead is unaffected by dry air, and when exposed to moist air a film of oxide is formed upon the surface, protecting the metal from further chemical action.

Lead rapidly oxidises under the combined action of air and water, forming the hydrated oxide (PbH₂O₂), which, being dissolved by the water, leaves a clean surface of lead liable to fresh attacks.

A limited quantity of carbon dioxide in the water tends to prevent the corrosion of lead by depositing on the surface a film of insoluble plumbic carbonate (PbCO₃). On the other hand, as plumbic carbonate is soluble in water highly charged with carbon dioxide, an excess of that gas may increase corrosive action.

Corrosion is hindered by the presence of sulphates, carbonates, and vegetable matter in water. It is encouraged by calcic sulphate in the presence of moisture, and for this reason metallic lead should never be used in contact with plaster of Paris.

At ordinary temperatures sulphuric and hydrochloric acid have no action upon lead. Acetic acid is a powerful solvent, and in the presence of carbon dioxide results in the production of the basic carbonate (2PbCO₃, PbH₂O₂), known as *white lead*. Hence lead should never be laid upon timber, such as green oak, which contains acetic acid.

Lead should not be laid in direct contact with other metals, or, in the presence of moisture, destructive electrical action will be induced.

The ductility of lead conduces very largely to its usefulness, but, owing to the fact that its tensile strength is not more than 15 tons per square inch, lead sheeting must always be laid upon close boarding.

As the coefficient of expansion for lead is relatively high, being 0.00015 as compared with 0.000065 in the case of iron, the metal should not be laid in sheets of greater length than 12 ft., and it must not be fixed so as to interfere with expansion and contraction. The use of solder should always be avoided when possible, and when nails are necessary they should be of copper. The melting-point of lead is 612 deg. Fahr.

Lead, as used in roof construction, is rolled in sheets usually measuring from 6 ft. to 7 ft. 6 in. wide, from 25 ft. to 35 ft. long, and from about ⅛ to 1½ in. thick.

Sheet lead is invariably sold by weight, the number of pounds per square foot, instead of the thickness, being used as the standard of comparison.

Table IV. gives the thickness of sheet lead from 1 lb. to 12 lb. per square foot, and, for convenience in comparing the thicknesses with those of iron, zinc, and copper sheets, the approximate equivalents are given in standard wire gauge.

TABLE IV.—THE THICKNESS OF SHEET LEAD.

Weight per sq. ft. in lb.	Thickness in in.	Approximate S.W.G.
1	0.017	36-37
2	0.021	30-31
3	0.025	27-28
4	0.029	25-26
5	0.033	23-24
6	0.037	21-22
7	0.041	19-20
8	0.045	18-19
9	0.049	17-18
10	0.053	16-17
11	0.057	15-16
12	0.061	14-15

The most suitable weights for lead employed in roofing work are as follows:—

Roof covering and main gutters ... 7 lb.
Ridges, hips, and small gutters ... 6 lb.
Flashings ... 5 lb.

Lead-covered flats should have a fall of not less than 1 in 80, and when the width exceeds 12 ft. the boarding should be stepped suitably for the formation of drips 2 in. deep.

Lead sheets are laid in a manner very similar to that adopted in the case of zinc. Wood rolls—varying in section from 1½ in. by 1½ in. to 2½ in. by 2 in.—are nailed to the boarding at intervals of about 3 ft. apart, centre to centre; one sheet of lead is then laid and dressed up to and two-thirds of the way over the roll at one side; the next sheet is brought up to the same roll and lapped completely over it and the overlap of the first sheet. By hammering down the lead with wooden mallets no nails are required. The end joints of the sheets at the drips are similar to those made in zinc.

Joints should have a lap of at least 4 in.

in ridges, hips, and flashings, and not less than 5 in. in roof slopes and valleys.

9. Copper.

At ordinary temperatures copper is unaffected by dry air, and in moist air or in contact with water it becomes coated with a film of hydrated dibasic carbonate, popularly known as verdigris, with the approximate composition: CuCO₃, CuH₂O.

Copper is readily soluble in ammonia, but is scarcely affected by the fixed alkalis. It is far more durable than iron, zinc, or lead, and for this reason is frequently more economical in the long run than the less expensive metals.

Copper is characterised by great ductility, and high tenacity as compared with practically all metals save iron and steel, its tensile strength being 15 tons per square inch.

The coefficient of expansion of copper is 0.000088. Consequently, it expands and contracts much less than zinc and lead. The melting-point of copper is 1966 deg. Fahr.

The physical properties mentioned above point clearly to copper as the best material (structurally) for roof covering. Although not so strong as iron and steel, it is far more durable than either of those metals. Copper is superior to zinc and lead in respect of its superior durability, small expansion, and contraction, high melting-point, and high tenacity. The chief objection to copper is first cost, but this is often counterbalanced, not only by the almost imperishable nature of the metal, but also by the smaller weight required for a given duty.

If the thickness of roofing sheets could be regulated solely by the tensile strength of the metal, copper would be quite as inexpensive as zinc, and much less expensive than lead. But for structural reasons it is not desirable to use copper of less weight than 12 oz. per square foot, and as the price per ton is considerably increased for sheets weighing less than 16 oz. per square foot, very little would be gained by adopting thinner gauges.

Consequently the usual practice is to employ 16 oz. copper (about 24 S.W.G.) for roofing purposes.

Table V. gives the weight and strength of copper, zinc, and lead of the gauges generally adopted in practice, and shows that copper compares very favourably as regards weight and strength with either of the other metals in question.

TABLE V.—WEIGHT AND TENSILE STRENGTH OF COPPER, ZINC, AND LEAD SHEETS 1 FT. WIDE, AND OF THE THICKNESS USUALLY EMPLOYED FOR ROOF COVERING.

	Copper.	Zinc.	Lead.
S.W.G. (appr. α.)	No. 24.	No. 19.	No. 10-11.
Weight per sq. ft.	16.0 lb.	13.6 lb.	7 lb.
Thickness	0.022 in.	0.041 in.	0.118 in.
Tensile strength	8,870 lb.	3,308 lb.	4,757 lb.

Copper roofing sheets should be laid with wood rolls on the boarding at intervals of about 2 ft. 4 in. apart, the roll-caps being welded on to the sheets to prevent any tendency towards opening at the joints. No drips are necessary, as welded joints at the ends of the sheets are quite satisfactory.

COURT OF COMMON COUNCIL.

A MEETING of the City Corporation was held at the Guildhall on Thursday last week, the Lord Mayor presiding.

Application from the Institute of Builders.—An application from the President of this Institute for a set of medals struck by order of the Corporation was referred to the Library Committee.

Loan of Pictures.—To the same Committee was also referred the application of the Burnley Town Council for the loan of pictures belonging to the Corporation for their summer exhibition of 1907.

The City Arms.—The Organising Committee of the Franco-British Exhibition applied for permission to use the arms of the City of London on letter paper and literature issued by them. In the course of a discussion which ensued it was pointed out that the application was merely an act of courtesy, as the City arms could be used by anyone without permission. The matter was referred to the Library Committee.

Alterations at the Central General Market.—The Central Markets Committee recommended the acceptance of the tender of Messrs. Johnson & Co., Ltd., of Wandsworth, at 596d., for works of

alteration in connexion with premises in the Central General Market formerly used by the Market Constables. This was referred to the Coal and Corn and Finance Committee.

Slaughter-houses.—The Cattle Markets Committee, in a report, recommended the abolition of private slaughter-houses at the Metropolitan Cattle Market, and the construction of public slaughter-houses thereat, divided into separate chambers for cattle and sheep, and with a general chamber for pigs, at an estimated cost of not exceeding 40,000. It was resolved that the report be printed and its consideration adjourned, and that it should also be referred to the Coal and Corn and Finance Committee.

Improvement of King Edward-street.—The Improvements and Finance Committee were authorised to purchase from the authorities of Christ Hospital, at a cost of 5,000, a strip of land necessary for the widening of this thoroughfare.

OPENING OF BRUCE HOUSE, KEMBLE-STREET.

BRUCE HOUSE, which was formally opened last week, is the third lodging-house which the London County Council has provided, and has been built in compliance with the scheme sanctioned by the House of Commons in 1895, and is situated in the working class displaced in connexion with the Holborn to Strand Improvement. The site has a frontage of about 220 ft., to Kembles-street, 108 ft., to Drury-lane, and 139 ft., to Kean-street. The plan of the building is E-shaped above the ground-floor, so arranged as to provide adequate light and air to the cubicles. It is a six-story building. The elevations, which look exceedingly well in a simple fashion, are of red-brick facings, relieved with glazed and Linton bricks, stonework and rough cast, and the roofs are covered with green slates. The ground floor (lodgers' section) comprises dining-room (including hot chamber and lodgers' crockery store), smoking-room, reading-room, writing-room, locker-room, parcels-room, and water-closets, and urinals for the use of lodgers. The administrative section comprises office, superintendent's quarters, clerk's bedroom, female staff sitting-room and bedrooms, porter's day-room, and shop. The basement (lodgers' portion) comprises lavatory, fast-washing room, baths, dressing-rooms, lodgers' wash-house, boot-brushing room, and barber's and bootmaker's shops. The administrative portion comprises establishment scullery, kitchen, bread and milk store, larder, crockery-store, shop-store, general store, bed-maker's day-room, soiled linen-room, clean linen-room, establishment laundry, including drying-chambers, one being set apart for mattresses), ironing-room, heating chambers and coal stores, and a disinfecting chamber. The upper stories, comprising 709 cubicles (with sanitary appliances on each floor), afford accommodation for 699 lodgers and ten porters. On the ground floor there is a room facing Kean-street, which it is proposed to let for commercial purposes. In the dining-room fixed tea tables and seats are provided to accommodate 360 men at one time. Near the middle of the room is an open chamber for a large hot plate, at which lodgers can, if they desire, cook their own food. Sink with hot and cold water, are provided in two recesses off this chamber, where food can be prepared for cooking. A cylinder is fixed at each end of the hot plate chamber with a constant supply of hot water for making tea, etc., and there are also two large cooking-ranges. The lodgers' crockery-store is placed on the north-east side of the dining-room, and any lodger desiring to cook and prepare his food will find, arranged on shelves, both cooking utensils and crockery. A lift, communicating with the establishment scullery, is fitted in the wall to complete the service arrangements. The smoking-room is on the main frontage, with fixed tea tables and seats, and heated by two open fireplaces, with special provision for the discharge of warm air. The reading-room is approached from the two main corridors, and a special writing-room is provided, approached from the reading-room. The water-closets and urinals are approached through a communicating lobby at the end of the main corridor. In the basement is a lavatory-room fitted with glazed fireclay basins, with hot and cold water supply to each. The bath-rooms are in close proximity to the lavatory, and contain five glazed fireclay slipper baths and one shower-bath with hot and cold supply to each. A waiting place is provided in connexion with the baths. Two rooms are placed near the lavatory for the use of lodgers desiring to change their clothes during the hours in which the cubicles are closed. The lodgers' wash-house is situated at the north-east end of the building, and is fitted with ten glazed fireclay washing troughs, with hot and cold water, for the use of lodgers desiring to wash their own garments. There is also a drying chamber, fitted with four drying hoods, heated by steam coils. Shops are provided for a barber and a bootmaker, for the convenience of the lodgers. A room adjoining the bootmaker's shop is fitted with a bench, and is allocated to the lodgers for the purpose of boot-brushing. Each cubicle floor is divided

into sections by division walls, which admit of the isolation and disinfection of sections in the event of contagious disease, and would also check the spread of fire. Each lodger has an independent cubicle having a minimum width of 4 ft. 10½ in., and an area of 36 superficial feet, and lighted by a separate window. The height of the stories from floor to ceiling is 9 ft., with the exception of the top floor, which is 8 ft. 6 in. The partitions between the cubicles are 7 ft. 6 in. in height, that portion adjoining the corridor is 6 ft. 6 in. in height, thus ensuring ample ventilation. The cubicle partitions are framed wood with panels which can be taken out and replaced, if necessary, without disturbing the framing. Each cubicle contains an iron bedstead with spring mattress, the whole of which can be folded back against the partition for the purpose of readily sweeping and cleansing the floor. There are two principal staircases leading to the cubicles, and, in addition, one emergency staircase. These are so arranged as to make it practically impossible for any part of the cubicle corridors to be cut off from one or more of the staircases in the event of fire. Iron gates, fitted with panic bolts are provided to the staircases to prevent lodgers having access to the cubicles during prohibited hours. Teak doors have been provided on the landings of the staircases, in order to check the spread of fire from one floor to another, and each staircase is fitted with a fire hydrant with hose pipes at the level of each cubicle floor. There are four water-closets on each floor on the staircase landings for night use, with the exception of the top floor, where two water-closets are provided. Taps for drinking water are also provided at these landings. The establishment scullery, which is situated in the basement, is fitted with teak and glazed fireclay sinks, and is connected with the lodgers' crockery store on the ground floor by a lift. The kitchen is spacious and is lighted from two sides. It is fitted with a large cooking-range, a gas cooking-range, potato-steamer, shelves, cupboards, etc. In close proximity to the kitchen is the larder, bread and milk store, with stores for crockery, shop and general purposes. The heating chamber is fitted with two Cornish steam boilers for the supply of hot water and steam to the lodgers' and administrative sections. The laundry, which is used for establishment purposes, includes a wash-house, fitted with two steam washing-machines, hydro-extractor, boiling-copper and soap and soda boilers, a drying chamber fitted with eight drying horses, a blanket drying chamber, an ironing-room, and clean linen-room, the last fitted with slatted shelves for the storage of clean linen, and provided with a lift to each cubicle floor. A soiled linen-room with a shoot connected to each cubicle floor is provided for the reception of soiled linen previous to its despatch to the laundry. The whole work has been carried out under the superintendence of the Council's architect, Mr. W. E. Riley.

Obituary.

MR. MAY.—The death, on July 7, at Hampstead, is announced of Mr. Francis J. C. May, in his sixty-eighth year, who, until his retirement four months ago, was Engineer and Surveyor to the Corporation of Brighton. He was appointed to that post in 1889, having previously been Surveyor to the Borough of Maidstone. Mr. May prepared the plans and designs for, at Brighton, the new Municipal School of Science and Technology in Richmond-terrace on the eastern side of the Level, with provision for future extensions (1897); the Borough Sanatorium, whereof the first portion, consisting of an administrative block, ward pavilion, isolation block, disinfecting-station, etc., was opened in November, 1898, having been built by Messrs. Peters & Son, of Horsham, who tendered for 19,778l.; the new municipal buildings on the Pavilion estate, including a public library, museum, and art gallery, with separate entrances from Church-street, a new picture-gallery, and a carriage-portal in place of the old wooden penthouse in front of the Dome in the Pavilion grounds, the contract amounting to nearly 38,000l. (1900-1); alterations and enlargement of the Fruit and Vegetable Market; the new telephone-exchange at the Royal Pavilion for the Corporation; and two pavilions, with a mortuary, at the Borough Sanatorium in Bear-road, with other works connected therewith (1902). Mr. May also built the swimming-bath, made plans for enlarging and improving the Town Hall, and carried out schemes for sewerage, protection of the sea-front, and similar undertakings. Mr. May was a Past-President of the Incorporated Association of Municipal and County Engineers, a member of the Institution of Civil Engineers, and a Fellow of the Surveyors' Institution.

MR. ADYE.—Mr. Charles Septimus Abye, of the County Offices, Trowbridge, County Surveyor for Wiltshire, died, aged sixty-five years, on July 7, at Westbury House, Bradford-on-Avon. Of his more recent work we may mention the new female ward at the Wilts County Pauper and

Lunatic Asylum, Devizes, for which he made the plans four years ago.

MR. DAY.—Mr. William Day, who died lately, aged eighty-three years, was a member of the long-established firm of Messrs. Day & Son, publishers and lithographic printers, of Gate-street, Lincoln's Inn-fields. Mr. Day entered upon the management of his father's business in 1845, and printed the plans and drawings of many of our principal railway engineers. He also produced several art-plates and the illustrations for Owen Jones's "Grammar of Ornament"; some of Digby Wyatt's books; W. Simpson's "Crimea"; and "The Holy Land," by David Roberts, R.A., whose sketches Louis Haghe reproduced upon stone.

General Building News.

CHURCH, GRANTHAM.—A new church is being erected at New Somerby, which is within the borough of Grantham, and the foundation-stone has just been laid. The whole scheme will entail an expenditure of between 5,000, and 6,000, but it was decided to erect a nave, with north and south aisles, and a temporary east end at a cost of 3,000, at first. The site is on the eastern side of the Harrowby-road, and adjoining the Grantham Cemetery, and the church will be perpendicular in style, built in red brick, with Ancaster stone dressings and a green slated roof. The length, including the chancel, when completed will be 113 ft. by 63 ft. wide, and is designed to seat 544 persons, the seats being arranged in two blocks in the nave, and one in each aisle. The feature of the edifice will be the large western window facing the street, with a bell-turret at the south-western angle. There will be porches at the north-west and south-west angles, giving access to the nave and aisles, whilst when erected the chancel will have accommodation for a choir of about 30. When complete there will be in the north side choir and clergy vestries, with heating chamber beneath, and organ loft above. The font is to be placed under the western window, and raised by two steps, whilst the pulpit will be on the north-east of the nave, close to the choir-stalls. There are to be two steps into the chancel, and the altar-table will be raised five steps above the nave. The east window will be in keeping with the remainder of the building, and will be raised high up, so as to give an opportunity in the future for a reredos. The ventilating fiche will eventually be erected on the roof, at the junction of the nave and chancel. The nave roof will be supported by a stone arcade of four bays on each side, carrying a boarded panelled roof, 28 ft. 6 in. high, at the apex. The height of the aisle roofs will be 11 ft. 6 in., rising to 20 ft. The architect is Mr. B. H. Tarrant, of Upper Tooting, London, and the contractor is Mr. A. S. Cooke, of Stroud, Gloucestershire.

CHURCH, RIEVAUX, YORKSHIRE.—The Earl of Eversham recently laid the foundation-stone of St. Mary's Church, Rievaulx, a new edifice which is to be raised over a portion of the ruins of Rievaulx Abbey. The work of designing the church has been primarily placed in the hands of Mr. Temple Moore. The estimated cost of the scheme is about 1,700l., and the church, when completed, will provide accommodation for 80 persons. Mr. Brothton, of Bilsdale, has been entrusted with the building contract.

CHURCH, Tooting.—The Bishop of Southwark consecrated on the 7th inst. a church, built at a cost of 50,000l., at Tooting Graveney, in memory of the late Lord Charles William Brudenell-Bruce. The building was designed by Mr. Temple Moore, and is built of brick, with stone facings, and is roofed with red tiles. The church is 180 ft. long, with a tower nearly 100 ft. high, while accommodation is provided for 1,024 worshippers. Besides the church, the memorial scheme includes a parish hall, capable of holding 600 or 700 people, a vicarage, and three houses, which have yet to be built.

NEW CHURCH, LEICESTER.—The church of All Souls, Leicester, was opened recently by the Bishop of Peterborough. The church, designed by Mr. G. F. Bodley, R.A., will accommodate about 700 worshippers, and has cost over 10,000l.

ST. PAUL'S CHURCH, LEYTON.—The first permanent part of the church is now being erected for the accommodation of 503 persons. There will be a temporary chancel of wood and iron with slate roof, and a temporary porch at the west end. The portion of permanent church to be erected at present will consist of the four easternmost bays of nave, with chancel arch and north and south aisles thereto and the westernmost halves of north and south transepts. These two latter will be built to a certain height only at present, and on completion will accommodate the organ and choir vestry in upper parts. The south transept will at present serve as a vestry, and will have lavatory accommodation. The fuses for entire heating system will be constructed at present, and it will only require a second apparatus to serve the completed church

when built. The present temporary work will, so far as possible, be utilised in building the completion of the church. This part of the church, together with furniture, is estimated to cost 5,000. The total amount required (excluding tower) is 9,000. The architect is Mr. G. E. S. Stratfield, and the builder Mr. Saint, of Cambridge.

CONGREGATIONAL CHURCH, STRATFORD.—The foundation stones have been laid of a new Wycliffe Congregational Church in Cranbrook-road. The church will seat 816 people, including 195 in a gallery. A lecture hall below the church will seat over 800, and there will be a church parlour, ministers' and deacons' vestries, and other offices. The plans of Messrs. Smees & Houchin were selected in competition, the contractor was Mr. J. Maddison, of Canning Town.

ROMAN CATHOLIC CHURCH, TYNE DOCK.—A new Roman Catholic church dedicated to SS. Peter and Paul, was opened recently at Tyne Dock. It is constructed of pressed Accrington brick, with facings of Rothbury stone, and embraces a nave and sanctuary 93 ft. long by 21 ft. wide, finished with an apse and end, and north and south aisles 11 ft. 6 in. wide. The benches and pews are of oak, and there is accommodation for 500 adults. The church has been designed by Messrs. Brodick, Lowther, & Walker, architects, of Hull, and the contractor for the work was Mr. James Young, Tyne Dock.

NEW CHURCH, BARNET.—A new church is being erected in St. Paul's Parish, Brentford, at a cost of 8,000. The architect is Mr. G. F. Bodley, R.A., the builders being Messrs. Dorey & Co., Brentford.

CONGREGATIONAL CHURCH, SOUTH NORWICH.—On the 4th inst., the foundation stones of the new South Norwich Congregational Church, situated on a corner site in Enmore-road, were laid. The new church has been designed by Messrs. George Baines & Son. The contract price for the present portion, embracing church and vestries complete, with the tower up to the belfry stage, is 4,900. The builders are Messrs. Walker Lawrence & Son, of Wolverhampton.

CHURCH, BRYANT'S HILL, BRISTOL.—The memorial stones have just been laid of the new John Wesley Memorial Church at Bryant's Hill. The building has been designed by Mr. W. H. Dinsley, of Chorley, a conspicuous feature of it being a clock-tower, terminating in a spire. The dimensions are 70 ft. by 40 ft. The transepts will be 7½ ft. wide, and the orchestra 25 ft. The exterior will be of Pennant stone, with Bath stone dressing, and the interior woodwork of polished pine. The buildings will entail a cost of about 4,500, and it will accommodate 750 persons.

PRESBYTERIAN CHURCH, GOSFORTH.—The foundation stones of the new Presbyterian Church at the corner of West-avenue and High-street, Gosforth, were laid recently. Messrs. Baddeley & Bruce, of Newcastle, are the architects. The building will cost 5,000, but in the meantime the erection of the tower and transepts is not to be proceeded with. The present cost is 3,500. Seating will be provided for nearly 500 worshippers, and the building will be lighted by electricity.

ROMAN CATHOLIC CHURCH, SEAHAM HARBOUR.—A start has been made with the ground work of the new Roman Catholic Church at Seaham Harbour, plans having been passed by the Seaham Council. The church will be built close to the new presbytery, adjoining which will be the sacristy. The dimensions of the building will be as follows:—Length, 100 ft.; breadth, 37 ft.; height, 46 ft.; and there will be accommodation for 500 persons. The building will be in the Romanesque style. The cost is estimated at about 5,000. The plans have been drawn by Mr. T. Axtell, of Ryhope.

U. F. CHURCH, COLDSTREAM.—On the 5th inst., the foundation stone was laid of the New West U. F. Church at Coldstream. Mr. George Reavell, jun., of Alnwick, prepared the plans. The building is in Doddington stone, and will be covered with Buttermere slates. The hall was built by Messrs. W. Smith & Sons, masons, slaters and plasterers; Messrs. J. & A. Gray, joiners; Mrs. A. Ford, plumber; Mr. A. Hogarth, painter; all of Coldstream, and the church is in the hands of Mr. A. Douglas, Amble, mason; Messrs. A. Inglis & Sons, Hawick, joiners; Mrs. A. Ford, Coldstream, plumber; Messrs. W. Smith & Sons, Coldstream, slaters and plasterers; Mr. A. Hogarth, Coldstream, painter. The south window is to be filled with stained glass by Messrs. Percy Bacon & Brothers, of London.

WESLEYAN CHURCH, ARMLEY.—A new Wesleyan Church is being built at Armley. The building, which is to have a tower and spire at one angle, is to cost about 6,000. It will be faced with stone, and will accommodate 700 people. Messrs. W. J. Morley & Sons, of Bradford and London, are the architects.

U. F. CHURCH, NEWBURGH.—The new U. F. Church was opened on the 27th ult. The church contains seating accommodation for 350, arranged in nave and transepts. There is a shallow recess at the end of the nave, in which the pulpit is set. A chancel arch of stone with pillars and carved capitals divides this recess from

the nave. The pulpit is of carved oak. A vestibule extends across the whole of the south end, and its walls are divided into panels with wood carvings. A recessed three-light tracery window over the vestibule lights the south end of the nave, while the transepts are also lighted by tracery windows. The woodwork is of pitch-pine, stained and wax polished. The other accommodation provided consists of a hall to seat 100, vestry, lavatory, and heating-chamber. The hall ceiling is treated with plaster panels. The heating is on the low-pressure hot-water system. The walls of the church are tinted with a red colour, and the cooves and ceiling are cream colour. The walls are of local whinstone, with white freestone dressings, and the roofs are covered with green slates. The work has been carried out from plans prepared by Messrs. Thomas & Wilkie, architects, Dundee, by the following contractors:—A. & T. Craig, masons; D. S. & J. Anderson, joiners; David Brown, plumber; Adam Beveridge, plasterer; John Storrer, slater; R. C. Haines, glazier and painter; Davidson & Sons, heating engineers; grates and railings, A. McCall & Son. The stone carving was done by Mr. Alexander Neilson, and the clerk of works was Mr. David Galloway.

CHURCH RESTORATION, ROTHESEY.—During the past eight months the Parish Church of Rothsey has been undergoing a complete overhaul and having considerable additions made to its main structure. The interior has been remodelled under the direction of Mr. Duncan Dewar, architect, Rothsey, at a cost of 2,200. Complete vestries and lavatories have been added, but the tower has not been completed meantime.

CONGREGATIONAL CHURCH, BURNING FARM, SOUTHWICK.—The new Congregational Church at Bitterne Park was recently opened. The architect was Mr. J. H. Blizard, who was assisted by his managing assistant, Mr. Knox, in all the detail work connected with the design, the builder being Mr. Jupp. The seating accommodation was carried out by Messrs. A. E. Jukes & Sons (Freemantle), and Messrs. Lankester & Sons were responsible for the lighting and heating, while Messrs. Shepherd & Hedger did most of the furnishing.

BAPTIST CHAPEL, DROITWICH.—A new Baptist chapel and schoolroom have been erected at Droitwich. The walls generally are of brick, with buttresses to the sides and stone dressings, and stone-headed windows of the three lights are placed between them in the side walls. The interior of the church is fitted with pine seats, the walls are lined with Oregon pine dadoes and stucco above; the chancel arching of stone, and the roof is slated. The school-room is 45 ft. long and 26 ft. wide, and has an open timber roof, coloured walls and pine dado. The builder was Mr. Henry Smith, of Kidderminster, and the architect Mr. Francis B. Andrews.

ROMAN CATHOLIC CHAPEL, LOWER BULLINGHAM.—The new chapel at Lower Bullingham, near Hereford, erected for the use of the Community of the Sisters of Charity of St. Vincent de Paul, was consecrated by Dr. Hedley, Bishop of Newport, a short time ago. The structure has been built by Messrs. William Bowers & Co., Hereford, to the design of Mr. Ware, of Exeter, at a cost between 4,000 and 5,000. Among the decorations is a reredos of Canne stone, the work of Messrs. Bolton & Sons, Cheltenham. The aisles and other parts are paved with encaustic tiles from the works of Messrs. Godwin & Son, Lugwardine, and the remainder of the flooring is composed of wooden blocks.

PENITENT METHODIST CHAPEL, OYNGTON.—A new Methodist chapel is being erected at Oyngton. The builders are Messrs. A. E. Harvey, of Watton, from plans prepared by Mr. H. Winkworth, architect, of Ipswich. The chapel will have a seating accommodation of about 100, and cost about 200.

BAPTIST SUNDAY SCHOOLS, IPSWICH.—New Sunday schools have been opened in connexion with the Bethesda Baptist Chapel in Fonnereau-road, Ipswich. The new buildings were designed by Mr. Frederick G. Faunch, the contractor being Mr. G. A. Kenney.

COUNCIL SCHOOLS, VENTNOR.—Mr. Godfrey Baring, M.P., recently opened the new Council schools which have been erected at Ventnor. The schools have been built by Mr. Albert Sims, of Ventnor, to the plans of Mr. Cocks, of Ryde, the County Surveyor, at a cost of 3,900. The exterior of the building is of local freestone, with Bath stone dressings. The roof is of Welsh green slates. Inside the walls are panelled with white glazed bricks, and the floors are of wood blocks. The rooms are fitted with Stone's patent swivel partitions, and the building is heated throughout with water and radiators, with Sharland's patent ventilators.

SOUTH WALES UNIVERSITY COLLEGE.—Eighteen tenders were received for the erection of the main building and library in Cathays Park, the first portion of the complete scheme. The Council have accepted a recommendation of the Building Committee to accept the tender of Messrs. E. Turner & Sons, of Cardiff, at 68,982. for the main building, and 18,862. for the library. Messrs. W. King & Son, of London, tendered at 85,327. for the two buildings. Mr. W. D.

Carrie's designs, with elevations and plans, are illustrated in our number of May 7, 1904.

CHURCH TOWER, HIGH CROSS, HERTFORDSHIRE.—A tower is being added to the High Cross Parish Church. Mr. Ford Whitcombe is the architect, and Messrs. Ekins & Co., of Hertford, are the builders. It will be 86 ft. high, and the foundation goes down to a depth of 9 ft., the internal dimension of the base is 16 ft. square, and the walls 3 ft. thick. The bricks are supplied locally from Mr. Terry's brickfield, and the facing will be of Kentish rag-stone. Surmounting the tower will be a spire coated with copper.

WESLEYAN CHURCH HALL, NEW BRISLINGTON.—A new Wesleyan hall is to be erected for the Wesleyan Methodists of the Bedminster Circuit. The site is at the junction of Sandy Park-road and Wick-road. It is proposed to erect at present a hall to seat 400 persons, and adjoining it will be four other rooms. One of these is intended for an infants' school, and the others for Bible class and institutional work. The two large rooms in the front can be opened into the hall so as to increase the accommodation to 550. The design for the scheme is the work of Messrs. La Trobe & Weston. It is intended to be carried out in pennant and Bath stone, and the total cost, including a portion of the land, furnishing, etc., will be about 3,000.

FORESTERS' HALL, GRIMSBY.—A Foresters' hall is being erected in Garibaldi-street, Grimsby. It has a frontage of 30 ft., and a depth of 96 ft. The ground floor comprises entrance hall, two subscription rooms, cloak-rooms for both sexes, refreshment-room, dressing-rooms, platform, and assembly-room, the latter being 83 ft. by 24 ft. 8 in. The first floor comprises committee-room, waiting-room, stock-room, etc. The front elevation will be built in the best Aston Hall (Cheshire) bricks, with Howley Park stone facings, with a glazed buff dado to first string course. Mr. Herbert Heap, A.M.I.C.E., prepared the plans.

CLUB PREMISES, RAMSGATE.—The new Constitutional Club in Cliff-street, Ramsgate, was opened recently. Mr. W. T. Stock, Ramsgate, has been the architect; the contractor being Mr. A. E. Goodbourn, Ramsgate.

FOOTBALL HALL, RAMSGATE.—A hall, which is to provide accommodation for the village club, and a large hall for entertainments, fitted up with a stage at one end and capable of holding from 300 to 350 people, is being erected at Earawick. The work is being undertaken by the estate building staff, supervised by Mr. Clerk of the works. Mr. G. B. Brown, and the plans have been executed by Messrs. Barry Parker & Raymond Unwin, architects to the Garden City of Letchworth.

W. H. SMITH MEMORIAL HALL.—On the 3rd inst. Lord St. Aldwyn opened the W. H. Smith Memorial Hall and Club, which had been erected within a few yards of Kingsway. The building, which, with the site, is estimated to be worth 12,000, comprises three floors, and includes a billiard-room and a large hall between 50 ft. and 60 ft. long, which will be used for concerts, lectures, and partly as a reading-room. Mr. Allen Vigers acted as hon. architect.

COTTAGE HOMES, CROYDON.—New cottage homes have been erected in the grounds of the Croydon Workhouse. The playgrounds have been laid out by Mr. G. Young, of Croydon. They are partly asphalted and partly gravelled, and are enclosed by a 6-ft. oak pale fence, erected by Mr. H. H. Gifford, of Croydon. The tender of Mr. Everitt, of Croydon, for the erection of the homes was accepted. The homes have been designed and the work superintended by Mr. J. Hatchard Smith, architect. Mr. Fenn, of Croydon, acted as clerk of works.

MISSION HALL, TORQUAY.—The Bible Christian Mission Hall, in Higher Princes-road, Eliacombe, Torquay, was opened on the 4th inst. The exterior walls are of limestone with brick coigns. In the interior the seats are of pitch-pine, and accommodation is provided for about 300. Underneath is to be a room for a Sunday-school. The building has been erected by Mr. S. C. Eales, from the design of Mr. E. Westlake.

CLUB PREMISES, HONLEY.—The new Liberal Club which has been erected in Cuckoo-lane, Honley, was opened on the 7th inst. by Sir James Kitson, Bart., M.P. Mr. J. Berry was the architect of the work.

HOME FOR WIDOWS OF SEAMEN, FERRMONT.—The Andrew Gibson Home for the widows of merchant seamen is now almost finished. The architect is Mr. Arthur P. Fry, of Liverpool. There are basement, three upper floors or stories, surmounted by a suite of garret rooms. In the basement the matron will take up her living quarters; there will be a kitchen, a wash-house, a laundry, and the heating apparatus. On the ground floor there are thirteen residential quarters for the widows, each one consisting of a living room partitioned off from which there is a bedroom. The quarters are on each side of a concrete corridor 7 ft. wide. There are also a cooking-kitchen, a bathroom, and a common room, with accommodation for the whole of the residents. In addition there are the usual sanitary offices. On each of the other two floors there are fifteen suites of rooms divided by a similar corridor running from one end of the

building to the other, and also having cooking-kitchens, bathrooms, and lavatories. The top story will be occupied by servants. The whole of the building is constructed of red stone and bricks from the works of Messrs. Middlehurst & Co., St. Helens, and the roofing is of green Westmoreland slates. The contractor is Mr. Isaac Dilworth, of Wavertree.

ISOLATION HOSPITAL, TEIGNMOUTH.—A new isolation hospital has just been opened at Teignmouth. The building is erected on the Bittow grounds, fenced off from the remaining portion with Jerra wood, whilst the entrance is from the main road to Newton. The hospital block consists of two wings, each comprising a male ward (two beds) and a female ward (two beds), nurses' duty room, ward kitchen, bathroom, sink chamber and storeroom. There is an administration block or residence for the matron, nurses, and other officials, containing five bedrooms, three sitting-rooms, kitchen, scullery, bathroom, and two small store-rooms. The third block comprises a laundry, disinfecter with two chambers for infected and disinfected goods, mortuary, ambulance-shed, and small store. The wards in the main building are 24 ft. by 13 ft., the length of the whole being 140 ft. The area of the ground enclosed is about 1½ acres, whilst the total cost of the work, exclusive of the purchase of the land, has been £2,630. Mr. C. F. Gittings, surveyor, prepared the plans, and the contractor was Mr. Marshall.

NEWSPAPER OFFICES, BELFAST.—New offices have been erected for the *Irish News* in Donegall-street, Belfast. The contractors for building were Messrs. Thornbury Brothers, Ltd.; the steel work was by Messrs. Ritchie; and strong-room doors, etc., by Messrs. Miles. The plumbing work has been carried out by Messrs. J. Baxter & Co.; and the patent glazing by Messrs. Pennycook. Mr. Joseph Downey acted as the clerk of works; and the entire work has been carried out from the design and under the supervision of Mr. J. M. McDonnell, architect.

ST. JUD'S CHURCH, DARLINGTON.—In connexion with St. Hilda's Church, Darlington, a new institution was recently opened. The building, which stands at the rear of the church in Park-gate, and replaces a former club, has been erected by Mr. T. Robinson, builder and contractor, from designs by Messrs. Kitching & Lee. It is of brick, with stone facings. On each story is a billiard-room, and a reading and recreation-room, the upper set being for the men and the lower set for the boys.

WESLEYAN METHODIST BUILDINGS, STENLEY.—The foundation stone of the new Methodist premises which are to supersede the Stenley Temple, Commercial-road, were laid recently. The new buildings are from designs prepared by Messrs. Weir, Burrows & Weir, architects, of Westminster, and are being erected by Mr. G. Parker, of Peckham.

BOWLING CLUBHOUSE, BELMONT.—A new clubhouse has been erected for the use of the members of the Belmont Bowling Club. The architect is Mr. C. A. Aikin, the builder being Mr. Kirker G. Walker, Jonesboro'-street, and Mr. Stanley Johnston had charge of the plumbing work.

PUBLIC LIBRARY, ROYTON.—A new public library is in course of erection at Royton. The main entrance is of red brick, with polished Stancliffe stone dressings. Internally the joinery and fittings will be principally in fumed and dull wax polished oak. The general contract has been secured by Messrs. Whitworth, Whittaker & Co., Oldham, the chief sub-contractors being: for mason work, Mr. Alex. Mackay, Oldham; for joiners' work, Messrs. Ledger & Saville, Royton; and for plumbers' work, Mr. J. W. Kent, Royton. The furniture contract is being carried out by Messrs. Ashton, Leach & Cumberbatch, Ltd., Rochdale, and the total cost is to be £3,500. The architects are Messrs. S. Butterworth & Duncan, Rochdale, whose design was selected in the recent competition.

Y.M.C.A. PREMISES, EALING.—The Duke of Argyll laid the foundation-stone of the new Young Men's Christian Association buildings at Ealing on the 7th inst. The new premises will consist of four floors, comprising reception hall, assembly hall, reading rooms, games room, library, class rooms, and gymnasium. The building is designed by Mr. W. A. Pitt, F.R.I.B.A., and will cost over £6,000.

PUBLIC LIBRARY, WEST ISLINGTON.—The foundation-stone of the public library at Thornhill-square was laid a short time ago. The architect is Professor Beresford Pitt, the builders being Messrs. Chas. Deering & Sons, of Islington.

HALL, ST. OSWALD'S, CHESTER.—A parish hall has recently been erected for this parish on land at the west end of the parish church. The building has been designed in the Gothic style to harmonise with its position in the church. The building has been erected from the designs of Mr. H. Bewick.

PAVILION, BRIDLETON.—The Lord Mayor of London recently opened the new sea defence works and the new Grand Pavilion at Bridlington. In 1903 the Town Council decided to extend the parade northwards and seawards, and to enclose a part of the foreshore. It was also decided to

construct a Grand Pavilion on this extension with accommodation for 3,000 people, also to erect a large café adjoining this pavilion. The whole of this work has now been completed at a cost of about 40,000. Mr. E. R. Matthews, A.M.I.C.E., the Borough Engineer, designed and superintended the construction of the engineering portion of the work, amounting to over 26,000, and Messrs. Mangall & Littlewoods, architects, of Manchester, designed and superintended the erection of the Grand Pavilion and Café.

CLUB, HONLEY.—New premises erected for the accommodation of the Liberals of Honley were opened recently by the Right Hon. Sir James Kitson, Bart., M.P. The new building has a frontage of 43 ft. to Cuckoo-lane. In the basement provision has been made for caretaker's quarters, consisting of living-room, scullery, and two bedrooms. On the ground floor there is a large billiard-room, with two tables; smoke-room, reading-room, committee-room, and lavatory. The first floor contains lecture-room, games-room, two bathrooms, and secretary's office. Adjoining the club is a bowling-green. The cost of the building will be about 1,700. The following are the contractors for the various works: Masons, Messrs. R. Jenkinson & Sons; joiners, Messrs. Ben Oldfield & Co.; plumber, Mr. Harry Webster; plasterer, Mr. Shaw Whitehead; painter, Mr. F. B. Hinchelliff; all of all of Honley; concresser, Mr. John Cook; electrician, Mr. T. W. Broadbent; and hot water engineer, Mr. T. H. Rayner, all of Huddersfield. The plans were prepared by Mr. Joseph Berry, Huddersfield, and the work has been carried out under his supervision.

SPINNING MILL, STOCKPORT.—The cornerstone of a new spinning mill has just been laid at Stockport. The main building will be 233 ft. in length, by 100 ft. in width inside, and five stories in height, in addition to the basement, which extends under the whole of the building. The two first stories will be extended in width by an annex along the northerly side, 174 ft. in length and 48 ft. in width, with steel stanchions between the main building, and the annex carrying the walls of the three upper stories. The whole of the buildings, with the exception of the roofs, will be fireproof throughout, on Messrs. Stott & Son's principle, with cast-iron columns, steel girders, and concrete flooring. The contractors for the buildings are Messrs. T. & W. Meadows of Heaton Norris, who also built No. 1 Mill from the designs of the same firm of architects, Messrs. Stott. Mr. E. L. Hughes was the clerk of the works.

HOME FOR BOYS, BOLTON.—A church home for boys has been erected on a site on the road leading from East to West Boldon. The contractors for the work are Messrs. D. & J. Ranken, of Sunderland, and the architects Messrs. W. & T. R. Milburn.

HOSPITAL EXTENSION, EDINBURGH.—At a meeting of St. Andrews District Committee, held on the 9th inst., it was resolved, on the recommendation of the Joint Committee for the Erection of the Northern Hospital, to appoint Mr. W. Carruthers Laidlaw, architect, Edinburgh, to be architect for the building. Certain structural alterations were agreed to which will reduce the cost by £861. The amended estimate of the building amounts to 4,065.

MISSION HALL, ELLACOMBE, TORQUAY.—A mission hall erected by the Bible Christian Methodist sect in Higher Princes-road, Ellacombe, was opened recently. The exterior walls are of limestone, with brick coigns, and over the entrance are three coloured windows. The seats are of pitch-pine, and accommodation is provided for about 300. Underneath is to be a room for a Sunday school. The site has a frontage of 125 ft., and a depth of 110 ft. The building has been erected by Mr. S. C. Eales, from the designs of Mr. E. Westlake.

PAVILION, TUNSTALL PARK.—The new pavilion overlooking the two bowling-greens in Tunstall Park was formally opened recently. The cost of the building, exclusive of foundation, is 225L, and the work has been carried out by Mr. Charles Smith from the designs and under the superintendence of Mr. A. R. Wood, architect and surveyor, who is responsible for the laying out of the park.

NEW OFFICES FOR LONDON, EDINBURGH, AND GLASGOW ASSURANCE CO.—This company intend to erect new offices facing the Euston-road, to stand back 50 ft. from the footpath, and occupy a position comprising the whole of the west side of Euston-square, with a return frontage at the widest part of Euston-road, where there is a clear width of 160 ft. between the buildings. The main front of the office building will eventually face Euston-road, and will be entered near the corner of Euston-square. The main office blocks will constitute two sides of a quadrangle in arrangement, thus furnishing two great Halls at right angles to each other, with windows on both sides. The new building will be of Portland stone. Professor Beresford Pitt, is the architect. The site for the new building is now being cleared: the contract has been secured by Mr. Gray Hill, of Coventry, and it is expected that the foundation stone will be laid towards the end of October, and that the company will be in occupation of the new premises by September, 1907.

Stained Glass & Decoration.

MARBLE FLOOR, ST. ANNE'S CATHOLIC CHURCH, BUXTON.—The wooden and stone steps of the sacristy of this church have been replaced by a marble floor with a mosaic predella. The marble steps, three in number, are of dark grand antique Belgian marble, and are surmounted by the mosaic panel of the predella, forming a platform for the celebrant, as wide as the altar frontal. The design of this mosaic has been framed on the lines of a pavement (now existing) in Canterbury Cathedral, adjacent to the site of the Shrine of St. Thomas of Canterbury. Messrs. Burgess & Mills, marble and mosaic workers, of Manchester, have executed the work, the architects being Messrs. C. & C. M. Hadfield, of Sheffield.

Sanitary and Engineering News.

WATER SUPPLIES IN SURREY.—The Medical Officer of Health for the County of Surrey, in his annual report just published, says that the county water map, which was originally prepared in 1896-7 with the co-operation of the officials of the companies and with the assistance of an expert draughtsman, has been brought up to date, and now shows the areas of the companies or district authorities furnishing supplies, their mains, their reservoirs, and their pumping stations. The information is of general interest, and it is believed will be found useful to persons who are about to take up residences in the county. It is intended that the map shall be kept up to date year by year. The map is on view free of charge in the County Medical Officer's room in the County Hall, Kingston.

CROWN PROPERTY AND SANITATION.—A circular letter has been sent by Islington Borough Council to the other metropolitan borough councils, asking them for their support of the following resolution, which was recently adopted at a conference convened by Islington Borough Council:—"That in the opinion of this conference it is undesirable that any lands or buildings situate in the County of London should be exempt from the provisions of the Public Health (London) Act, 1891, or from the sanitary provisions of the Metropolitan Management Acts, or from the by-laws made thereunder, and that a memorial be addressed to His Majesty's Government urging them to introduce a Bill to ensure that all lands and buildings owned by or on behalf of the Crown, or at present otherwise exempt, are brought within the provisions of the said Acts and by-laws." When the replies have been received the Prime Minister is to be asked to receive a deputation in support of the memorial referred to.

PROPOSED NEW WATER SUPPLY, BIRKENHEAD.—The source of the new water supply which is proposed for Birkenhead is the mountain moorlands of mid-Derbyshire draining into the river Alwen, from which, under the three separate schemes into which the project is divided, it will be possible for Birkenhead to draw off daily either seven millions, fourteen millions, or eighteen and a-half millions of gallons of water according as the requirements grow. Mr. G. F. Deacon, L.D., M.Inst.C.E., is the author of the scheme.

LEEDS WATERWORKS.—At a meeting of Leeds City Council recently Mr. J. H. Armitage moved that the Council approve the acceptance by the Waterworks Committee of the tender of Messrs. Clayton, Son, & Co., Ltd., for the supply of about 11½ miles of steel pipes intended to be laid between Kettleing and Kirby Malzeard, for the sum of 69,435L. 8s. This was the beginning, he said, of the second step which the Council had to take in the construction of an aqueduct to bring the water from the new works in the Ure and Colster Valleys. The first step was the making of the Kettleing tunnel, which was 5,000 ft. in length, and had to be made because the water could not be carried over the hill by gravitation. The second step was the laying of a double line of pipes over 22 miles long. The Waterworks Committee now proposed to let by tender 11½ miles. That was about a quarter of the whole work. The Bradford Corporation, under the guidance of their able engineer—Mr. Watson—were the first Corporation in the country to adopt the plan of laying a steel aqueduct, and since then other engineers had followed suit. When the work was complete Leeds would have the longest steel pipe line that had so far been laid. The result of inquiries from engineers and other investigations was to show that steel was preferable to cast-iron on three out of four of the points he had named. Alderman Currer Briggs seconded the motion, which was carried unanimously.

DEVONPORT DOCKYARD.—An extensive installation of electrical lighting and power is being carried out under the general superintendence of Messrs. Preece & Cardew, consulting engineers to the Admiralty. The generating-station near Keyham-yard has been built by Messrs. Laphorn & Co., of Plymouth; the cables, to the length of

100,000 yds., have been laid by Messrs. Henley & Co., and the British Westinghouse Electric and Manufacturing Company furnished the motors. The lighting apparatus, equipped by Messrs. Edmundson & Co., Messrs. Crompton & Co., and Messrs. Foot & Milne, comprises 160 arc lamps of 5,000 candle-power a-piece for out-door operations, and about 200 arc lamps of from 1,500 to 2,000 candle-power, together with 4,000 incandescent lamps, in the workshops and offices.

Miscellaneous.

PROFESSIONAL AND BUSINESS ANNOUNCEMENTS.—Messrs. Roger Smith & Son, of 130, Temple Chambers, Whitefriars, E.C., have taken into partnership Mr. Harold E. Church, A.R.I.B.A., as from July 1st.—In reference to the recent death of Mr. Bradley Batsford, the head of the well-known architectural publishing firm, we may mention that the business will be carried on by the younger brother and surviving partner, Mr. Herbert Batsford, assisted by his nephew, Mr. Harry Batsford, and by Mr. Smith, the head of the staff, under the old style of "B. T. Batsford."—Messrs. Ford & Walton, builders from the West End-lane to 242, High-road, and contractors, have removed their offices Kilburn.

ROAD IMPROVEMENT IN BETHNAL GREEN.—The Works Committee of Bethnal Green Borough Council reported on Tuesday that the total cost of the Cambridge-road improvement was 32,673*l.*, as against the London County Council estimate of 48,600*l.* The whole of the paving and engineering work had been carried out by the Borough Engineer and Surveyor (Mr. E. E. Finch, Assn. M.Inst.C.E.) at a total cost of 5,038*l.*, which was considerably below the amount included in the original estimates of the London County Council. The Committee expressed their appreciation of the services rendered by Mr. Finch and the expeditious and economical manner in which he carried out the portion of the work entrusted to him.

A HUGE CONCRETE RETAINING WALL.—Geologists show that the recession of Niagara Falls is due to the gradual destruction of the shales underlying the limestone rock, which, at the edge of the falls, has acquired the form of a shelf-like projection, and is gradually breaking away. Similar deterioration of the shales has been evidenced in the lower portion of the cliff rising vertically behind the power-house of the Niagara Falls Hydraulic Power and Manufacturing Company in the gorge below the upper steel arch bridge. Feeling that the continued destruction of the shales under the action of rain and frost will sooner or later induce the fall of rock from the cliff, thus endangering the retaining walls of the forebays, and presenting a serious danger to buildings and workmen engaged on the premises, the company decided to face the cliff for its entire height with a concrete retaining wall. The cliff had previously been faced up to the shale by a concrete wall which has been incorporated in the new work, and suitably strengthened by the addition of massive buttresses. The complete wall extends for a length of 200 ft. along the cliff, and is 200 ft. high. It is composed of 1:3:5 concrete, and varies in thickness from 2 ft. to 12 ft. Experiments show that no danger is to be anticipated from ice behind the wall, as the temperature of the rock at the surface is never below 39 deg. F. under the most severe conditions. Provision is made for the removal of water by numerous weep holes, and in one part of the wall an arch has been constructed over a natural grotto, whence proceeds a spring of water. The wall contains 7,000 cubic yds. of concrete, all of which was mixed on the edge of the cliff and delivered by means of shoots to the required positions.

UNION BRIDGE, ABERDEEN. We understand that the Town Council have adopted a scheme proposed by Sir Benjamin Baker for widening the bridge by means of steel girders, at a cost of nearly 10,000*l.*

PATENTS AND "SEARCH FOR NOVELTY."—In his Report for the year 1905, which is just issued, the Comptroller-General of the Patent Office makes some observations upon the new procedure. He says that in the endeavour to avoid the prescribed reference in the specification to any previous invention the tendency has been to define more clearly and particularly the features of the invention which the applicant has added to the stock of knowledge in the art concerned, and that the general effect has undoubtedly been to improve the specification. The examining staff, increased in the twelve months from 110 to 129, and to be further increased in the current year, have carried out their new labours with less difference of opinion between the officials and the applicants or their representatives than might have been expected, regard being had to the great changes of procedure introduced under the Act of 1902, which was lately put into force. In a very large number of cases no hearing before the

Comptroller was found necessary, the requisite amendments having been made by the applicant or his agent either directly in response to the official communication notifying the anticipation of invention or after conference with the examiner. During 1905 the examiners made in 10,379 cases the investigations as to novelty prescribed by the Act. In over 60 per cent. of these applications it was reported that the invention had been wholly or partly anticipated, and in the great majority of those cases the specification was amended. When the applicant and the examiner disagreed in that respect, or when the applicant took no action within the statutory period, a hearing was fixed. Of 1,335 hearings arranged for determining whether a reference in any prior specification ought to be recorded in the patent by way of notice to the public, 532 were rendered unnecessary through the abandonment in 108 cases of the claim and in 424 cases of the amendment of the specification before the day of hearing. Formal decisions were given in 803 instances; the reference was ultimately made in 154, and only one appeal (as yet not decided) from those decisions has been made to the Law Officers. The total receipts for the year amount to 265,740*l.* 4*s.* 9*d.*, including 238,047*l.* 8*s.* 8*d.* for patent fees; the payments show a surplus of 106,444*l.* 4*s.* 10*d.* (balance of 91,232*l.* 19*s.* 7*d.* for salaries and 2,897*l.* 17*s.* 6*d.* for the new buildings in Furnival-street, Holborn, which it is expected will be completed some twelve months hence).

A TECHNOLOGICAL DICTIONARY.—For the *Technolexicon* of the Society of German Engineers about 2,000 firms and individuals collaborators at home and abroad are assisting in its compilation. It is to be a universal technical dictionary for translation purposes (in three languages, English, German, and French) and was commenced in 1901. Over 3,000,000 word-cards have been collected. Alphabetising has so far advanced that printing will begin early in 1907. The work will be printed and published by the firm of J. J. Weber, *Illustrirte Zeitung*, Leipzig. Dr. H. Jansen, the editor-in-chief, will be pleased to give any further information wanted. Address: *Technolexicon*, Berlin (N.W. 7), Dorotheenstrasse 49.

HOUSES OF CELEBRITIES.—A fund of 4,600*l.* is being raised for the purchase of the house inhabited by Keats in Rome, and its conversion into a museum and memorial of Keats and of Shelley. The trustees of the fund anticipate that the graves of the two poets will be committed to their care. We may mention here that some years ago, in order to meet demands for further house accommodation, the Municipality of Rome built some artisans' dwellings near Monte Testaccio, and made a scheme for the laying out, as an approach thereto, of a wide road through the old Protestant cemetery outside Porta Ostiense—now the Porta S. Paolo—with a gate in the city wall of Aurelian, adjoining the sepulchrum Cestii, or pyramid of Maus Cestius. They, however, modified their plans so as to leave untouched the adjacent grave of Keats (near the pyramid), which they enclosed within a small raised garden: in a grave close by Trelawny laid the ashes of Shelley. The Corporation of Bath have placed a memorial tablet to Testaccio and his sister Sarah upon the wall of Widcombe Lodge in that city.—At the recent annual meeting of the Dove Cottage, Grasmere (Wordsworth), National Trust, under the presidency of Professor Knight, it was reported that the property is in excellent order, and during the twelve months ended May 1, 1906, 4,250 tickets of admission to the cottage were sold, being 95 more than in any previous year, and 463 more than in the last preceding period. The cottage working account shows a balance of 40*l.* 19*s.* 4*d.*, which enables the trustees to add to the invested capital fund.

BISHOP'S SAFETY STAIR TREED.—This is a stair tread formed of Limmer's asphalt surrounded by a metal frame, within which is an expanded mesh through which the asphalt is run. The expanse on the surface of the step is very narrow, being only the edge of a containing plate of metal which forms part of the mesh, and the mesh, which depends largely upon metal are always apt to get slippery after a certain amount of wear. The non-slipping quality of the asphalt surface seems as perfect as it could well be, and where appearance is not an important consideration this may be recommended as one of the best and probably one of the most durable of non-slipping treeds; and it can easily be applied also to stone steps that are worn, by packing them up with cement to form a level bed for the asphalt tread. It is not an attractive looking step, being rather dingy in appearance, but its practical merits are undeniable.

IRISH INTERNATIONAL EXHIBITION, 1907.—A committee is formed for the Fine Art Section of the Exhibition at Dublin to embrace modern works by British and foreign painters, water-colours, and miniatures, with architectural drawings and examples of British sculpture. Mr. Lionel Cust, Director of the National Portrait Gallery; Mr. C. F. Corbould-Ellis, Chairman of the Corporation of London Art Gallery Com-

mittee; Mr. G. J. Frampton, R.A.; Sir Charles Holroyd, Director of the National Gallery; Mr. Whitworth Wallis, Director of the Birmingham Gallery; Mr. A. G. Temple, Director of the Guildhall Gallery; Sir Isidore Spielmann; and Mr. Philip Norman, Treasurer of the Society of Antiquaries, constitute the committee.

PLAYGROUNDS.—A memorial has been addressed to all educational authorities in England and Wales by the National League for Physical Education and Improvement of Vauxhall-bridge-road. The memorialists state that the London County Council will now consider proposals for the use of their school grounds and that a playground committee of the League has been formed to acquaint all accredited bodies engaged in social education committees throughout the country to contribute to an extension of the movement and thereby afford facilities to the boys and girls employed in factories and workshops to engage in organised games in open playgrounds and under efficient leadership.

A CORRECTION.—In "Some Notabilia," page 40, ante, of "Notes on Old London," the house leased by Sir Edmund Verney were inadvertently mentioned as being at the east end of (Great) Russell-street. They were at the west end of that street, and on the east side of the Piazza.

CONSISTORY COURT OF LONDON.—At a sitting of July 15, Dr. Tristram, K.C., Chancellor of the diocese, granted a faculty upon the petition of the vicar and churchwardens of St. James the Great, Bethnal Green, for the erection of an iron chancel-screen 3 ft. 6 in. high, with gates, and the conversion of the south transept into a side chapel, to be separated by a work of trellis-work from the remainder of the church. The learned Chancellor also considered the issue of a faculty in respect of considerable improvements which it is proposed to carry out at Christ Church, Hornsey, at an outlay of about 2,500*l.* The alterations will add 120 to the present 100 seats, and comprise a widening of the north aisle from 9 ft. 8 in. to a total width of 23 ft., the alteration of the vestry in the tower for a clergy vestry and the building of a large choir vestry, with porch, to serve also for classes, meetings, and similar purposes; two new porches at the west end, rearrangement for new clergy and choir stalls; shifting of the pulpit from the north to the south side of the chancel; improved means of heating and electric lighting; and insertion of leaded lights in the windows of the clerestory. Christ Church was built in 1861-2 after Sir A. W. Blomfield's designs in the Early English style; the church was enlarged five years subsequently, and the spire was erected in 1873. St. James the Great, Hornsey, is known as the Red Church, was built in 1843-4, after Blomfield's designs.

JEWISH MUSEUM AND LIBRARY, UNIVERSITY COLLEGE, LONDON.—The library and museum founded by the late Mr. F. D. Mocatta, was inaugurated by Lord Reay, President of University College, on July 11. Mocatta's collection, which is temporarily housed in the College library, and constitutes the nucleus of a museum of Jewish antiquities and of a Jewish library. The present exhibits consist of 4,600 books and MSS., which will hereafter be placed in cases which are included in the bequest. A first cheque for 2,500*l.* was handed to Lord Reay towards the endowment fund. The Chief Rabbi announced that Professor Flinders Petrie had presented to the Mocatta Museum the marble column brought from the Temple of the High Priest Onias, and Professor Petrie, in describing some recent discoveries of the temple of Onias and the camp of the Hyksos, maintained that the statements of Manetho and Josephus which have been questioned are thereby confirmed.

BIRMINGHAM ART GALLERY.—At the recent disposal by auction of Mr. H. Quilter's collection, a small replica of Ford Madox Brown's "Work" was purchased for 390 guineas for the Gallery—then largely by reason of the picture is in the Manchester Gallery. Miss Albright has presented a landscape in oils by Mr. Bertrand Priestman, and a body of subscribers have given upwards of 300 studies and drawings in water-colours, pencil, pen and ink, and chalk, by Sir John Millais, Fredk. Sandys, and Ford Madox Brown, in addition to the bequest of three years ago to the Corporation by other subscribers of some drawings and studies, and by Sir E. Burne-Jones and Rossetti which had formed a portion of the same collection.

HAMPSTEAD-ROAD (SOUTH END).—Demolition is in progress on the east side for a widening of the street at the junction with Euston and Tottenham Court roads. The early aspect of that spot is depicted in Hogarth's "Arch of the Guards to Finchley" painted in 1760. In the foreground are seen the site of Tottenham Court Nursery and Broughton's boxing amphitheatre, with the Adam and Eve tavern, of which the sign still distinguishes the public-house at the corner, west of Hampstead and Euston roads. Hogarth designed in his picture by lottery; a parcel of unsold tickets he gave to the Foundling Hospital, where it is preserved.

Legal.

OBSTRUCTION OF THE LIGHT OF ST.
GEORGE'S CHURCH, HANOVER-SQUARE.

MR. JUSTICE SWINFEN EADY, in the Chancery Division on the 14th inst., delivered his considered judgment in the case of Anderson and others v. Francis & Adams, the action brought by the plaintiffs, the Rector and Churchwardens of St. George's Church, Hanover-square, for an injunction to restrain the defendants, the owners and occupiers of Nos. 40, 42, and 44, Maddox-street, W., from heightening the roof of their building so as to obstruct or diminish the light of the church. (The facts of the case and the evidence were fully reported in last week's issue of the Builder.)

His lordship, in giving judgment, said in this case the rector and churchwardens of St. George's, Manchester-square, claimed an injunction to restrain the defendants from building so as to obstruct the ancient lights of the parish church. The defendants denied that such were increasing windows, and that the building was so near as to give the plaintiffs any legal ground of complaint. It was not denied by the defendants that their new building would cause some obstruction. The only dispute was as to the extent of the obstruction. The question which he had to determine was whether the effect of the proposed building would be such as to do a nuisance to the plaintiffs—an illegal obstruction to the light of the church; whether the church would thereby be so darkened as to interfere materially and substantially with the use of it as a building for public worship, and with the comfort and convenience of the worshippers. He decided in the House of Lords in the *Colls* case that it was not sufficient for a plaintiff to show that there had been some appreciable diminution of light to entitle him to an injunction, the deprivation of light must be such that, having regard not only to the amount taken, but also to the height of the building, and the nature and surroundings of the buildings, the obstruction complained of amounted to a nuisance. The architects called by the plaintiffs said that the church was not a well-lighted one before the commencement of the defendants' operations, and that if the buildings were completed as proposed, the result would be a serious and substantial interference with the ordinary use of the church. The architects called by the defendants said that the church was an exceptionally well-lighted one, and even if the defendants built their fourth floor as proposed such building would not materially diminish the light. The evidence of the experts on one side was in direct conflict with the evidence of the experts on the other, as it so often was. There was, however, other evidence. The church was situated nearly, but not quite, east and west. On the west it faced George-street, but there were not any windows on that side. On the east the church was composed of stained glass. On the north the church was lighted by five windows above the gallery, and by four windows above it, and on the south by a similar number of windows. Having regard to the number and size of these windows, the area of glass was considerable for the floor area of the church, but the important question was what light was derived through those windows, and how this light was distributed over the area of them. No doubt if the church were situated on an open plain it would be a well-lighted church. The church was bounded on the south by a narrow passage from 9 ft. to 10 ft. wide, and on the south side of this passage at the western end were high buildings from 40 ft. to 50 ft. high, and on the north side of the church, through the four western windows on the south side. The photograph No. 3, taken at 9.5 a.m. on July 4—which he was satisfied was fairly taken—showed that these windows were practically valueless for giving light. With regard to the four eastern windows on the south side, the evidence was that the lower windows were at a distance directly opposite the two upper windows, but the second window was laterally obstructed by a high building, and the two lower windows were partially directly obstructed. The result was that on the south side the light was principally derived from the two upper windows at the eastern end. On the north side of the church, north by Maddox-street, which was from 28 ft. to 30 ft. wide, and at the western end the building No. 29, George-street varied from about 44 ft. to 52 ft. high opposite the four western windows. The buildings complained of were situated in Maddox-street, and faced the four eastern windows on the north side. The church was situated on the north side of it, was through those windows that the church derived its principal light on the north side. The reconstruction in progress involved the demolition of the old third floor, which was an attic, and the building of a new third floor slightly higher and some feet nearer to the ground than the old third floor. The ground was of an entirely new fourth floor about 10 ft. above the third floor, and set back about 4 ft. 9 in. This would cut off about 8 degrees of light from

The upper windows, but the extent of a obstruction could not be estimated alone by the number of degrees of light obstructed. With a view of making a test a tarpaulin had been placed in the position of the new intended buildings. The rector was present when this tarpaulin was put up, and he described the result as follows: "The light was not materially affected by its effect on the light of the church. It was said that this experiment was valueless, because a person in the church could read equally well after the tarpaulin was put up as before, but it must be remembered that it was on a brilliant day (June 30), between 4.30 and 5.30 p.m., that the test was made. Mr. Anderson stated that the test was valueless for the purpose of determining whether a person could read equally well when the tarpaulin was up as when it was down in no way detracted from his evidence that even on that bright summer afternoon the result on the light was most distinctly visible in the choir. And that the light of the aisle was bound and was seriously at midsummer which had to be considered. The result of the building up to the third floor, as seen by a person standing in the pulpit, was to cut off the sky area for nearly one-third of the gallery windows, and if the fourth floor was erected as proposed would cut off the sky area for nearly two-thirds of the gallery windows, and would very materially diminish the light coming to the pulpit, and necessitate the use of artificial light considerably before it would otherwise be

Inquired, Mr. Anderson's evidence was that the light on the flight of the church would be truly disastrous if the works were allowed to be completed. The church at the present time had not any light which could be spared. The rector had himself refused an offer to put a stained-glass window where a plain one now was. Dr. Jolley, the organist, said that the keyboard of the organ derived its principal light from the windows in the choir. The light from the windows on the music had already been diminished. The organist had already, even at midsummer and on a very bright evening, been compelled to use artificial light when it would not otherwise have been necessary, solely on account of the obstruction caused by the defendants' new building. The rector, who had been in the choir, also exceeded well and without trace of exaggeration, had his evidence confirmed in a remarkable manner. On May 27 he noticed how dark the church was towards the conclusion of the service and spoke to one of the officers of the church about having artificial light. He was not aware, nor were the plaintiffs, that the defendants were then erecting a new building. The evidence continued until the close of the evidence, when the last witness, G. H. Adams, was being examined, that the fact came out that Adams was in church on May 27, and that the tarpaulin was being put up by his direction, and he remembered noticing the verges come up and speak to a churchwarden or sexton sitting immediately below him, and another witness, J. Turner, the tarpaulin was placed in position while the verges was away at dinner and without his knowledge. On his return he noticed how unusually dark the church was at the end opposite the window, and the pew-opener then drew his attention to the fact that the tarpaulin had been put up which he had not noticed. He was not aware that the fact was known that the tarpaulin was being experimented with, Turner was at the west end of the church and could not see the tarpaulin itself, but when this was raised and lowered the difference was very noticeable, as when it was raised he saw it throw a shadow over the church, and when it was removed the light was considerably increased. On the other hand the defendants called—besides the evidence of the three architects called in as experts to advise—Mr. Sidney Ewart Adams, the architect who prepared the plans, but his evidence did not assist him. Mr. Adams stated that he considered the light to the church would not have been affected by the erection of the new building, and he proposed before any alterations of the plans. This was manifestly incorrect, and was indeed promptly disposed of by Mr. J. D. Matthews, architect, the next witness called by the defendants, who stated that if the defendants had built according to the original plans the obstruction of light to the church would not have been materially and substantially altered, and that he could not agree with Mr. S. E. Adams's view for a moment. In order to assist him in appreciating the evidence, he had twice visited the church and seen the defendants' new buildings so far as erected, and he had seen the tarpaulin in position. As a result of the whole evidence, aided by his inspection, he had no doubt that the erection of the new buildings and new buildings were completed as proposed a nuisance would be occasioned; the church would be thereby materially and substantially darkened and the comfort and convenience of the worshippers there and of those ministering in the church would be seriously prejudiced and interfered with, and there would be enough light to show that the defendants had not been able to show that the building was a church according to the requirements of ordinary people. He granted an injunction.

the form suggested by Lord Macnaghten in the *Colla* case, the defendants would be restrained from erecting any building so as to cause a nuisance or illegal obstruction to the plaintiffs' ancient windows, as the same existed previously to the commencement of the alterations in the defendants' buildings, and the defendants must pay the costs of the action up to and including the hearing. There would be liberty to the plaintiffs to apply, not later than three calendar months after receiving notice from the defendants that their new buildings had been completed, for further relief by way of mandatory injunction or damages, as they might be advised.

WEST-END ANCIENT LIGHT CASE

THE hearing of the case of Sandows, Ltd., v. Duveon commenced before Mr. Justice Warrington in the Chancery Division on the 13th inst., an action brought by the plaintiffs for an injunction to restrain the defendants from obstructing their ancient lights.

Mr. W. H. Upjohn, K.C., and Mr. Peterson appeared for the plaintiffs, and Mr. Warmington, K.C., Mr. George Cave, K.C., and Mr. Rolt for the defendants.

Mr. Upjohn, in opening the case, said that the defendants' building was in the course of erection on the well-known site of Gloucester House, at the corner of Piccadilly and Park-lane. The plaintiffs' building was on the opposite side of Park-lane, and extended considerably to the westward of the Gloucester House. The plaintiff company were the owners of a large block of flats on the opposite side of Park-lane, and running down to Piccadilly. Gloucester House was occupied for some time before his death by the Duke of Cambridge, and there were stables near by, but apparently the Duke had not used them. This house continued to stand until the late war, and the defendants commenced to pull it down and were now in the course of erecting a block of buildings of a different character on the site. It would be necessary to give a history of the plaintiffs' property, because there seemed to be some question as to the existence of ancient lights on the plaintiffs' property. The old buildings which occupied the site of the plaintiffs' block of flats numbered 10 to 10 Park-lane on the east side. Some of these houses might have been a century old, and others were about seventy or eighty years. According to their evidence, except for some alterations to No. 10, Park-lane, more than twenty years ago, there had been no alteration to any of these houses, so far as they could find for sorting the evidence. The old plaintiffs' property was vested in the Crown, and the freehold of the defendants' property was vested in the Ecclesiastical Commissioners. Before the plaintiffs' old buildings were pulled down, careful plans, elevations and sections were made. After the site had been cleared in 1900 a building agreement was entered into for erecting flats on the new premises to be erected on the site of Nos. 7, 8, 9, and 10, Park-lane. The plaintiff company was incorporated in September, 1900, for the purpose of obtaining the benefit of the agreement and for the purpose of erecting flats. The buildings were started directly after. The buildings progressed, and in May, 1901, the first-floor windows were put in. The lease was granted in April, 1902, by the Crown. The lease was for ninety-nine years from July, 1901, at a ground rent of 1,475*l.*, and a large sum of money had to be expended in building the flats. The building was completed soon after the granting of the lease. It consisted of six floors of flats, and two complete flats on each floor. The first-floor windows projected 3 ft. The second and third floors there were bay windows, and on each case these windows formed the windows to the reception-room of the flat adjoining and at the rear. The rents were according to the floor on which the flats were situate, and varied from 600*l.* to 820*l.* per annum. At the present moment all the flats were let, and produced a total of 1,975*l.* per annum. The question of the deprivation of the light to the windows of these flats was, therefore, one of seriousness. In 1904 the defendants pulled down old Gloucester House and very soon afterwards prepared their plans for erecting their new buildings. These plans were submitted to the plaintiffs. The defendants went on with their buildings, and the present action was commenced. The width of the roadway where the buildings were varied from 37 ft. to a little more. The height of the defendants' buildings was shown on the plan as 98 ft. 3 in., although the top stories were set back. Plaintiffs had set out their plans for the new buildings the bays and entrance-hall projected the 3 ft. to the line of the old buildings.

His lordship said that he did not accept his learned friend's statement as to the windows.

Mr. Warmington said that his case was that

there was no interference with the plaintiffs' light.

Mr. W. H. Gibson, an architect and surveyor, assistant to Mr. Chas. A. Doll, an architect and surveyor, of 5, Southampton-street, Bloomsbury, was the first witness called. He said that in April, 1900, he was assistant to Mr. Arthur Green, the Crown Surveyor, since deceased. At that date he made a survey of Nos. 7, 8, 9, and 10, Park-lane, and from that survey he made the plans, elevations, and sections of that property, which had been produced by the plaintiffs, and which had come from the office of the Commissioner of Woods and Forests. In his opinion, Nos. 7, 8, and 9 were old houses, having been erected some sixty or eighty years. No. 10 did not appear to be quite so old.

Mr. Peterson: No, we know now that alterations had been made to that house.

The witness was cross-examined as to his surveying of the property. He said he made his plans, etc., soon after his survey, and put the date on the plans, etc., but Mr. Green signed them. Mr. Green visited the property, but never surveyed them as far as witness knew. Witness visited the houses and went inside them.

Mr. Thomas Henry Watson, architect, District Surveyor of St. George's, Hanover-square, examined, said that when he received the plans made by Mr. Gibson for Mr. Green he went to inspect the buildings, and he could speak of their general accuracy. In his opinion the buildings were old buildings, certainly more than sixty years old.

Cross-examined.

Apparently alterations had been made to several of the windows, the woodwork and brickwork around being modern.

Mr. Stevens, a veterinary surgeon, who formerly resided at No. 9, Park-lane, gave evidence to the effect that from about 1884 to 1900 the windows of the house were not shuttered, except each night.

Mr. Gentle, who recollected Nos. 7 and 8, Park-lane since 1888, said he never knew of any alterations to have been made to those premises since that date. The first-floor windows always remained the same.

Mr. Shaw, a builder, said that alterations were made to No. 10, Park-lane in 1883, and continued in the following year.

Mr. E. A. Gruning, Mr. J. Matthews, and Mr. L'Anson also gave evidence in support of the plaintiffs' case.

Mr. E. H. Bousfield, senior partner in the firm of Messrs. Edwin Fox & Bousfield, gave evidence as to the effect the defendant's building would have if completed on the rental value of the plaintiffs' building. He said that in his opinion the defendant's building when completed would have a material depreciative effect on the plaintiffs' flats. The depreciation he had put into figures, and to the best of his knowledge and experience the depreciation would amount to 5 per cent. The gross rental of the flats exceeded £7,000 a year, and after allowing for the rates and taxes his estimate was that the plaintiffs would sustain a capital loss of over 4,000£, taken at 13½ years' purchase. The plaintiffs would also sustain a heavy loss if they were to sell the flats.

At the close of the plaintiffs' case his lordship said he should like to hear what Mr. Upjohn had to say in the light of the evidence given.

Mr. Upjohn said his contention was that the right to light was not lost by the pulling down of an old building and erecting upon the site a building of a different character.

His lordship: I am not certain that the decision of the House of Lords in the *Colls*' case may not have altered that to some extent. Four witnesses have looked at the plaintiffs' building as if it was the old building.

Mr. Upjohn proceeded to cite several judgments of the House of Lords in support of his submission. The case was proceeding when we went to press.

APPEAL BY A BUILDER AND CONTRACTOR.

The case of Ward v. Green came before the Court of Appeal, consisting of the Master of the Rolls and Lord Justices Moulton and Farwell, on the 17th inst., on the application of the defendant for judgment or new trial on appeal from verdict and judgment at trial before Mr. Justice Phillimore and a special jury in the King's Bench Division.

Mr. Montague Shearman, K.C., and Mr. Rowlatt appeared for the appellant, and Mr. McCall and Mr. Willis for the respondent.

Mr. Shearman, in opening the case, said it was an action brought under the Fatal Accidents Act. It was brought by the plaintiff on behalf of herself and her children, claiming damages from the defendant on the ground that her husband had met with his death owing to the negligence of the defendant or his servants. The case he said had a most unfortunate history. It had been tried three times, first before Mr. Justice Lawrence, when, after a long trial, the jury disagreed, then before Mr. Justice Wills, when the jury again disagreed, and on the third occasion before Mr. Justice Phillimore. When the jury found a verdict for the plaintiff, assessing the total damages at 500£, and distributing the damages in certain proportions among the widow

and children. The only question on the present appeal was that of liability, there being no quarrel with the amount of the damages awarded by the jury. The case was a most unusual one. The London School Board were extending and rebuilding a school in Boundary-lane, Camberwell. They gave the building part of the contract to the appellant, and they also directly gave a contract for the heating apparatus for the building to a firm called Pearsons, Ltd., in whose employment Ward was. Between Ward and the builder, the defendant, there was no contractual relation of any kind. At the time the accident happened the builders had been on the work for about eighteen months, Pearsons having been at work there about six months. The way the accident happened was this: Pearsons sent a number of heavy radiators which required fixing on the upper floors of the buildings. Two small radiators weighed half a ton, and a big one about the same. The floor of the School Board building consisted of girders running from length to length of the building, and between the girders were joists, and each girder with its pair of joists made a rectangle described as a bay. The concrete was laid in the bay by a method of centring. The concrete was put in loose, and the centring kept it in position until it hardened sufficiently for the boards to be taken away. There was a provision in the specification that the centring was not to be struck until seven days after the floors were laid. The concrete was being laid in the bays, and the middle bay was left open because it was necessary that there should be some means of hoisting heavy weights to the top of the building. All the plant for hoisting was the property of the builder. The bay where the accident happened was the last to be laid, and the evidence showed that that took place about January 20, 1904. The centring was struck on January 27, the minimum time allowed. During that day the builders were employed in getting up some heavy hearthstones on to the second floor, and these stones were substantially about the same weight as the radiators. Defendant's foreman was a man named Gilson, and he had employed two men named Coker and Dutton in getting up the landing stones. During the course of the afternoon, Ward, the deceased man, came to Gilson and asked him to lend him two of his men to get up the radiators, and Gilson declined, but he said that when his men knocked off work there was no objection to Pearsons employing at their own expense his workmen to help them. The defendant's men knocked off work at about 4.30 p.m., and then Dutton and Coker were engaged for 3s. for the job to assist Ward and another man in hoisting up the radiators. Dutton and a man named Knight remained below, and Ward and Coker went up above. Two radiators chained together were hoisted up above the level of the second floor, and then the men proceeded to unwind the chain, and when the chain had nearly got unwound one of the claws of the radiators struck the cement on which the men were standing. Then the whole thing gave way, Ward falling and being killed, and Coker falling and breaking his leg. The learned Counsel submitted that on these facts there was not the slightest evidence to show that the defendant had been guilty of any negligence, and that judgment should be given for the defendant. Mr. McCall submitted that there was clear evidence of negligence on the part of Gilson to go to the jury, and that there was no evidence of contributory negligence on the part of the deceased man.

In the result, their lordships held that there was no evidence of negligence on the part of the defendant or Gilson, and that there was evidence that the accident was brought about by the contributory negligence of the deceased man. The appeal was accordingly allowed, and judgment entered for the defendant with costs.

THE MAIDENHEAD BUILDING DISPUTE.

The case of Lanning v. Davy & Salter came before the Court of Appeal, consisting of Lord Justices Cozens-Hardy and Farwell, on the 16th inst., on the appeal of the plaintiff from an order of Mr. Justice Darling. The plaintiff also applied for security for costs of the defendant's application for a new trial on appeal from verdict and judgment at the trial before Mr. Justice Darling and a common jury in the King's Bench Division. (The case was reported in the *Builder* of June 30, 1906.)

Mr. G. A. Scott appeared for the plaintiff, and Mr. George Vaddies for the defendant. Mr. Scott, in opening the case said the matter required some explanation. The action was brought by the plaintiff against a firm of architects in Maidenhead for damages for alleged negligence, and for the present purpose it was only necessary to state it was an action in which the learned judge left five specific questions to the jury, with a direction which he (counsel) did not complain of. The learned judge told the jury that if they answered the questions it would dispose of the whole case. There was one incident in the case which made it somewhat different from other actions. During the course of the trial a suggestion was made that the jury

should have inspection of certain pieces of the work which were in dispute, and that both sides agreed that three members of the jury should go down to Maidenhead and see the work, and they went and saw the whole of the work. The suggestion in the case was that a house had been built in such a way that the architects had been negligent. When the three jurymen came back they made a report to the other members of the jury. Then the learned judge summed up the case and left the questions he had referred to the jury. Despite a very hostile summing-up towards the plaintiff the jury took the view of the facts that he (counsel) had invited them to take, and returned a verdict in favour of the plaintiff, and awarded him 750£ damages. Up to that point he (counsel) had nothing to complain of, but what he did complain of was the next step in the case. The learned judge, having failed to get the jury to adopt his view of the facts, entered judgment and granted a stay of execution to enable the defendants to apply for a new trial. He (Mr. Scott) did not think there was any ground for asking for a new trial except the vague ground that the verdict was against the weight of the evidence. He should contend that there was ample evidence to support the verdict. In these circumstances he protested strongly against the learned judge staying execution without giving the plaintiff some security for the damages pending the time when the application for a new trial was heard in that Court. He submitted that the learned judge had not properly exercised his judicial discretion in the matter. On July 4 he again went before the learned judge, and asked him to make an order that defendants should pay the damages into Court, or otherwise secure the plaintiff's position pending the hearing of the appeal, but the learned judge again refused to do so, and declined to grant him leave to appeal to the Court of Appeal.

After hearing Mr. Wallace on behalf of the defendants Lord Justice Cozens-Hardy, in giving judgment, said that although the learned judge had made an unusual order, he thought it was plainly one which it was within his power to make, and he considered the verdict of the jury was perverse. It was clearly competent for the learned judge to grant the defendants an unconditional stay, and, therefore, in his opinion, the present application failed. He also was of opinion that the plaintiff's application failed for the reason that it was out of time.

Lord Justice Farwell concurred, and the appeal and the application were dismissed, the costs to be the respondents' (defendants') in any event.

BURIALS NEAR DWELLING-HOUSES.

Mr. JUSTICE JOYCE, in the Chancery Division on the 14th inst., had before him the case of *Godden v. the Hythe Burial Board*.

In this case the plaintiff is the owner of land at Hythe, and in April last defendants acquired a piece of land adjoining that of plaintiff for a burial ground, and in spite of protests from the plaintiff buried a pauper within 100 yds. of a dwelling-house. Mr. Justice Kekewich granted the plaintiff an interlocutory injunction, and the Court of Appeal affirmed his decision on the ground that the Burial Board could not legally bury a person within 100 yds. of a dwelling-house. Counsel now stated that defendants felt that they could not contest the matter further, and in these circumstances Mr. Justice Joyce made the injunction perpetual, and ordered the defendants to pay the costs of the action.

Patents of the Week.

APPLICATIONS PUBLISHED.*

17,490 of 1905.—R. HOSLER: *Cowls*.

This invention consists in the construction of vanes, baffle plates, and crown from a single piece of sheet metal, the whole forming the complete revolving cowling proper without the use of seams or joints, the said head being supported from a pivoted disc operating over and being the actual cover of an oil cup.

22,024 of 1915.—W. MORGAN: *Hanging Window Sashes*.

This relates to means for mounting and suspending window-sashes and the like, and consists of oppositely disposed flat springs carrying rollers at the extremities, which are fixed on the window sash and press against the frame.

24,919 of 1905.—EVERED & CO., J. WALE & C. HOLT: *Barrel Bolts for Doors and other Articles*.

This invention relates to barrel bolts, and consists in making a way or passage for the introduction of the solid bolt proper into the barrel by slitting and opening out the short tubular end of the said barrel at the top or side, the said way or passage being closed after the introduction of the bolt or shoot.

* All these applications are in the stage in which opposition to the grant of Patents upon them can be made.

PATENTS.—Continued on page 117.

List of Competitions, Contracts, etc.

For some Contracts still open, but not included in this List, see previous issues. Those with an asterisk (*) are advertised in this Number: Competitions, —; Contracts, iv. vi. viii. x.; Public Appointments, xviii.; Auction Sales, xxviii.

Certain conditions, beyond those given in the following information, are imposed in some cases, such as: the advertisers do not bind themselves to accept the lowest or any tender; that a fair wages clause shall be observed; that no allowance will be made for tenders; and that deposits are returned on receipt of a boni-fide tender unless stated to the contrary.

Competitions.

JULY 24.—Salford. HOSPITAL EXTENSION.—Salford Royal Hospital Board of Management invite architects practising in the neighbourhood of Manchester and Salford who are willing to send in competitive designs for the proposed extensions of the hospital buildings to forward their names, with evidence of experience, to Mr. George Ruddle, Secretary and Superintendent, Salford Royal Hospital, on or before July 24. Premiums amounting to 100l. will be awarded to the three best designs.

SEPTEMBER 1.—Elsesmere.—SEWAGE DISPOSAL SCHEME.—The U.D.C. of Ellesmere invite competitive schemes for the disposal of the sewage of the town of Ellesmere. Detailed schemes, plans, and estimates of cost should be sent to Mr. R. E. Lloyd, Clerk of the Council, Ellesmere, not later than September 25 next. The author of the selected scheme must be prepared to attend, at his own expense, the Local Government Board inquiry, and to submit and explain his scheme to the Inspector thereat. Upon the sanction of the Board being received (but not otherwise), the author of the selected scheme will be paid a premium of 100l. if the Council decide to carry out the scheme, will be employed as an engineer to supervise the execution of the work at the usual professional remuneration of 5l. per cent. of the cost of the work. The plans, etc., of the scheme executed (if any) shall become the property of the Council.

Contracts.

BUILDING.

JULY 20.—Sheffield.—COLLEGE ALTERATIONS.—Sheffield Education Committee invite tenders for the alterations of the old University College buildings in Leopold street, for the purposes of the Central Secondary School. Send in names to the architects Messrs. Gibbs & Flockton, 15, St. James' row, not later than July 20. Quantities will be ready for tender on the 21st inst. and in covers provided, must be delivered at the Education Committee's Offices not later than 2 o'clock on August 3.

JULY 20.—South Shields.—ALTERING PREMISES.—Alterations to premises, Nos. 78-84, Victoria-road, South Shields, for a social club for the Mursden and St. Hilda miners. Names to Mr. Fred. Rennoldson, architect, 37, King-street, South Shields, not later than July 20. Bills of quantities will be supplied to such applicants only. The tenders are to be delivered to the Secretary, Mr. J. R. Toll, 28, Maxine-street.

JULY 20.—Wakefield.—HOUSES.—The erection and completion of three houses in Marsland-terrace, Wakefield. Names and addresses to Mr. J. Day, architect and surveyor, Central-buildings, Marygate, Wakefield, not later than 12 o'clock noon, July 20.

JULY 21.—Allerton.—STABLE.—The erection of a five-stall stable at Lower Westgate Farm, Allerton. The plans may be seen, and quantities obtained, on application at offices of Jackson & Fox, architects, 7, Rawson-street, Halifax.

JULY 21.—Farnborough.—VILLA.—For the erection of a proposed villa, Pinchurst-road, Farnborough. Plans and specification may be seen, and further information obtained, upon application to Messrs. Friend & Lloyd, architects, Grosvenor-road, Aldershot. The tenders are to be sent in to their offices, Grosvenor-road, not later than 11 a.m. on July 21, endorsed "Tender for Villa, Farnborough."

JULY 21.—Hunslet.—ENGINE-HOUSE, ETC.—Hunslet Guardians invite tenders for the erection of an engine house and pump-room at their new Work-house, Rothwell Haugh, in accordance with the drawings and specifications prepared by the architect, Mr. W. E. Richardson, Rothwell, near Leeds. Applications for bills of quantities and forms of tender must be made to the architect on or before July 21, and bills of quantities will be supplied to such applicants only. Drawings may be inspected at the offices of the architect, and tenders, on forms provided, must be delivered at office of Mr. Fred. W. New, Clerk to the Guardians Union Offices, Hunslet, Leeds, by 10 o'clock on July 31.

JULY 21.—Ludlow.—VICARAGE HOUSE.—For erection of vicarage house at Ashford (Carbott), Ludlow. Apply to Mr. A. G. Lloyd Owen, architect, Dane-chambers, Shrewsbury, not later than July 21. Quantities will be supplied on payment of 1l. 1s.

JULY 23.—Branderburgh.—HOUSE.—Estimates wanted for the mason, carpenter, plumber, slater, plaster, and painter work of house to be built in Commerce-street, Branderburgh. Plans and specifications may be seen at the offices of the architect, Town and County Bank-buildings, Elin, who will receive offers not later than July 23.

JULY 23.—Castlerahan.—COTTAGES.—Castlerahan R.C. invite tenders for the erection of boundary walls in above district, viz.:—Ballyjannetduff, Castlerahan, Munterduff, Lurgan, Killybeg, and Virginia, according to the specification prepared by Mr. Luke Brady, which can be seen at office of Mr. Peter Brady, Clerk of Council, Oldcastle Workhouse. Tenders will be received by Clerk up to 11 o'clock on July 23.

JULY 23.—Fowey.—TAKING DOWN AND BUILDING.—Taking down old and erecting new building in Forest-street, Fowey. Drawings and specifications can be seen on application to Mr. B. Vincent, Manager, Fowey Wharf Company, Fowey. Tenders to be delivered to the above on or before July 23.

JULY 23.—Gunnislake.—CHAPEL WORKS.—For altering and renovating the Bible Christian chapel at Gunnislake. Plans, etc., may be seen at Mr. Mitchell's, New Bridge-hill, Gunnislake. Tenders to be sent to Rev. F. Stephens, Crewleaze House, Calington, on or before July 23.

JULY 23.—Newtown.—SCHOOL WORK.—Renovating, repairing, etc., Newtown County Intermediate schools. Separate tenders are to be sent in for the carrying out of the works as follows:—(1) For structural work and repairs; (2) for painting, glazing, distemping and whitening. Specifications may be seen on application to Mr. Martin Wosnam, Clerk to the Workmen, Bank-chambers, Newtown. Tenders are to be sealed, and marked "Tender No. 1" or "Tender No. 2," and are to be received by the Clerk not later than 12 o'clock noon on July 23.

JULY 23.—Nottingham.—BUILDING ALTERATIONS.—Building alterations at Bagthorpe Workhouse. Particulars and quantities on application to Mr. Arthur Marshall, A.R.I.B.A., architect, King's-clerk, and on payment to him of a sum of 2l. 2s. Tenders must be delivered to Mr. G. Muncester Howard, Clerk to the Board of Guardians, Poor Law Offices, Shakespear-street, before 12 noon on July 23.

JULY 23.—Tredgar.—VILLAS.—The erection of two semi-detached villas for Mr. T. J. Price, Glamorgan Tredgar, to whom sealed and endorsed tenders should be sent by July 23. Plans and specifications may be seen with Mr. W. S. Williams, architect, etc., Tredgar.

JULY 23.—Warley.—ALTERATIONS TO FARM BUILDINGS.—Alterations to farm buildings at Warley. Plans may be seen, and quantities obtained, at offices of Mr. Lister Coates, A.R.I.B.A., architect, Central Chambers, Central-street, Halifax, from July 17 to July 23.

JULY 24.—Accrington.—TECHNICAL SCHOOL.—Accrington Municipal Technical School extension. Application by letter to Mr. Henry Ross, architect, 15, Cannon-street, Accrington, before July 24.

JULY 24.—Halifax.—EXTENSION OF COLLEGE.—Halifax Education Committee invite tenders for mason's, ironfounder's, joiner's, slater's and plumber's work in connection with a proposed extension of the Technical College, Hopwood-lane, Halifax. Plans and specifications may be seen, and forms of tender obtained, on application to Mr. James Lord, C.E., Borough Engineer, Town Hall, Halifax, on payment of a deposit of 1l. Tenders, endorsed "Extension to Technical College," must be sent to Mr. W. H. Ostler, Secretary to the Education Committee, on or before noon, July 24.

JULY 24.—Kingston-on-Thames.—ALTERATIONS TO HOUSES.—The Guardians of the Kingston Union invite tenders for making alterations to houses at Hamman Wick, Kingston-on-Thames, at the house of Rhymney and Brimble, Wolverton-avenue, Kingston-on-Thames, in accordance with plans, etc., prepared by Mr. William H. Hope, C.E., architect and surveyor, Hamman Wick, Kingston-on-Thames. Plans may be seen, and form of tender obtained, on application to Mr. Jas. Edgell, solicitor, Clerk to the Guardians, Union Offices (opposite Northolt Station), Kingston-on-Thames, between the hours of 9 a.m. and 5 p.m., and until 1 p.m. on Saturdays. Tenders to be delivered not later than July 24, at 12 noon.

JULY 24.—Lavey.—HOUSE.—Tenders are invited on or before July 24 from competent contractors for the erection of a dwelling-house at Lavey. Plans and specification to be seen with the architect, Mr. Thos. O'Brien, A.I.S.E., Lavey.

JULY 24.—Mardy.—CLUB.—Pulling down and rebuilding the Conservative Working Men's Club, Mardy, Glam., for the Trustees, Blough and specifications may be seen at the club premises, Mardy. Tenders to be delivered to the Secretary, Mr. T. R. Leyshon, Secretary, 24, North-terrace, Mardy, Glam., on or before 6 p.m. on July 24.

JULY 25.—Ashford.—WALLING.—Ashford U.D.C. invite tenders for the erection of a Kentish ragstone boundary wall, about 1,200 ft. long, at its cemetery, Canterbury-road, in accordance with plans and specifications which may be seen. Form of tender, and any other information, obtained on application to Mr. William Terrill, surveyor, North-street, Ashford, Kent. Sealed tenders, endorsed "Cemetery Walling," to be sent to Mr. F. Hughes Hallett, solicitor, Clerk to the Cemetery Committee, not later than 5 p.m. on July 25 at his office, 11, Bank-street.

JULY 25.—Broughton-in-Furness.—COTTAGES.—The Broughton-in-Furness Co-operative Society, Ltd., invite tenders for the erection of three cottages, the plans and specifications of which have been deposited, and may be inspected, at Mr. W. H. Whimray's, Sandgap Farm. Tenders, sealed, and marked "Tender," to be in the hands of Mr. John J. Singleton, Secretary, not later than 5 p.m. on July 25.

JULY 25.—Erdington. BOUNDARY WALLS.—Erdington U.D.C. Highways and Buildings Committee invite tenders for the erection of boundary walls at their depot in Spring-lane. Drawings may be seen, and copies of specification, quantities, and form of tender obtained, upon application at office of Mr. Herbert H. Humphries, Engineer and Surveyor, The

Council House, The Park, Erdington, where tenders endorsed "Tender for Walls," must be delivered not later than 12 o'clock at noon on July 25.

JULY 25.—Kingstown.—RESTORATION.—For the restoration of Nos. 105, 106, and 107, Lower George's-street, Kingstown, for The Hibernian Bank, Ltd. The plans and specification relating thereto can be seen at office of Messrs. William H. Byrne & Son, architects, 20, Suffolk-street, Dublin.

JULY 25.—Lancaster.—RECEPTION HOUSE.—Tenders are invited by the Central Committee of the Royal Asylum, Lancaster, for the erection of a reception house. Plans can be seen at the Asylum, and blank copies of quantities obtained from the Secretary, on payment of 1l. 1s. Tenders to be sent in to the office of the architects, Messrs. Woolf & Fecers, 60, Castle-street, Liverpool, not later than 4 p.m., July 25.

JULY 25 and 27.—Leshmahogow.—SCHOOL.—Leshmahogow School Board invite tenders for alteration of front lobby and lavatory at Leshmahogow senior school. Separate contracts for mason, joiner, plumber, and plaster work. Plans may be seen at school on and after July 19, and offers to be lodged with Mr. James N. Gilmore, Clerk, School Board Office, Leshmahogow, not later than July 25. Sealed "Offer for Senior School." Tenders also invited for new bathroom at Blackwood school-house. Separate contracts for mason, joiner, plumber, and plaster work. Plans may be seen at the school on and after July 21, and offers to be lodged with the Clerk not later than July 27, marked "Offer for Blackwood."

JULY 25.—Norwich.—BOILER-HOUSE, ETC.—The Guardians of the Poor of the Norwich Incorporation invite tenders for the erection of new boiler-house, seating for boilers, and economiser, at the Norwich Workhouse. Plans and conditions of contract may be seen, and bills of quantities obtained, on payment of 1l. 1s., at the offices of Messrs. Morgan & Buckingham, architects and surveyors, 3, Redwell-street, Norwich. Sealed tenders, endorsed "Tender for Boiler-house," to be delivered to Mr. Henry Stone, Clerk to the Guardians, Guardians' Offices, St. Andrew's-street, Norwich, not later than 3 o'clock on July 25.

JULY 25.—Minehead.—HOUSES.—Three houses and garage, in the Parks, Minehead, for Mr. J. K. Heard, Taunton. Sealed tenders to be left at office of Mr. W. J. Tamlyn, M.R.S.A., architect, Minehead, not later than July 25.

JULY 25.—Youghal.—HOUSES.—The Youghal U.D.C. invite tenders for the erection of nine houses for the accommodation of the working classes, on Park Hill, including the drainage, water supply, fencing, and roadway, according to plan and specification, which can be seen at the Town Hall between the hours of 11 a.m. and 4 p.m. Each tender must be accompanied by a schedule giving the quantities and prices, upon which said tender is founded. Each tender is to be on the prescribed form, and must contain the genuine signatures of two solvent persons willing to enter into a joint and several bond for the due execution of said works within the time specified. Tenders, endorsed "Tender for the Housing of the Working Classes," addressed to the Chairman, Town Hall, to be sent through the post-office not later than the evening of July 25. Mr. James J. O'Sheer, Clerk of the Council, U.D.C. Offices, Town Hall, Youghal.

JULY 27.—Orton.—ANTE-ROOM.—For the erection of ante-room to Inchberry Public Hall, Orton. Plans and specifications may be seen with Mr. A. B. Hunter, Chairman of Inchberry Hall Committee, Orton Station, with whom offers, endorsed "Ante-room," may be lodged, on or before July 27.

JULY 28.—Celdio.—HOUSES.—Two houses for Pentecostal Congregational Church, Celdio. Plans, etc., to be seen at Meillonien, Celdio. Tenders to be sent in on or before July 28. Mr. Henry Williams, Meillonien, Celdio, Pelly.

JULY 28.—Mynyddislwyn.—RESTORING CHURCH.—For restoring and repairing the Parish Church of Mynyddislwyn, near Abercarn, for the Rev. J. Jones Evans. The plans and specification can be seen at the offices of the architects, at office of Mr. E. M. Bruce Vaughan, F.R.I.B.A., architect, 21, Dumfries-place, Cardiff, on receipt of 2l. 2s. The tenders are to be delivered at office of architect on or before noon on July 28.

JULY 28.—Naas.—CHURCH WORK.—Certain alterations and additions to the church, etc., of St. David's Church, Naas, Co. Kildare, for the Very Rev. Thomas Morrin, P.P. Plans, etc., seen at office of architects. Bills of quantities have been prepared by Mr. D. W. Morris, surveyor, 68, Harcourt-street, Dublin, and can be obtained from him. Tenders to be delivered at the architects' office not later than 12 o'clock noon on July 28. Messrs. Astlin & Coleman, architects, 7, Dawson-street, Dublin.

JULY 28.—Penygraig.—VICARAGE.—Building a vicarage at Penygraig for the Rev. T. E. Griffiths. The plans and specification can be seen, and quantities obtained, at office of Mr. E. M. Bruce Vaughan, F.R.I.B.A., architect, Cardiff, on receipt of 2l. 2s. The tenders are to be delivered at office of architect on or before noon on July 28.

JULY 28.—Pontycymmer. SCHOOL HALL.—The erection of a school hall, at Pontycymmer, for the English Calvinistic Methodist Church. Plans and specifications may be seen with Mr. Owen Jones, saddler, Pontycymmer, or at office of Mr. Arthur

Lloyd Thomas, A.M.I.M.E., architect and engineer, Church Street, Chambers, Pontypool. Sealed and endorsed tenders to be sent to Mr. Owen Jones on or before July 28.

July 30. Pontardunlais.—Shops, etc.—Three new shops, altering present shop, and erecting new offices at Pontardunlais. Plans and specifications at the offices of Messrs. Williams, Hutton, and Arnold, architects, Bank Chambers, Hayfield-street, Swansea. Endorsed tenders to be sent to Mr. W. Williams, Bank House, Pontardunlais, not later than July 31.

July 31. Wolverhampton.—Hospital, Block—Wolverhampton Health Committee invite tenders for the erection of a large chapel and schoolroom for the Hospital. Plans to the administrative block of the Hospital. Tenders, addressed to the Chairman of the Health Committee, to be delivered at the Town Clerk's Office by 10 a.m. on July 31.

August 1. Hopkinstown.—Chapel.—The erection of a large chapel and schoolroom for the English Baptist Church at Hopkinstown, Pontypool. Plans and specifications may be seen with Mr. Arthur Lloyd Thomas, A.M.I.M.E., architect and engineer, Church Street, Pontypool. Sealed and endorsed tenders to be sent to the Rev. Samuel Davies, Oakfield, Pwllgarn, Pontypool, on or before August 1.

August 1. Nottingham.—Mission Hall.—New Baptist mission hall, Robin Hood's Chase, Nottingham. Plans and specification may be seen with Mr. Pilkington, 114, Albion-street, Nottingham, and at the office of the architect, Mr. J. R. Kees, architect, 3, Dunsford-place, Cardiff, from whom bills of quantities may be obtained. Tenders are to be sent to the architect, Mr. W. A. Coombs, Rosebush, Chumley-street, Mansfield, Pkiss, Nottingham, on or before August 1.

August 1. Slapton.—House.—Erection of a vicarage house at Slapton. Plans and specifications can be seen on application to Mrs. Bowler, Carlisle, Slapton, between the hours of 10 and 4 o'clock, at the office of Mr. W. F. Toller, architect, 10, High-street, Tolnes, from whom any further particulars can be obtained. Tenders are to be sent to Messrs. Odridge & Hingston, Bridgetown, Tolnes, on or before August 1.

August 2. Alnwick.—Residence.—Tenders are invited in one sum for the trades separately for the works required in the erection of new residence at Alnwick for Mr. Wm. Percy. The plans and specifications may be seen at office of Mr. George Beavell, jun., A.R.I.B.A., Alnwick, and the tenders duly endorsed, must reach architect not later than noon, August 2.

August 4. Roseadun.—Cattle House.—The erection of a cattle house at Roseadun, in the Parish of St. Hilary, in the occupation of Mr. Benjamin Hocking and the executors of Mr. William Hocking. Plans and conditions and specifications at the farmhouse at Roseadun. Tenders should be sent on or before August 4 to Mr. George Gore, Tregilham, Oke, T. 10.

August 6. Dumfries.—Pavilion.—The various tender, etc., can be had upon application at the Clifton Royal Institution, Dumfries. Plans and specifications, etc., can be seen at the office of the architect, Messrs. Sydney Mitchell & Wilson, 13 Young-street, Edinburgh, till July 23 thereafter at the Clifton Royal Institution, Dumfries, on July 23 and subsequent dates. The Clerk of Works will be in attendance at the Institution on July 25, 26, and 27, to give explanations of the plans and specifications. Copies of the specifications and schedules may be obtained on application to Messrs. Sydney Mitchell & Wilson, on or before July 19, and before must be lodged with them on or before August 6.

August 15. Lestock Hall.—School.—The Lancashire Education Committee invite tenders for the erection of a new public elementary school at Lestock Hall, near Preston. The plans may be seen and bills of quantities obtained at the office of the County Architect, Mr. Henry Lither, 16, Ribblesdale-place, Preston. Payment of a deposit of 21 shillings should be made on or before August 15, sealed and endorsed, to Mr. W. S. Woodcock, Council Offices, Rammer Bridge, near Preston.

No DATE. Ballymena, Ireland.—CHIMNEY.—For the erection of a 60 ft. brick chimney at Aboghill Creamery, Ballymena. Plans and specifications can be seen at Mr. C. C. C. C.

No DATE. Belfast.—HOUSE.—For the erection and completion of shop and dwelling-house, Falls Road, Belfast, for Mr. John Mulholland. Plans, specification, and particulars may be obtained at the office of Mr. W. J. Moore, architect, 35, Royal Avenue, Belfast.

No DATE. Bognor.—SCHOOL. ENLARGEMENT.—The Education Committee of the West Sussex C.C. invite tenders for the enlargement of the Council school at Bognor. Particulars, etc., may be obtained from Mr. W. Lewis Barrett, Arcade Chambers, Bognor. Tenders should be sent on or before August 10 to the Secretary, West Sussex and Chichester Joint Education Committee, Education Offices, Horsham.

No DATE. Brackley.—HOUSE.—Northamptonshire C.C. Standing Joint Committee invite tenders for taking down and rebuilding the Council's house at Brackley Police-station. Plans can be seen, and quantities obtained, upon application to Mr. C. S. Morris, County Surveyor, County Hall, Northampton.

No DATE. Carlisle.—DRILL HALL.—For the whole or any of the several trades required in the erection of a new drill hall for 1st Cumberland Poyal Garrison Artillery Volunteers. Names to Messrs. Glover & Dodgson, F.R.I.B.A., architects, Carlisle. Quantities will be supplied to such applicants on site tenders furnished.

No DATE. Crumppall.—HOUSES.—For any of the trades required in the erection of eight houses at Crumppall. Quantities from the architect, Mr. Jesse Horsfall, F.R.I.B.A., 4, Chapel-walks, Manchester.

No DATE. Heyrod.—STALYBRIDGE.—CLUB.—For construction of Liberal club at Heyrod, Stalybridge. Plans and specifications may be seen at the Club

premises by arrangement. Mr. J. W. Toothill, Hon. Secretary.

No DATE. High Wycombe.—SCHOOL. REPAIRS.—Repairs, etc., at "New School" for the High Wycombe Borough Education Committee. For particulars apply Mr. Thos. Thurlow, architect.

No DATE. Hull.—TANK SUE.—Melville Lenham, architect, 21, Bond-street, Savile-street, Hull, invites tenders for the erection of proposed tank shed, etc., Oxford-street, Hull, for Messrs. J. B. Walker & Co., Ltd. Plans may be seen, and quantities obtained, on application, on or before July 28.

*** No DATE. Leeds.**—PROPOSED MINING AND METALLURGICAL LABORATORIES OF THE UNIVERSITY OF LEEDS.—Builders desirous of being selected to tender for the above should apply in writing stating whether all or separate trades to Mr. Paul Waterhouse, architect, Slapton Hall Buildings, Holborn Bars, W.C.

No DATE. Kirkburton.—Houses.—The several trades required in the erection of nine houses at Kirkburton. Names and addresses to Mr. Henry Wood, Park View, Kirkburton, when quantities will be forwarded.

No DATE. Melton Mowbray.—PREMISES.—The Melton Mowbray Co-operative Society, Ltd., invite tenders for the erection of central premises to comprise four shops, assembly-rooms, warehouse, etc., on their land in Church-road, Builders desirous of tendering may see the plans upon application in writing to the Secretary, at the Society's Office, King's-road, Melton Mowbray. Particulars may be obtained as to time for delivery of tenders, etc.

*** No DATE. Mile End.**—BRICKYARD WALL.—Tenders are invited for the erection of a boundary wall at the Mile End Brickworks, Mile End, London, E. Tenders, sealed and endorsed, may be sent to the architect, Mr. J. M. Knight, 35, Bancroft-road, Mile End, E., on or before July 28.

No DATE. Minsbridge.—MILL.—Masons and bricklayers, carpenters and joiners, plumbers and glaziers, patent glaziers, iron and steel founders, slaters, cementers, and painters, work required in the erection of mill premises, containing about 5,600 sq. ft. floor area, together with engine-house, staircase, tower, etc., at Minsbridge. Applications to Mr. Messrs. Lane & Co., Minsbridge, and Mr. Minsbridge and Huddersfield, when quantities will be forwarded in due course.

No DATE. Stokekilnland.—REPAIRS, etc.—Repairs to dwelling-house and outbuildings at The Hill Farm, Stokekilnland, including new roof, re-building and wall, laying floors to shoppens, etc. For full particulars apply to Mr. Sandcock, Trebil.

ENGINEERING, IRON, AND STEEL.

JULY 23. Hemsforth.—HEATING APPARATUS.—The Hemsforth District Sub-Committee of West Riding C.C. invite tenders in connexion with the repairs to be done at the heating apparatus at the Hemsforth Provincial Prison. Plans and specifications may be obtained on application to the Education Officer, Northgate, Wakefield. Sealed tenders, endorsed "Heating Apparatus," must be sent to Mr. James Whaley, Divisional Clerk, Northgate, Wakefield, not later than 10.30 a.m. on July 23.

JULY 23. London.—INGOTS.—The Bengal and North-Western Railway Company Directors invite tenders for the supply and delivery of copper ingots and tin ingots, as per specification, to be sent at the Company's offices. Tenders, addressed to Mr. Alexander Izal, Engineering Director, 27, Grosvenor-house, Old Broad-street, London, E.C., and marked "Tenders for Copper Ingots," or as the case may be, are to be lodged not later than noon on July 23. For each specification, information is given, which cannot, under any circumstances, be returned.

JULY 24. Biggin.—CONVENIENCES.—West Riding C.C. Education Department (Church Fenton District Sub-Committee) invite tenders for the removal and re-erection of conveniences on the premises of the Biggin Provided School. Sealed tenders, to be delivered to Mr. Benj. Sheard, Divisional Clerk, Education Officer, Selby, on or before July 24, and quantities may be obtained, not later than July 24.

*** JULY 24. Ealing.**—REBUILDING BRIDGE.—Tenders are invited for rebuilding Parnall Bridge, Ealing-road-rd. Drawings and specifications may be seen, and forms of tender, bills of quantities, and other particulars may be obtained, from the Borough Engineer, Town Hall, Ealing, W., during office hours, on deposit of 2s. Tenders, endorsed "Tender for Rebuilding Parnall Bridge," to be delivered to the Town Clerk, Town Hall, Ealing, not later than 9.30 a.m. on July 24.

JULY 24. Featherstone.—WIDENING BRIDGE.—Lancashire and Yorkshire Railway Directors invite tenders for works, etc., required in widening the bridge carrying Common Side-lane over the railway, at Featherstone. Plans can be seen, and form of tender and specification obtained, on application at the Engineer's Office, Manchester. Tenders, endorsed "Tender for Widening Bridge at Featherstone," to be in the hands of Mr. R. C. Irwin, Secretary, Hunt's Bank, Manchester, not later than 10 o'clock on July 24.

JULY 24. London.—STEEL BRIDGES.—The South Indian Railway Company, Ltd., invite tenders for the supply of steel bridges, 12 ft. to 70 ft. spans, and 1,360 tons. Specifications may be obtained at the tender may be obtained at the Company's offices. Tenders, addressed to the Chairman and Directors of the South Indian Railway Company, Ltd., and marked "Tender for Bridges," must be left with Mr. Henry W. Notman, Managing Director, Company's Offices, 55, Gracechurch-street, London, E.C., not later than 12 noon of July 24. A charge, which will not be returned, will be made of a full copy of the specification. Copies of the drawings may be obtained at the office of Sir George B. Bruce, 3, Victoria-street, Westminster, on payment of 5s. per sheet on or before July 24.

JULY 24. Manchester.—COVERING OVER RIVER.—Lancashire and Yorkshire Railway Directors invite tenders for covering over of the river, near Victoria Station, Manchester. Plans can be seen, and form of tender and specification obtained, on application at the Engineer's Office, Hunt's Bank, Manchester. Tenders, endorsed "Tender for Cover-

ing Over River Irk, Victoria Station, Manchester," to be in the hands of Mr. R. C. Irwin, Secretary, Hunt's Bank, Manchester, not later than 10 o'clock a.m. on July 24.

JULY 24. Orrell Park.—A HALT.—Lancashire and Yorkshire Railway Directors invite tenders for the construction of a halt at Orrell Park, between Walton and Orrell, near Sefton. Plans can be seen, and form of tender and specification obtained, on application at the Engineer's Office, Hunt's Bank, Manchester. Tenders, endorsed "Tender for Halt at Orrell Park," to be in the hands of Mr. R. C. Irwin, Secretary, Hunt's Bank, Manchester, not later than 10 o'clock a.m. on July 24.

JULY 25. Dublin.—REPAIR OF PIER.—Dublin C.C. invite tenders for the repairing of the south pier of the harbour, Lambay Island, in accordance with the County Surveyor's specification, which may be seen in office of Mr. R. P. Blackburne, Secretary, County Dublin C.C., 11, Rutland-square, Dublin, between 11 a.m. and 3 p.m. on any day (except Saturday), when it may be seen up to 1 p.m. Tenders, endorsed "Lambay Pier," are to be lodged with the Secretary not later than 4 p.m. on July 25.

JULY 25. Longford.—WATER MAINS.—Sevenoaks R.D.C. invite tenders for providing and laying water mains, in accordance with the following:—(1) 24 in. of 2 in. cast-iron water main; (2) 1,308 ft. of 1-in. galvanised iron water pipes. Plans and specification may be seen at the office of Mr. A. Fowler, General Manager, Longford, and at the County Engineer's Office, Longford. Tenders, sealed and endorsed outside, must be sent to Mr. George F. Carnell, Clerk of the Council, Longford, on or before July 25.

JULY 25. Manchester.—The Manchester Electricity Committee invite tenders for the supply, delivery, and erection at their Dickinson-street Generating Station, Manchester, of six extra exhaust pipes. Specifications, drawings, and forms of tender may be obtained from Mr. F. E. Hughes, Secretary, Electricity Department, Town Hall, Manchester. Tenders, duly endorsed, must be sent to the Chairman of the Electricity Committee, must be delivered to the Town Hall not later than noon on July 25.

JULY 25. Middlesbrough.—CONVENIENCES.—Middlesbrough Sanitary Committee invite tenders for the erection and completion of a semi-underground convenience in Newport-road, at Boundary-road, Middlesbrough. Plans and specifications may be seen at the office of Mr. Frank Baker, C.E., F.G.S., Borough Engineer, Municipal Buildings, Middlesbrough, on payment of 10s. 6d. per plan. Tenders, sealed and endorsed, must be sent in not later than 10 a.m. on July 25, endorsed "Tender for Convenience, Newport-road," and addressed to Mr. Alfred Sackett, Town Clerk.

JULY 25. Norwich.—The Guardians of the Poor of the Norwich Incorporation invite tenders for two new Lancashire boilers and fittings, and a Green's economiser (160 tubes), to be delivered, on or before August 1, to the Corporation's Works. Plans can be seen, and copies of specification obtained, on payment of 1s. 1d. at the offices of Messrs. Morgan & Dickinson, architects and engineers, 3, Red-lion-street, Norwich. Tenders to include credit for purchase and removal of two existing boilers. Sealed tenders, endorsed "Tender for Boilers, etc.," to be delivered to the Clerk of the Guardians of the Poor, St. Andrew-street, Norwich, not later than 3 o'clock on July 25.

JULY 25. Sutton.—ELECTRIC LIGHT.—The Metro Police Sanitary Committee invite tenders for installation of electric lighting at the Downs school, Burslem-road, Sutton, Surrey, in accordance with drawings and specification prepared by Mr. W. H. Hilly, M.I.E.E., M.I.Mech.E., Engineer-in-Chief. Drawings, specification, conditions of contract, and form of tender, may be inspected at the office of the Board Engineer, Sutton, E.C., and may be obtained on payment of a deposit of 1s. 2d. Tenders, addressed as noted on the form, must be delivered at the office of the Board not later than 10 a.m. on July 25.

JULY 26. Bradford-on-Avon.—SEWAGE DISTRIBUTION.—Bradford-on-Avon U.D.C. invite tenders for the supply and fixing of sixteen 38-in. diameter reducing valves for their Sewage Disposal Works, Bradford-on-Avon; also for the supply of valves and fittings. A copy of the conditions and specification and forms of tender can be obtained of the Council's Surveyor, Mr. A. S. Woolton, Town Hall Chambers, Bradford-on-Avon, upon payment of a deposit of 1s. 1s. Sealed tenders, upon prescribed forms, marked outside "Tender for Sewage Distributors" or "Tender for Valves," etc., as the case may be, must be delivered or sent to Mr. E. Pinckney, J.P., South Waxall, Bradford-on-Avon, not later than mid-day, July 26.

JULY 26. Dublin.—STEEL RAILS, etc.—Great Southern and Western Railway (Ireland) Directors invite tenders for the supply of 4,550 tons steel rails, 40 tons steel soleplates, 150 tons steel fishplates, in accordance with the specifications, which can be obtained on application to the Company's Engineer, Inchicore, Dublin. The specifications for the rails, soleplates, and soleplates are upon separate forms, and a charge of 5s. (not returnable) will be made for each specification. Tenders, which must be made on the form attached, and sealed, must be delivered at Kilmbridge Terminus, Dublin, addressed to Mr. Francis B. Ormsby, Secretary, and endorsed "Tender for Rails, etc.," before 10 a.m. on July 26.

JULY 26. York.—DESTRUCTORS BUILDINGS.—York Corporation invite tenders for extending the destructor buildings, Foss Island Depot. Specifications and bills of quantities may be obtained at the office of Mr. A. Creer, Architect, Guildhall, York, on deposit of 1s. 1s. Tenders, endorsed "Destructor Buildings," to be delivered not later than noon on July 26.

JULY 26. Bandon.—WATERWORKS.—Bandon (Ireland) R.D.C. invite tenders for the laying of additional water mains in the town of Bandon. Plans and bills of quantities may be obtained at the Council Room at the Workhouse. Tenders, containing the names of two solvent sureties willing to become bound with the tenderer, in a total sum of £1,000, must be sent to the Clerk of the Corporation, Bandon, on or before July 26. The due performance of the work to be done with Mr. A. Haynes, Clerk of District Council, Council Room, Workhouse, before 12 o'clock noon on July 26.

JULY 30.—Ballinasloe.—ROOF FRAMES.—Supplying and erecting five iron and steel roof frames for a span of 30 ft. in the roof of the Southern Hospital, New Cross, S.E., in accordance with drawings, etc., by the Engineer-in-Chief. Drawings, specifications, etc., may be inspected at the Metropolitan Asylums Board Offices, Enbarmment, E.C., and after Monday, July 23, and obtained there on deposit of 11. Tenders, addressed as noted on form, to be delivered at above offices not later than 10 a.m. on Wednesday, August 1.

JULY 30.—Beckenham.—DUST DESTROYER.—Beckenham U.D.C. invite tenders for the extension of their dust destructor, and also for repairs and alterations to the existing cells. Particulars and forms of tender may be obtained on application to Mr. John A. Angell, Surveyor, on the production of a receipt from the collector for a deposit of 2l. Tenders, duly sealed, and endorsed "Tenders for Dust Destroyers to be replaced," to be sent to the Council, not later than 4 p.m., July 30.

JULY 30.—Durban, Natal.—STEEL TRAMWAY POLES.—The Corporation of Durban, Natal, invite tenders for the supply and delivery, "free on board," of 166 welded steel tube tramway poles, 38 ft. long, in one length, with cast-iron flanges, all of British manufacture. Particulars may be obtained on application to Messrs. J. Webster, Steel and Co., agents to the Corporation, 5, Essex-street, London, E.C., to whom tenders (sealed and endorsed) must be delivered on or before July 30.

JULY 30.—Reading.—IRONWORK.—The Corporation of Reading invite tenders for the manufacture, supply, and erection on site complete of ironwork and fittings in connection with a cattle auction with side ring—two ranges of sheep pens and two ranges of pig pens at the Corporation Cattle Market, Great Knollys-street, Reading. Drawings and specifications may be inspected, and form of tender, etc., obtained at the office of the Engineer-in-Chief, Surveyor, Town Hall, Reading. Sealed tenders, in the printed addressed envelopes provided for the purpose, must be delivered to Mr. John Bowen, Assoc. M. Inst. C.E., Reading, 10, Broad-st., Reading, Town Hall, not later than 12 o'clock noon on July 30.

JULY 30.—Rhymney.—WATER MAINS, ETC.—Rhymney U.D.C. invite tenders for the supply of cast-iron water mains, hydrants, etc., Specification, bill of quantities, and form of tender obtained of Mr. W. Lloyd Marks, Surveyor, 61, High-street, Rhymney, on payment of 1l. 1s. Sealed tenders, endorsed "Water Mains," to be sent to Mr. L. Reynolds, Clerk to the Council, Milborne-chambers, Benthley Tydfil, not later than 12 noon on July 30.

JULY 31.—Bangor.—PLANT.—The U.D.C. of Bangor, Co. Down, invite tenders for the supply and erecting complete of a sulphate of ammonia plant. Full particulars can be had at the gasworks from the Manager, Mr. B. J. O'Connell, and form of tender, "Sulphate Plant," must be delivered at office of Mr. James Miliken, Town Clerk, Town Hall, Bangor, Co. Down, not later than 12 o'clock noon on July 31.

JULY 31.—Barnstaple.—PLANT.—Metropolitan Water Board invite tenders for the construction of filter beds at Barn Elms, in the Western District. Forms of tender and contract, with specification, may be obtained on application to the District Engineer, Commercial-road, Pimlico, on production of an official receipt for the sum of 5l., which sum must be deposited with the Comptroller, at the Board's Central Office, Savoy-court, Strand, W.C. Tenders, enclosed in sealed envelopes, addressed to the Clerk of the Board, Metropolitan Water Board, Savoy-court, Strand, W.C., and endorsed "Tender for Filter Beds, Western District," must be delivered at the offices of the Board not later than 10 a.m. on July 31.

JULY 31.—Shanghai.—PLANT.—Messrs. Prece & Cardew are authorised by the Municipal Council of Shanghai to receive tenders for the supply and delivery, c.i.f. Shanghai, of the following plant:—(a) Two 600-kilowatt steam turbo-dynamos, or, as an alternative, two 200-kilowatt steam dynamos, together with condensing plant, certain pipes and valves, motor generator, switchboard, etc.; (b) two 250-horsepower boilers, with feed-water heaters, superheater, and electric starters. Feed pipes, valves, etc. Specifications, general conditions, and forms of tender can be obtained from Messrs. Prece & Cardew, 8, Queen Anne's-gate, Westminster, S.W., on payment of a deposit of 2l. for each section. Extra copies of the specification and general conditions for each section can be obtained on payment of 5s. each (non-refundable). Sealed tenders, endorsed "Shanghai Electricity Supply," are to be addressed to Messrs. Prece & Cardew, 8, Queen Anne's-gate, Westminster, S.W., and delivered before 12 o'clock noon on July 31.

AUGUST 2.—Aberdeen.—BRIDGE WIDENING.—Aberdeen Town Council invite tenders for the widening of Union Bridge by the addition on each side of a steel arch rib, and by extending the existing masonry approaches, and all other work in connection therewith. Drawings may be seen, and specification, schedule of quantities, and form of tender obtained from Mr. D. Dyack, M. Inst. C.E.,burgh Surveyor, Aberdeen, on payment of 5l. Sealed tenders, addressed to the Town Council of Aberdeen, and endorsed "Tender for Aberdeen City Improvement, Union Bridge Widening," to be lodged with the Surveyor not later than 11 o'clock a.m. on August 2.

AUGUST 3.—Goole.—RENEWAL OF BRIDGE SUPERSTRUCTURE.—North-Eastern Railway Directors invite tenders for the renewal of the superstructure of the bridge carrying the Hull and Doncaster Railway over the Lancashire and Yorkshire Railway, near Goole. Plans may be seen, and specification, detailed quantities, and form of tender obtained on personal application at the office of Mr. W. J. Cudworth, the Company's Engineer, at York. Sealed tenders, marked "Tender for the Renewal of Bridge, Goole," must be sent to the Secretary at York not later than August 3.

AUGUST 5.—Edmonton, Alta, Canada.—REUSE DESTROYERS.—Tenders are invited for destructors for the City Sanitary Department. Present population approximately 12,000. Propositions and plans

to be fully descriptive of capacity, etc., with arrangements for readily extending the plant. Plans and specifications to be delivered not later than August 5. Mr. Geo. J. Kinnaird, Secretary-Treasurer, Edmonton.

AUGUST 7.—Cradley.—CORRUGATED IRON GOODS SHED, ETC.—Tenders are required by the Great Western Railway Company for a corrugated iron goods shed, offices, etc., at Cradley. Plans and specifications may be seen, and forms of tender at the office of the Engineer at Wolverhampton Station, between 10 a.m. and 4 p.m. Tenders, marked outside "Tenders for Goods Shed, etc., Cradley," to be in by August 7.

AUGUST 9.—Painswick.—RESERVOIR.—Stroud Water Company Directors invite tenders for supplying materials and constructing a reservoir at Painswick. Also for the providing and laying of about 9,165 yds. of 6-in., 4-in., C.I. mains, and 14-in., 1-in., and 2-in. galvanised piping, together with the necessary heads, 7½ valves, etc., from Cashes Green to Painswick, Gloucestershire, in accordance with plans and specifications, which may be inspected at the company's office, 13, Kendrick-street, Stroud, on Mondays and Fridays. Tenders, to be endorsed "Extension to Painswick," are to be sent to the Secretary of the Company, 181, Queen Victoria-street, London, on or before August 9.

MISCELLANEOUS.

JULY 23.—Leeds.—GAS OIL.—Leeds Corporation Gas Committee invite tenders for the supply of 2,000 tons of gas oil for the manufacture of gas, bottled water gas, for a period of one year, commencing on September 1 next. Specification and conditions of tender may be obtained on application to Mr. R. H. Townsley, General Manager, Gas Offices, East Parade, Leeds. Tenders and samples, addressed to the Town Clerk, and enclosed in sealed envelopes, must be delivered at the Town Hall, Leeds, on or before July 23.

JULY 23.—Pontypridd.—WAGGONS.—Pontypridd U.D.C. invite tenders for the supply, complete, of five or six loaded tip waggon suitable for scavenging purposes. Specification can be seen on application at the office of the Engineer and Surveyor, Mr. P. R. A. Wylloby, A.M. Inst. C.E., Tenders, sealed, and endorsed "Waggons," must be received by Mr. J. Colenso Jones, Clerk to the Council, Municipal-buildings, Pontypridd, not later than July 23.

JULY 23.—Waltham Cross.—STEAM ROLLER.—Waltham Holy Cross U.D.C. invite tenders for the general overhauling and repairing of their steam roller. The roller may be viewed, and the specifications examined, on application to Mr. W. T. Streather, Assoc. M. Inst. C.E., Town Hall, Waltham Abbey. Tenders, in envelopes supplied by the Engineer, to reach the office of Mr. F. C. E. Jessop, Clerk to the Council, by 12 noon on July 23.

JULY 25.—Heanor.—ROLLER.—Heanor U.D.C. invite tenders for a compound 10-ton steam roller, to be delivered on or before September 29 next. Tenders, with drawings and specifications attached, endorsed "Tender for Steam Roller," to be sent to Mr. John Holbrook, Surveyor, Town Hall, Heanor, Derbyshire, by 6 o'clock on July 25.

JULY 25.—Titchhurst.—ROAD ROLLING.—Titchhurst R.D.C. invite tenders for steam rolling in their district as from the first week in November, 1906. The contractors will be required to supply one or more rollers, with driver and mule to each, scarifiers, sleeping vans, water carts, with horse and man to each, and also necessary appliances. The work to be undertaken either by the piece or by day work as the Council may determine. Forms of tender may be obtained from Mr. W. N. Wood, Surveyor, Titchhurst, on a stamped addressed foolscap envelope being forwarded Titchhurst, sealed and endorsed "Steam Rolling," must be sent to reach Mr. J. C. Lane Andrews, Clerk to the Council, Wadhurst, Sussex, not later than July 25.

JULY 25.—Tunbridge Wells.—PULLING DOWNS, ETC.—The Ground Committee of the Tunbridge Wells and South-Eastern Counties Agricultural Society invite tenders for pulling down and storing the timber used in the Society's shops, on July 25 and 27, and erecting same in 1907. Forms of tender may be obtained upon application to Mr. Charles J. Parris, Surveyor, at 67, High-street, Tunbridge Wells. Tenders to be sent in to the Surveyor, marked "Show Tender," on or before 12 o'clock on July 25.

JULY 28.—Blackley.—TERRA-COTTA.—Manchester Education Committee invite tenders for the supply of terra-cotta for the Domesday-street Municipal school, Blackley, Manchester. Plans may be seen, and a copy of the bill of quantities (including specification) may be obtained at the offices in Deansgate, Manchester, on a deposit of 1l. 1s. Tenders, on the forms and in the envelopes provided, must be delivered at the Deansgate offices of the Education Committee not later than July 28.

JULY 31.—Beaconsfield.—CARTRIDGE, ETC.—The U.D.C. of Beaconsfield invite separate tenders as follows:—(1) For the supply of a suitable horse for the carriage on the following days as required in the district at per day of ten hours: (2) For the carting of ballast from Long Bottom (at per cubic yard) and depositing the same on the following roads:—(a) Per road including Long Bottom, (b) Windsor-road, (c) Burnham-road and Hedgeley-road. Further particulars can be obtained of the Surveyor, Mr. H. W. Allen, Beaconsfield, on July 25 (tenders, under seal, and endorsed "Tender for Horse Hire and "Tender for Carting" respectively, must be sent in to Mr. C. H. Charsley, Clerk, Beaconsfield, not later than 4 o'clock p.m. on July 31).

JULY 31.—London.—ROPS, ETC.—Bombay, Baroda, and Central India Railway Company invite, up to noon on July 31, tenders for the supply of the following stores, viz. Class B, Main loading ropes, Class C, red and white lead. Tenders must be made on forms, copies of which, with specifications, can be obtained at the office of Mr. W. Constable, Secretary, Gloucester House, 2, and 4, Bishopsgate-street, Woking, London, E.C., on payment, as follows:—For Class B, 10s. 6d. each, and for Class C, 5s. each (which will not be returned).

AUGUST 1.—New Cross. FIRM GARDENS.—Tenders are invited for the supply and fixing of about fifty glass panes at the Southern Hospital, New Cross, S.E., in accordance with drawings, etc., by the Engineer-in-Chief. Drawings, specifications, etc., may be inspected at the Metropolitan Asylums Board Offices, Enbarmment, E.C., and after Monday, July 23, and obtained there on deposit of 1l. Tenders, addressed as noted on form, to be delivered at above offices not later than 10 a.m. on Wednesday, August 1.

AUGUST 11.—Aitcham.—ROLLER.—Aitcham R.D.C. invite tenders for the hire of a 10-ton steam roller, etc., from October 1, 1906, to November 30, 1906, and from March 1, 1907, to May 31, 1907, are invited. Particulars may be had on application to Mr. Mr. Joseph Everest, Clerk to the Council, St. John's Hill, Shrewsbury; or the Surveyor, Mr. F. Fortane, of Pontesbury. Also for a man and horse for the Council's water cart to work with the steam roller. Sealed tenders must be sent to Clerk not later than August 11, marked on outside "Steam Roller" or "Man and Horse," as the case may be.

NO DATE.—Hereford.—CLEANING OUT BROOK.—Persons desirous of undertaking the cleaning out of about five miles, are desired to send their names to Messrs. H. Haywood & Son, Hereford.

PAINTING, ETC.

JULY 23.—Ashton-under-Lyne.—PAINTING.—The Corporation of Ashton-under-Lyne invite tenders separately for painting the whole of the woodwork and ironwork on the exterior of the Municipal baths, and of the town hall. Specifications and tender forms, and any information may be obtained at the office of the Borough Surveyor. Tenders to be enclosed in official envelopes, sealed with wax, and endorsed "Tender for Painting Baths," and "Tender for Painting Town Hall," respectively, and they must be delivered at the office of Mr. John Neal, Borough Comptroller, Town Hall, not later than 12 o'clock noon on July 23.

JULY 23.—Huddersfield.—PAINTING.—Huddersfield Education Committee invite tenders for painting and decorating at various schools. General specifications and conditions may be seen, and forms of tender and short specification for each school obtained, on application at the offices of Mr. K. F. Campbell, M. Inst. C.E., Borough Engineer, and Mr. J. H. Gledhill, or as the case may be, signed in the handwriting of the tenderer or his agent, and addressed "Town Clerk, Town Hall, Huddersfield," must reach him not later than 10 a.m. on July 23.

JULY 23.—Knockinny.—CEILING, ETC.—For ceiling etc., Knockinny Catholic Church, according to plan and specification, to be seen at residence of Mr. John Shannon, P.P., Derrylin, on or before July 23.

JULY 24.—Birkenhead.—PAINTING.—The Corporation of Birkenhead invite tenders for painting the exterior of Ferry Buildings and Approaches. Further information, specifications, and forms of tender may be obtained on application at the office of the Ferries Manager, Woodside Ferry, Birkenhead. Tenders, sealed and endorsed "Tender for Painting Ferry Buildings," must be sent in to Mr. Alfred Gill, Town Clerk, Town Hall, Birkenhead, not later than 5 o'clock in the afternoon of July 24.

JULY 24.—Great Yarmouth.—PAINTING, ETC.—Great Yarmouth Education Committee invite tenders for washing and colouring the inside walls of the following schools: St. James's, St. John's, St. Peter's, St. Mary's (Regent-road), Hospital, and the "Daniel Tomkins" (late British). Tenders are also invited for painting the outside wood and iron work of Church-roy (Gorleston) and Cobholm Island etc. Specifications of the work to be done, and forms of tender, may be obtained at the Office of the Borough Surveyor, Town Hall, Great Yarmouth. Separate (endorsed) tenders to be delivered at the office of the Committee, 28 South Quay, Great Yarmouth, by noon on July 24.

JULY 25.—Hammersmith.—PAINTING.—Tenders are invited for painting portion of steel work of Addison-gardens Bridge. Plans and specifications may be seen, and forms of tender obtained, on application to the Borough Surveyor. Tenders, endorsed "Tender for Painting Bridge," must be delivered to the Town Clerk, Town Hall, Broadway Hammersmith, not later than 6 p.m. on July 25.

JULY 27.—Hull.—PAINTING.—Hull Corporation invite tenders for certain painting required at Drypool Bridge and North Bridge. Forms of tender and other particulars may be obtained at the City Engineer's office. Tenders, endorsed "Tender for Painting Bridges," are to be addressed to the Chairman of the Bridges Committee, and delivered at the Town Clerk's office before 10 a.m. on July 27.

JULY 27.—Salford.—PAINTING, ETC.—Salford Guardians invite tenders for whitewashing, painting, and decorating required at the following: Union Work-house, Eccles New-road, Salford; and Eccles Infirmary, Hope, near Eccles. Specifications can be obtained at offices of Mr. F. Townson, Clerk to the Guardians, Union Offices, Eccles New-road, Salford. Tenders must be delivered, in sealed envelopes, endorsed "Tender for Painting, etc.," not later than 10 a.m. on July 27.

JULY 30.—Caerau.—PAINTING.—Llandaff and Din-powia R.D.C. invite tenders for painting and glazing required at their Infectious Diseases Hospital now in course of erection at Caerau, near Cardiff, in accordance with specifications and bill of quantities which may be obtained on application to Mr. J. H. James, 18 Quay-street, Cardiff. Tenders, sealed and endorsed, to be sent to Mr. M. Warren, Clerk, Park House, Cardiff, not later than 12 noon on July 30.

JULY 30.—Warrington.—PAINTING.—Warrington Electricity and Tramways Committee invite tenders for:—(1) Painting tramway poles and brackets; (2) painting electric light standards. Particulars can be obtained on application to Mr. F. V. L. Mathias, Borough Electrical and Tramways Engineer, Howley, Warrington. Tenders must be sealed with wax, endorsed "Tender for Painting Poles," and delivered to the Chairman of the Electricity and Tramways Committee, Town Hall, Warrington.

AUGUST 4.—Faversham.—GRANITE. Faversham Corporation invites tenders for the supply of 370 tons (more or less) of Cornish granite or Rhenish basalt broken to a 2-in. gauge, and of 130 tons (more or less) of clean 4-in. Gurnsey granite, Cornish granite, or Rhenish basalt chippings free from dust. The material is to be delivered on to the Town Wharf, Faversham, or into carts or trucks as may be directed by the Borough Surveyor. The

whole of the material is to be delivered in such quantities and at such times not later than December 25, 1906, as may be ordered by the Borough Surveyor. Tenders must be accompanied by a sample of each material tendered for. Tenders in sealed envelopes, endorsed "Tender for Road Metal," must be sent to Mr. Allan Tassell, Town Clerk, 20, West-street, Faversham, not later than 12 o'clock noon on August 4.

AUGUST 4.—Saffron Walden.—GRANITE MACADAM.—Saffron Walden Corporation invite tenders for the supply and delivery at Saffron Walden Railway Station of about 450 tons of granite macadam broken to 1½-in. gauge. To be delivered in such quantities as may be required before March 31, 1907. Samples of granite, with tender, to be delivered to Mr. A. H. Forbes, Borough Surveyor, not later than 12 o'clock on August 4.

Public Appointments.

Nature of Appointment.	By whom Advertised.	Salary.	Applications to be in
*QUANTITY SURVEYOR	Metropolitan Boro., Deptford	Applicants to state terms	July 25
*DRAUGHTSMAN	Straits Settlements, P. Wks. Dept.	300l., etc.	July 28

Auction Sales.

Nature and Place of Sale.	By whom Offered.	Date of Sale.
*FREEHOLD BUILDING ESTATE, THORNTON HEATH.—At the Greyhound Hotel, Croydon	H. J. Bromley	July 24
*FREEHOLD BUILDING SITE, BOW.—At the Mart	Mark Liell & Son	do.
*DEALS, BATTENS, Etc.—Great Hall, Winchester House, Old Broad-street, E.C.	Churchill & Sims	July 25
*BUILDER AND TIMBER MERCHANT'S STOCK, Etc.—New-st. Mews, Kensington Park-rd.	B. Bailey & Co.	do.
*PLANT, MACHINERY, AND STOCK, BATTERSEA.—At 105, Lavender-hill, Battersea, S.W.	Faller, Horsey, Souls, & Cassell	July 26
*TIMBER, WANDSWORTH.—At 135, High-street, Wandsworth	H. W. Smith	do.

PATENTS.—Continued from page 112.
25,386 of 1905.—W. M. STILL & A. G. ADAMSON: Steam-heating Systems.

This invention relates to a steam-heating system, and consists of a steam supply, a radiator, a communication between said steam supply and radiator, a valve in said communication, a device adapted when acted on by the steam to hold said valve closed for a period, a by-pass from the radiator side of said valve to said device and a valvular device controlling said by-pass according to the pressure in the radiator, said device comprising a casing having an inlet passage at its end, and beyond the inlet an enlarged part, a port leading therefrom at a distance from the inlet passage and a loaded valve the body and stem of which are a sliding fit in said inlet passage and enlarged parts respectively.

1,486 of 1906.—H. E. VANSE: Slats for Fireproof Blinds or Shutters.

This relates to a fireproof blind having a body portion composed of non-metallic heat-resisting material, and its edges made of separate metallic pieces added thereto for joining the slat to other slats.

5,635 of 1906.—G. H. CHUBB, J. E. CHUBB & F. BUTTER: Adjustable Metal Shelving and Framing for same.

This relates to an adjustable shelving and framing and consists of fixed vertical standards having holes at suitable distances apart in which are placed bearing strips and of metal sheets or plates which form the shelves, the front or back edges or both front and back edges of which shelves are bent or flanged so as to retain the bearing strips in place.

5,049 of 1906.—C. E. D. WARING: Ferro-concrete Tanks and Reservoirs.

This invention relates to a ferro-concrete tank or reservoir having embedded in the cells thereof plates or sheets of suitable material adapted to form either a continuous barrier to the passage of water or so arranged as to overlap with the spaces between the overlapping parts filled with concrete, said plates being either keyed to the concrete by projections fastened thereto, or employed with or without said keying projections in combination with metal reinforcements of the known type.

15,363 of 1905.—M. S. SALTER: Counting and Registering Mechanism Applied to Locks, Latches and the like.

This relates to a registering lock for lavatory and other doors having the main bolt opened independently from the outside or inside, and counting mechanism actuated on opening the door, a second bolt operating the indicator and also the counting mechanism if the latter is not already set, which is closed independently, but withdrawn together with the main bolt.

15,651 of 1906.—J. N. RUSSELL: Heating of Buildings by the Circulation of Steam or Vapour.

This relates to an installation for heating buildings by the circulation of steam or vapour, wherein a partial vacuum is maintained in the return portion of the heating cycle, and comprises the method of automatically effecting the maintenance of a predetermined difference of pressure between the supply and return portions of the cycle, which consists essentially in utilising

variations from the normal difference of pressure between the two portions of the cycle, by co-action with a yielding resistance of substantially constant value, to control the pressure in the supply portion of the cycle, by regulating the supply of motive power to the apparatus which serves to maintain a partial vacuum in the return portion of the cycle.

17,671 of 1905.—G. CHISHOLM: Socket Connections between Water-closet Pans and Soil Pipe Bends. This relates to socket connections between water-closet pans and soil-pipe bends, and consists of a socket formed from sheet metal, and which is provided with a stamped or spun annular recess at or near its outer end.

18,066 of 1905.—O. C. KINGCAID: Valve Water-Closets and In-flushing Apparatus therefor.

This relates to a valve water-closet and flushing apparatus therefor, and consists of a casing, a diaphragm in said casing having an aperture and a flange surrounding said aperture and constituting a seat, a bowl mounted in said seat, stems extending through slots in opposite sides of the aperture valve members at the lower ends of said stems co-operating to form a closure for the bowl and counterweights at the upper ends of the stems.

16,049 of 1905.—W. D. TUCK: Scaffolding.

This relates to a scaffolding, and consists in the combination of pullock brackets in halves with bolts and nuts for fastening the half-brackets together and clamping the pullocks to the structure, angle pieces carried by the pullocks, bolts and a coupling bolt between each opposite pair of angle pieces.

20,115 of 1905.—A. BAUCE: Ball or Float Cocks.

This relates to a ball or float cock, and consists of a contrivance for deadening the noise due to the rush of water whenever the cock is opened, and consists of a cup or vessel which is removably fitted to the cock below the outlet thereof, and is provided with a cap or cover having a depending rim which directs the water downwards.

20,043 of 1905.—W. E. MORRIS: Manufacture of Dust Preventers for Domestic Fire Grates.

This relates to the manufacture of a dust preventer for domestic fire-grates, consisting in turning over and strengthening the edges of the blank, stamping a raised pattern on the same to extend round the front and sides of the dust preventer, stamping a gutter along each to the larger sides of the blank to form the bottom bead and the top bead, which latter is strengthened by a bar laid and enclosed therein, and finally forming the rounded ends of the dust preventer by bending the end portions of the blank between a block made with a flange to fit in the bottom channel of the blank and a plate or Jacob which is grooved to suit the blank and the bottom bead of the same, and has a flange to take under the bottom of the blank to prevent the same from buckling whilst it is being bent.

20,860 of 1905.—W. KINDLER: Kitchen Ranges. This relates to a kitchen range, and consists of a ventilator adapted to lead the air sucked in from outside the range directly beneath the range grate, or, by turning a flap provided for this purpose, into the flue of the range.

21,178 of 1905.—H. SIMMONS: Safety Door Bolt.

This relates to a safety door bolt, and is distinguished by having the removable pin which can be passed through or into the shoot bolt when in its extended or shot position, in such a way as to prevent the shoot being pushed back without the removal of the pin.

22,312 of 1905.—W. MORGAN: Chimney-pieces.

This relates to a box or like chimney-piece having its jambs, frieze and shelf each complete in itself, and formed of suitably-shaped tiles assembled together and held in the required position to form the respective parts by a cement or other backing.

18,249 of 1905.—G. ROSE: Apparatus for Repairing Drains.

This relates to an apparatus for repairing drains, and consists of a plain spindle on which are mounted two rubber discs with a plate bolted to the back of the front disc, and with a collar fixed to the outer side of each disc.

20,781A of 1905.—W. D. HARDING: Porous Drain-pipe.

This relates to the construction of drain and the like pipes having tubes which are entirely or partly porous, with ends either or both of which are solid or non-porous.

24,839 of 1905.—J. E. W. BRYNING: Tools for Roughing, Shaping, and Finishing Stone.

This relates to an apparatus for roughing, shaping and finishing stone, comprising heads carrying a beam, a number of sets of spaced blades, the closeness of which are varied by packing strips of varying width and means for attaching said sets of blades in successive and in correct position to the beam.

1172 of 1906.—A. ABEY: Water Heating Arrangements for Gas and like Cooking Stoves.

This relates to a cooking apparatus with an arrangement for heating water, and is characterised by the fact that the hollow part of the apparatus is subjected to heat, and is in communication with a water vessel placed above by means of two pieces, one of which terminates at the bottom, whilst the opening to the other one is situated higher up for the purpose of obtaining a circulation of the water.

SOME RECENT SALES OF PROPERTY.

ESTATE EXCHANGE REPORT.		
July 2.—By WILKINSON, SON, & WELCH (at Brighton).		
Brighton.—9, King's Rd. (S.), f. y. r. 100l.		£1,200
36, Regency-sq., f. y. r. 190l.		1,800
July 3.—By NICHOLAS, DENYER, & CO. (at Tonbridge).		
Tonbridge, Kent.—1 to 6, The Ter., f. a. r. 234l. 6s.		3,775
July 4.—By KEMSLEY (at Romford).		
Romford, Essex.—1 to 5, Gage's cottages, f. ..		390
84, Andrew's-rd., "Lawn Cottage," f.		340
Korlehaw-rd., freehold building plot.		100
Dagenham, Essex.—1 to 4, Rectory-rd., f.		1,650
1 to 24, Victoria-cottages, f.		2,485
25 to 29, Gladstone-ter., f.		665
By FAREBROTHER, ELLIS, & CO. (at Biggleswade).		
Biggleswade, Beds.—Drove-lane, three building sites, 3 acres, f.		865
The Baulk, a building site, 1 a. 1 r. 24 p., f. ..		800

July 5.—By THURGOOD & MARTIN, & WINTER- TON & SONS (at Stoke-on-Trent). Draycott Staffs.—The Draycott Estate, 3,830 a. 0 r. 4 p. l. (in two lots).....	£99,000
By CECIL HORDAY (at Putney). Putney.—Dryburgh-rd., "Brebby," u.t. 77½ yrs., g.r. 161. 10s. e.r. 100l.	1,550
July 6.—By LANGRIDGE & FREEMAN (at Tunbridge Wells). Crowborough, Sussex.—South View, freehold building land, 7 a. 1 r. 29 p. f.	575
By HASLEM & SON (at Charlbury). Charlbury, Oxon.—"Banbury Hill Farm," 23 a. 0 r. 18 p. f.	530
Various enclosures, 27 a. 3 r. 8 p. f.	830
Six freehold cottages.....	315
July 7.—By NORRIS & DUNNELL (at Hertford). Great Alwittell, Herts.—"Brooms Farm," 42 a. 3 r. 10 p. f. (in lots).....	3,960
Ware, Herts.—86 and 88, High-st. (s.), l., y.r. 42l.	825
Waltham-rd., four freehold building sites.....	850
July 9.—By BALLS & BALLS. Fyfield.—"Little Widney Farm," 46 a. 1 r. 5 p. l., y.r. 60l. 15s. 5d.	1,200
Three freehold enclosures, 12 a. 2 r. 8 p. f.	530
By ERNEST J. GALE. Mount Bures, &c., Essex.—"Balls Farm," 104 a. 1 r. 1 p. f.	850
Tillingham, Essex.—"Brick House Farm," 24 a. 1 r. 8 p. f.	325
"Marks Farm," 158 a. 2 r. 23 p. f.	1,150
"Stova Farm," 5 a. 1 r. 16 p. f.	900
"Brook Fields," 5 a. 1 r. 16 p. f.	175
"Loggatt's and Wattle Farm," 187 a. 3 r. 1 p. f.	1,600
"Smarie" and 4 a. 3 r. 27 p. f.	150
By G. A. McDOWALL. West Ham, Surrey.—"Henden's Yard" (site), c. y.r. 10l.	300
By MAY & ROWDEN. Marlebone.—10 and 11, Molyneux-st., f. e.r. 100l.	1,300
By ROGERS, CHAPMAN & THOMAS. South Kensington.—34, Bardsley-cres., u.t. 60 yrs., g.r. 8l. y.r. 60l.	500
Merton.—5, Nursery-rd., f. w.r. 24l. 14s.	210
12 and 13 Park-rd., f. w.r. 60l. 14s.	400
By SWICKED, BOX & WALLS. Ruislip, Middx.—Chesney Farm-rd., a freehold orchard, 3 a. 1 r. 25 p.	620
Eastcote Hall-rd., a freehold enclosure, 2 a. 2 r. 12 p.	260
July 10.—By COCKETT & HENDERSON. Wanstead.—13, Grove-rd., f. e.r. 50l.	500
By SIMPSON & MOORE. New Cross.—2, Shardloes-rd., u.t. 46 yrs., g.r. 4 l., y.r. 32l.	235
8, Shardloes-rd., u.t. 52½ yrs., g.r. 6l. e.r. 34l.	260
18 and 20, New Cross-rd., f. y.r. 82l.	1,050
Pomeroys-st., the "Canton Arms" b.h., f. y.r. 35l.	580
3, Pomeroys-st. (s.), l., y.r. 20l.	405
By TREBINDER & CO. Wimbledon.—18, South Park-rd., u.t. 71 yrs., g.r. 104l. p.	550
By S. & G. KINGSTON (at Spalding). Whaplole, Lincs.—"Eagle House Estate," 77 a. 0 r. 19 p. f.	3,400
By A. J. ROBERTS (at Chislewick). Acton Green.—58, Rothchill-rd., u.t. 64½ yrs., g.r. 44l. 10s.	325
Gunnery-bldg., 1, 2, and 4, Wellesley Villas, u.t. 97 yrs., g.r. 21l., y.r. 107l.	1,160
By THOMSON & CO. (at Penitence). Bampton, Westmorland.—The Fieldgate Estate, 43 a. 0 r. 30 p. f. and c.	2,206
Watermill-lock, Cumberland.—The Baldow Estate, 35 a. 2 r. 6 p. f.	1,275
By OROILL, MARES, & BARLEY (at Masons' Hall Tavern). Haymarket.—St. Alban's-pl., The "White Lion" p.h., u.t. 6 yrs., y.r. 80l., with good will.	600
By E. J. VIDLER (at Ashford). Bethersden, Kent.—"Russell Farm," 51 a. 2 r. 27 p. f.	1,010
"Tippit Farm," 62 a. 2 r. 0 p. f.	550
"Ring Farm," 22 a. 0 r. 20 p. f.	520
"Star Farm," 26 a. 3 r. 19 p. f.	435
Various enclosures, 63 a. 1 r. 30 p. f.	935
Part of "Wassenden Farm," 62 a. 3 r. 39 p. f.	460
Smarden, Kent.—"Little Ronden Farm," 183 a. 2 r. 38 p. f.	2,100
"Snappill Farm," 24 a. 2 r. 6 p. f.	550
"North American Fields," 1 a. 2 r. 39 p. f.	60
"Manney Wood," 6 a. 2 r. 21 p. f.	30
June 11.—By BAXTER, PAYNE, & LEPPER. Kenilworth.—22 and 24, Rhyel-st. (s.), 56½ yrs., g.r. 144l., y.r. 92l.	615
Caledonian-rd.—Freeling-st., f.g.r. 10l., u.t. 38½ yrs., g.r. 34l.	226
New Cross.—3 to 8, Park-rd., u.t. 26 yrs., g.r. 41l. 1s. 6d., y.r. 35l.	1,195
Peckham.—14, Montpelier-rd., u.t. 44½ yrs., g.r. 6l. 6s., y.r. 32l.	800
By J. G. PLATT. Hounslow, Middx.—1 to 12, Oxford-rd., f., y.r. 313l.	3,080
Hammersmith.—109, "The Grove," u.t. 70 yrs., g.r. 111l., y.r. 55l.	620
Chislewick.—14, Sutton Court-rd., f. p.	890
By RAWLINS & CO. Wimbledon.—Quick-rd., f.g. rents, 26l., reversion in 73 yrs.	680
Hardy-rd., f.g.r. 26l. 12s., reversion in 73 yrs. Haydon-rd., f.g.r. 26l. 12s., reversion in 73½ yrs.	435
Wandswoth.—Abbeide-rd., f.g.r. 164l. 10s., reversion in 91 yrs.	375
By FRANKLIN & SON (at Braine). Finchfield, Essex.—"Lophams Farm," 195 a. 2 r. 4 p. f. and c.	1,550

Stebbing, Essex.—A freehold residence and 0 a. 2 r. 14 p.	£400
Three enclosures of land, 14 a. 2 r. 63 p. f.	370
July 12.—By R. W. COPE. Portman-square.—12, Old Quebec-st., u.t. 4 yrs., g.r. 16l., y.r. 95l.	100
By A. & A. FIELD. Mile End.—22, Underwood-st., l., w.r. 31l. 4s. g.r. 11l., w.r. 70l. 4s.	300
Clapham.—30, Lydon-rd., s.t. 64 yrs., g.r. 7l. 17s. 6d. p.	595
Tooting.—110 and 112, Esplanade-rd., u.t. 97 yrs., g.r. 11l., w.r. 70l. 4s.	445
55 and 49, Chertsey-st., u.t. 97½ yrs., g.r. 10l., y.r. 62l. 8s.	300
Dulwich.—Dulwich-rd., a freehold building site Commercial-rd. East.—32 to 50 (even), Unber- ston-st., f. w.r. 224l. 18s.	200
Row.—17 and 19, Vinlet-rd., l., w.r. 62l.	1,600
Poplar.—29, Goodcliffe-st., u.t. 19, Alton-st., f., w.r. 41l. 12s.	465
Leytonstone.—21, Forest-drive East, u.t. 76 yrs., g.r. 7l. p.	280
By NEWSON, SHEPHERD & EDWARDS. Hoxton.—20, Buckland-st., u.t. 28 yrs., g.r. 6l., e.r. 36l.	365
New Southgate.—8, Friern Barnet-rd., u.t. 47 yrs., g.r. 5l. 4s. 45l.	255
By STIMSON & SONS. Wandsworth.—114 and 116, High-st. (s.), f. y.r. 98l.	250
Homerton.—Durrington-rd., f.g.r. 6l., reversion in 67 yrs.	1,175
Camberwell.—85, Paulet-rd., u.t. 61 yrs., g.r. 7l., y.r. 44l.	100
Woodford.—78, g.r. 10l. 10s., e.r. 45l.	280
Peckham.—24, Clifton-cres., f. y.r. 28l.	430
By DANIEL WATNEY & SONS. Smitham, Surrey.—Off-lane, a freehold, free- hold building land with the Stock Nest Farmhouse, etc., 20 a. 0 r. 23 p.	11,600
By FAREBROTHER, ELLIS, & CO. Tooting.—6, Longley-rd., u.t. 77½ yrs., g.r. 10l., y.r. 60l.	500
St. Pancras.—35 to 41 (odd), Drummond-st., and 23 and 24, Lancing-st., u.t. 13 yrs., g.r. 18l., y.r. 410l.	1,300
Balham.—45, 37, 39, 40, 41, 42, 43, and 45, Ouseley-rd., f. y.r. 304l.	3,785
29, 28, 30, 34, and 68, Sarfild-rd., f. y.r. 187l. Acton.—6 to 11 (odd), shad-rd., u.t. 78 yrs., g.r. 40l., y.r. 196l.	2,000
Tottenham.—14 to 25, Nelson-rd., u.t. 73 yrs., g.r. 48l., y.r. 280l.	1,400
By HALL, PAINE, & CO. (at Portsmouth). Farrington, Hants.—"Oaklands Farm," 17 a. 2 r. 28 p. f.	1,250
Two freehold building plots, 1 a. 1 r. 2 p.	1,490
July 13.—By PORTER. Hampstead.—Winder-tar, "Olm Bank," and 4 acres, u.t. 43 yrs., g.r. 24l. p.	255
4, Pilgrim-st., u.t. 83 yrs., g.r. 8l., e.r. 55l.	2,425
By PROTHOROE & MORRIS. Leyton.—5 and 6, Station-rd., u.t. 71½ yrs., g.r. 12l., e.r. 70l.	625
Leytonstone.—55 and 57, Southwell Grove-rd., f. w.r. 62l. 8s.	350
Forest Gate.—Field-rd., f.g. rents, 8l. 8s., reversion in 51 yrs.	520
By W. B. HALETT. City.—Angel-court, f.g.r. 60l., reversion in 31 Whitechapel.—3, Old Montague-st., also Nag's Head Yard, area 14,400 ft. f. y.r. 350l.	3,660
Chelsea.—18, 22, 24, 26, 28, 30, 32, 34, 36, 38, 40, 42, and 46, Bernshaw-rd., u.t. 47½ yrs., g.r. 74l., y.r. 574l. (in lots)	4,000
Portman-square.—5, Montagu-pl., u.t. 18 yrs., g.r. 80l. p.	4,875
Concessions used in these plots: f. for freehold ground-rent; l.g.r. for leasehold ground-rent; f.g.r. for improved ground-rent; g.r. for ground-rent; r. for rent; f. for freehold; c. for copyhold; l. for leasehold; p. for possession; a.t. for estate rental; w.r. for weekly rental; q.r. for quarterly rental; y.r. for yearly rental; u.t. for unexpired term; p.a. for per annum; yrs. for years; l.a. for lane; st. for street; rd. for road; sq. for square; pl. for place; ter. for terrace; cres. for crescent; av. for avenue; gds. for gardens; yd. for yard; gr. for grove; b.h. for beerhouse; p.h. for public-house; o. for office; s. for shops; ct. for court.	1,000

MEETING.

SATURDAY, JULY 21.
Association of Municipal and County Engineers.—
Western Counties District Meeting to be held at Trow-
bridge and Devizes.

PRICES CURRENT OF MATERIALS.

. Our aim in this list is to give, as far as possible, the
average prices of materials, not necessarily the lowest.
Quality and quantity obviously affect prices—a fact
which should be remembered by those who make use of
this information.

BRICKS, &c.	
Hard Stocks.....	1 0 0 per 1000 alongside, in river.
Bought Stocks and Grizzlies.....	1 6 0 " " " "
Picked Stocks for Facing.....	2 15 0 " " delivered.
Flettons.....	1 7 0 " " at railway depot.
Red Wire Cuts.....	1 13 0 " " " "
Red Face Bricks.....	3 12 0 " " " "
Best Bed Pressed Buxton Facing.....	5 0 0 " " " "
Best Blue Pressed Staffordshire.....	3 15 0 " " " "
Do. Bullnose.....	4 0 0 " " " "
Best Stourbridge Fire Bricks.....	3 14 0 " " " "

BRICKS, &c. (continued).			
GLAZED BRICKS.			
Best White and Ivory Glazed Stretchers.....	2 8 d.	0 0	per 1000 at railway depot.
Headers.....	11 0 0	"	" "
Quoins, Bullnose, and Flat.....	16 0 0	"	" "
Double Stretchers.....	19 0 0	"	" "
Double Headers.....	16 0 0	"	" "
One Side and two Ends.....	19 0 0	"	" "
Two Sides and one End.....	20 0 0	"	" "
Spays, Cham- fered, Squints.....	20 0 0	"	" "
Best Dipped Salt Glazed Stretch- ers, and Headers.....	12 0 0	"	" "
Quoins, Bullnose, and Flat.....	14 0 0	"	" "
Double Stretchers.....	15 0 0	"	" "
Double Headers.....	14 0 0	"	" "
One Side and two Ends.....	15 0 0	"	" "
Two Sides and one End.....	15 0 0	"	" "
Spays, Cham- fered, Squints.....	14 0 0	"	" "
White and Dipped Salt Glazed.....	2 0 0	"	less than best.
Thames and Pit Sand.....	6 d.		9 per yard, delivered.
Thames Ballast.....	5 3	"	" "
Best Portland Cement.....	25 0	"	per ton, "
Best Ground Blue Lime.....	19 0	"	" "
NOTE.—The cement or lime is exclusive of the ordinary charge for sacks.			
STONE.			
Grey Stone Lime.....	11s. 0d.		per yard, delivered.
Stourbridge Fireclay.....	27s. 0d.		per ton at rly. dpt.
BATH STONE.—delivered on road wag- gons, Paddington Depot.....			
Do. do. delivered on road wag- gons, Nine Elms Depot.....	1 6 2	"	" "
PORTLAND STONE (20 ft. average). Brown Whitbed, delivered on road waggons, Paddington Depot, Nine Elms Depot, or Fimlico Wharf.....	2 1	"	" "
White Banded, delivered on road waggons, Paddington Depot, Nine Elms Depot, or Fimlico Wharf.....	2 2 1/2	"	" "
YORK STONE.—Robt. Hood Quality.			
Scrapped random blocks, 2 10	"	"	" "
6 in. sawn two sides land- ings to sizes (under 40 ft. super.).....	2 3	"	per ft. super., "
6 in. rubbed two sides ditto, ditto.....	2 6	"	" "
3 in. sawn two sides slabs (random sizes).....	0 11 1/2	"	" "
2 in. to 2 1/2 in. sawn one side slabs (random sizes).....	0 7 1/2	"	" "
1 1/2 in. to 2 in. ditto, ditto 0 6	"	"	" "
HARD YORK.—			
Scrapped random blocks, 3 0	"	"	per ft. cube, "
6 in. sawn two sides land- ings to sizes (under 40 ft. super.).....	2 8	"	per ft. super., "
6 in. rubbed two sides ditto.....	3 0	"	" "
3 in. sawn two sides slabs (random sizes).....	1 2	"	" "
2 in. self-faced random flags.....	0 5	"	" "
HOPTON WOOD (Hard Bed) in blocks 2 0 per ft. cube, deliv- ery, depot.			
" " " 6 in. sawn both sides landings 2 7	"	"	per ft. super. deliv. ry, depot.
" " " 3 in. sawn both sides random slabs.....	1 0	"	" "
" " " 2 in. do. 0 8 1/2	"	"	" "
SLATES.			
In. In. £ s. d.			
30x10 best blue Bangor.....	13 17 6	"	per 1000 of 1200 at r. d.
20x12.....	13 0 0	"	" "
20x10 first quality.....	13 0 0	"	" "
20x12.....	7 5 0	"	" "
16x8.....	7 5 0	"	" "
20x10 best blue Fort- madoc.....	12 12 6	"	" "
16x8.....	12 12 6	"	" "
20x10 best European fading green.....	15 17 6	"	" "
20x12.....	18 7 6	"	" "
16x8.....	13 5 0	"	" "
20x10 permanent green.....	11 12 6	"	" "
18x10.....	9 12 6	"	" "
16x8.....	12 12 6	"	" "
TILES.			
Best plain red roofing tiles.....	4 0	"	per 1000 at rly. depot.
Hip and Valley tiles.....	3 7	"	per doz.
Best Broseley tiles.....	60	"	per 1000
Do. Ornamental tiles.....	63 6	"	" "
Hip and Valley tiles.....	4	"	per doz.
Best Buxton red, brown, or brindled do. (Edwards).....	57	"	per 1000
Do. Ornamental do.....	60	"	per 1000

TILES (continued).

Hip tiles	4	0	per doz at rly. depôt.
Valley tiles	3	0	"
Best Red or Mottled Staffordshire do. (Pekes)	51	9	per 1000
Do. Ornamental do.	54	6	"
Hip tiles	4	1	per doz.
Valley tiles	3	8	"
Best "Rosemary" brand plain tiles	48	0	per 1000
Best Ornamental tiles	50	0	"
Hip tiles	4	0	per doz.
Valley tiles	3	8	"
Best "Hartshill" brand plain tiles, sand-faced	50	0	per 1000
Do pressed	47	6	"
Do. Ornamental do.	50	0	"
Hip tiles	4	0	per doz.
Valley tiles	3	6	"

WOOD.

Deals: best 3 in. by 11 in. and 4 in. by 9 in. and 11 in.	£ s. d.	£ s. d.
Deals: best 3 by 9	13	0 15 0 0
Battens: best 24 in. by 7 in. and 8 in. and 3 in. by 7 in. and 8 in.	11	0 12 0 0
Battens: best 24 by 6 and 3 by 6	10	0 10 0 0
Deals: seconds	10	0 10 0 0
Battens: seconds	10	0 10 0 0
2 in. by 4 in. and 2 in. by 5 in.	8	10 0 10 0
Foreign Sawed Boards—1 in. and 1½ in. by 7 in.	0	10 0 more than battens.
3 in.	1	0 0
Fir timber: best middling Danzig or Mersey (average specification)	4	10 0 5 0 0
Seconds	4	0 0 4 10 0
Small timber (8 in. to 10 in.)	3	12 0 3 15 0
Small timber (10 in. to 8 in.)	3	10 0 3 10 0
Swedish balks	2	10 0 3 0 0
Pitch-pine timber (30 ft. average)	4	0 0 4 15 0

JOISTERS' WOOD.	At per standard.
White Sea: first yellow deals, 3 in. by 11 in.	34 0 0 25 0 0
Battens, 2 in. by 9 in. and 3 in. by 7 in.	6 10 0 18 0 0
Second yellow deals, 3 in. by 11 in.	18 10 0 20 0 0
Battens, 2 in. by 9 in. and 3 in. by 7 in.	17 10 0 19 0 0
Third yellow deals, 3 in. by 11 in.	13 10 0 14 10 0
Battens, 2 in. by 9 in. and 3 in. by 7 in.	13 10 0 15 0 0
Petersburg: first yellow deals, 3 in. by 11 in.	21 0 0 22 10 0
Battens, 2 in. by 9 in. and 3 in. by 7 in.	18 0 0 19 10 0
Second yellow deals, 3 in. by 11 in.	16 0 0 17 0 0
Battens, 2 in. by 9 in. and 3 in. by 7 in.	14 10 0 16 0 0
Third yellow deals, 3 in. by 11 in.	13 0 0 14 0 0
Battens, 2 in. by 9 in. and 3 in. by 7 in.	12 10 0 13 0 0

White Sea and Petersburg—First white deals, 3 in. by 11 in.	14 10 0 15 10 0
Battens, 2 in. by 9 in. and 3 in. by 7 in.	13 10 0 14 10 0
Second white deals, 3 in. by 11 in.	11 0 0 12 0 0
Battens, 2 in. by 9 in. and 3 in. by 7 in.	10 10 0 11 0 0
Pitch-pine deals: 3 in. by 11 in.	18 0 0 21 0 0
Under 2 in. 1 ft. extra	0 10 0 1 0 0
Yellow Pine—First, regular sizes	44 0 0 upwards.
Oddments	32 0 0
Seconds, regular sizes	33 0 0
Yellow Pine edmonds	28 0 0
Kauri Pine—Planks, per ft. cube	0 3 6 0 5 0
Danzig and Stettin Oak Logs—Large, per ft. cube	0 3 0 0 3 6
Small	0 2 6 0 2 6
Wainscot Oak Logs, per ft. cube	0 5 6 0 6 0
Dry Wainscot Oak, per ft. sup. as inch.	0 0 8 0 0 8 1/2
3 in. do.	0 0 7 0 0 7 1/2
Dry Mahogany—Honduras, Tebaco, per ft. super. as inch.	0 0 9 0 0 1 0
Selected, Figury, per ft. super. as inch.	0 1 6 0 0 2 6
Dry Walnut, American, per ft. super. as inch.	0 0 10 0 0 1 0
Task, per load	17 0 0 22 0 0
American Whitewood Planks, per ft. cube	0 4 0 0 5 0

Prepared Flooring, etc.—1 in. by 7 in. yellow, planed and shot	0 13 6 0 17 6
1 in. by 7 in. yellow, planed and matched	0 14 0 0 18 0
1½ in. by 7 in. yellow, planed and matched	0 16 0 0 1 0 0
1 in. by 7 in. white, planed and shot	0 12 0 0 14 6
1 in. by 7 in. white, planed and matched	0 12 6 0 15 0
1 in. by 7 in. white, planed and matched	0 15 0 0 16 6
1 in. by 7 in. yellow, matched and beaded or V-jointed brds.	0 11 0 0 13 6
1 in. by 7 in.	0 14 0 0 18 0
1 in. by 7 in. white	0 10 0 0 11 6
1 in. by 7 in.	0 12 6 0 15 0
6 in. at 6d. to 9d. per square less than 7 in.	

JOISTS, GIRDES, &c.

In London, or delivered Railway Vans, per ton.	£ s. d.	£ s. d.
Bolled Steel Joists, ordinary sections	7	0 0 7 10 0
Compound Girder, ordinary sections	9	0 0 10 0 0
Steel Compound Sections, Angles, Tees, and Channels, ordinary sections	12	0 0 13 0 0
Angles, Tees, and Channels, ordinary sections	9	0 0 10 0 0
Fitch Plates	9	0 0 10 0 0
Cast Iron Columns and Stanchions including ordinary patterns	7	10 0 8 10 0

IRON—Common Bars	8	0 0 8 10 0
Staffordshire Crown Bars, good merchant quality	8	10 0 9 0 0
Staffordshire "Marked Bars"	8	10 0 9 0 0
Mild Steel Bars	8	15 0 9 0 0
Hoop Iron, basis price	9	5 0 9 10 0
Galvanised	17	0 0 —
"And upwards, according to size and gauge."		

SHEET IRON BLACK—Ordinary sizes to 20 g.	9	10 0 —
" " 24 g.	10	10 0 —
" " 26 g.	12	0 0 —
Sheet Iron, Galvanised, flat, ordinary quality—Ordinary sizes, 6 ft. by 2 ft. to 3 ft. to 20 g.	14	0 0 —
Ordinary sizes to 22 g. and 24 g.	14	10 0 —
Sheet Iron, Galvanised, flat, best quality—Ordinary sizes to 20 g.	17	0 0 —
" " 22 g. and 24 g.	17	10 0 —
Galvanised Corrugated Sheets—Ordinary sizes 6 ft. to 8 ft. 20 g.	14	0 0 —
" " 22 g. and 24 g.	14	10 0 —
Best Soft Steel Sheets, 22 g. & 24 g.	12	10 0 —
Best Soft Steel Sheets, 22 g. & 24 g.	12	10 0 —
Cut Nails, 3 in. to 6 in.	9	10 0 9 15 0
(Under 3 in., usual trade extras.)		

LEAD, &c. Per ton, in London.

LEAD—Sheet, English, 3lb. and up.	19	5 0 —
Pipe in coils	19	15 0 —
Soil pipe	22	5 0 —
Composite pipe	22	5 0 —
ZINC SHEET—Vieille Montagne	33	0 0 —
Silesian	32	15 0 —
COPPER—Strong Sheet	0	1 1 —
Thin	0	1 1 —
Copper nails	0	1 0 —
BRASS—Strong Sheet	0	1 1 —
Thin	0	1 1 —
TR—English Ingots	0	1 10 —
Solder—Plumbers	0	0 0 —
Timmen's	0	0 11 —
Blowpipe	0	1 0 —

ENGLISH SHEET GLASS IN CRATES OF STOCK SIZES.

15 oz. thirds	24	1/2 per ft. delivered.
" fourths	34	" "
21 oz. thirds	34	" "
" fourths	44	" "
26 oz. thirds	44	" "
" fourths	54	" "
32 oz. thirds	54	" "
" fourths	64	" "
Fluted Sheet, 15 oz.	34	" "
" 21 oz.	44	" "

ENGLISH BOLLED PLATE IN CRATES OF STOCK SIZES.

A Hartley's	24	d. per ft. delivered.
" "	24	" "
Figured and Oxford Rolled	31	" "
"Oceanic" Glass, white	44	" "
Do. "tinted"	54	" "

OILS, &c.

Raw Linseed Oil in pipes	per gallon	£ s. d.
" " in barrels	0	1 11
Boiled " in drums	0	2 1
" " in pipes	0	2 0
" " in barrels	0	2 1
Turpentine in barrels	0	2 3
" in drums	0	4
Genuine Ground English White Lead	per ton	22 10 0
Red Lead, Dry	per cwt.	21 10 0
Best Linseed Oil Putty	per barrel	12 10 0
Stockholm Tar	per barrel	12 10 0

VARNISHES, &c.

Fine Pale Oak Varnish	per gallon	£ s. d.
Pale Copal Oak	0	8 0
Superfine Pale Elastic Oak	0	10 6
Fine Extra Hard Church Oak	0	10 0
Superfine Hard-drying Oak, for seats of Churches	0	15 0
Fine Elastic Carriage	0	16 0
Superfine Pale Elastic Carriage	0	16 0
Fine Pale Maple	0	16 0
Finest Pale Copal	0	18 0
Extra Pale French Oil	0	18 0
Eggshell Flattening Varnish	0	18 0
White Copal Enamel	1	4 0
Best Japan Paper	0	19 0
Best Japan Gold Size	0	16 0
Best Black Japan	0	16 0
Oak and Mahogany Stain	0	19 0
Brunswick Black	0	19 0
Berlin Black	0	19 0
Knottin	0	10 0
French and Brush Polish	0	10 0

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Remittances payable to J. MORGAN should be addressed to The Publisher of "THE BUILDER," Catherine-street, W.C.

SUBSCRIBERS IN LONDON AND THE SUBURBS, by prepaying at the Publishing Office 18s. per annum (62 numbers) or 6d. per quarter (13 numbers), can ensure receiving "The Builder" by Friday Morning's Post.

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We are compelled to decline pointing out books and giving addresses.

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All communications regarding literary and artistic matters should be addressed to THE EDITOR; those relating to advertisements and other exclusively business matters should be addressed to THE PUBLISHER, and not to the Editor.

TENDERS.

Communications for insertion under this heading should be addressed to "The Editor," and must reach us not later than 10 a.m. on Thursdays. [N.B.—We cannot publish Tenders unless authenticated either by the architect or the building-owner; and we cannot publish announcements of Tenders accepted unless the amount of the Tender is stated, nor any list in which the lowest Tender is under 100£, unless in some exceptional cases and for special reasons.]

* Denotes accepted. † Denotes provisionally accepted.

ANGLESEY.—For additions and alterations to the "Elm" C.M. Chapel, Llandudno, Mr. J. Owen, F.R.I.A.A., Menai Bridge and Holyhead.

Hugh & J. Williams, From Deg. Llanfyllid £ 2717

BRADFORD.—For erecting mechanical and tinners workshop in Frederick-street and Eastbrook-lane, Messrs. T. C. Hogg & Son, architects, 23, Bank-street, Bradford. Quantities supplied by the architects.

Jobbers: Toothill & Balmforth " amount of Plumber: S. Rushworth " accepted Plasterer: W. Bagnatons " tenders. *Barnes: J. Walsh & Sons " £ 1,085. [Total of highest tenders for the same work, £1,360. 65 tenders were received.]

[All of Bradford and neighbourhood.]

BRADFORD.—For new warehouse in Thornton-road and Quebec-terrace, Mr. E. H. Parkinson, architect, conside-gate-chambers, Bradford.

Yorkshire Homeopathic Contracting Co., Ltd., Leeds. Messrs. Pakes, Kershaw, & Sons, Bradford. Joiner: W. Cowan, Bradford. Plumber: E. Fox, Bradford. Sinter: T. Nelson & Son, Bradford. Plasterers: T. Cordingley & Sons, Bradford. Painter: T. H. Hewitt, Bradford.

BRIGHTON.—For internal and external repairs, painting etc. to schools, for the Education Committee. Messrs. T. Simpson & Son, surveyors, 17, Ship-street, Brighton.

Pelham-street Schools. G. R. Lockyer £198 0 0 E. Howell £173 0 0 G. Ayling & Sons £179 0 0 J. Barnden £168 0 0 Geering & Sons £179 0 0 Bell & Sons £152 8 0 Gates & Sons £175 0 0 Oliver & Sons £149 0 0

Preston-road and Hanover-terrace Schools. J. Barnden £251 0 0 Geering & Sons £258 0 0 Holloway Bros. £181 8 0 G. R. Lockyer £67 15 0 Gates & Sons £69 10 0 Bell & Sons £47 7 0

Queen's Park and St. Luke's-terrace Schools. Geering & Sons £104 J. E. Howell £70 J. D. Cheal £76 J. Barnden £65 Oliver & Sons £72 Gates & Sons £65

York-place Girls' School. G. R. Lockyer £258 Gates & Sons £170 Geering & Sons £254 Oliver & Sons £167 J. Barnden £187

Middle-street I. School. Geering & Sons £50 0 0 Gates & Sons £37 10 0 G. R. Lockyer £43 10 0 J. Barnden £35 0 0 P. Howell £42 5 0 Bell & Sons £29 13 6 J. D. Cheal £38 15 0

Richmond and Sussex-street Schools. Geering & Sons £210 Oliver & Sons £169 Gates & Sons £180 J. Barnden £163

Stanford-road Schools. G. Ayling & Sons £137 0 0 Gates & Sons £80 0 0 J. D. Cheal £88 0 0 G. R. Lockyer £8 0 0 Geering & Sons £74 0 0 J. Barnden £5 10 0 P. Howell £71 0 0 Bell & Sons £2 13 6

York-place Boys' School (Electric Light). Durell & Co. £368 0 0 H. J. Galliers £249 15 0 Page & Miles £288 15 0 G. Virgo £249 15 0 Adams Bros. £58 10 0 C. Reed & Sons £175 10 0

Leaves-road Schools (Caretaker's House). J. Barnden £7 8 6 Gates & Sons £8 19 0 J. D. Cheal £7 5 0 Holloway Bros. £6 17 8

Pupil Teachers' Centre (Laboratory Fittings). G. R. Lockyer £89 15 0 Barnes & Sons £84 0 0 Holloway Bros. £9 8 1 Sattin & Evershed £4 0 0

Financery-road Schools (Repairs to Heating Apparatus). G. Virgo £285 J. Phillips & Son £26 J. Grundy £67

[† Recommended for acceptance.]

Wandsworth, Epsom-street (Erection of Iron Building).
T. Cruvys £875
W. Bain & Co. 560
Gordon & Co., Ltd. 555
Humphreys, Ltd., Co. 530
W. Harrow 501
T. J. Hawkins & Co. 498

Earlley-road, Wandsworth.
W. Read £349 0
Maxwell Bros. £467
Dowsett & Jenkins 328 0
W. A. King 320 0
W. Johnson & Co. 399 0

Silwood-street, Rotherhithe.
H. Line £218
R. Woolaston & Co. 188
W. J. Howie 174

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Lumley, Son, & Wood, Ltd.	2 5 0	2 10 0	2 17 6	3 0 0
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Tenby-street, Bethnal Green.
R. Woolaston & Co. £2,043 0
H. Bouneau 614 10
J. Hayden & Sons 597 16
Staines & Son 525 0

Greenwich-road.
W. Banks £109 10
H. Groves 82 0

Smilley-street, Brixton.
W. Fitch £1,225
J. Appleby & Sons 812
W. T. Bennett 570
W. A. King 557
J. Haydn Bros. 515
W. Read 501

Queens Head-street, Islington.
Palman & Pethering £580
T. Cruvys 556
McCormick & Sons 546
C. R. Price 472

Napier-street, Hoxton.
McCormick & Sons £585
Staines & Son 585
Grover & Son 546
Stevens & Son 446

Bryon and Bright-street, Poplar.
H. Bouneau £250 15
A. W. Derby 247 0
J. Hayden & Sons 246 15
R. Woolaston & Co. 240 0

"Elm Court," Norwood.
W. Johnson & Co. £190 0
E. P. Bull & Co. 186 0
Maxwell Bros. 182 0
J. & C. Bowyer 173 10

Upton House Tenant School.
J. Stewart £50 0
Staines & Son 510 0
W. Shurmer & Sons 476 0
J. Grover & Son 434 0
Vigor & Co. 398 10
Barratt & Power 390 0
H. Bouneau 368 10

Shoreditch Technical Institute.
W. Cullitt & Co. £490 0
W. Rensson 419 10
Staines & Son 418 0
Kilby & Gayford 413 0
W. Shurmer & Sons 401 15

Chunton-road, Peckham.
T. G. Sharphington £550
W. T. Bennett 468
H. Bragg & Sons 447
W. Chappell 417

Vigor & Co. £114 0 0
Newell & Lusty 113 10 0
W. Banks 109 19 6
H. Groves 105 0 0
A. W. Derby 103 0 0

Wood-street, Woolwich.
R. Woolaston & Co. £440
E. Proctor & Son 390
H. Groves 373

Wood-street, Peckham.
W. A. King £504 0
Lathley Bros. 487 0
W. V. Good 469 0
Maxwell Bros. 444 0
W. Chappell 418 0
J. Garrett & Son 389 0

Newell & Lusty £203 10 0
A. W. Derby 194 0 0
W. Banks 174 16 6
Vigor & Co. 160 0 0
H. Groves 160 0 0

Woolwich-street, Poplar.
H. Bouneau £686 0
J. Hayden & Sons 644 0
J. A. Penn 615 0
G. Barker 610 0
Vigor & Co. 610 0

Haverstock-street, St. Pancras.
J. G. Richards & Co. £524
G. Foxley 489
J. Peattie 449
Marchant & Hirst 448
A. H. Inns 440

Sedles-street, Stepney.
R. Woolaston & Co. £496 0
W. Shurmer & Sons 473 10
W. H. Luscelles & Co. 450 0
G. Barker 450 0
W. Chappell 420 0

Manchester-street, St. Pancras.
J. G. Richards & Co. £180
G. Foxley 180
W. Reason 186

Stanhope-street, St. Pancras.
Parrott & Ison £199 0
G. Foxley 195 0
Chinchen & Co. 177 8
Gowley & Drake 170 5
Marchant & Hirst 169 0

Garratt-lane, Wandsworth (mentally defective).
E. B. Tucker £45 0
Holloway Bros. 44 0
Gowley & Drake 42 0
Holliday & Green-wood 36 0

Cator-street, Camberwell.
H. Line £240 0
T. G. Sharphington 397 0
W. V. Good 288 0
J. & C. Bowyer 268 0
W. L. Bragg 265 0

Leipside-road, Camberwell.
J. J. Richards £375 0
W. Fitch 369 10
W. V. Good 337 0
W. Saver & Son 312 0
J. F. Ford 283 0

Star-lane, Fulham.
Bristow & Edwell £375 10
Aldridge & Son 360 0
S. N. Soole & Son 318 0
J. Christie 195 0

Fossdene-road, Greenwich.
W. J. Howie £176 0
H. Groves 170 0
H. L. Holloway 164 0
E. Proctor & Son 160 0
W. Haydn & Son 149 10

Glyn-road, Hackney.
C. R. Price £174 0
McCormick & Sons 171 0
W. Shurmer & Sons 166 10
W. Silk & Son 147 15
G. Barker 139 10

Hamond-street, Haggerston.
A. H. Inns £378 0
J. Hayden & Sons 219 0
W. Shurmer & Sons 204 0
F. W. Harris & Co. 202 10
J. Grover & Son 168 0

York-road, Islington.
W. Reason £209
T. Cruvys 244
J. G. Richards & Co. 227
A. H. Inns 168
Stevens & Son 162

Upper Kennington-lane, Kennington.
W. King & Son £250
J. Appleby & Sons 180
W. Smith & Son 170
J. F. Ford 172

Heckford-street, Limehouse.
A. W. Derby £175 0
J. S. Penn 165 8
A. E. Symes 155 0
J. Hayden & Sons 153 10

Eltra-parade, Norwood.
W. T. Bennett £165
J. & C. Bowyer 159
Grace & Marsh 130
E. P. Bull & Co. 129
Lathley Bros. 125
Maxwell Bros. 119

Arthur-street, Poplar.
H. Line £19 0
J. Parsons 15 0
Martin Wells & Co. 149
J. Greenwood, Ltd. 148
W. Haver & Son 139
H. Groves 139

Manner-street, Bow and Bromley.
G. Barker £180 0
A. E. Symes 172 0
J. Hayden & Sons 149 17
Stevens & Son 139 0

LONDON.—For constructing covered reservoirs, etc., at Forte Green, Boresey, for Metropolitan Water Board.
Mr. Joseph Francis, C.E., Quantities by Messrs. Fowler & Hugman:—

W. Kennedy, Ltd. £130,167 3 0
Widdows Bros. 105,941 0 0
W. G. Smith & Co., Ltd. 101,939 4 4
F. W. Trimm 100,937 0 0
T. Adams & Sons 98,585 8 1
S. Pearson & Son, Ltd. 91,827 8 6
J. Mowlem & Co., Ltd. 87,781 0 0
T. Dwyer & Son 85,340 12 5
C. A. Ziegler & Co. 84,756 19 0
G. Treadwell 82,793 5 11
J. Aird & Sons 82,461 0 1
D. R. Patterson 80,936 5 10
G. Hay & Co. 80,721 12 11
R. H. B. Neal, Ltd. 70,511 10 11
Boulding & Verburgh 75,529 0 0
J. A. Ewart 75,600 5 11
Kellett's, Ltd. 75,573 9 5
J. Moran & Son, Ltd. 75,631 16 0
Smith & Co. 75,311 0 5
D. J. Ball & Co. 74,197 11 10
W. Lawrence & Son 74,000 0 0
A. Brathwaite & Co. 73,737 10 4
E. & E. Hes 73,447 0 0
A. E. Nunn 72,072 0 4
Kirk & Randall 71,774 0 0
W. Patinson & Sons, Ltd. 71,665 9 8
C. Wall, Ltd. 70,288 12 11
Pethick Bros. 69,990 0 0
W. Moss & Son, Ltd. 68,990 18 1
J. Byrom, Ltd., Bury, Lancs. 60,278 17 8

LONDON.—For kerbing, channeling, and making-up roads for the Lewisham Borough Council. Mr. E. Van Patten, A.M.I.C.E., Borough Surveyor, Town Hall, Catford.

Bargely-road.
B. Martin £950 Fry Bros. £912
H. Woodham & Sons 928 J. Mowlem & Co., Ltd. 896
W. H. Wheeler 920 W. Pearce 834

Duncan-road.
W. H. Wheeler £512 B. Martin £415
Fry Bros. 498 W. Pearce 388
J. Mowlem & Co., Ltd. 425

George- lane.
B. Martin £1,220 W. Pearce £1,126
J. Mowlem & Co. 1,150 H. Woodham & Sons 1,113
Id. 1,150 Fry Bros. 1,059

LONDON.—For the erection of colour works (Building No. 25) at Homerton, N.E., for Messrs. L. Berger & Sons. Mr. H. Tanner, A.R.I.B.A., architect, 12, Regent-street, S.W. Quantities by Messrs. W. H. & P. B. Strudwick:—
Poster & Dicksee £7,705 Colls & Son £7,496
Mowlem & Co. 7,700 Chessum & Co. 7,474

LONDON.—For the erection of colour works (Building No. 3) at Homerton, N.E., for Messrs. L. Berger & Sons. Mr. H. Tanner, A.R.I.B.A., architect, 12, Regent-street, S.W. Quantities by Messrs. W. H. & P. B. Strudwick:—
Waring, White, & Co. £6,731 Carmichael £6,425
Colls & Son 6,468 Chessum & Co. 6,145
Holland & Hannen 6,461

MARLEY.—For erection of a house at Marley, Haslemere. Mr. John H. Howard, architect, The Cottage, Lower-street, Haslemere:—
F. Milton £1,392 D. Fry £1,198
R. Smith 1,350 Haslemere Builders, Chapman & Lowry 1,300 Ltd. 1,185

MORESBY.—For erecting new stables and bays at High Common Oak Farm, Moresby, near Whitehaven, for Mr. W. Burney. Mr. J. S. Stout, architect, 36, Lowther-street, Whitehaven. Quantities by architect:—
Mason: H. J. Doloughan, Biggins £563 7 1
Cumberland 222 18 1
Joiner: J. Shaw, Moresby 105 19 2
Slating: G. Hurrow, Workington 18 19 3
Plumbing: W. Holloway, Whitehaven

SALTASH.—For premises, Fore-street, Saltash, for Mr. P. A. Rawling. Mr. Edgar M. Lest, architect, Devonport and Saltash. Quantities by Messrs. Leest & Adams:—
T. May & Son £759 0 W. H. Rothory, Pearce Bros. 467 17
W. V. Alford 430 4
Id. 430 4
Revised tender accepted.

SANDBACH.—For erecting workshop, alterations, etc., at the central premises, Bold-street, for Sandbach Industrial Co-operative Society, Ltd. Mr. A. Price, architect, Elworth, Sandbach:—
W. Street £775 0 G. Edwards, J. Stringer 765 11
Id. 595 0 Alsager £540 10
Id. 595 0
[Quoted probable cost £561.]

SENGHENYDD.—For erecting six houses and for road-making, etc., for the Lewis Merthyr Consolidated Collieries, Ltd. Mr. J. H. Phillips, architect, Clive-chambers, Windsor-place, Cardiff:—
Son £15,902 7 10 R. Jones £12,850 0 0
Davies & Lloyd 14,812 14 6 A. J. Rossiter 12,900 0 0
T. F. Howells 13,610 0 0 J. Pugh 12,418 10 3
Id. 12,092 0 0 J. Williams 12,092 0 0
A. Richards 11,796 15 0
Id. 13,079 0 0 Hamilton & W. Harding 13,051 0 0
W. J. Madley 12,968 0 0 Carrphilly 11,639 0 0

SEVENOAKS.—For erecting an isolation hospital at Otford, for the Rural District Council. Mr. M. Maberty Smith, architect, 62, Bornea-street, Oxford-street, London, W. Quantities by Messrs. Glead & Belcher, 5 and 9, Martine-lane, Cannon-street, London, E.C.:—
G. E. Wallis & Sons, Ltd., Broadmead, Work, Maidstone £5,534

STOKE-ON-TRENT.—For erecting a mission church and schoolroom at Beech, for the Rev. D. W. Jenkinson. Messrs. R. Schreiner & Sons, architects, Hanley:—
J. Cooke £1,440 J. Fielding & Sons £1,278
Id. 1,416 Tompkinson 1,345
T. Godwin 1,347 Bettelley, Longton 1,197
W. Whitfield 1,345 T. Moss 1,193
B. Heath 1,297 T. R. Vovall 1,180

SOUTH SHIELDS.—For the construction of 87 lineal yds. of concrete sea-wall between Whitburn and Fulwell, for the Rural District Council. Mr. J. H. Morton, F.R.I.B.A., 50, King-street, South Shields:—
J. Rule £509 8 0 R. M. Storey £375 17 0
G. Wells 440 0 0 D. & J. Banken 375 0 0
Middleton Bros. 438 0 0 Kirk & Brown 368 0 0
J. Young 432 1 0 J. W. White 363 0 0
J. L. Miller 427 3 8 J. H. Hall 317 5 3
W. D. Allison 415 8 3 J. Johnson, East R. Purvis 408 0 0 Boldon 316 9 9
J. B. Stott 393 17 8 G. Bailey 311 9 7
Clery & Charlton 390 0 0
[Surveyor's estimate, £305.]

STAINLAND.—For taking up and redressing about 660 yds. super. of old setts and repaving with new setts, part of Station-road, for Stainland-with-Old-Landley Urban District Council. Mr. J. H. Walker, Surveyor, Mechanic's Hall, Stainland:—
D. Brook & Son, redressing old setts, 10d. per yd.; setting new setts, 2s. per yd.; setting old redressed setts, 2s. per yd.
W. Billington & J. White, redressing old setts, 9d. per yd.; setting new setts, 1s. 9d. per yd.; setting old redressed setts, 1s. 6d. per yd.
Riley Bros. & Hartley, redressing old setts, 7½d. per yd.; setting new setts, 1s. 6d. per yd.; setting old redressed setts, 1s. 6d. per yd.
Amos, Burton, Lee Mount, redressing old setts, 9d. per yd.; setting new setts, 1s. 2d. per yd.; setting old redressed setts, 1s. 3d. per yd.

SUNDRIDGE.—For alterations and additions to the Union Workhouse, Ide-hill, for Sevenoaks Guardians. Messrs. Lewellyn & Pawley, architects, 86, High-street, Sevenoaks:—
C. Bentley £258 0 E. Wallis £197 0
R. Durnell & Sons 215 0 K. Canfield, Sun- W. T. Banks 219 0
H. J. Smith & Son 198 0 Oats 167 10

WELLINGTON.—For erecting house and butcher's premises at Trench-road, Mr. A. Jenkins, architect and surveyor, Bell-street, hammers, Wellington:—
France Bros. £54 0 Skelborne £500 0
Blakemore 549 0 W. Mart in
A. Holmes 545 0 Donnington 495 5

WESTON-SUPER-MARE.—For alterations and additions to the matron's house at Statutory Hospital, for the Urban District Council. Mr. Hugh Nettleton, Surveyor, Town Hall, Weston-super-Mare:—
A. Rossiter & Sons £356 B. A. Fore & Sons, H. Dyer 325
Id. 325 Contractors, Bristol £309

Correction.—In our issue of the 14th inst., in the list of tenders received for stabling, etc., at Seaford, the address of Messrs. Wm. Cooper & Co. is given as Eastbourne. It should have been Hastings and Seaford.

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VOL. XCI.—No. 3312.

JULY 25, 1903.

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2. Elevations and Plans.	
3. Sections and Details.	
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Congress Comments.



It seems to be agreed on every hand that the Congress has been a great success. It has been more largely attended than any other; and it is gratifying to find

that London, in spite of its out-of-the-way position geographically, can attract so large a number of visitors. It will be many years before we have an International Architectural Congress here again; whenever we have, there are one or two improvements which the experience of this occasion may suggest. One is, that there should be an endeavour to select the chairmen of sectional meetings long before; that they should be invited to study the subjects over which they are to preside and make themselves acquainted in advance, if possible, with the contents of the special papers which will be read; and that chairmen should be selected partly for their knowledge of at least two of the languages to be used at the Congress. It was attempted to provide for this by having an English and a foreign chairman for each meeting; but this does not assist very much if the two chairmen cannot well understand each other. Apart from the language difficulty, chairmen are born, not made; and the faculty to keep a meeting in hand and keep speakers to the point is not a very common one. Several of the meetings resulted in some confusion and misunderstanding

from want of decisive control; and in one or two cases, as we shall have to note, the foreign and English sections of a meeting decidedly misunderstood each other's aims, and were led to support conclusions different from what their speeches showed that they intended, through want of a facility on the part of the chair to act as an intermediary. It is the business of a chairman on such occasions to encourage members to speak audibly; to prevent a debate degenerating into a conversation between individuals; and to announce audibly and clearly the names of speakers unknown to the audience: all which points were much neglected at many of the meetings. Secondly, it would be much better policy to limit the number and length of papers to what could really be read within the scheduled time of a meeting. To allow people to write long and elaborate papers which cannot possibly be all read, and then request them at the last moment to compress them into a quarter of an hour in reading, is a very bad system; it is impossible for a man to do himself justice when asked to compress a paper in that way at short notice. The limited time, or the limited number of words, should have been laid down from the first, and the writers of papers required to conform to it; the necessary study of brevity and conciseness in putting things is beneficial rather than otherwise to most writers; and it is far better to have a short paper read as a whole than to have bits cut out of a longer one. And in view of the fact that one irrepressible French member seemed determined to contribute

a paper on every subject, we might suggest that it would be a very good rule for future Congresses that no member should contribute more than one paper to the proceedings. We recommend these points to the consideration of the Permanent General Committee.

We have given as full a record as possible of the Congress in two far larger editions of this journal than have ever been issued before in its whole history, and we hope they will be found fairly accurate, in spite of the difficulty of getting up so lengthy a report in so short a time. Some of the visits we have necessarily been obliged to neglect; but these were rather the recreation than the work of the Congress.

In regard to the conclusions arrived at, we notice that the foreign architects are generally pretty much of the opinion that we have always held, that official architects are not likely to be the persons to do justice in an architectural sense to an important public building. Some official architects seem to think this a very unfair conclusion; but we have long been convinced of two things: firstly, that official architects are not generally selected for architectural genius but for other valuable but less artistic qualities; secondly, that even if they had the artistic quality originally, official duty is not calculated to keep it alive. A man cannot be cultivating his artistic powers amid the routine duties of administration. It is not so much a question of the good of the outside architects, as of the good of public architecture itself.

On the subject of reinforced concrete

the remarks of M. Rey and M. Cloquet are well worth attention, especially the criticisms of the latter upon the architectural treatment of reinforced concrete, which, as he rightly urged, can never be the same treatment as that suited for the architectural expression of masonry. A new style is wanted for the reinforced concrete building; a style arising out of the nature of the material itself. But while decidedly supporting this opinion, we neither expect nor wish to see reinforced concrete taking the place of stone in buildings of the highest class; it is suitable only to those of which the main objects are utilitarian and economical.

As we thought from the first, the question of the education of the public in architecture is rather a vague one for a Congress of this kind to take up. It is impossible for any Congress of Architects to organise a system of education of the public, because you have first to get the public, like Mrs. Bond's ducks, to come and be educated; and they will not come. Mr. Jackson's suggestion was after all the most practical; that the best way to educate the public in architecture is to erect good buildings. Those are obvious to all; and people who see much of them may in time come to prefer them to bad ones. There are not too many of them at present; not enough, it is to be feared, to produce the desired effect. So that the real first step towards educating the public is to educate ourselves; partly, as Mr. Jackson suggested, by learning to see that architecture is not archæology. We do not think the process of lecturing to the public will do very much, though we see columns of suggestions to that end. It may have some effect, perhaps, in stimulating public interest in architecture; although as before suggested, there is always the question, will the public come and be lectured? We cannot preach to them in the streets, except, as Mr. Jackson suggests, by means of our architecture.

In regard to the question of the control which the architect should have over other artists, painters and sculptors, contributing to the building, we are glad to find one member, Mr. Ellicot (Baltimore), reminding architects that the art of painting can and does lead to a higher sphere than architecture; a view of the matter which is often forgotten; and that you cannot possibly expect painters and sculptors of genius to act in a position which would reduce them to the level of assistants. But the architect may claim, in the first place, to select the artists who are to work with him. M. Nénot gives a good illustration of this in his story of how he wanted Puvis de Chavannes to paint a fresco in the amphitheatre of the Sorbonne, and was threatened by the Government with Benjamin-Constant instead. Every one who knows the style of the two painters would see at once that if Puvis de Chavannes' style suited the architectural surrounding, Benjamin-Constant's could not, since they are as opposite as the poles. M. Nénot could only say that rather than have Benjamin-Constant he would have a plain frieze, and then he got the artist he wanted. This seems to suggest the key to the situation—viz.: that the architect should have absolute power of selecting the

sculptors and painters whom he wishes to work with him. The architect should have a scheme for the decorative treatment of the building, even to the selection of the subjects to be treated in sculpture and painting, but he can hardly require them to submit their designs to his criticism, as sculpture and painting. But if he can choose his own people, he can then discuss his scheme with them in advance, and ask them if they are willing to work it out on the lines he wishes for. If they are not, he has the power of saying "then I am afraid we cannot work together," and of looking for others who will meet his views. But he ought not to have painters or sculptors imposed upon him against his judgment and choice. If he is safeguarded against that, he has the matter practically in his own hands.

In regard to the question of the ownership of architect's drawings, we have succeeded in obtaining an International expression that the drawings made by the architect are rightly his property, and that they are not what the client pays for. Mr. Statham's original resolution was no doubt too much limited to the English position and to the relation of the Institute of British Architects to the subject, to be rightly put before an International Congress; the form in which the resolution was ultimately put was more suitable to the occasion, and perhaps more practically useful, as it recorded the expression of a general principle. But we decline entirely to accept the opinion expressed by one member on behalf of the Institute, that the Council were right in declining to follow up the case of *Gibbon v. Pease*. People who are concerned in defending the Council may say what they please; the fact remains that a most serious blow was struck at the just and right privileges of architects, and that the representative body of the Profession did nothing publicly to defend it, and shirked a contest which they were bound to have entered upon, from a mere fear of being technically worsted by the lawyers; and it is an exceedingly pusillanimous policy. The discussion on the subject was an eminently unsatisfactory one, owing to a confusion of issues; the question of "copyright" proper being constantly introduced, whereas the subject under discussion was the "ownership" of drawings. We may mention that after the close of the meeting M. Poupinel explained that in France the custom is as follows:—After the client has signed the working drawings (to a scale of 2:100), if building operations are not proceeded with, then the client pays a fee of about one-third of the 5 per cent.; and is then entitled to retain a tracing or copy of the working drawings. The rights of the architect are so protected, however, that the client is unable to make any use of the drawings, without rendering himself liable to pay the architect his full fee. This is so well known, that it prevented the carving before the courts of what would otherwise have been an interesting test case. A bronze façade in the Rue Royale, Paris, was in process of being reproduced next door; which the architect of the original happened to observe. He made inquiries as to this infringement of his rights in his own design, and the client (a new

owner) paid his fees a second time, rather than risk the tardy and costly process of the law: a story which forcibly illustrates the contrast of the legal position which the architect holds in France, as compared with what the law awards him in England.

The discussion on Saturday morning on the subject of the statutory qualification of architects, was even more unsatisfactory for a similar reason—that the English and foreign architects were really recommending totally different things, and neither of them understood rightly the others' meaning. The snap vote which was recorded at the close, and which makes it appear that the Congress has formally passed a vote in favour of the statutory qualification of architects, is an entire delusion in so far as it is supposed to represent the opinion of this Congress. It does not do so, firstly because some of the most important opponents of registration had been called away, or allowed themselves to be called away, by professional engagements, while the supporters on the other side took care to remain and record their votes; but the more important consideration which renders this vote of no real significance, is that the foreign members envisaged the subject from their own point of view, and obviously did not really understand what they were voting for. No one who was present who understood both languages, equally well could help seeing that the French and the English architects in the discussion were really meaning two different things; that their apparent unanimity was based on ignorance of an essential difference in their aims; and that there was no one who could officially explain this to them. M. Bonnier and Herr Wagner must have voted for the resolution, since the two dissentients were English architects; but it is no less the case that their papers tended in a directly opposite sense. The French regard their "diploma" and the study which it entails, as a pledge for securing good work for the Public; the English Registrarians hope that Registration will give them a better status in the eyes of the Public. The tone of the French and German architects on the subject is a great deal higher than that of the English, and radically different. Look at what M. Bonnier said (we quote the English version): "The diploma which is the consecration of long scholastic studies, preparing the architect for all eventualities, cannot and must not be obligatory in a free country"; it is only an indication and, as it has been rightly called, a powerful presumption of artistic and professional capacity." And that represents the whole tone and tendency of M. Bonnier's paper. Look again at Herr Wagner's paper, read on behalf of the Society of Austrian Architects, and at what he says on the relation of art to legal status:—

"On all sides the endeavour of artists to favour the progress of art is strongly manifested. Now, they are in fact the only promoters of art, since the public, entirely absorbed as it is in the acquirement of riches and in politics, has lost almost every sentiment for art. It can, therefore, be understood that the desire makes itself manifest to protect art, and it is thought that this and will be obtained by giving the title of Architect a legal recognition.

* The italics are ours.

This legal backing, as has been shown before, is not possible. But neither is it necessary at all, because it is not the question of admitting legally recognised architects to the construction of artistic buildings, but that only the very best be produced. If, therefore, the State, the country, or a city, or its administrations, respectively make use of a senate of art, there is in this way created an artistic control from which it can best be hoped that the desired goal will be reached."

It is instructive to contrast these sentences, in which obviously the improvement of architecture and of the attainments of the architect is the main object in the minds of the authors, with the mere trades-unionism and desire to keep at bay those who might divert fees from the pocket of the professional architect. The English agitation looks ignoble enough by comparison; and it is quite certain that if the authors of the sentiments quoted above voted for a resolution for statutory qualification as it is understood by the English agitators on the subject, they cannot have understood what they were voting for. Herr Wagner's reference to a "Senate of Art" at the conclusion of the quotation seems in fact to imply exactly that kind of indirect influence from membership of a recognised body which we have always maintained was the true solution of the question.

The concluding banquet on Saturday night, at the Hotel Cecil, was very largely attended, and the proceedings were as cordial as could be wished for. However architects may differ at "Sectional meetings," when they meet at dinner their unanimity is wonderful.

In speaking of the Congress Exhibition last week we referred to Mr. Forsyth and Mr. Townsend as being credited with the hanging and arrangement of the works exhibited; they were the only names we had heard actually mentioned, but it appears that we have done an involuntary injustice to other willing helpers; the two gentlemen we named having been concerned only in collecting and hanging the illustrations of the middle and late Gothic periods. Mr. Millard and Mr. Wonnacott were responsible for the whole of the work in connexion with the Norman and Early English collection, Mr. J. A. Gotch for the Early Renaissance, and Mr. Mervyn Macartney for the Later Renaissance. We ought also to add that Mr. Ralph Straus has done excellent work as Secretary of the Congress Exhibition Committee, and also in collecting and arranging the exhibition of furniture and silver work.

But we are sure that all who attended the Congress will feel that a special recognition is due to the Secretary of the Institute, Mr. W. J. Locke, who has had most arduous work in the weeks preceding it, in making all the almost endless arrangements necessary and providing against all contingencies; who during the Congress seemed to be everywhere where any one required assistance or information; and who (an important gift in an International Congress) speaks French better than some Frenchmen. It is undoubtedly to the Secretary's ability, energy, and courtesy that the success of the organisation of the Seventh International Congress has been mainly due; while its social success is largely due to the universal courtesy of the President, Mr. Belcher, who has been the central figure round which the *entente cordiale* of foreign architects revolved, and has

devoted himself heart and soul to the arduous duties incident to his position. We hope we shall see his services in connexion with this International gathering of architects fittingly recognised by a knighthood.

THE HOME OF PETER PAUL RUBENS.

DURING the course of the Congress, an announcement was made which concerns the general public no less than a single section of workers. The name of Peter Paul Rubens is honoured all the world over; and the project of restoring his house in Antwerp is one that cannot fail to be of general interest. The subject has for years been discussed by a small committee, consisting of M. van Ruyck, of the Musée Plantin; M. Max Rooses, architect to the town of Antwerp; M. Aug. Delbeke, and M. Henri Blomme. They knew that the house of Rubens still existed, and they formed the project of buying it, and fitting it up as a museum, to rank with the Maison Plantin.

With this object in view, the committee collected all the data they could find in drawings and descriptions, etc., and it has been a source of considerable satisfaction to them to recognise, in various pictures by Rubens, backgrounds and details which they now find were taken from his own house. From the data obtained, M. Henri Blomme has been able to evolve a complete project of restoration, and his drawings have been much admired at the Institute. These drawings show evidence of the greatest care and thought, and are carried out with the extreme finish which is found in foreign draughtsmanship. On the Continent, relief is given to geometrical elevations with the aid of sciography: a method of indicating projections, etc., which is less misleading than "pretty" perspectives some times prove.

As regards the main walls, the house of Rubens remains intact, but the decorations are all gone, and the interior (now used as offices) has been quite altered. When Rubens bought it, the house consisted of a street front and one wing in which he lived; he added to the main building, and threw out a new wing to contain the studio, etc. The courtyard thus outlined was further defined by a screen representing a monumental gateway; and through this opening was obtained a vista of garden with a pavilion beyond. The pavilion stands there to-day, though a modern wall disfigures the prospect. The street fronts and the older wing remain as Rubens left them; but the glory of the studio wing has departed.

It was Rubens himself who designed the additions to his house, and we see from M. Blomme's drawings that it was regular "painter's architecture." Rubens was a fervent admirer of the Renaissance, and while in Genoa he collected plans of all the palaces where he was received. These were subsequently published. Rubens entertained hopes of introducing and implanting the "true Italian style" in Flanders; he considered that "we have had enough of this barbarous style which is called Gothic." To this end he incorporated in his new building both the simple severity of the Early

Renaissance and the florid profusion of the later period. The street elevation of the studio wing is charmingly simple, so that it does not clash with the remainder of the façade; but in the elevation to the courtyard Rubens laid no restraint on his luxuriant imagination, and the result is a sumptuous medley of statues, sculpture, inscriptions, etc. The internal decorations were carried out with similar lavishness and magnificence. This makes one rather wonder how and where the money will be collected to accomplish restoration on such a scale. It is estimated that the work (together with the purchase of the buildings) will require a sum of 2,000,000 francs, or 80,000*l*.

That the home of Rubens should be made into a museum worthy of his reputation, is a sentiment that all admirers of his work must certainly endorse; and we cordially wish the committee all success in their undertaking. We heartily congratulate M. Henri Blomme on the admirable set of drawings he has produced, and we ought to thank him, also for the opportunity he gave us of inspecting them.

NOTES.

The Problem of the Unemployed.

THE interesting discussion last week in the House of Commons on the working of the Unemployed Act was of much importance, even if it was somewhat depressing; for Mr. Burns admitted with the utmost frankness that the several temporary schemes for meeting the want of employment during the winter months had broken down. We now start with the admission and the fact that those who are relieved by emergency and other similar works are in the bulk the ordinary casual labourers who never have any regular employment. The habitual artisan who happens to be out of work does not use this machinery. In other words, an immense amount of public and private money has lately been spent in keeping alive by extraordinary means men who could just as well have been relieved by the ordinary methods of the poor law. It would seem, in fact, that, whilst the capable workman who unhappily has fallen on bad times either gets help from friends or frankly uses the poor law, the means of help which was intended for this man is devoted to the casual labourer or the habitual vagrant. As, however, the Act is still in existence Mr. Burns proposes to allocate a grant from the Treasury to its purposes during the coming winter, to be distributed under the supervision of the Local Government Board. The debate made it clear that under modern conditions there must always be a fringe of unemployed—men of weak physique and low mental power and bad moral habit, who should be dealt with under the regular poor law system, and that the best means to diminish the numbers of this body is by raising the general level of the population—mentally, morally, physically, and socially.

The St. George's Church Light Case.

THE case of Anderson v. Francis & Adams, the St. George's Church light case, has been fully reported in our

columns, and calls for little special comment. The sole question involved, as in most light cases since the decision in *Colls* case, was whether the proposed buildings would so obstruct the light to the church as to cause a nuisance. The alterations brought the third floor a few feet nearer to the church windows, and involved raising the building 10 ft. by the addition of a fourth floor, which, however, was set back 4 ft. 9 in. more than the third floor. The actual obstruction of light from the upper windows at the north-east end of the church only amounted to 8 deg., but these windows, surrounded as the church is by other buildings, were of great importance in lighting the church. The evidence offered as to the diminution of light was rather remarkable, since whilst experiments were being made with a tarpaulin, which represented the proposed new structure, a witness, who was ignorant of the cause, on two occasions commented on the unusual darkness in the building. The Court found that the church was substantially and materially darkened, that the comfort and convenience of those worshipping or ministering there would be seriously prejudiced, and that not enough light would be left for the comfortable use and enjoyment of the church as a church, and the defendants were restrained by injunction from interfering with the lights existing at the commencement of the alterations in the defendants' building.

From town and country alike come complaints against motor vehicles, chiefly in respect of noise, vibration, smell, and dust. In London, people of means who live in expensive districts are asking why their houses should be shaken and their lungs poisoned by motor omnibuses because workmen, clerks, and others want to be conveyed more rapidly to and from work or about their daily business. At present, however, the main thoroughfares of London that have been chosen for residential purposes are simply being applied more extensively than heretofore to the purpose for which they were originally intended. As there is no law to prevent any number of Pickford's vans from lumbering through the public streets, so there is none to exclude motor omnibuses. Therefore, while we cannot avoid sympathising with people who occupy houses in streets which have become motor-bus routes, it does not seem that any relief can be anticipated, except so far as this may be afforded by compulsory improvement in the design of such vehicles. In the country, people complain to-day chiefly of dust raised by motor-cars, having become fairly acclimated to the speed of these vehicles. All the pleasure of driving and walking along main country roads is now a thing of the past, and since motorists have begun to find out the byways, the air in country lanes also is periodically clouded with dust. Some authorities, like the Warwickshire County Council, for instance, seem to fancy that they will be able to secure relief by invoking the aid of the Local Government Board. This is an absolutely futile idea, and the only practical remedy is to be found in dustless road construction, such as has been

adopted with conspicuous success in various districts where the problem has been boldly faced by the authorities.

Access to
Underground
Railways.

THE case of *Miner's Safe Company, Ltd., v. Great Northern and City Railway Company* raised an interesting point. The railway company, under their compulsory powers, had acquired the site of two houses in Finsbury Pavement, and had constructed an underground station under this site. Attached to these houses was a right to the user of a certain private passage which gave access to the rear of these two houses, and also to other premises belonging to the plaintiffs in this action. The railway company had not acquired this passage under their compulsory powers, but they used it as a means of access to their station. Shorn of its many legal technicalities the case appears to have turned upon the point whether the railway company were entitled to this extended user of this passage to the detriment of others having similar rights. The company contended that the railway passengers were their customers, and, therefore, that their user was in accordance with that implied in the grant to them, but the Court decided that the use of the passage as a means of access for passengers to the railway-station was different from the user the right of which attached to the houses, a user for business purposes, and since it interfered with the plaintiffs' ordinary use of the passage the Court granted an injunction.

Making up
Added Portions
to Streets.

THE Divisional Court in the case of *Mayor, etc., of Chorley v. Nightingale*, have again had to consider this question of the liability of owners and occupiers of property as regards the expenses of making up roads under the Public Health Acts. The action was brought by the plaintiffs to recover expenses incurred in making up part of a lane known as Pilling-lane. This lane was bounded by two hedges, but on the side remote from the defendant's land there was a ditch some 8 ft. wide, which was not available for traffic, but served to carry off the surface water. Of late years a pipe had been laid within the ditch to carry the water, and the ditch was filled in. The lane, that is to say that part of the lane used for traffic, was a highway repairable by the inhabitants at large, and, therefore, not within sect. 150 of the Public Health Act, 1875, for the purposes involved in this case, but the latter part of the section refers to making up roads or streets part of which were repairable by the inhabitants at large, and the plaintiffs' contention was that the defendant was liable in respect of this addition to the road. The Court held that this ditch was situated within the space originally dedicated to the public, and not being inclosed or by the side of the highway and that it formed part of it. This finding absolved the defendant from liability, and, therefore, it became unnecessary to decide whether, as the defendant's premises abutted only on that portion of the lane which was unquestionably a highway, he could be rendered liable for making up the added strip on the other side of it. A question involving some doubt. Similar difficulties have been

experienced in regard to added portions to new streets under the Metropolitan Management Acts, and we commented on some of these cases in our issue March 28, 1902.

The
Electrolysis of
Water Pipes.

THE Report of the Commission appointed by the German Gas and Water Companies on the effects of leakage electric currents on gas and water pipes which has recently been published, is very instructive. A scientific investigation extending over three years has been carried out by Herr Besig in many towns in Germany, and the data obtained justify some general conclusions. For instance, the amount of the electrolytic corrosion depends largely on the nature of the soil. In Danzig, where the average value of the electric currents in the iron water pipes in the immediate neighbourhood of the tramways was found to be as high as five amperes, corrosion was only beginning to be noticed. The small amount of the damage done was due to the soil being mostly dry sand. The extensive nature of the leakage was shown by the rails themselves being in many places badly corroded. In Erfurt on the other hand, where the mean value of the leakage electric currents was less the gas and water mains were badly corroded. Recently the pressure of the water supply was increased, a new reservoir being used. An immediate result was the bursting of the mains in ten places in the "danger zone." There were also marked signs of corrosion in the pipes at all the places where they were bursts. An examination of the water mains in Stuttgart showed that they were badly corroded in the neighbourhood of uninsulated return conductors. It is stated that the replacement of bare insulated conductors in Hamburg effectually stopped all electrolytic troubles. The leakage currents, however, were not all due to the electric tramways. In Freiburg they were strongly in evidence at times when the tramway power station was not working. In this case they were due to the electric-lighting network. It is proposed to carry out farther experiments in a town which has the usual gas and water systems but where there is no electric system. The Commission is to be congratulated on the thoroughness with which the work being carried out.

The
New Laboratory
at Rothamsted.

By the addition of the new Laboratory James Mason Laboratory at Rothamsted, the accommodation of the Lawes Agricultural Institute at Rothamsted has been increased by four rooms, of which three will be devoted to bacteriological investigations. The history of the institution is very much akin to that of numerous technical enterprises in this country. As a nation we have been pioneers in many things, but almost invariably have allowed ourselves to be outpaced by other nations who have followed in our footsteps. Thus, whilst the Rothamsted station was established in 1843 by private munificence, it still depends very largely upon voluntary donations for the funds necessary for continued extension of the valuable work there conducted. On the other hand, the agricultural laboratories of Germany and the United States, &c.

which the first were founded ten years and thirty-two years later respectively, receive ready and adequate Government support. In declaring the new laboratory open, Lord Carrington said that the Lawes Institute had the best wishes of the Government, and that if things went well he trusted he might be able to go with a good case to the Chancellor of the Exchequer so that some contribution might be obtained. This is a very non-committal pledge, and is just the sort of thing that Ministers have been saying for the past fifty years, and will probably continue to say for fifty years to come, with regard to scientific research of supreme national importance.

The Economic Design of Columns. IN our "Note" of July 1, 1905, reference was made to the experiments conducted by Professor Lilly at Trinity College, Dublin, upon mild steel tubes with the object of obtaining definite information as to the economic proportions of hollow columns. A paper read by Professor Lilly before the Institution of Civil Engineers of Ireland in March last, and now published in pamphlet form, points out some interesting phenomena which were shown by subsequent experiments to occur in the testing of columns. One of the principal results of the experiments has been to demonstrate the remarkable wave phenomena that occur in connexion with the secondary flexure of a column. In testing very short tubes with flat ends under direct thrust, buckling took place in such a manner as to form a series of waves giving to the specimen an appearance somewhat like that of a spiral spring. In the case of longer tubes buckling took place at one side, a strongly marked wave occurring near the middle of the length and gradually diminishing waves above and below it. These singular phenomena are well illustrated by photographs reproduced in the paper, wherein Professor Lilly gives an analysis of the results obtained from his experiments, and a table of constants, for round-ended and fixed-ended circular columns, to be employed in a modified form of the Rankine-Gordon formula. Experimental work still awaiting attention is to determine the relative resistance of various column sections to secondary flexure, and thus to obtain additional values for the determination of constants to be used in the same formula when applied to other than circular sections.

Reinforced Concrete for Fire-Resisting Structures. THE discussion of Captain Sewell's paper read in December last before the American Society of Civil Engineers on "The Economical Design of Reinforced Concrete Floor Systems for Fire-Resisting Structures," has now been brought to a conclusion. It demonstrates that the author has achieved what he modestly terms the main object of his contribution, which was to arouse a greater interest in certain points pertaining to the design of reinforced concrete. While many of the views expressed are not based upon demonstrated facts, the information and opinions contained in this paper and called forth during its discussion fully deserves study, for the reason that most of the essential points and difficulties connected with the design of reinforced

concrete floors are thoroughly considered from various standpoints by the leading American experts in this class of construction.

National Collection of Architectural Drawings. In reference to the collection of drawings at the Congress Exhibition, we may remind our readers that Mr. Spiers has organised a Committee for the purpose of getting together a permanent collection of that kind, to which object Mr. Spiers has generously devoted the money balance of the testimonial recently presented to him. Arrangements have been made whereby the collection will be deposited in the Art Library at South Kensington, and any contributors of drawings will be recognised as donors conjointly with Mr. Spiers's Committee, and will be entitled to the donors' privileges of the Museum. It may be suggested that some of the drawings which formed the Congress collection, and which are very likely of no use to their owners at present, might form valuable additions to Mr. Spiers's permanent collection. Perhaps some of those who lent drawings for the Congress collection will take this into consideration.

THE NATIONAL ART STUDENTS' COMPETITION.

THE exhibition of students' works in the National Competition of Art Schools and Classes throughout the country was opened last week, and remains open during August, in the galleries of the Indian Section of Victoria and Albert Museum. The exhibition shows some excellent work as well as some that is not of much interest. In the modelling section gold medals are awarded to two students; to one, Christine Gregory, of Hammersmith School of Art, for a reclining figure of a child, which is graceful and charming, showing a high perception of light and shade; in another class Harold Brown, of Hanley School, obtains a similar award for a pottery sundial. In the class of modelling design the students, as usual, show but a very poor idea of architectural forms and accessories. The drawings of architectural enrichments and ornament from the east are, on the other hand, of a high order of merit; that of Christine Baillee, of Sunderland School of Art, and two other examples by students of the same school being particularly attractive. In the designs for illustrations, prints, etc., there is a lamentable deficiency in lettering—a very important part of some work. The stained-glass is a good collection, fresh and interesting; it is, in general, of Gothic feeling. Miss Ida L. Kay, of Birmingham School of Art, obtains a silver medal for a good piece of work. The award made for designs for tiles and glass, especially the gold-medal design for tiles, is unfortunate; the tendency to the Art Nouveau style of design needs no encouragement. The architectural drawings and designs are very poor and disappointing, with one exception. Fortunately the examiners are Messrs. Belcher, Reginald Bloomfield, and Champneys, who explain very definitely in their Report the reason of the failures, and lay down the general principles on which students should work. The exception quoted above refers to the measured drawings of Mr. Robert Atkinson, of Nottingham School of Art, whose work is excellent.

STUDENTS' WORK AT THE ARCHITECTURAL ASSOCIATION SCHOOL.

Nor the least of the many interesting events of the International Congress week was the exhibition, at 18, Tufton-street, on Friday last, of the students' work of the Architectural Association's day and evening schools. The interest of the exhibition lay not so much in the good work done, as in the evidence of the system and the thoroughness with which the question of architectural education has at last been tackled. The

course of instruction is in two sections; the first consists of the day school; the second of the evening school. Students newly entering the profession direct from school or the universities join the day school, and go through a two-years' course of instruction and lectures; at the end of the two years' training they enter on work in an architect's office during the daytime, and they are encouraged to continue their work at the Architectural Association in the evening school. The day school receives the boy with absolutely no knowledge of drawing or architectural accomplishments, and prepares him with a thoroughness, we shall shortly describe, which fits him to make the best use of the early years which he must necessarily spend in an architect's office. The evening school carried the instruction still further, with a view to balancing the practical work of the office, and developing the taste of the student in the higher branches of his work. At the completion of two years at the evening school a four-years' course of training has been obtained by the student. By passing a test examination in design, which lasts about one week, in conjunction with good work done during his studentship, the student is awarded the certificate of the Board of Architectural Education. This test examination is in progress this week, the subject for design being the entrance to Hyde Park at Marble Arch. During the first term in the day school, the student is set to measure the room in which he works, set it out to scale, and parts of construction, etc., full size, that he may become accustomed to the relationship of plan, section, and elevation, and to the use of his pen and drawing instruments. After setting out a big plan from a diagram, the classic Orders are next drawn out, followed by parts of Gothic work to small and large scale, including full-size details. English Renaissance follows on the Gothic work. Simple designs are worked out in one or other of the historic styles; a Greek Doric Propylaea, a Greek Ionic swimming-bath, a Roman vaulted museum of antiquities, a domed church, a village church, are some of the subjects shown on the walls, the work of students during their first year; thus something of the monumental element of design is instilled into the student before he is full of the practical difficulties ahead of him. Drawings of a cottage or small house are then embarked on, carried out as far as possible as working drawings, and very thorough are the drawings shown. A simple scheme of drainage is worked out to a larger scale in plan and section, the carpentry carefully set out, and joinery details shown full size; the house is also drawn in perspective, and hereafter every design and every measured drawing that is made is shown in a perspective drawing. Vacation work is encouraged, and much good work is done even by the first year's students, the reason being that they have received the instruction necessary to know how to set about it and what to study. Amongst the second year's students the vacation work is naturally more interesting; a good drawing is shown of Chessenden House, Kent; in measuring brickwork of any age it is important to note the size of the bricks used, they vary so much in different parts of the country, and it is seldom that they work out in the convenient dimension of four courses to the foot; another point to notice in Kent and Surrey cottages suggested by the example mentioned is the very slight projection of the corbelling out to the chimney heads, a very small point, but one that makes all the difference to the appearance. Good vacation work is shown by Mr. B. H. Collcutt and Mr. A. N. Peckham. Mr. J. K. Ground's work, measured and drawn on the spot, is particularly promising.

Clever work is shown by second year's students in the day school, notably some expeditious and vigorous drawings of ornament by Mr. Paul Faraday, a design for a house by Mr. Charles Whitby, and a village hall by Mr. W. Scott Moncrieff.

Coming to the third year's work, or that done in the evening school, we find the student encouraged to think out the subjects set for design from the necessities of the case, apart from questions of architectural style. The architectonic idea is insisted upon, and only here and there, as in the instance of the suburban house where the difficulty of roofing a nearly square house of

wide span was not foreseen until too late, is there a lack of grip of the subject as a whole. A feature of the evening school is the study of design against time. A wooden porch, a fountain, a brick garden house, are some of the subjects set, and the time being limited, the student is encouraged to make up his mind and work out his idea without too much procrastination. With the domestic subjects the requirements of building acts and local authorities are considered: the domestic designs of Mr. F. W. Grant, Mr. J. K. Ground, Mr. A. Walford, and Mr. Bernton Benjamin are particularly good. With public buildings, such as the market hall, the students are addressed regarding the laws of composition and more practical points of design. With fourth year's students the subjects become more monumental and freer from practical restrictions. In the design for the mausoleum a model is made in clay as well as a perspective drawing, the application of the dome being better realised in this way. The designs for the clock tower were made after calculating the weights to be carried by the piers and foundations. Amongst other subjects for design are a public library, a street front in colour, and a big scheme for a museum and art gallery, in which Mr. B. H. Colclutt and Mr. A. Walford distinguished themselves. "Westminster Replanned" is another exercise in monumental planning of a different class, but equally important to the architectural student.

To those of us who look back on early years in an office where they were at liberty to pick up as much knowledge as they could, or do as little work as they liked, the value of a systematic education with the agreeable stimulus of friendly rivalry and companionship seems to be a blessing untold for the coming generation, and promises great things from the architects of the next generation.

THE ASSOCIATION OF MUNICIPAL AND COUNTY ENGINEERS.

A WESTERN Counties district meeting of the members of the Association of Municipal and County Engineers was held at Trowbridge and Devizes on Saturday, July 21. The meeting aroused a good deal of interest among municipal engineers, as it afforded an opportunity for the inspection of the slate filled bacteria beds described by Mr. W. J. Dibdin at the recent annual meeting of the Association.

The members assembled at the Town Hall, Trowbridge, where they were received and welcomed by Mr. Herbert Mundy, Chairman of the District Council.

Mr. J. Patten Barber (Islington), President, occupied the chair, and there were present:—Messrs. J. Lemon (Southampton), J. Pollard (Westminster), J. P. Norington (London), J. S. Pickering (Cheltenham), G. Bell (Swansea), S. P. Andrews (Faversham), F. T. Clayton (Reigate), A. P. I. Cotterell (Bristol), G. Eaton Shore (Crewe), A. Gladwell (Exeter), F. W. Jones (Frome), G. T. Lynam (Barton-on-Trent), and others.

On the proposition of Mr. Nicholson Lailey, Mr. J. S. Pickering, of Cheltenham, was unanimously elected Hon. District Secretary.

Municipal Work in Trowbridge.

Mr. H. G. Nicholson Lailey, M.Inst.C.E., Engineer and Surveyor to the Trowbridge Urban District Council, read a paper on "Municipal Work in Trowbridge." He said Trowbridge had for several centuries been famous for the manufacture of West of England cloth, and was a flourishing centre of the cloth trade in the XVth century. This manufacture was still the principal source of employment and gain for the inhabitants of the town, and cloth with the Trowbridge stamp upon it had always found ready buyers and good prices in the markets of the world. The town was now controlled by an urban district council consisting of twenty-one members. The area of the district was 2,126 acres, and the population at the census of 1901 was 11,526. The council's indebtedness up to March 31, 1906, was 52,730l. 11s. 11d., and the general district rate for the year ending March 31, 1907, was 5s. 8d. in the pound for Trowbridge, and 3s. 4d. in the pound for Hilberton and Clarendon. The birth-rate for the year 1905 was 21.7 per 1,000 of the population, and the average for the past ten years 20.7 per 1,000. The death-rates for the

same periods were 12.5 and 13.4 per 1,000 of the population. The Trowbridge market was formerly held in the public streets of the town until 1871, when Mr. William Stancomb, the then lord of the manor, erected at his own expense the present market-house and adjoining cattle market. In the year 1891 the local board purchased from Mr. Stancomb the whole of these premises, including all manorial rights in connexion therewith, for the sum of 6,000l., and had since spent considerable sums in improving and enlarging same. The town hall, which was a gift to the town by the late Sir W. Roger Brown, was built in the English Renaissance style of architecture, apparently of the Jacobean period. The exterior was built of Athwath stone with Corsham stone dressings. The interior contained a large public hall, council chamber, and other rooms on the first floor, and on the ground floor sessions' court, barristers', registrar's, and committee rooms; also a complete suite of offices for the urban district council's officials. The building was erected at a total cost, including furnishing, of 28,000l., from the designs of Mr. A. S. Goodridge, of Bath, and completed and formally opened by H.R.H. the Duchess of Albany in June, 1889. The Victoria Technical Institute was erected from the designs of Mr. T. Davison, architect, of London, at a cost of 7,800l., in memory of her late Majesty's 1897 Jubilee. The infectious diseases hospital provided accommodation for thirty patients, and comprised five buildings, namely, administrative block, three wards, pavilions, and a block containing the laundry, disinfecting chamber, ambulance house, mortuary, etc. The administrative block was two stories in height, but the other buildings were all of one story only. The buildings were carefully planned and arranged on the site with regard to aspect, approach, communication with and between the various blocks and isolation of same. Provision being made for all probable future extension. The provision for patients in the several pavilions was thirty beds. The total cost of the whole scheme was:—Land, 500l.; buildings, 8,063l.; furniture, 650l.; architect's fees, quantity surveyor, etc., 670l.; total, 9,883l., practically 530l. per bed. At the present time there were nearly eight miles of main roads, and a little over eight miles of district roads in the town which were repaired by the authority. The whole of the main roads were macadamised. The proportions having most wear, and also where steep gradients occurred, were coated with 2-in. broken Clec Hill stone. Other portions were coated with 2½-in. broken mill grit stone. Some portions in the town had also been coated with tarred limestone. The latter material, where laid, considerably lessened the noise of traffic on the roads, and largely prevented dust; but the author found that it wears somewhat unevenly, probably due to the difficulty of keeping the traffic off same before it had properly set. The total cost paid by the county council for roads and footpaths maintenance for the year ending March 31, 1906, was 2,676l., and the estimated amount required to be paid by them for the present year was 2,726l. Various materials had been used for paving the footpaths throughout the town—concrete *in situ*, concrete paving slabs, pennant stone paving slabs, and tar-paving. In most cases where concrete *in situ* pavements were laid the kerb was formed in the pavement itself; in the cases of other pavements pennant stone kerb of various sizes was used. Concrete *in situ* pavement kerb of the same material, and consisting of 2-in. of ½-in. limestone chippings and cement, gauged three to one, and topped with ½-in. layer of ½-in. Leicestershire granite chippings and cement, gauged two to one, all laid on a 4-in. broken stone foundation. Average cost 4s. 6d. per super. yard exclusive of kerbing, which varied in price according to size. A very large quantity of the old pennant stone paving, which had been taken up in various streets, where new paving had been laid, had been found to be of sufficient thickness to stand redressing. This work had been done at a cost of 2s. 6d. per super. yard, and when finished made an excellent material for new pavements; in fact, he found it in many respects superior to new flags. Tar-paving

was mostly manufactured and laid by the council's own workmen. The stone used was Somerset limestone, ½-in. to 1-in. gauge for the bottom layer, and 1-in. gauge, carefully screened, for the top layer. The stone was heated in a kiln until all moisture was evaporated, and then thoroughly mixed with boiling tar with a small admixture of pitch. The cost, when laid, averaged 2s. 6d. per super. yard. This made a cheap and durable pavement for by-roads and district road footpaths.

The street lighting was at present done by 320 incandescent gas lamps. These lamps were the property of the local gas company, who did the whole of the cleaning, repairs, lighting, and extinguishing for the sum of 2l. 17s. 6d. per single burner lamp per annum. The water supply was in the hands of a company, who obtained their first Act of Parliament in 1873. The supply was obtained from a chalk formation, and also from the lower greensand at Upton Scudamore, a point seven miles south of Trowbridge. The water was pumped into reservoirs in the parish of Delton, and thence flowed by gravitation to Trowbridge. A scheme of main drainage was carried out in 1872 from the designs of Messrs. Gotto & Beesley, the system emptying directly into the river Biss. A new main drainage scheme had recently been carried out by the author, at a cost of over 20,000l., which included, in addition to several miles of new main and subsidiary sewers, the reconstruction of a large portion of the system laid down in 1872.

The New Slate Bacteria Beds.

Mr. W. H. Stanley, A.M.Inst.C.E., Engineer, gave a description of the sewage disposal works. He said the Urban District of Trowbridge comprised an area of 2,126 acres, with a population in 1901 of 11,526. The town was situated on a small stream known as the Biss, which discharged into the river Avon one mile below the Town Bridge. The subsoil was Oxford clay.

The water supply was in the hands of a company, the daily consumption averaging 195 gallons per head.

The woollen industry, including wool scouring and dyeing, was the staple trade of the town, its West of England cloth having for two or three centuries enjoyed a world-wide reputation. There were also large breweries and several bacon-curing establishments, where large numbers of pigs were slaughtered. At present a considerable amount of trade effluent discharged into the sewers, but the bulk of that from the woollen mills went into the river. There was no separate system of drainage, and this fact, together with the trade effluents that would have to be dealt with, necessitated much larger disposal works than the mere size of the town would at first indicate.

The town was sewered in 1875, the main outfall sewer discharging into the Biss half a mile below the railway station, but the construction of the disposal works then proposed was left in abeyance. Pressure from various quarters, together with an injunction obtained by a neighbouring landowner, made the question of the pollution of the stream a pressing matter, and in 1900 the author was instructed by the urban council to prepare a scheme for dealing with the sewage. There being no suitable land for irrigation, he recommended that the works should be on bacterial lines, and Mr. Dibdin was called in by the Council to advise and report, especially as to the probable action of the chemicals used in the woollen trade on the proposed process of purification. His report was favourable. Meanwhile, the author made investigations as to the quantities of trade effluents then discharging into the public sewers and stream. The following figures were the estimated quantities of liquid trade refuse discharged from the cloth factories and dye works per diem, assuming that all the mills were working to the full extent of their present machinery, and that the wool scouring, where at present carried on in the river, was done in machines. Wool scouring, 140,000 gallons; wool rinsing, 756,000 gallons; piece washing, 274,000 gallons; dyeing, 62,000 gallons; total, 1,232,000. Of this quantity the estimated amount discharged into the new sewers was 137,805 gallons per day, leaving a net total of 1,094,195 gallons discharged into the river. Innox Oil Works: The

estimated amount of liquid waste was 40,000 gallons per day. Breweries and maltings: The amount of liquid waste refuse at present reaching the river was estimated to be 9,000 gallons per day. This was exclusive of water used for cooling purposes, which would continue to discharge into the river. Gasworks: Occasionally an estimated quantity of 2,000 gallons per day reached the river. From cloth factory and dye works 1,094,195 gallons per day. Innox Oil Works, 40,000 gallons per day; breweries and maltings, 9,000 gallons per day; total, 1,143,195. Gasworks (only occasionally) 2,000 gallons per day. Estimated quantity of liquid trade refuse, included in the above total of 1,143,195 gallons per day, which reached the river through old drains, 240,650 gallons per day. Estimated quantity of clear water discharged into the new sewers that should be returned to river, 80,000 gallons. As a preliminary to the taking in of additional liquid trade refuse into the sewers, the author recommended:—(1) That the Council adopt some such rules as are in operation at Leeds; (2) that the liquid trade refuse from the breweries, maltings, and Innox Oil Works be taken into the sewers; (3) that all waste dye water be taken into the sewers, if so required by the manufacturers. The works were designed to provide for the treatment of 240,000 gallons of sewage per day, multiplied by three, equal to 720,000 gallons, and, in addition, 280,000 gallons of trade effluent, making a total of 1,000,000 gallons to be treated as sewage, and the storm-water bed had a capacity for dealing with 720,000 gallons of storm water. The whole of this had to be pumped; 280,000 gallons per day of trade effluent was an assumed quantity, and, considering a larger amount might have to be dealt with, the author kept the sedimentation tank higher above the contact beds than usual, to allow of converting one or more into sprinkling filters should it be found necessary hereafter. The pumping-station stands on 2 acres of land close to the river Biss. The 21-in. outfall sewer discharged into a screening-chamber, provided with a $\frac{1}{2}$ -in. screen having a revolving rake working in same. There were two detritus tanks, from which the sewage was pumped, each 54 ft. by 14 ft. 6 in., having a joint capacity of 100,000 gallons. Over these tanks were the engine-room, 40 ft. by 33 ft., and gas-producer house, 33 ft. by 15 ft. The tanks were constructed of cement covered by 21-in. brick arches, carrying the floor of engine house, with two sumps for cleaning the tanks. The machinery consisted of three 18 B.H.P. gas-engines for sewage, one 10 B.H.P. for storm water, and a 14 B.H.P. for working the air compressor. The pumps were three 5-in. and one 6-in. centrifugal. One of the sewage pumps was a stand-by for storm water. The producer-gas plant, suction type, was in duplicate, with a total capacity of 60 B.H.P.

The contract required each 18½ B.H.P. engine to raise 30,000 gallons per hour through a 12-in. rising main, 312 yds. in length, with a lift of 48 ft., and the 10 B.H.P. 40,000 gallons per hour through a rising main, 12 yds. in length, with a lift of 22 ft. The storm-water bed adjoined the engine-house, having an area of 1,375 super. yds., constructed of concrete, with a clay puddle bottom 12 in. in thickness, depth 4 ft., filled in with coarse local clinker. On the upper site, 15 acres, was the rising main and sediment tank. A 12-in. rising main was carried under the river to the upper site, where it discharged into a carrier with an open tank built in three compartments, each 90 ft. by 30 ft. by 10 ft. in depth, with a total capacity of 500,000 gallons, or twenty-four hours' dry weather flow; the sewage, after travelling the whole length of the three compartments, in all 270 ft., flowed into the main carrier to the primary beds. The tank was built of concrete with blue brick copings, the inlets and outlets being submerged. Provision was made, by means of floating arms, to empty either section through a drain back to the pump wells. The sludge, to be brushed through outlet valves and open channels to a sludge pit, was also drained back to the pumping station. The beds were constructed of cement-concrete, 1 to 5 in. walls 18 in. in thickness, covered with cement, bottoms 6 in. of cement with a fall of 12 in. from inlet to outlet in the primary beds. The secondary beds were under-drained by 6 in. and 4 in. land tiles. The contract provided for all

beds being filled with clinker, the total quantity being 12,000 cubic yds.; price 6s. 6d. per yard; but the difficulty of obtaining this large quantity of hard clinker, and the tendency shown by clinker to break down, decided the Council to abandon it for the primary beds, and to seek other materials. The alternative materials that could be obtained locally were ironworks' slag from Westbury, and limestone from Frome. At this time, in the neighbouring town of Devizes, the Town Council, under Mr. Dibdin's supervision, were carrying out experiments with waste slate. The Committee visited these works, and were much impressed with what they saw, and the results obtained there. The author was also carrying out a series of experiments on a small scale, using slate, limestone, broken brick, slag, and clinker, and the consulting chemist, Mr. C. J. Waterfall, F.C.S., F.I.C., of Bristol, reported very favourably on slate and limestone, the former giving better and the latter nearly as good results as clinker. It was consequently decided to fill four of the primary beds with Tytherington limestone, as being, in the author's opinion, harder than the Frome stone, and four with slate, laid under Mr. Dibdin's directions as follows:—Single rows of blue vitrified bricks were laid flat on the floor in the direction of the fall, varying from 2 ft. to 2 ft. 9 in. apart; on this the thickest slates, about $\frac{3}{4}$ in. in thickness, were laid, above the slates were carried up in layers 2 in. apart with slate cubes for support, 10 ft. apart in every direction; the slates were built round a 10-in. wooden cylinder having holes for flushing out the bed when required. Slate beds having a water capacity of 50 per cent. greater than limestone or clinker, the Local Government Board were asked to sanction the primary beds being reduced from eight to six, but declined, on the ground that slate for filling was a new material of which they had had no experience, the result being that there were two spare primary beds. The secondary beds were filled with broken clinker screened to pass a 1-in., and rejected by an $\frac{1}{2}$ -in. mesh. The final effluent was collected in carriers for distribution over about 6 acres of land for conveyance direct to the river. The contractor for the general works was Mr. J. Riley, of Cheltenham, and for the gas plant, engines, and pumps, the National Gas Engine Company, Ashton-under-Lyne. Mr. C. S. Cole, A.M.Inst.M.E., carried out the duties of resident engineer.

The members then walked to the sewage-disposal works, where they saw the new slate-filled beds in course of construction. Mounting a partly-filled bed,

Mr. W. J. Dibdin said the principle of the slate bed was very simple. If they imagined that to be an ordinary bacteria bed of coke or clinker, it was obvious that they had one surface—the outer surface—and the interior of the mass was simply waste space. It contained no water, nor could it assist in the bacterial action, because, after the first few weeks, the minute cells in the coke or clinker became choked or filled in with the ordinary matter, and they had one surface—the outer surface. It was very evident that in that way there was an enormous waste of otherwise available space. The interior of the mass could be made to do the work if they could hollow that piece of coke, or clinker, or stone, and thereby get an interior surface, and the extra quantity of water which would be taken up by a bed filled by such hollow spaces would be something equal to double. To overcome that problem was a point he set himself to work upon, and it became perfectly evident that one could not hollow out masses of clinker, or coke, or stone, and the next consideration was whether they could use some hollow material. Naturally, ordinary agricultural drain-pipes presented themselves, but the expense and the difficulty of getting at them for the purposes of cleaning was objectionable, especially the question of expense. The next and obvious conclusion was that the pipe was only a bent plate, thereby they had an interior surface and an exterior surface, and by separating those plates with distances of a suitable size, they had a series of plates one above the other, and as the bacterial action would take place upon any surface, whether coke, clinker, stone, glass, or concrete, it did not matter what the surface

was if it was chemically inert, and would support the weight of sludge. Then the deposited matter would settle upon that surface, and the bacteria would grow and feed upon it. This led to the inference that, if they could obtain suitable horizontal surfaces and separate them by suitable distances, they would have a desirable result. They had first to consider as to the utilisation of the interior mass of the material. He found that slate *débris* could be obtained under reasonable conditions. Originally he had thought of slates many years ago, but ordinary slates on the market at 8/ or 10/ per ton were impossible, but when he found the slate *débris* thrown away was of excellent quality, was suitable, and could be obtained at a mere bagatelle in the matter of price, then he saw that the problem as to material was solved. He had obtained a material which could be separated by suitable distances. At Devizes the beds were constructed of very rough blocks. At first it was not known how they could get blocks at a suitable price, and they had to split them up by hand. The work was necessarily arduous and very costly. But Mr. Owen Jones, of the Oakley Slate Quarries, Blaneau, Festiniog, set to work and devised machinery by which he could split the blocks. The cost of these slates, split as they saw them, and including the necessary number of the blocks, put on the rails, was 10s. per ton. He specially pointed out to the quarry company that there must be a fixed price, because it was no use starting the use of slates for that work, and then finding the price of the material raised against them. As each ton of slates would fill 3 cubic yds., the price at the quarry was 3s. 4d. per yard. To that they must add the carriage, cartage, and cost of laying. The cost of those beds for all charges was 9s. 3d. per cubic yard, that was built into the bed in the way they saw. One cubic yard of slate would take as much sewage as 2 cubic yds. of coke or clinker. As a matter of fact, it started with doing nearly four times as much, but they would allow a little bit, and reckoning it only did twice the work, it was equal to coke beds at 4s. 7½d. per cubic yard, with the further advantage that the slates were indestructible. They would never wear down by the action of the sewage or bacteria. And they found by experiment after eighteen months' working at Devizes that the deposit on the surface of the slates was in such a loose, friable, non-stickable state that it could be washed off simply by a flush of water. For that purpose they would notice in the beds certain places which covered a flushing shaft, which was made by simply putting in a wooden template in position and building the slates up round it. Then that was taken out and there was a flushing shaft. It might be, according to the experience at Devizes, eight or ten years before those beds require to be cleaned out. But whatever the time might be, a hose, with a bent nozzle, could be put down the shaft and the deposit washed off and run on to a special ash or clinker bed on which it could be dried without any nuisance or trouble whatever. Of course there was a certain amount of labour, but it was of such a minimum character that it became a very small matter indeed.

The members were then entertained to luncheon at the George Hotel by the Chairman of the District Council, Mr. H. Mundy. After luncheon the two papers were discussed.

Mr. Read (Gloucester) proposed a vote of thanks to the authors, and to Mr. Dibdin. He said the new departure in the construction of bacteria beds by slate-filling was of particular interest, and he hoped it would prove a success.

Mr. J. Lemon (Southampton) expressed his astonishment that it had been necessary to resewer the town, and said he sympathised with the ratepayers of Trowbridge. He congratulated the town upon carrying out works which were thoroughly up to date.

Mr. Gladwell (Eton) said the progress of the sewage-disposal works would be watched with national interest, and he hoped in the future they would have further papers showing the result of some years' experience of treating sewage on the lines they had seen that day.

Mr. Cotterell (Bristol) remarked that, if they were going to take gas liquor into the sewers, heaven help the engineer who had to

look after the works. Mr. Dibdin had introduced a new departure in bacteria treatment which many of them would be glad to adopt, or get Mr. Dibdin's advice in adopting, so as to secure the better efficiency of their filter beds.

Mr. W. J. Dibdin, in reply, said he had to examine the effect of gas liquor upon sewage in regard to its action upon the bacterial processes going on in the modern sewage works very frequently, and in connexion with a large number of places, and he had found that, if the volume of gas liquor did not exceed 2 or 3 per cent., then it was absolutely without any effect upon the bacterial activity in ordinary bacteria beds. If it went up to 5 per cent. of the total volume, then the quantity was, under some conditions, sufficient to make them careful. It might have a retarding effect in the sense that, although the daily flow might be only 5 per cent. of the total volume of the sewage, they would not control the rate of discharge, so that it did not at any time exceed 5 per cent., and they might have at times 8 or 10 per cent. If that was the case they must have a true septic process, and that was objectionable. The rate of discharge from the gasworks into the main sewer should not exceed 5 per cent., and if they could keep them to that limit then no harm would be done, but don't let

them get beyond that. If they keep it to that, and it was well diffused, they need not be frightened of gas liquor. He was one of those who had always advocated the studying of the interests of the trades of a town. If they began to interfere unduly and unnecessarily with the manufacturing interests of a community, they were doing a very serious thing indeed, because their action might have very far-reaching results. Manufacturers might do a certain amount of what people consider harm in sewage matters, but they did a considerable amount of good every Saturday when they paid their wages. Therefore he had always advocated the studying of their industries and their interests, and he had always believed that, if manufacturers would work with the authorities so as not to make an undue discharge of large volumes of liquor, and would assist by making the distribution of their waste liquor over a period of time, there was no difficulty in dealing with it at the disposal works. If the manufacturer said: "No, I will dump it all in an hour," then he was taking up an unreasonable attitude. He said that of manufacturers generally, as well as of gas manufacturers. The other point was as to the cleansing of those slate beds. He was going to throw that at their heads. Mr. Pickering, the other day at their annual meeting, said

the cleansing of those beds was an engineering question. He could put the bacteria on the slates and get them to do a good deal of work, and then it was for them to clear the deposit off. Some of them might say what size of hose and what pressure of water was required to do it. After eighteen months' work at Devizes he was anxious to know whether that was going to be a success or not. So they cleared out the bed and exposed the slates, and then it proved to be such a loose, friable material that it flushed off the slates and left them perfectly clear. It was obvious that a simple flushing would clear it off. Then came the question, after they had washed it off the slates, what were they going to do with the residue? They had put it on the ash bed. On the previous afternoon he was walking over it, and his boots were as clean as if he had been walking over that floor. What residue was washed off the slates was put on the porous asphalt, and it would drain and dry without nuisance and without trouble and expense. That was the experience of the work at Devizes, and that was the best answer.

The members then proceeded in brakes to the sewage-disposal works at Devizes, where they inspected the slate-filled beds, which have been in active work for the past eighteen months.

The International Congress of Architects.

IN our last issue we gave a full report of the first three days of the proceedings of the seventh International Congress of Architects, concluding with the proceedings on Wednesday night at the Institute of Architects and the Grafton Galleries.

THURSDAY'S PROCEEDINGS.

On Thursday morning meetings were held in both the Grafton Galleries and the rooms of the Royal Institute of British Architects.

Artistic Copyright.

Mr. W. S. Eames (United States) presided at the sitting of the Congress held on Thursday morning at the rooms of the Institute.

Two papers, by M. Pablo Salvat and M. Gaston Trélat, were taken as read, the following being abstracts:—

By M. D. Pablo Salvat:—

1. Architectural property ought to be recognised and enjoy identical rights with those of intellectual property in general.

2. Each country ought to fix, as far as it is concerned, the limit of duration of copyright; but in no case ought this limit to be less than twenty-five years, counting from the death of the author.

3. In no case ought the design—that is to say, the idea expressed in terms of architectural art—to be reproduced without the author's consent.

4. The architectural work ought never to be reproduced either in its whole or in any one of its details, no matter for what constructive purpose, without the author's consent.

5. The architectural work may be reproduced in sculpture, drawing, painting, photography, or engraving, provided the author has not expressly and publicly signified his absolute prohibition.

6. The right of ownership is inherent in artistic work. It is constituted *de facto*, without need of registration or deposition of any kind. For copyright to be guaranteed signature and date should be sufficient.

7. Assignments of copyright should be made in the same form as assignments of personal property at the will of the contracting parties.

8. The author should specify in the assignment the points as to which he reserves copyright.

9. Any contract without restrictions implies an assignment also without restrictions.

10. Assignment without restrictions does not deprive the author of the power to reproduce his own works, but the assignee can, by an express condition, demand the right to oppose it.

By M. Gaston Trélat (Paris).—(The author's summary):—

In conclusion:—I do not believe that there

exists an artistic property besides the possession of the objects themselves, which is exactly the case as regards the property of architectural drawings. In the matter of art, in the matter of architectural elaborations, there is no *artistic property*. We have seen that the question was of a nature to interest the question of *morale*, inasmuch as it regulates our personal actions towards others. But the *right* which is connected with other people's actions in relation to our selves must not interfere in the matter.

In architecture the proportions of a piece of land, the building site, the surroundings, are all elements which must be taken into consideration in making the studies for the composition of the plan. The mind of the artist is haunted by too many equally decisive ideas in the orientation of his work that any other mind could grasp the leading idea of his conception. The arrangements and the co-ordinations are all connected with it. It is a law from which the artist will never be able to free himself under the penalty of turning out bad work, and consequently of injuring his own personality.

Artistic property, as far as I have been able to understand it, does not rest upon a sufficient examination of the question; it could not support a conscientious and logical analysis. The result of it is, therefore, in my opinion, an action without profit and a regrettable loss of time.

M. Georges Harmand (Avocat à la Cour d'Appel, Paris) went through Señor Salvat's propositions, commenting as he proceeded.

With No. 1, he fully agreed. In regard to No. 2, he queried the limit of twenty-five years. Considering that literary copyright in Spain extends over a period of eighty years, why should artistic copyright be given a lower limit? Nos. 3 and 4 he fully endorsed. In regard to No. 5, he said, why demand that this prohibition be explicitly expressed? It should rather be implicitly understood. In regard to No. 6, M. Harmand considers the optional addition of the signature as an excellent suggestion, though he would not make it obligatory. No. 7, he observed, refers to a purely Spanish legal aspect concerning the transfer of property. In regard to No. 8, instead of the author specifying, in the assignment, the points as to which he reserves copyright, M. Harmand suggests that the author reserves his absolute copyright, except in so far as the client has specified the direction (if any) in which he (the client) wishes to acquire a copyright. Clause 8 should reserve to the artist the right of specifying restrictions as to the reproduction of his work. Clause 9 was negative by M. Harmand, who would maintain the inviolability of copyright, even without explicit mention in regard to No. 10.

M. Harmand approves of the first half of the clause, but considers that the second half contradicts the first.

M. Salvat (Barcelona), the author of the propositions, suggested that it would be as well to lay stress on the inherent difference between the drawing and the executed work. He would give to the drawings themselves every copyright that can be claimed, but he would leave full liberty to reproduce the executed building, whether by photographs, drawings, or engravings.

M. Harmand amplified his preceding remarks, and quoted a regulation which is in force in both France and Italy. In the case of a street, for instance, while an ordinary general sketch is allowed, in which perhaps several houses appear, with no undue preponderance of one over the others; yet it is not allowable to make a careful drawing or a detailed sketch of one single house without the permission of the architect.

He moved the following resolution:—

"The seventh International Congress of Architects assembled at London in 1906, recalling, on the one hand, the resolutions passed during the past twenty-eight years by the International Congress of Architects and the International Congress of Artistic Copyright, as well as by the International Congresses of the Association Littéraire et Artistique Internationale, notably at Madrid in 1904; recalling, on the other hand, the Protocole de Clôture of the Diplomatic Conference held at Paris in 1896, which upholds the principle of complete protection of works of architecture; recalling, finally, the Spanish law of 1879 and the French law of 1902, both of which expressly protect works of architecture:

This Congress is of opinion:—

1. That architectural designs comprise designs of façades, exterior and interior, together with the plans, sections, and elevations, and they constitute the first manifestation of the architect's idea and the work of architecture.

2. That the building is but a reproduction, on the site, of the architectural drawings.

And this Congress renews the resolution that works of architecture be protected in all legislative enactments and in all international conventions equally with every other kind of artistic work."

Mr. Kersey, in seconding the resolution, said he agreed absolutely with all that was contained in it, but he would like to have a little more clear understanding of exactly what had taken place at the Conventions and what was the nature of the resolution of 1886. He would like to know if the Convention was signed by representative delegates to bind all countries to adhere to the protection of all artistic productions.

M. Harmand said that in 1886 diplomats of the countries met at Berne to consider the protection of literary works, paintings, sculpture, and maps and plans of architects, and there was a meeting again in 1896. The delegates of Belgium, France, Italy, and Spain reported that they had protection for architectural work, and promises were made by Germany and Great Britain. The Conference had not since met, but it was hoped to meet in 1907. Germany had got a project before its Parliament to protect architecture fully, but Great Britain had done nothing so far.

Mr. Kersley said that if they passed the resolution great service would be rendered in strengthening everybody's hands with the English Government. If they were able to show the English Government that we were practically the only civilised country in the world which was standing outside the Convention for the Protection of Artistic Productions they might get something done.

M. Salvat criticised the wording of the resolution, and M. Harmand replied.

The Chairman said he could see nothing in the remarks of M. Salvat contrary to the spirit of M. Harmand's own remarks.

M. Harmand thought that M. Salvat would be able to fully support the resolution.

M. Salvat expressed himself satisfied with the remarks of M. Harmand.

The resolution was then agreed to.

The Architect's Control Over Artists and Craftsmen.

M. R. Böker (Russia) succeeded Mr. Eames in the chair, when the following question was discussed:—To what extent and in what sense should the architect have control over other artists or craftsmen in the completion of a national or public building?

The following are abstracts of the papers contributed:—

Sir William Richmond, K.C.B., R.A.:—

A simple question is asked upon a very complicated subject. Complicated because we live in times when artists come much more rarely into touch than formerly. Cities are bigger, life is less simple, distractions of various kinds are ever hindering any artistic intercourse. Above all, the State does not take much account of art. Education is in all hands, superficially. Hundreds of clever young fellows are taught the rudiments. How few of these gain permanent employment, or even make a living. Yet notwithstanding, the Institute is always broadening its ground: the Royal Academy seeks to be more comprehensive. The Art Workers' Guild has accomplished much, and the "Arts and Crafts" have succeeded in gaining the interest of a section of the public. Against the cold attitude of the Government towards art may be set a growingly democratic bearing of artists to artists. Architecture, sculpture, and painting are getting only too slowly more closely into touch, and the professor of each separate art is gaining knowledge from the specialist. And yet there are great difficulties. The great mother of art, architecture, is still shy of her children. For this there must be a reason. May it not be that though increased liberation from "Styles" finds a less pedantic outlook, still a really modern expression in architecture has not entirely overcome them? The rapidly increasing necessities of modern life, the almost innumerable and new problems which the architect has to solve render him more or less an experimentalist. And exactly, though less forcibly, an analogous uncertainty surrounds the inspiration of the sculptor and painter.

Modern costume does not lend itself to sculptural or pictorial art as monumental art, and only monumental design can find fellowship with architecture; so that we are more or less in a dilemma, all of us. It would seem a commonplace to say that a Classic building should be embellished with Classic stories told either in the round in relief or by painting of the same character, and the same applies to Gothic buildings. And yet being done the average even instructed citizen is left cold. He is aware of a certain anachronism; and though he may admire, his admiration is without sympathy, and if he does not state it there is lurking in his mind some such sentence as this: "Is there nothing good enough, picturesque enough, grand enough in modern life to create a style?" This leads one to the conclusion

that architecture must make the move; sculpture and painting will follow. The divorce of the three arts has been destructive to the highest art, which contains them all three. It is impossible to deny that the Royal Academy is *per se* an academy of painting; it has fallen to be so. The architectural room there enlists but little of the public attention. Why? The average public is neither interested in nor does it know any thing about that noble art which is beyond its power of comprehension, because it appeals to the most abstract of our senses, beauty of line and of proportion. Architecture is an art which appeals last, not first, to the average individual. Painting appeals first, first as portraiture, second as anecdote; that painting which is the highest, which is abstract, and hence in allegiance with architecture, appeals scarcely at all. The same may be said of sculpture, though in a less degree than of painting. Regard for the abstract beauty of form is very rare in England; thus architecture, sculpture, and the higher forms of decorative painting have no market; they are not either of them, as it were, dealers' wares; their value is intrinsic, not fluctuating, and it cannot be grouped in the sale-room; therefore neither architecture, sculpture, nor decorative painting is within the market. So much the better! Doubtless a combination of serious architects, sculptors, and painters would be quite invaluable, a society, say, comprising a small number of each section of the arts, perhaps six architects, six sculptors, and six painters.

The Institute is the very body to create this new departure from specialism and all its narrowing effects.

In my opinion no amount of "papers," either for discussion at a Congress or for stimulating a pleasant chat at one of the evenings at the Institute, will ever lead further than that evening's passing instruction and pleasant pastime. There are many men capable of writing able articles, convincing also for the time being, but which very soon are found in that limbo called forgetfulness. We must get practically into touch; there must be no priority. Our several professions are full of difficulties, which would be appreciated as soon as we could get to work together. The architect can learn much from the painter and sculptor, and *vice versa*. It is "touch" that is needed, not "shyness," and real "touch" can only occur when practice follows precept in the initial stages of a great work. It is of little use for an architect to tell the sculptor or the painter. Here I want a statue, there a relief, here a wall painting, etc. At the very initial the three should work together. There is nothing harder than the experience of an artist who is called to decorate a building with painting or sculpture which is in a sense complete without either. Surely the structure must be designed to receive. A niche is nothing without its statue, a sentry-box is a silly thing without its sentry, just as a framed panel seems to ask for what it is framing, for something precious—marble, mosaic, or colour. Incomplete is the monument to the Duke of Wellington in St. Paul's; it looks like a pedestal without a reason; it fails because it has no culmination. There are plenty of arches, plinths, pedestals, scattered all over London which present the same absence in appearance of any utility. If there is no money forthcoming to complete a scheme why ask us to imagine what all these pedestals, plinths, and arches mean? They mean nothing, they are inadequate and senseless! Surely we can imagine a style of architecture the growth of necessity which shall ask for no adornment save that of beauty of line and dignity of proportion. That would be one thing, perfectly complete and quite comprehensive and entirely satisfactory as far as it went. But when we see forms which are not structural placed for purposes which they do not fulfil are we not puzzled and dissatisfied? We are presented with shams. Now, if the architect, starting his design, says, "I am going to design for sculpture and painting," and calls in the best sculptor and painter to consult with him, his hands will be strengthened: knowing how much money he has to spend, he will be able to portion out the various costs of the various parts of his scheme.

My main contention is that with a view to closer touch between the architect, sculptor,

and painter, a committee, such as I have indicated, might be appointed by the Institute. That committee might in time become an advisory body to the Government and the London County Council, which both need assistance, not only in common-sense but good taste also, in all that applies to art.

By M. H. P. Nénot (Membre de l'Institut de France):

The study submitted to you touches one of the most delicate points of our art; it has for its subject "The Professional Relations between the Architect and the Painters and Sculptors his Collaborators."

In all the bygone periods of art the same idea has united all artists. Painters, architects, and sculptors had the same idea, and the master of the work was sure to find in his collaborators a decorative interpretation in perfect harmony of feeling with his own composition.

Among the Egyptians the hieratic sculptures form part of the architecture itself, and the finest paintings in the tombs of the Theban kings indicate that from the pictorial decorative point of view as well as from the sculptorial the unity was perfect.

The beautiful monuments of Greece, where sculpture played an important part, sometimes even a predominant part, as in the Erechtheion, show us that the greatest sculptors tried above all to accomplish this desirable union.

At Pompeii, where we find once more the intimate life of the Romans, we see that in their private habitations, as well as in their monumental buildings, the decorative paintings and sculptures, although varied *ad infinitum*, are always in complete harmony with the architecture.

In the Middle Ages the charming Latin basilicas, the splendid Byzantine churches, the beautiful Roman and Gothic cathedrals, in spite of the very great liberty of movement of the sculptors and painters, show clearly that a common idea, a uniform faith, animated all the artists.

During the Renaissance, architects, painters, and sculptors, completely changed their aesthetics, and the record of the unity with regard to the three arts belongs to Michelangelo, who, as an architect, was his own collaborator as painter and sculptor.

In the Louis XIII., Louis XIV., Louis XV., Louis XVI., and the Empire styles the architects prefer the curves or the very straight lines, and both painters and sculptors in their works adapt themselves to their conceptions, and are either graceful and simple or rigid and severe, according to the different periods.

This unity of the different schools was fruitful for the artists; each of them, according to his temperament, interpreted the sentiment of art which exercised its influence on the period, and either followed or led its fluctuations.

They ignored the styles and passed, like our great colleague Blondel, from the Louis XIV. to the Louis XV. without being aware of it, simply by following the fashion. Painters, sculptors, and architects were all of the same school, and this school appeared to them far superior to all those of the previous periods; they had even a certain contempt for the said periods, and it must have been a great joy and a great force to be sure of the perfect truth of the esthetic part of their art.

How easy and simple were the professional relations between the architect and his collaborators, the painters and sculptors; they always spoke the same language, and this common thought gave to their movements that beautiful union which is so difficult to obtain in our days.

The earthly paradise of the happy unitarian periods is closed to us. We all wanted to eat the fruit of the tree of science. Critics and archaeologists have taught us the history of art and of the different styles, and each of us, according to his predilections, has placed in them his apogee or his decadence.

Without having an idea that art is a language which every generation must alter only a little, and that it is impossible to account for these modifications and to judge them before at least half a century has gone by, we have been asked what style we were creating! We should have answered like

those heroes of a popular drama who, drawing their swords, exclaimed, "We gentlemen of the Middle Ages!" These at least did not hesitate to classify their period.

We have, besides, been told very politely that we were living in complete decline, and then instead of continuing to speak the language we had learned we were required to return to the origin. But there are so many delightful streams and so many charming little rivulets in the stream of art, when we try to advance up its current, that some have found the true source in India, others in Greece, certain others in Italy, and many in the Latin and in Gothic countries and elsewhere. Each artist, having found the true source, took a delicious bath in it; his followers sustained that there was not any clearer water elsewhere; but, as there were many true sources, each group speaking a dead language with which he was little conversant, the artists ceased to understand each other, as of old during the building of the Tower of Babel.

In this confusion some beautiful individualities asserted themselves, but all these schools rendered the task of the architect very difficult when it was the question of decorating a monument.

At the time when the Sorbonne was building a great fresco of 26 metres had been decided upon for the great amphitheatre, to decorate the part at the bottom which supports the cupola.

The success depended on the tone of this fresco. Puvion de Chavannes seemed to be the right man. With him the white stone wall, almost entirely covered over, would continue to bear its cupola. But my friend Benjamin-Constant, appointed for another decoration in the same monument, wished to be appointed to carry out this fresco, and the President of the Republic, M. Grévy, informed the Director of the Fine Arts, M. Kœnig, that he wished very much that he should be given the work.

The position of the architect was painful. To resist the head of the State was a difficult matter, but, on the other hand, with the powerful pallet of Benjamin-Constant the semi-cupola would no longer be supported, and the general harmony would be destroyed.

I declared that if I was forced to accept Benjamin-Constant I should give up the fresco and substitute an architectural motive for it. Then I was allowed to have Puvion de Chavannes.

This should always be the case; instead of the architect having a certain artist forced on him he should be given a great freedom in the choice of his collaborators, and he himself must point out the artists and follow their work, without any other preoccupation than the general harmony of his work; and he should leave to the painters and sculptors, who are responsible for their work, every liberty of form or of colour, provided they do not prejudice that general harmony without which no architectural work can really exist.

By Herr L. B. Muller, architect (Ellers-Düsseldorf):

The author takes it for granted that in giving the order to the architect in question the decision is based upon his evident capacity. (Success in a competition or constructions specially remarkable for their qualities previously designed by him or carried but after his plans.)

Architects thus discovered will and must possess so much commonsense that they are able to give the necessary instructions to all co-operating artists.

If it is the question that a public or national building, or also some other monument, devised by one architect shall be adorned with statues or pictures the architect shall be the designer of the whole work. It is he who shapes the frame of the picture and gives the subject for it. The other artists are the co-operators. They have to subordinate themselves to his intentions in the dimensions, in the tone and harmony of colours, in order to obtain a desired effect; if they will not they must not assume the task.

If it is the question of a monument in which either the sculptor or the painter (interior monument) gives the tone or expression the architect must subordinate himself to the intentions of the relative artist, and must continue making sketches until he has

produced the impression desired by the artist; and if he cannot find it he must withdraw from the task.

If in the erection of public or national buildings a co-operative artist is forced upon the architect, or if, *vice versa*, in the execution of monuments an architect is imposed upon another artist it is more than likely that their idea will be diametrically opposed.

The stronger mind will prevail, and the work will be a failure.

The watchword in every case must be: The designer of the work shall have the choice and supervision of his co-operators.

But the designer ought not to be possessed of a false sentiment of honour. He ought not to reject an improvement on his design simply because it was not he who hit on the idea.

He should leave to his co-operators, so long as they work with ability on the plan of his design, not only a certain liberty, but also a rightful share in the honour, "mention of his name, and recognition of any eventual improvement."

"By so doing he honours himself." Now, if in what precedes it has been asked and reasons given for the subordination of the co-operating artist then much more shall the mere artisan subordinate himself to the designer.

But, of course, the architect must in these spheres be sufficiently an adept, so as to be able to give the proper decision in the various questions which may turn up to be decided upon.

He shall encourage the artisan to express his opinion about things he believes will contribute to the improvement of the work.

He shall without fear or favour refuse to accept any work done badly or slovenly, and already in the conditions of tender he shall leave no doubt about this.

The architect must direct his fullest attention that everything necessary be carried out in the most beautiful (or most perfect) form.

In this Nature must be his model, in which everything necessary is given in the most beautiful form.

By M. Gaston Trélat (Paris).—(Author's summary and conclusion):—

In short, I do not hesitate to declare that the architect ought to have control—with no other limit than his aptitudes and possibilities—over all the other artists and all the artisans.

This control could not be too effective, both as to the construction and the arrangement. It is thanks to this control that the departments will be able to respond to the mind that the originator has placed at the service of the programme, together with the social need which it enters into his speciality to supply.

Finally, with regard to the character which the plastic motive is to assume, the architect, as composer, is alone capable of ripening the idea which he has conceived and rendered practicable. It is only necessary to be suited with the multitude of forms which he has realised exactly by his sketches. The latter contain a complete order of ideas which the pencil permits us to understand and to hint at. And from it results a *maestria* the word is not too strong—which belongs to the composer architect, and which attaches him more and more to the elaboration of the work he has conceived.

Conclusion.—Consequently it is to the architect that appertains the control of all the artists as well as all the artisans having to collaborate in the erection of monuments destined for the State or the public service.

And this until the absolute completion of the *ensemble* in question.

By Herr Otto Wagner (Imp. and Roy. Superintendent of Works, Professor of the Imp. and Roy. Academy of the Plastic Arts).—(On behalf of the Society of Austrian Architects):—

In how far and in what sense is the architect to be given absolute authority over other artists or artisans in the completion of a public or international building? As regards this question, the considerations already gone into in this Society's communications on the previous subjects are to be completed by the following:

The quality and quantity of the architect's knowledge, and certainly in the majority of cases his practical capacity, certainly surpass, as has been shown, the same qualities of

his co-operators; they therefore actually force the leading part in the execution of any work upon the architect. This leading *role*, if it is to be crowned with success, must be provided with absolute power over all the contributing hands, because a correct artistic and technical harmony of the various parts depends on it, and only the creator of the work—that is to say, the architect is in a position to make the necessary dispositions.

To this has still to be added that many works and modes of use of the material are invented by the architect himself, and that he must for this reason be the master to decide about every measure in carrying out tests, trials, in making samples, etc. No doubt that about matters which deviate from the broad way of the ordinary methods he will deliberate with the contractors and purveyors, and come to an understanding with them, but the final decision in the matter can only rest with him, because he alone remains responsible to the public for the success or failure of the enterprise.

If the architect has a certain security for the success of his work in the proper selection made by him of the persons to whom the carrying-out of the various parts of the work is to be entrusted, the importance of such a choice shows itself in a much higher degree when it is the question of a co-operating artist, because in this case a new factor, viz., the individuality of the collaborator, is of the most vital importance. Every artistic conception of the co-operators must adapt itself completely to the intentions which the architect wants to realise, so that the work to be created appears as of one cast. Considering that the creator of the work alone can form a correct judgment about this, no doubt he alone is entitled to make the choice of his collaborators. The answer to Question 8 can therefore only be:—

The architect, in the construction of a building, is to be given absolute power over the co-operating craftsmen, but in a special manner over the co-operating artists.

By Señors José Amargós (Salvador Oller y Padrol, P. de Miquelarena, Salvador Valeri).—(On behalf of the Association of Architects of Catalonia):—

Having been appointed delegates by the Committee of Propaganda of the Association of Architects of Catalonia to the Congress which will be held in the great city of London to set forth the conclusions bearing on Question VIII.: Should the architect be invested with the supreme authority over all the artists and artisans until the complete termination of State monuments or those destined for public service? and having accomplished our task, we have the honour to submit to your superior judgment the result of our mission.

During the discussion of the subject we have been assailed by the fear of not having, perhaps, correctly understood its scope and transcendence, since it is evident, and it is a matter of practice in Spain, that the authority of the architect must be supreme over all the artists and over the workmen until the complete termination of the monuments destined for the State or for the public service.

The supreme authority of the architect is necessary. The undisputed authority he must have over the workmen belonging to the building trades, properly so called, might to some people appear to be doubtful when extended to persons who are exercising one of the fine arts, and who also take part in the execution of monuments of a public character. The pretended emancipation from this authority on the part of certain artists compels us still more to defend our rights, which have not been granted to us as a matter of grace, but which are fully recognised by a law without appeal of the professional capacity and distinction, which rights must prevail as much in order to render more easy, more free, and more correct our facultative mission, as to accomplish the greatest possible development of architectonic activity.

It is not meant, of course, that this justified authority shall be exercised in an arbitrary manner, since in that case all the workmen and artists would be converted into mechanical executors of the work. The authority must be exercised with the greatest discretion by giving clear, precise, and methodical instructions to the artists and

workmen, taking care that these have understood the nature and importance of the work entrusted to them, so that all, by using their best endeavours, shall contribute by their intelligence and good will to the perfect execution of the work.

Powerful reasons of a moral as well as a material order can be alleged in favour of the principle of the absolute authority of the architect, but the limitations prescribed by the Congress prevent us from entering fully into the arguments necessary to completely justify our judgment, which is to make the most formal affirmation.

The architect must have the authority indicated in the question for the following reasons:—

First: Because the architect surveyor must transfer his thought by the proper means, either graphic, written, or verbal, as the case may be, to all the artists and workmen taking part in the execution of the monument, by explaining to them the reasons which determine him to take such and such a resolution; otherwise the monument would be devoid of that harmonious variety in the uniformity which every architectonic work must possess.

In the second place: Because for every edifice is necessary and indispensable an architect to direct the work in order that the building shall be carried out in the proper order and without interruptions; otherwise it would be prejudicial to the monument and to the artists and workmen who contribute to its execution.

In the third place: Because without this authority the architect could not present the necessary estimates of cost and the technical management of the works would be difficult. In fact, there would be created certain obstacles, dualisms, and suspicions, which, besides causing prejudice to the professional moral standard, would be damaging to the realisation of the work itself, because the various parts would not be in harmony with a uniform judgment and study, and because the architect would not be in a position to insist upon the fulfilment of all the contracts of the different trades or arts which necessarily enter into the production of every public or State monument.

In the fourth place: Because it would be subversive of the dignity of the architect, who might be suspected to be lacking in the knowledge he is obliged to possess by his title and by the practical experience he has acquired in his profession, if the interference of another artistic authority were tolerated which would deprive him of the means to act, and would put him into antagonism with the conditions which must be united in an architect, and which are the outcome of the fusion of science and art.

In the fifth place: Because without this absolute authority the architect would remain by this very fact exempt from the responsibility which he enters upon towards the State or the Administration, because of being deprived of the means which such authority gives over those who are placed under him, as the artists and artisans must be—not that this subordination is to be considered as humiliating; rather, on the contrary, it is honourable for the man who is able to fill his place in the various walks of life.

In the sixth place: Because the profession of an architect is certainly the most complex of all the artistic careers and the one which requires the greatest amount of knowledge, which fact by itself alone gives him a superiority over all the other artists and workmen who take part in the works.

One case only can present itself in which the supreme authority of the architect may be doubted upon some points, viz., in the erection of monuments which at first sight appear to be almost totally sculptural, in which exceptional case the architect gives to the sculptor the necessary freedom of action, so that the latter in the development of his idea shall not be hampered by the architectural part.

This in synthesis is our view, and we think that we are not mistaken in saying that the architect fervently wishes that his professional dignity may be protected and raised by furnishing him with that absolute authority in his relations with the other artists and artisans in harmony with the innovations of a state of civilisation which becomes every day more complex and more perfect, and that it shall be recognised by

the public authorities in their works, in order that the architect shall never in any way be deprived of it, because he is prevented from it by his mission, in order to preserve his prestige in the face of the whole community and render himself worthy of it.

In the discussion which followed, Mr. Elliott (delegate from Baltimore) suggested that the control of the architect over the collaborating artist should be exercised with the utmost consideration. In the case of an artist of transcendent genius, this control might result in irreparable injury to the world in reducing him to the position of mere assistant. Ideal conditions are almost impossible of realisation, and to find that the highest aspirations of an artist of the first rank had been rendered abortive or only partially successful by the artificial restrictions thrown around him by the less sensitive and subtle architect would be a misfortune never to be retrieved. That the art of painting can and does lead to a higher sphere than does architecture cannot seriously be denied. That many noble works of art are partially or entirely lost to the world by the fact that they are unfortunately exhibited is certain, and wherever this is the case, it is obvious that the conditions should be changed. What artist would begin by purchasing a frame for his picture? And yet the architect demands that he shall conform his art to whatever contortions he may see fit to introduce into a given apartment! The architectural features and decoration of an interior should lead up to and not overwhelm the painting on wall or ceiling. Enfin il y a deux moyens. Either confess that painting and sculpture are higher in the sphere of art than is architecture—that there is a point beyond which architecture should not go (for the reason that the same amount of effort expended in painting, sculpture, or tapestry can do a greater service to mankind)—give the artist his way, and only supply such features as will enhance the value of what he will evolve, or concede the point that his work is a mere accessory, which will inevitably tend to enslave and humiliate him, and so deprive the world of what he might have produced under happier conditions.

M. Rozet (Paris) contended that, whatever the calibre of the artist, he could not be given an absolutely free hand, and he must keep his own work in due subordination to the general design.

M. Bonnier (Paris) supported M. Rozet's contention. He pointed out that the education and experience of the painter and the sculptor, as well as his scope in general, differ essentially from that of the architect. A sculptor, as a rule, does not allow himself to be hampered by any considerations of his site, or the position his work will occupy. Similarly, a painting made in a studio often takes no account of the wall surface it is destined to cover, and so does not possess the necessary inherent qualities suitable, and indeed essential, for flat wall decoration. The architect, on the other hand, has carefully considered both painting and sculpture as adjuncts to architecture, and as he has assigned to each a certain function in the design, it is for him to decide whether each form of decoration does take its proper place in due subordination to the general scheme. It is unusual to find either painter or sculptor who possesses a "sense of architecture," i.e., who realises the essential differences which exist between an easel picture and a coloured wall, or a detached group and a tympanum. And it is just the disregard of these inherent qualities which is so apt to mar the unity of a well-considered whole.

M. Poupinel (Paris) spoke in support of M. Bonnier, and laid great stress on the importance of the architect's advice to both painter and sculptor. He further explained the system in vogue in Paris. When a large public building is to be carried out, the design has first to be approved by the Municipal Art Committee. Next, the preliminary sketches and models of both painters and sculptors have to be submitted to the Committee. When completed, the painting and sculpture are again inspected, this time *in situ*, and if any work does not satisfy the Committee it is removed. The Art Committee possessing these powers consists partly of members of the municipality acting on behalf of the ratepayers, and partly of architects, painters, and sculptors of recognised

ability, who ensure the best artistic criticism possible.

The Chairman proposed the resolution in Herr Wagner's paper, viz., "The architect in the construction of a building is to be given absolute power over the co-operating craftsmen, but in a special manner over the co-operating artists."

Mr. Howard Ince seconded the resolution, and it was carried.

The meeting then adjourned.

The Education of the Public in Architecture.

On Thursday, at the Grafton Galleries, papers on this subject were read at a meeting under the joint presidency of Sir Aston Webb and Dr. J. Stübgen (Berlin).

The following are abstracts of the papers read:—

By Mr. John Belcher, A.R.A., President R.I.B.A., President of the Congress.

The first step, as so often is the case, will be for the public to unlearn much that has been wrongly learnt. The superstitions of antiquity and the "styles" must be exploded. It must be made plain that neither a smattering of archaeology nor a superficial study of styles affords a sound basis for a critical judgment in matters of present-day architecture, which must be presented to the eyes and ears of men as a living art, founded upon past achievements, it is true, but in strict with a power and vitality of its own.

Neither is architecture merely a matter of a beautiful exterior; the importance of the "plan" of a building and of sound principles of construction must be pressed home. In other words, architecture is a science as well as an art, a blending of the two in such a way that the practical knowledge of the builder or engineer is interpenetrated by the artistic spirit, and made without prejudice or loss to subserve its ideals.

Instruction of a positive order will range itself under the three heads of Principles, Qualities, and Factors.

The principles of architecture are two, Truth and Beauty.

Truth requires that a building, both in its entirety and in its several parts, should never seem to be other than it really is.

This excludes all pretence of antiquity where no such claim exists.

It requires that a church should look like a church, a town-hall like a town-hall, and a private residence like a private residence.

An external shell of plaster over brick must not present the appearance of blocks of stone, nor a steel structure cased on terra cotta suggest solid masonry.

Good architecture never deceives the eye even for a moment. There must be no false suggestion as to the purpose or construction of the building, nor any hiding under one external feature that which is usually expressed by another.

The principle of truth, however, finds its widest scope in the true use of materials.

Every material has essential characteristics of its own, and therefore a proper place and purpose in building. There is a time and a use for stone and for each kind of stone, for wood and for each kind of wood, and so on.

To defy, neglect, or misuse the natural qualities of materials is not good architecture. These natural qualities will be roughly indicated under the head of Factors.

Beauty is the second great architectural principle. Its elements do not admit of popular exposition, but the public may be trained to recognise its presence by the appeal that it makes to their imagination and emotions. The fact that beauty can be felt, but not (ordinarily) analysed, is of importance in the education of the public, as tending to withdraw their attention from mechanical rules to the spirit that animates and pervades, like a living thing, the highest architecture.

An appreciation of beauty of form is less common than susceptibility to colour effects, and needs training and development.

The qualities that distinguish good work from bad may be classed as follows:—

Strength.—It is not sufficient that a building be, in fact, strong and secure; it must be so; it must satisfy the eye.

The engineer may by exact mathematical calculation know that the conditions of security are amply fulfilled, but the architect has to see to it that the work presents an appearance of strength and solidity. The larger and heavier parts must be below;

every arch must have sufficient abutment or even a tie-rod as well; solids when placed over voids must be strongly supported, and so on.

Methods of support and resistance must be clear and well defined.

Granite in the upper story of a half-timbered house may, as a matter of fact, be quite safe, but it seems to threaten danger; placed below, it satisfies the eye with its impression of solidity.

Vitality.—Evidence of life and growth, most plainly illustrated in Gothic work, where the perpendicular lines rising heavenward and clothed (as it were) with luxuriant ornament suggest the life of a tree or plant.

It is vitality that gives ever fresh combinations and effects from the same primary elements.

Restraint.—The limitation of means to an end, the suppression of all unnecessary parts or details.

Whatever be the nature of the building, there should be purpose, definite purpose, in every feature or ornament.

This may be illustrated under the head of Proportional Divisions (see Factors); but the general principle is one which will be readily grasped by the intelligent layman, to whom it will often suggest a line for thought and inquiry.

Refinement is impossible without restraint, but it includes also purity of form and perfection of material.

Everything must not only be the best of its kind, but so suited to its purpose that Nature will seem to have expressly designed it for that use and place.

The fitness of certain materials and forms for defined purposes and effects is subject matter for an important chapter in the education of the public.

Repose.—Every really good work is clothed, as it were, in an atmosphere of repose. There is a sense of power, but it is latent power; there is evidence of vitality, but it is restrained vitality.

Effects too pronounced hurt the eye; ornament too profuse wears both the eye and the emotions. There must be no "loud" or vulgar elements.

Grace.—A dignified seriousness of purpose should be observed in the appearance of all public buildings, but an expression of the graceful courtesies of life should not be lacking. In domestic buildings this element of grace takes a more prominent place, and assumes a higher and more refined form, corresponding to the tender sentiments of home life.

The public interest ought to be readily roused in this direction, and a demand created for a better class of small suburban residence.

Breadth.—The treatment of the subject as a whole in a simple grand manner, the proper massing of the several parts, the subordination of detail to the larger forms of the composition and to the bringing of the whole design into unity.

An attempt may be made by illustration and comparison to explain this somewhat technical term, that the public generally may be led to understand and appreciate this quality of breadth which is so conspicuous in every great architectural work.

Scale.—The right relation of the several parts to one another and to the whole in point of size.

It will be pointed out that there are different scales in architecture as in music, and that the varying effects upon the mind and heart are as powerful and distinct in the one case as in the other.

Also that the scale should be appropriate to the character and purpose of the building. A building of a monumental character or of great public importance should be designed and built on a large scale, and each part and every moulding should be of a proportionate size.

Factors.—In dealing with factors—the means which the architect has to his hand, as it were, for the attainment of his ends—it will be necessary to emphasise the fact that most, if not all, of these factors have their origin in utility, and answer some practical need in the construction or preservation of the building.

To forget this primary purpose and use them as means of artistic embellishment is to sacrifice use and convenience to artistic ideals, and is not true architecture.

The public are quick to recognise the importance of this in respect of window and door openings, floor divisions, chimneys, etc., but are apt to think of columns, pilasters, sills, hood-mouldings, cornices, and perhaps even buttresses as decorative rather than useful, and to suppose that the architect has a free hand in the disposition of them. Education in this matter will include instruction in the primary use of purpose of the common architectural forms, and will give an insight into the difficulty of making these forms serve the ends of use and beauty at one and the same time.

Such an insight—like propounding a problem—will go far to quicken interest.

The subject may be dealt with under the four heads of Proportion, Light and Shade, Solids and Voids, Balance and Symmetry.

Proportion.—Certain proportions are pleasing to the eye, and effects of proportion are obtained by the relative size of different parts.

The various ways in which the constructional parts and features of a building may be utilised to obtain proportional divisions, both horizontal and perpendicular, might be described in detail.

Light and Shade.—The advantage that may be taken of effects of light and shade might also be pointed out.

Solids and Voids.—The importance of a right adjustment of solids and voids, both in respect of size and position, would come next.

How easily a false scale may be set up, and a building made to look insignificant, by broad sheets of plate-glass in the windows.

Balance and Symmetry.—These give a very distinctive character to a building, and aid in setting forth its special purpose. There is or can be rhythm in architecture, as in verse.

Material.—The right use of the various kinds of material furnishes an interesting and useful subject for public instruction.

The general principle having been laid down that every kind of material has its special characteristics, and should be treated accordingly in other words, that its very best should be got out of it—a brief account of the natural qualities of the chief building materials (stone, wood, metal, bricks, plaster, etc.) would follow.

The following leading thoughts are appended by way of illustration:—

When stone and brick are used in conjunction, the former should be accorded the more honourable parts, e.g., quoins, architraves to doors and windows, sills, cornices, etc.

Granite, even if it could be carved for mouldings, should be used rather for strength and solidity than for ornamental features.

When the beauty of marble or wood is in its figure or colour, it is best exhibited in the form of slabs or panels; if moulded, the forms should be large.

Stone is granular, wood fibrous; each has its appropriate forms and mouldings, suggested by the natural qualities of the material.

Wrought-metal admits of the finer and more delicate forms, metal cast in moulds naturally assuming a more bulbous shape. Both kinds have their appropriate place and effective use.

Well-known examples of wrought iron and cast-iron gates and railings afford interesting illustrations.

The foregoing summary indicates the main lines along which the education of the public in matters architectural should be developed. Whether in public lectures, or in articles published in book-form, illustrations should be abundant.

There are signs of a wave of public interest in architecture which, "taken at the flood," may become permanent and lead to great results.

By Mr. T. G. Jackson, R.A.:

Importance of the public being qualified to know good from bad in architecture, since they are the employers with whom it rests to choose the designs of modern buildings.

Importance of architecture as the only necessary art, and one that cannot be evaded like the others.

Knowledge of architecture part of a liberal education.

Architectural works a main attraction to

travellers at home and abroad. Nevertheless less very imperfectly understood.

Various methods of educating the public in architecture considered.

The literary method. The vast bibliography of architecture.

Lectures on architecture with illustrations. Archaeological and architectural societies with their meetings and excursions.

Inadequacy of these means to qualify for a sound judgment in dealing with modern architecture because they deal with the subject mainly from the point of view of archaeology.

Imagined case of an archaeologist called upon to choose among a set of competition designs. His standard of merit will be based on conformity to precedent and ancient example.

Archæology will never teach us to build up a new design sensibly and beautifully.

Proper use of ancient example, that of a tutor rather than a model.

Archæological study of architecture, moreover, only touches one side of it—the outside features of hygone styles, not their inner reasonableness.

All styles in the past have been based on natural and social reasons, and mainly on construction, and their general form and features are such as have been suggested thereby and are expressive of it.

Greater dignity of architecture regarded from this point of view.

So long as we think the essence of a style consists in its outward features we shall fail to understand the true nature of it.

This, however, is the case to-day.

Architecture, whether ancient or modern, must be called upon to explain itself and give a reason for its design, and be judged by that, instead of by mere conformity to precedent.

One effect of the false view of the subject is to teach that architecture is ornament applied to building. A fatal fallacy.

Desirability of reforming the course generally taken by writers and lecturers in the direction above recommended.

Need of awakening public interest in modern work. It rests with architects to show that our art is still alive, and not merely a dead language.

After all, the best means of education is by the production of well-designed buildings. Architects the best teachers, and real work more edifying than books or lectures.

By Mr. Arthur Hill, B.E., M.R.I.A. (Lecturer on Architecture, Queen's College, Cork):

On the Public Appreciation of Architecture.

For the intelligent appreciation of any art or science some knowledge of that art or science is indispensable. It is not to be expected that the ordinary non-professional observer will take an interest in what he does not understand. To many people a new building represents nothing more than the money it cost, that being the only scale they are capable of applying to the object.

The value of University training for professional purposes does not now need an argument; the principle has been already adopted in some of the modern Universities of this country. But why should the teaching be limited to professional students? Why should not the history of architecture, taught by a professional architect, be included as a branch of general history available to students specialising in history for the B.A. degree?

Several Universities admit lectures on classic art and archaeology, but the "mother of all the arts" scarcely receives adequate treatment in lectures of this kind. Why limit the subject to the classic period? Does not architecture, taken as an historical study, reflect the social conditions of a people in one century as well as in another? Taken from its own standpoint as an art, how can an artistic sense be better cultivated or acquired than by a critical review of the best buildings of all time that have survived to the present day?

Lectures on the history of architecture, showing its true basis of evolution, delivered by trained architects, and with the prestige of the "University," would exercise an important and beneficial influence on the public appreciation of our art. For, in addition to the students who would take the University

course, it may safely be assumed that through the medium of the University Extension System, which is bound to follow the example of the parent University, lectures would be given and considerable interest aroused among a number of people in many parts of the country.

There can be no doubt that the criticism of those who have had the necessary training on which to form an opinion would be a valuable aid to the development of good architecture throughout the kingdom and a stimulating influence both to the architect and his client.

This is not the only way, but perhaps one way in which the public may be brought to take more interest in our professional work.

By Professor Gthmar v. Leixner (Architect, Custodian of the Imperial and Royal Central Commission).—

The solution of this question is of the greatest importance for architects as a professional class. The neglect of the public to take an interest in architecture has an unpleasant influence on the position of the modern architect with regard to his social standard, and also in relation to the question of the preservation of fine-art monuments, which at the present time has become a matter of great importance.

I propose to consider this question from the following three points of view:—

1. What is the attitude of the public at the present time towards architecture?

2. Where are the causes of this attitude to be found?

3. What are the means and methods at our disposal to bring about an improvement in this state of affairs?

First Question.—The public of the present time generally shows a very lively interest for the art of painting, that for plastic art is very much less universal, and with regard to architecture the public shows almost no interest at all.

This scale of interest is very curious and very interesting to follow up.

If we watch the public in exhibitions of works of art, in the museums, and on travel we shall arrive at the following results: The interest in modern and in historical paintings is everywhere very great and very genuine. The public is, as a rule, well informed, and is able to explain a great many points; it often forms remarkably independent opinions, and is generally right in appreciating the value of individual productions.

At the fine art exhibitions and in museums the public gathers in groups round the pictures. It often shows a general interest, so that even works without any very striking features are the object of a minute examination. Now and then can also be found a very genuine interest in small plastic objects, whereas those of large dimensions, if they do not pass completely unobserved, are at least the subject of only a quite superficial examination. The judgment of the layman about plastic works of considerable dimensions is as a rule uncertain and timid. Only exhibitions of groups of plastic artists of very great renown, such as Meunier, etc., seem to command a really lively interest. If we go to the museums we shall find that the public remains in hesitating contemplation even in presence of the masterpieces of the plastic art of antiquity, while it examines with a lively interest even the paintings of inferior artists of the quattrocento. The public generally neglects visiting architectural exhibitions, saying, "Oh, we do not understand anything about it; there are nothing but plans." In the rooms set aside for architecture we generally only meet with members of our own profession. It is impossible to speak about an opinion of the public on questions of architecture; for even if it expresses one, it will be found that it is never the expression of an individual, but it will nearly always be found that this opinion has been influenced by other persons. In spite of all the uncertainty of the public with regard to styles of architecture, it always tries, however, to make out the style of any particular building; but the forming of an idea embracing the whole edifice is never attempted. Here and there some details attract some attention, such as doorways, windows, gables, verandahs, etc. Unless his attention be drawn to them the non-initiated will pass without observation even

before the most wonderful masterpieces of architecture. In the case of historical buildings the principal interest is often caused by the antiquity of the monument. Buildings in a state of ruin generally make a deeper impression on the masses than buildings which are well preserved. In the case of the former the mind of the observers is greatly influenced by the poetical impressions and by the character which the ruins give to the landscape. With persons who are not architects, but who possess a receptive mind for objects of art, the interest they show will always centre on buildings of a pure style in preference to those in which several epochs are represented. But the layman will never be able to follow the real idea of the composition. As a final result of our meditations we may safely say that the public shows an indifferent, or, at any rate, a very timid, attitude with regard to architecture.

Second Question.—The reasons for this attitude are the following:

1. The peculiar method of the education at school, especially in the teaching of free-hand drawing in the lower as well as in the higher schools. Until quite recently it was customary to teach drawing in such a manner that the pupil only learned to know the level surface and the colour; the general rule was to give to the pupil a model drawing to copy, and the teaching was limited to two dimensions only. The teaching of drawing objects in perspective was limited to a minimum. By this fact is explained the understanding of the image and the colour, and the uncertainty or incapacity to understand productions of the plastic and architectural arts.

2. The interest in painting is, moreover, favoured by the great periodical exhibitions of objects of art by the museums, by the generally intelligent and good criticism in the newspapers, by the assiduous reading of fine art periodicals, which at the present time can even be found in café restaurants. Attention must also be made of the numerous popular lectures on certain subjects of modern and historic painting. A great influence is also exercised by the abundant and cheap literature about the art of painting (monographs of painters, etc.). If we come to the plastic art the circumstances are already less favourable.

In the exhibitions the plastic art occupies a much more limited space: its literature is much poorer, lectures on the subjects are few, and the criticism of to-day is much less prominent and more timid, and to this must be added the difficulty of understanding the laws of the three dimensions.

When we come to architecture it is almost totally deprived of all the necessary conditions of vitality.

The exhibitions are very few and far between, and public lectures on the subject are almost unknown, and finally there hardly exists any literature at all on this art. The understanding of the three dimensions in architecture is even more indispensable than in the plastic art. The criticism of to-day, even if it sometimes occupies itself with a question of architecture, is not generally lucid, and, as a rule, is not understood, because persons without any knowledge of the science of architecture will never be able to thoroughly understand a question of architecture unless the writer, however clever he may be with his pen, happens to possess the necessary technical knowledge. Finally, as a last reason, it is necessary to mention the opinions so diametrically opposed which exist among the body of architects themselves. By what means could the non-initiated form a somewhat clear judgment if the architects themselves are nearly always at war among themselves about the principles of their art? Neither must we forget to mention the frequently astonishing negligence of Governments in giving the orders of a public building to be constructed. The modern State buildings, which if they were models of good architecture would contribute to educate the taste of the public, are often built by persons who have a very poor knowledge of art.

Third Question.—To bring about an improvement in this state of things Governments and the societies of architects must unite in their best endeavours.

1. The instruction in free-hand drawing must from the beginning be given, not by

model drawings of level surface, but from the actual bodies.

2. It should be the duty of the State to have public buildings of a certain importance constructed, not by officials, but by artists.

3. The societies of architects must carry out the following programme:—To arrange exhibitions of modern as well as of historic architecture; to give popular lectures on the subject; to take an active part in the literature on architecture, especially on questions of actuality; to gather together all the artistic elements and to settle vital artistic disputes among the members themselves; to publicly exclude all those elements which in our days so frequently put architects of real artistic merit in the shade, and which contribute to corrupt the taste of the public; to give the most efficient assistance possible to writers possessing a technical education who contribute to render architecture popular by summary as well as by more voluminous publications; and finally to bestow particular attention on the cultivation of national art among the local associations, with a view to the preservation of the monuments of the country.

By Mr. Banister F. Fletcher, F.R.I.B.A.: *Architecture and its Place in a General Education.*

Part I.—Architecture.—The works of man, as presented in architecture, from a lithic history, and indicate the social condition of the peoples of bygone days, thus linking it inseparably with history.

The architecture of the Egyptians indicates their mode of life, the powerful priesthood, and belief in a future existence.

Western Asiatic architecture shows the records of a nation of warriors who employed their prisoners to erect elevated platforms upon which were placed palaces and temple observatories for the use of the astrologers.

Grecian architecture indicates the progress of Grecian civilisation, and the existence of temples, theatres, palaestrae, and stadia evidences the rational love for religion, the drama, philosophy, and outdoor sports.

Grecian architecture and civilisation formed the parent stem of most subsequent European styles.

Roman architecture was a complex type, the use of concrete rendering possible the erection of various kinds of buildings. Roman civilisation was faithfully mirrored in Roman architecture, which became the type of all later European styles. Roman art and literature were at their highest state in the Augustan Age. The decline of the Roman Empire accompanied the decay of art.

A new force—Christianity—brought about a revival of architecture; but this, like the new faith, was slow in developing.

Byzantine architecture, resulting largely from the removal of the capital to Byzantium, has remained as unaltered and unprogressive as the orthodox faith of the Greek Church.

The Romanesque style was one produced by the barbarian tribes who conquered the Roman legions. It was in imitation of the Roman art which they saw around them.

"Gothic" architecture was the result of the formation of the European States, the wealth, learning, and prominence of the monastic orders, and the religious enthusiasm of the time. The Church was the greater avenue for advancement during the Middle Ages.

The cathedrals formed the history books of the time, their beauty being due to the concentration of the artistic energy of the period. The fortified and frowning castles of the nobles testify to the existence of the feudal system.

The Renaissance of the XVth century in Italy was brought about by the discovery of the Greek and Roman MSS., the invention of printing, the discovery of gunpowder, and the mariner's compass. Other events were the capture of Constantinople by the Turks in 1453 and the influx of Greek scholars and artists into Europe.

It became the fashion to talk in Latin, and there was thus a close connexion between the architecture (which was a modified form of the Roman Orders in conjunction with the Byzantine dome on pendentives) and literature.

The invasions of Italy by French kings exercised a great influence by the consequent distribution over Europe of Italian artists and workmen.

In England the Renaissance synchronised with the Reformation, and was greatly influenced by the suppression of the monasteries, endowment of grammar schools, destruction of the old nobility in the Wars of the Roses, and the rise of the merchant class.

The facility of travel and other causes led to the revival of all styles in the XIXth century.

Requirements of our complex civilisation produce modern types of building, and no new systematised style is likely in the future.

Part II. Its Place in a General Education.—Why is architecture, the petrified history of the past, not generally included in educational schemes?

Its absence is probably due to its technical nature. Its importance as a general subject has not been realised, though it is inseparable from the progressive history of every civilised nation. The subject must be illustrated, for without views and plans it is akin to a play which is read instead of being witnessed on the stage.

The use of photography in conjunction with lantern slides nowadays enables a lecturer to fully illustrate any period of architecture.

The technicalities are simpler than in most scientific subjects. It can easily be invested with human interest and made intelligible to the ordinary student.

Architecture, as the work of human hands, is the result of brain power or thought, and is, therefore, more worthy of inclusion in a general education than a score of subjects which have secured recognition and protection.

A study of architecture enables us to interpret the moral, artistic, and religious character of humanity, and a knowledge of the profoundest characteristics of a nation may be gleaned from a study of its buildings.

It might be expected that our older Universities, such as Oxford and Cambridge, would welcome the study of an art which is so bound up with humanity of all ages, and would provide for a special faculty to advance the general study of architecture, apart from its adoption as a profession.

Its inclusion would be far-reaching, and many benefits would be derived by the public, who would thus be enabled more fully to appreciate the works of art which are to be found in the highways and byways of every land, and which serve as free galleries of art.

Further, the study of architecture is necessary to a complete understanding of history, and gives an added interest to travel.

Bishop Creighton defined architecture as the most democratic of all arts, and pointed out how it is equally for everybody—rich and poor alike. History has been to architecture what steam is to machinery, the grand propelling power; and it may well be described as the printing press of all periods. It calls into action so many branches of mechanical labour which promote national prosperity that it is therefore more entitled to the attention of the general student than any other of the fine arts, a further reason why the general community should acquire a taste for it.

As the art which shelters us from the elements, and with which we come in daily contact—as the art which gives us "home" and enshrines and illuminates the most sacred of our associations—and, lastly, as the mother of all the arts, architecture is certainly worthy to be included in the curriculum of a general education.

By Señors Francisco del Villar y Carmona, Manuel Vega y March, and Eduardo Mercader y Sacanella.

The want of architectonic education among the masses of the public is everywhere a general fact. Owing to local circumstances and to the various shades of the phenomenon it is generally attributed to different causes: there is in reality, however, but one, and this is the most pitiful ignorance of what constitutes and characterises our art.

The reality and importance of the subject are, of course, evident, as well as the necessity for affording concrete solutions that may modify the actual state of things for the benefit of the public, whose education will increase; of architects, whose status will improve in proportion as their efforts are duly appreciated; of art, by means of which it will ensue the respect of everybody, and

will henceforward be free from sacrilegious attacks by the ignorant masses.

Public architectonic education includes two problems: first, to teach people what architecture is; secondly, to direct their taste, so that knowing what art is they may point out the best models. This second problem is only an aspect of the general one of artistic education, which nowadays one tries to solve in all art manifestations.

It is necessary to educate public taste in architecture as we educate it, for instance, in music or in painting. In reference to the first, I must say that though almost everybody knows, instinctively at least, what music is and what painting is, yet very few know what is meant by architecture. Therefore it is necessary to teach it, and before doing so it would be losing one's time to pretend to educate public taste in art.

In order to solve the first problem it is necessary to make the public understand that architecture is all that realises art in a building. There is, or there ought to be, art in the selection of a site; in the distribution of a building; in its situation; in the selection of materials; in the silhouette of the whole building; in the composition of the facade; in the decoration of the inside; in the distribution of light and shade; in the sanitary arrangements; in comfort; in the cleverness with which inside and outside aspects, diversified or uniform, are brought about; in the whole impression of the building upon its dweller or upon the spectator; in colour; in relief; in proportion; in material security; in a word, in everything which reveals the thought of the artist-architect and the influence of his soul on the work. Art is to be displayed in buildings, gardens, towns, and even in the country. By architecture is meant the construction of a cathedral, of a bridge; the distributions of a mansion, as well as the projecting of a village; the sketching of a road, the aperture of a canal, if there is art in them.

To solve the second problem it is necessary to feed the public imagination with examples, as well as by teaching them what in the present and in the past has been best produced in architecture; and in addition, to keep them free of all exclusive preference of school, giving them to understand that only what is true, sincere, direct, and spontaneous is good in art. What really stands against beauty is untruth; and everything, whether poor or sumptuous, little or great, transitory or permanent, may be artistic if it be sincere. But what is architectonic sincerity? It is the essential quality of beauty, *viz.*, harmony. If there is harmony between the aim and character of a building, between its wants and its aspect, between its style and distribution, between the forms and distances, between the impression of the whole and every one of its inherent parts, between its materials and the use made of them and its appearance, between the moral and material aspects within the order of the purpose which the building is to fulfil; if there is harmony between the immanent logical conception of the building conceived and its corporeal realisation, in the whole and in its parts, beauty then really exists. If there be anything, however so trifling, contrary to this harmony, no beauty can exist. That is the measure which must be made clear to the public, so that they may formulate their judgment with accuracy, and be enabled to give their assent only to what is a good æsthetic theory.

To obtain these ends we recommend the adoption of the following means:—

1. All governments should order to be placed in every primary school photographs or drawings showing the classical works of all kinds of specimens of architecture, with an indication of its style and epoch.

2. The teaching of æsthetics and of the history and theory of the fine arts should be included in the general curriculum of schools.

3. Schools of every kind should be compelled to teach elementary architecture.

4. All countries should promote permanent exhibitions of architectonic works, conveniently classified, represented by drawings or photographs or models, and illustrated with short descriptive explanations.

5. Governments should encourage all kinds of publications for the divulgence of art, instituting for the purpose rewards and bounties. They should also purchase a considerable number of them for distribution

among all public libraries, and their price should be such as to place them within reach of persons of small means.

6. Free chairs should be endowed for the divulgence of the history and theory of architecture.

7. It would also be expedient to arrange cheap excursions to the most renowned buildings of all countries, the parties to be presided over by an architect who would lecture on the monuments visited.

8. Money bounties should be awarded for the best collections of buildings or architectonic works exhibited in cinematographs and theatre-sceneries, etc., of which municipalities should afford gratuitous displays.

9. Artistic educational associations should be organised for the propagation everywhere, and with all the means at their disposal, of the teaching of art, more especially of architectonic art.

By Herr Otto Wagner (on behalf of the Society of Austrian Architects):—

The Architectural Education of the Public enters, by the discussions about Question I., already into that field from which a correct answer may be hoped.

If the best model buildings are created by eminent artists, the artistic interest of the public is sure to be awakened, or that already existing will be increased.

It is, however, to be understood that the main condition always holds good, *viz.*, that these models shall be of a very high artistic order; consequently, that they owe their origin to first-rate artists. Artists of the first class will adapt every work for the purpose for which it is destined, in every particular; they will make use of the most convenient material, and of the proper method of construction, in order to produce the best forms of art. Only in this way the desired characteristic and beauty of the work will be created, and only these will be able to satisfy the spectator. No doubt, then, the recognition will flash upon the spectator that the artist expresses his ideas in a language intelligible to all. But if the spectator is able to understand a work of art, his aversion to enter into the study of a work will vanish, and will be replaced by the possibility and the will to judge it.

No doubt in order to create model works of architecture the co-operation of the State is necessary, because it is in the first instance the duty of the State to favour art, which is the gauge of civilisation of mankind.

This State help, in order that it may be efficient, is only possible by the State, the country or a city since it does not itself possess the necessary artistic intelligence making use, for the solution of all questions of art, of an appropriate organisation, a senate which should be exclusively composed of participating artists, who would have to watch that only good work be produced.

The answer to Question IV. must therefore be:—

The architectural education of the public can only be rightly influenced by good work, for nothing is so victorious as good work.

By M. Gaston Trélat (Paris).—(Author's summary and conclusion):—

The contemporary phenomenon of democracy characterises the world in which we are called upon to develop our powers. It tends to establish the equilibrium between classes. From it result comprehensions and feelings which from day to day become more general. So much for the nature of the spirit which characterises the public of our time.

Discoveries, which are due to the great initiators of the time, have lighted new paths in the matter of the salubrity of houses. Hence the anxiety with regard to the public health which we see nowadays. No sphere escapes from this anxiety, which seems to be a mark of our time, and which one may describe as a happy beginning.

In the same way, in consequence of an education perhaps unconscious but very real, the plastic arrangement of material has become a cause of impression in all social spheres. At least one meets everywhere people of unquestionable taste, who are sensible of correctness in form, this being always in accordance with the mode of imperfectly seen realisations.

Conclusion.—Architecture is related to many sciences which have a living interest for the public. It is the object of current

applications for these sciences, from which results an immanent cause of interest for the growing mass of the intelligent public.

But, again, the number of the admirers of public beauty increases daily; and as architecture is a considerable element of it, one sees there the evidence of a continually increasing education.

By M. Gaston Anciaux (on behalf of the Central Society of Architecture of Belgium).—In the words of Mr. Morris, "Art must be made for the people, and by the people." This latter idea, in the present state of things, seems to be rather utopic.

If, however, we must take care not to reject it as being too idealistic, it must, on the other hand, also be admitted that at the present time, in spite of the enormous progress realised in every field, we are not only very far from art by the people, but also very far from art for the people.

And why is this the case?

Camille Maclair in a recent article in the *Revue Bleue* tells us in a sarcastic but characteristic way:—

"It is not a question," says Maclair, "of placing an individual who swears, who spits, who shouts, who does not wash himself, before a masterpiece and thinking one has done one's duty by him. What is wanted is to lead this individual by persuasive teaching to the idea that it is the duty of every reasonable being to become more refined; and it is in this way that he will be rendered capable of understanding and recognising in a beautiful thing the common inheritance of his race. In a word, it is necessary to form the character of the people in order to prepare it for art, and not to expect that in putting it into direct contact with art it will be provided with a character."

A working man may render himself worthy of appreciating a masterpiece, but a masterpiece has not the virtue and has not been created to refine a working man."

And does not what M. Maclair expresses in such an incisive manner with regard to the people properly so called applied fairly exactly also to our crowds, to the great bulk of the public?

Without wishing to go so far, without wishing to be pessimistic, it must nevertheless be admitted that much needs to be done in this respect.

In fact, it is with strong reason that the question of education with regard to architecture has been put on the order of the day of the present International Congress of Architects.

We therefore are of opinion that long explanations on this point would be superfluous, and we shall at once come to the conclusions which we wish to propose to the Congress on this matter.

Conclusions.—The education of the public in architecture can only be brought about by long, patient, and unceasing effort.

The most practical means to educate the public in matters of architecture are of a very numerous and of the most varied order.

Among these the following seem to us to be more particularly proper to give good results:—

A. For the future:

Within the shortest possible time:

To establish or to develop at the various stages of teaching special lectures adapted to form the taste for architecture; or, better still, above all in the classes of the elementary and secondary schools, to infuse this element into the general matter to be taught without making it the object of a separate course of lessons.

For this purpose, especially to divert to a greater extent the teaching of the history of wars and of politics of the nations towards that of the various stages of civilisation, by characterising them by their stages in architecture, without, however, separating this characteristic element from the most salient features of manners, costumes, and social institutions of each of them.

Similarly to alter the direction in the teaching of geography in the same sense. For this purpose to arrange excursions for the pupils in their native town, in their province, and their country generally, and even to foreign countries if possible. To illustrate with the same view the classical works with vignettes representing not only typical sites but also views of monuments and interiors (by preference of those still existing). To

frame the text with ornamental fragments of an architectural and decorative nature by the best masters of the periods under consideration, and to choose only the most characteristic from among them.

To reform the present collection of pictures in schools in a more artistic sense by having recourse to artists of value, and by making use of the modern processes of perfect and cheap reproduction, such as phototyping, chromolithography, etc.

To put, however, into the hands of the pupils only elements of the very best kind, and to look to quality rather than to quantity, to the composition rather than to the details.

For the teaching in the most advanced classes, to create professorships specially affected to architectural art and its philosophy.

To have this delicate subject only taught by a particularly able and specially competent personnel, as in the adverse case the results can only be disastrous and diametrically opposed to the aim in view.

B. For the present:

To take action in such a way as to obtain the realisation of the following desiderata:

1. The creation of not only central museums of architecture in the capitals, but also provincial ones in the smaller towns of the country.

These museums would either be connected with the museums of painting and sculpture, or rather joined to the museums for the moulding and decorative art of which they would form the head.

These museums would contain, besides the graphic executions, the rough models, the photography and aquarelles which would be more suggestive and more attractive to the public than the technical drawings.

These museums would also contain complete decorations of furnished interiors, where the properly so-called architectural framing largely treated would be accompanied by the explanatory graphic documents.

2. The organisation in these museums of numerous public conferences and attractive temporary exhibitions of architectural works of recent creation or of projects of architecture, the latter in the widest sense of the word.

3. For the public authorities to take care that only constructions, be they important or accessory, of a temporary or a permanent nature shall be erected which are proper to form the taste of the public.

By M. Albert Mayeux:—

Of all the arts, architecture is the one which concerns, or must concern, most mankind, since it is in relation with one of the immediate necessities of life—habitation. Of all the arts architecture is the one which has in the highest degree exercised the genius of man, by the reasoning which is necessary for the conception of projects of an infinite variety for their realisation, and for the research of an æsthetic sensation in most of these projects.

It is also the only art which, so to speak, was created in all its parts by man. Whilst painting and sculpture only contemplate nature in different ways, taken as a model it is transformed by architecture, and new forms are created, and in order to succeed in this even new products are created.

On the other hand, the painters and sculptors have but few or no co-operators; the architect, on the contrary, has a legion of them, from the navy who makes the excavations to the tiler or slater who covers the roofs, and this even for the simplest object, sometimes only a humble shed.

Architecture is, therefore, an eminently collective concern, which, nevertheless, must interest the people, if it is possible to explain to them the reasons for the interest they must bestow on it.

The works of architecture, from the simplest constructions to the most sumptuous monuments, may be considered as immovable objects which form one of the principal items of public wealth. Even leaving on one side the question of their usefulness, how many monuments, not to say even how many interesting constructions, are sources of wealth for the country? Chartres, Reims, Amiens with their cathedrals, Versailles with its palace, Rouen with its palace of justice, Nancy with its squares, and Carcassonne with its ramparts, bring to the towns to which they belong an undeniable moral as well as a

material profit. That is to say that the creations of architecture have a right not only to the interest but also to the respect of everybody.

It is necessary to teach the public, to tell it again and again the value of the existing buildings, in order to prevent the mutilation and the total or partial destruction of the works of architecture, making appeal not only to the sentiments of morality and æsthetics, but to those of social economy as well.

Architecture being of all the arts the one which reflects in the most intimate way the moral state of a period, to such an extent that it has been said that a monument was a book of stone in which history could be read on its indelible pages, it must be understood how much its teaching may be interesting to the public from the point of view of curiosity alone. That is to say that the faces upon which these teachings can be read are numerous and varied, but in order to be able to read it is necessary that they should be brought within the intelligence of the spectators, according to the surroundings and the class of public.

Now the public to whom an architectural education can be given is of two kinds:—(1) The youth frequenting the schools and the soldiers; (2) the independent public. The teaching to the students can naturally be imparted to them in the schools, lycæums, and colleges, and that to the soldiers in the barracks, whilst on the other hand the instruction of the public may take place in the shape of conferences and collective visits.

A complement of instruction exists more or less for everybody in the books and libraries, but this is a means which it must be known how to administer, and which, in any case, is outside the range of a programme of special studies such as we wish to propose to the Congress.

The Teaching of School Children and Teachers.—Already in the elementary school the teacher can open the mind of his young audience by speaking to the children—of course only very shortly—of the general beauties of the buildings which can be seen or visited by all. But if he does not merely limit himself to a burst of admiration in the presence of superior works of art, he will attract attention to some modest building; if in the country, for instance, before a barn, by trying to analyse the work to an extent that his young hearers can understand.

He will say, for instance, first, what is its use, the reasons of its particular shape, the reasons of its walls, of its timber work, of its roofing, of the materials used in the construction, etc., so as to leave in the mind something more than a vague and in consequence fugitive impression. On another occasion he will take his pupils to a schoolhouse, a chapel, etc., preparing them in this manner for a more extensive education in the future.

Some visits to building yards in activity, or into workshops where it will be possible to show the children the wrought materials, will be an excellent complement in the education.

In short, he will instil into them a sort of respect for the collective efforts which are already represented by those modest buildings, which will give them some idea of the gigantic effort which must have been at work in the building of the large church or the big town hall of the district, which has not yet been spoken about, but which they may have had occasion to see already. Needless to say that in the towns the examples will be more numerous, but the method will be the same; from the simple to the more complicated.

For the lycæums and colleges, the teachers of which have had a superior education, the same subject may be developed by making use of engravings, drawings, and photographs of architectonic works, choosing simple rather than complex specimens, in which always the spirit of analysis and of criticism will follow the more or less lively phase of admiration which must necessarily precede in order to attract the attention of the audience.

With regard to the teaching of architecture in the normal schools for teachers, it may be much more developed in the shape of special lectures, in which an erudite and eloquent architect would be better in his place than a professor of science. In fact, in such schools, where teachers are to be educated, it is necessary to say and above all to explain more.

The general features about monuments are no longer sufficient; it is necessary to enter upon the essence of the subject, to speak of

the basis of the programme, of the composition of the forms, of the proportions, of the relations, of the silhouette, and of the decoration; it is necessary to insist on the necessity of particular organs of the work which do not exist in other kinds of buildings, such as buttresses, large resting points, composed pillars, large or reduced bay windows, flat or steeply inclined roofs, etc.

Finally, the historic and archaeological part, which is altogether omitted or very limited in the elementary school, at the college, and in the lyceum, becomes very important in the normal schools.

The study of the style, its tendencies, etc., complete as far as possible the teaching in question.

The Teaching of the Soldiers. It is naturally at the barracks that the instruction of the soldiers can be carried out, but, as it is rare that the garrisons are not placed in a town of some importance, the officers will be able to arrange visits to the monuments and to the factories in the district, under the guidance of men whose professions in civil life are connected with the building trade.

At the barracks those officers whose tastes are in the direction of practical science and art could deliver some lectures on the monuments visited, and if, in the course of the manoeuvres, the troops encamp in a region which possesses one or several monuments of some interest, these officers could, in the moments of leisure, explain to their men what they know on the subject, the historic features of the buildings, the nature of their construction, the judicious use of the materials, etc., and finally explain the respect which should be shown not only to a fine piece of work, but to a collective work produced by the united efforts of so many artists, craftsmen, and labourers. Finally, they might insist upon the moral consequence of the love of manual work, the tenacity and the faith of which the men of those trades gave proof who contributed to produce these admired monuments.

The Teaching of the Independent Public.—Once come out of the school or the college, and free from military service, man becomes free of his movements, and if his tastes carry him towards the study of art or archaeology he can, without being a specialist, increase his knowledge in architecture. For so doing he must feel some inclination, because nothing obliges him to do so, and if he is encouraged to cultivate it, this must be done cleverly and wisely.

To accomplish this end the best means of to attract the independent public is once more the public lecture made pleasing and attractive.

The lecturer will therefore, as a rule, after having explained his subject, commence by showing by drawings prepared for the purpose, or by photographs, the monuments about which he is going to lecture. If he is able to make good sketches on the blackboard this may be excellent. Finally, if it is possible to have recourse to projections with the oxy-hydric light he will do well to use this process, because the magic lantern of our fathers, especially with its modern improvements, exercises always the greatest attraction. To see, being comfortably seated, without even having to go to the trouble of turning one's head or the leaflet of an album, to hear explained at the same time the edifice in question, to make no other effort except that of understanding, is the ideal of the great majority of the public attending at lectures. If the hearer understands, so much the better; if he retains nothing of what he saw and heard he has at least been amused. In fact you no longer amuse him if he stays away from the coming lectures.

By the side of these hearers, who are merely curious, there are sure to be some others who want to learn, and for these the lecturer will do well to complete the general descriptions, showing cause why it is justifiable to admire architectural works exposed to view for the purpose of arousing the enthusiasm of the public, by explanations about the technical part of the arrangements and of the way in which they are constructed. Over and above the beauty of the proportions and of the decorations which alone generally captivate the uninitiated public, he would speak of the structure, of the essential organs, of the practical points which gave origin to the conception of the building, interweaving from time to time, with a view to break the

monotony of the demonstration, some anecdote, a fragment of history, a legend, and the like. If he makes the audience laugh or smile, so much the better; if he wants to make his hearers think and reflect too much, he will soon create a relative emptiness in his lecture hall. This kind of lecture requires some wit and tact.

One piece of advice the lecturer might give with advantage to his convinced hearers will be to have recourse to libraries, by pointing out immediately the works bearing on the subject of which he is treating, so that they will be able to fill in the gaps of a description which must of necessity be summary and rapid, because the strained and prolonged attention is a fatigue which the hearer only wants to bear within certain limits. The independent public—that is to say, persons who are not compelled to do anything—is very difficult to satisfy, and the convinced among the hearers are more exacting than is generally thought, for the reason that it is seldom that an immediate aim is the cause of their attendance; it is rather a vague and healthy curiosity which induces them to attend at lectures.

To instruct and at the same time to entertain, even for such a serious subject as architecture, such is, in our opinion, the line of conduct to be followed before an audience of independent listeners.

It is impossible here to draw a positive programme of instruction, the professors and lecturers being of different temperaments and aptitudes; it is only possible to point out a general line on which to proceed.

Collective visits to monuments and even to towns on the road of excursions at reduced prices, and all the pleasantness connected with similar excursions in company, are also to be enumerated among the best means of teaching architecture, because the sight on the spot conveys more to the mind than the best of photographs, and with a good lecturer cicerone the result, which, in short, is to succeed in developing interest and respect for the monuments and the necessity of their preservation, will then be completely obtained.

The question put by the Congress which we have answered in the foregoing seems to be of primordial importance, and we therefore utter the wish that societies similar to ours should study the elaboration of *Standard Manuals* for the use of lectures.

By M. Jean Gilson, architect, Brussels, Professor of Drawing at Boitsfort:—

"Art comes from man and is intended for man. It is the flame of a spirit, its radiance; it cannot fail to affect first of all the being from which it emanates, and afterwards, from one to another, some other beings," said M. Serillanges.

It is the same with architecture, the queen mother of all the arts: destined, above all, to strike and to captivate the attention of the public. To attain this highly desirable end, which ought to be the object of a noble emulation, always on the alert, it would be necessary, to start with, to try to call forth gradually among the general public the beginnings of the æsthetic sentiment, which in a great number exists in a latent state.

It is therefore necessary that those who are convinced, the enthusiasts who possess the cult, and consequently the enthusiasm, for art, shall fight, without respite and without weakness, against the slow and growing invasion of the domain of inspiration by pedantry which pretends to domineer and to reduce to mathematical dryness the creating genius.

Thus it happens that too frequently the mission to initiate into that immaterial thing called "art" is intrusted to pedagogues, to teachers, while the professional practitioners who have made of æsthetics and of their multiple applications the study and the constant practice of their existence are given the cold shoulder.

It would therefore be greatly desirable that only persons initiated into the sublime and imperishable beauties of art, special professors who have shown special capacity and made special studies, should be intrusted with giving to school children as well as to young men a good and healthy education of their visual organ either by the daily environments of the educative centre, or by rational visits to museums, by excursions, by illustrations, books, etc.

For it is desirable to try, from early childhood, to move the hearts which gradually and

naturally will feel themselves attracted in this manner towards the works of art.

Art and history are in relation with each other, and art is the man.

In every epoch, in the creations produced by genius, one can see manifest itself for posterity all that which characterised the man-creator; his thoughts, his feelings, the moral and social life, in a word, the various degrees of civilisation at work.

Consequently it is necessary that our creations should speak with eloquence to the attention of the passer-by or to the visitor, that they should be healthily conceived, and that they should represent clearly, by characterising it, the idea of their author. It is important that these creations should be in direct relation, not only to the surroundings in which they are placed, but also to the customs which have inspired their creation; it is necessary, moreover, that all the decorative arts should move in harmony with architecture, so as to give the impression that they were all one and the same conception.

Let us likewise avoid the mistakes and exaggerations of the modern at any cost! Let us carefully avoid trying to be innovators, moved by the unwholesome desire to astonish, to stupefy the public. Let us prove to this public that we endeavour to initiate it into the imposing splendours of the beautiful, to all the importance of arduous work, to the never-ceasing study which our art requires.

Let us make efforts to revive again the corporate spirit from which came to us those admirable and sublime creators; artisans, ignorant of the rules of pedagogy, even almost illiterate, which did not, however, prevent them from producing immortal pieces of workmanship, pure masterpieces of architecture, of tapestry, of ironfoundry, of joiner's work, etc., privileged practical workers with an immortal genius, to whom we are indebted for our jewels of architecture as well as for our jewels of the decorative art, the one forming the pride of our ancient cities, the others the wealth and the value of our museums.

Being thus animated only by the care for the vital interest, for the future and the dignity of our profession, let us unite our efforts so that we may succeed in the creation of the diploma, which would be granted by a jury composed of master architects of recognised talent and merit.

This essential measure of safeguard would keep away the ignorant and incompetent who in our day give themselves the name of "architects," abusing this title, and, in fact, creating great prejudice to the prestige and good reputation of the profession!

To obtain this desirable end the Press might be a powerful auxiliary. If the Press would second our efforts, what a glorious educative part it would play. It could interest and instruct the public by publishing judiciously written articles, commenting upon and bringing before its readers the qualities and merits of the works which are really worthy of such name.

Let us declare it: it would be highly desirable to see the Press bestow on the architects a little of that interest which it lavishes upon painters, sculptors, musicians, and writers. In the same way as the Muses are sisters, are not the arts brothers? It is by reason of this fraternity that I make appeal to those who wield that marvellous instrument of publicity—the pen.

In conclusion I would say that the vital interest of the country, our dignity as disciples of art as well as the defence of our professional interests, oblige us to rally ourselves incessantly, courageously, without relaxing, into a fraternal union against the fatal tendencies which in the end would render it impossible for architecture, that grand book of tradition, to add marvellous pages to the glorious annals of Belgian art.

Mr. Albert Kelsey (Philadelphia), in opening the discussion, said he had listened with great interest to the papers that had been read. There had been a great interest developed in architectural matters among the people of the United States, due not so much to the points that had been referred to by the readers of the papers as to the great object lessons that had sprung up, as it were, in a night in the form of their exhibitions. There was no time for him to explain why it was thought expedient to make those buildings more or less archaeological, but it had had a tremendous influence, and had done a great deal more than all the

reading and all the teaching in their various institutions to awaken an interest in architecture. The Dewey Arch, for instance, which was a work of love, had created a tremendous furore throughout the entire country, and for days and days there were always dozens of people photographing it. The T-Square Club delegate to the Brussels International Congress of Architects said that in the United States among their reproductions of Continental architecture they had already in Florida specimens of the Spanish Renaissance as fine as any in Spain. At Philadelphia they had very high buildings, occupied by bureaus of commerce, where the ground floor and the first floor were in the style of Francois I., as fine as any examples of that epoch in France. At New York they had a "Tour Giralda de Seville," and at Boston a Sainte Genevieve library, a perfect example. But a modern spirit, national, indigenous, and inspired by their epoch, a spirit which represented that epoch instead of those servile copies of old-world monuments, had yet to come, and they awaited its advent with impatience. This was nine years ago, and they were still impatient. Since then XXth century life has created XXth century problems. Since then architecture has passed through the experimental stage, and was now recognised as one of the learned professions. This fortunate state of affairs had been brought about primarily by the creation of an educational system which stretched from the Atlantic to the Pacific, a system so liberal in its interchange of courtesies between the architectural societies and the architectural schools of their universities that it was now possible for any talented and ambitious draughtsman (either college or office trained) to procure the advantages of foreign travel, as well as a course at the Ecole des Beaux Arts, without cost to himself. Moreover, a complimentary arrangement had even been made by the French Government whereby the winner of the Paris prize in the final competition of the New York Beaux Arts Society was admitted to the first class upon his arrival in Paris, thus eliminating an exacting entrance examination and all the work of the lower class required of other architectural students at the French National School of Fine Arts. Their educational system, however, was not alone responsible for progress and prosperity. They had had unusually lavish opportunities to build; and, lastly, their endeavours had been loyally seconded by an Architectural Press, which had done much to raise standards and to diffuse knowledge. And now the domestication or nationalisation of their architecture was the next problem confronting them. The florid ornament so common on the interior new buildings of Paris and its architectural suburb, New York—was a manifestation of ignorance which they were combating, many contending that in a search for indigenous sources of inspiration their traditions led to England rather than to France. For instance, within one hundred miles of his home, let him tell them of some of the customs in vogue, which were still carried out under the shadows of good old Georgian buildings. At Lancaster and York ancient rivalries were perpetuated by emblematic use of the red and white roses of the Royal Houses, for which those towns were long ago named. At Bethlehem a trombone choir ascended to the lofty belfry of the old Moravian church, and these, by playing familiar chorals announced to the people below the death of a member of their congregation. At Bird-in-Hand a church debt was solemnly discharged annually by the payment of a single red rose. At Ephrata the old monastery still stood where Protestant monks and nuns lived. Thus in the United States more than anywhere else their architects were entitled, both on account of diverse historical associations and because of the constantly increasing mixed population, to come to a reunion like this, prepared to learn something from every delegate that might be turned to appropriate and practical use. Naturally their thoughts turned first to the Mother Country, and with gratitude to the Royal Institute of British Architects for the magnificent entertainments they were enjoying, and for the many expressions of cordial goodwill they had listened to. They fully recognised how vitally and intimately related their work is to the work of the English architect; they recognised the manifold advantages to be derived or before a class of students, should allow half an hour for questions and conversation and perhaps for practical demonstration on

power to strengthen, fortify, and buttress those fraternal ties.

Herr Bernard Felsch having spoken, Mr. Hugh Stannus said that, as Mr. Jackson had remarked in his very thoughtful paper, the public whom they wanted to educate in architecture were their masters, and naturally their clients. If architecture be combined of three elements—firstly, the plan, that accumulation of cells which together made the building, the cells themselves, and the conglomeration of those cells arising from the function that they expected the building to perform; secondly, the walling or the inclosing of those cells when they had put them together; and, thirdly, the decorating in a fitting and logical manner of the building—they had got to educate the public to recognise those three elements, and they could do it in the way Mr. Jackson had pointed out. They might build large buildings by way of educating the public, and he believed that the majority of them would be only too glad to educate the public in that manner; but unfortunately the public went to others besides architects. He quite granted that they were the salt of the earth and that wisdom would die with them, but the public was not content merely to come to them; it went to others, and they must remember that bad buildings were made as well as good buildings. If they were to educate the public while they were waiting for the buildings to be made, it must be done by lectures, and their lectures must be made more interesting. They must interest the public and get them to attend before they could get them to accept their *dicta* on the subject. Then, in the second place, their lectures must be clear and convincing with regard to the plan. Too much had architecture been considered to be merely a matter of the outside, of the perspective, for they knew that all that was required by competition committees were perspectives of the outside of buildings. They ought to recognise that architecture was the inside as well as the outside—that a building should grow from the inside, and that the inside must be considered and planned first. That led him to the suggestion that more and more they should try to persuade competition committees that, in addition to the perspectives, there should be sections and plans in perspective. That was one of their methods at South Kensington—when they had a plan of a building it was put into perspective, with the walls showing a certain height all through. In that manner the public understood a building much better than if they merely had the plans drawn geometrically. He wanted to see perspective sections required by competition committees, and in that way the public could understand the inside of a building much better than by the mere ordinary elevation. Those of them who were old enough to recollect the first publication of Choisy would remember that it was from those beautiful perspectives with which he enriched his book that they were able to learn more about the construction of Gothic architecture than from a mere plan of elevation. The first point, therefore, he wanted to make was that they should think in perspective, and he remembered his great master and tutor, Alfred Stevens, said that about perspective. Secondly, he wanted to say something about the use of models. Their brethren in the engineers' craft made very much of models in the teaching of engineering. Of course, they also had in an engineering class models of portions of machinery—models of pulley blocks, pedestal blocks, cranks, etc.—portions of machinery which were capable of being put together to construct machines out of. They as architects might very well take a lesson from their book, and he believed the more models they employed in the teaching of architecture—models which were capable of being taken to pieces and re-combined to make further designs—the better for the student and the more they would be able to interest the public. If they had lectures accompanied by models which could be taken to pieces, instead of lantern slides, he thought they would be able to interest the public more. He would further suggest that the lectures should not end when the last echo of the speaker's voice had died away, but that every lecturer, whether lecturing before the public or before a class of students, should allow half an hour for questions and conversation and perhaps for practical demonstration on

the subject. In that way he ventured to think that they would interest the public, and by interesting them they would be also educating them. Architecture was essentially the art of putting together, and if they desired to interest the public he ventured to think that their method of teaching should rather be by way of models of small portions of the building, reserving the analytic method for dealing with their students.

Herr H. P. Berlage (Amsterdam) said he agreed with what Mr. Jackson had said in his paper, that after all the best means of educating the public in architecture was by the production of well-designed buildings. On the motion of Mr. Kelsey, a vote of thanks was accorded to the chairman for presiding.

President's Garden Party: Botanic Gardens.

In the evening the President's garden party was largely attended; the reception was within the entrance of the large conservatory, through which visitors poured in a nearly continuous stream from nine to ten. The lighted gardens looked even more beautiful than usual, perhaps from a more liberal allowance of Chinese lanterns. The band of the Horse Guards played in the gardens; in the conservatory there was a musical entertainment of a more æsthetic order, furnished by "The Ladies' Salon Quintet," a piano and a quartet of strings played by lady artists, who gave a very refined and finished performance. In the course of the evening a little ceremony took place in the committee room of the gardens, when M. Damet presented to Mr. Belcher, as President of the Institute of British Architects, and as a gift to the Institute, the medal of the Institut de France, with a reverse inscription connecting it with the occasion.

FRIDAY'S PROCEEDINGS.

Visit to Cambridge.

Some two hundred and fifty members of the Congress, including the President, paid a very pleasant visit to Cambridge on Friday. True, it is not possible to obtain much more than a glimpse of the town's chief architectural features in the space of a few hours, but the committee in charge of the excursion had succeeded in arranging a programme, which, including as it did inspection of three such Colleges as Trinity, King's, and St. John's, could hardly have been altered for the better. A special train left St. Pancras at 9.45 a.m., and ran into Cambridge an hour and a half later. Bikes were in readiness to take the party to the Senate House, where Dr. Butler, Master of Trinity, who was acting for the Vice-Chancellor, received the visitors. The foreign delegates and several members of the Executive Committee were then presented to him by Mr. Belcher, after which Dr. Butler, in the happiest possible terms, welcomed, in the name of the University, its British and foreign guests. He took occasion to observe that the building in which the members of the Congress then found themselves was used for purposes both of examination and of admission to University degrees, equally a centre for professor and undergraduate. The galleries overhead, he went on to say, which were now empty and had perhaps even been unnoticed, could hardly escape a very general inspection at most times when the Vice-Chancellor occupied his chair by reason of the very marked behaviour of their youthful audiences. He was delighted to welcome the members of the Congress, both in the name of the University, and, if he might be allowed, also in the name of his College. Dr. Butler was attended by Dr. Geo. Cunningham in the absence of the University Registrar (Mr. J. W. Clark). From the Senate House Dr. Butler led a procession along Trinity-street, where members of the Congress had an opportunity of seeing the new buildings of Caius, built by Sir Aston Webb, to his own College, at the famous gate of which Dr. Cunningham delivered the first of an interesting series of short explanatory speeches. In a few words he sketched the history of the gate and the Great Court into which it leads. It was owing "to the taste and energy of Dr. Thomas Nevile, who became Master in 1593," he said, that the Great Court had begun to assume its present magnificent proportions. Ralph Symonds, the architect of the famous second Court of St. John's, had been called in to superintend its construction, and it was due to him and Nevile that Cambridge could

boast of what was unquestionably the finest court of its kind in England.

Next the party passed into the Chapel, the Fellows' Garden, the Screens, and the Hall, the latter "copied with certain alterations from that of the Middle Temple." Thence in small groups the members inspected Neville's Court with its library, one of Wren's most successful works. Further speeches told how the architect had not omitted to design the bookcases and other furniture, so that the library was one of the noblest in the country. Passing under the Cloisters the visitors entered the garden adjoining the river, and caught their first glimpse of the "Backs," of which they had heard so much. From this garden a splendid view of the back of the library was obtained, and many questions from foreign visitors were raised with regard to the peculiar tints of its stones.

It was now approaching lunch-time, and the party divided itself into three groups; the largest, some hundred and fifty in number, went to the Hall at King's College, the others dividing themselves between Clare and Trinity Hall. At King's the Vice-Provost of the College took the chair, sitting between Mr. Belcher and the Master of Trinity.

Lunch over, the Provost of King's (Dr. James) delivered, in the Chapel, an address, which out of compliment to his foreign guests was in French. In sketching the history of this most famous of all chapels, he commented upon the fact that in all probability his own College and that of Eton had been designed by the same person. "The stone used for both foundations had been quarried 'at their joint expense, and then divided between them.'" The Chapel itself had been completed during the reign of Henry VIII. He drew attention to the windows which, as Mr. Clark had observed, are perhaps "the most important specimens of English glass-painting that have been preserved."

In the interval between the inspection of the Chapel and the drive through the town a few members of the party seized the opportunity of examining Pembroke, one of the

three most ancient Colleges in the University. Here the butler showed an audience that was all too small over the Chapel, built by Wren, with carvings ascribed to Gibbons, the College silver, and the fine XIVth-century benches still in use at the bachelors' table in Hall.

Passing out by the side gate of King's, the party made its way by the back of St. Catharine's to Queens—one of the most interesting of the smaller Colleges—ultimately crossing the quaint old bridge to Silver-street, where the brakes were waiting to convey members along the "Backs." At the gate of St. John's they alighted, and once again had a sight of a College garden, among the best of its kind, the back of Trinity Library, and the river at its most picturesque point. Then followed a slow procession over the Bridge of Sighs to the third Court, thence into the red-brick Quadrangle, pronounced by more than one writer the most beautiful in Europe, into the Hall, and so out into Trinity-street.

A minute later one of the four round churches which England possesses—the Church of the Holy Sepulchre—was filled with members. This building is "reputed to be the oldest of the English round churches, and to have been consecrated in 1101. Its inspection proved not the least interesting incident of the visit.

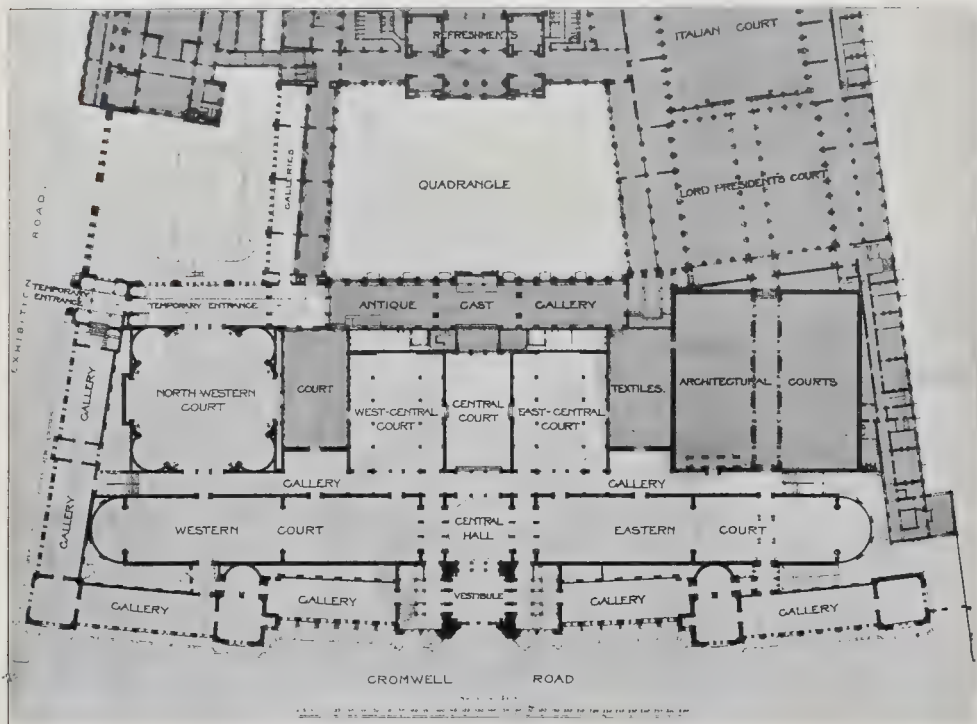
From this point the brakes were again in use, and the members enjoyed a drive which included glimpses of Jesus and Emanuel Colleges, the new Science buildings completed only a year or two ago, and the new Court of Pembroke, the work of the younger Gilbert Scott. A hurried tea at the station, and the party left for London by a special train at 5.7 p.m.

Mr. Fawcett, helped by a small committee consisting of Mr. Blackburne-Daniell, Mr. Alfred Cross, and Mr. Ralph Straus, arranged what was commonly allowed to be a very successful programme.

College of Science and Victoria and Albert Museum.

In the afternoon about fifty members, ladies

and gentlemen, attended to visit the College of Science and the new buildings of the Victoria and Albert Museum, under the guidance of Sir Aston Webb. There would no doubt have been a much larger number, but for the fact that the all-day visits to Oxford and Cambridge had taken so many visitors out of town. The party met at three at the College of Science, when Sir Aston Webb took them round the building, explaining the special points of construction for ensuring freedom from vibration in the physics laboratories, which have been described on a previous occasion in our columns. Sir Aston pointed out that while chemical students, as they advanced in proficiency, moved higher up in the building, for the sake of better light, physics students began at the top of the building and descended to the ground floor as they advanced in the classes, as what they required above all things was a solid foundation and freedom from disturbance by vibration. The upper story of the physics department showed the only wooden roof in the building, steel being avoided here on account of its disturbance of experiments in electricity and magnetism. The roof is of sequoia wood, which has been largely used in the building, and looks very well. A gallery has been constructed along the centre of the roof framing, to afford an opportunity for pendulum experiments. In regard to the main staircase, the architect drew attention to the fact that the centre well had been floored over at each level, instead of leaving the staircase hall open to the ceiling; the architectural effect might suffer, but the open staircase hall would have been noisy, whereas the construction of a floor at each level not only prevented this, but also gave the students a convenient place on each floor to assemble when necessary. After looking at the exterior of the building from the opposite side of the road, the party proceeded down Exhibition-road and round by Thurloe-square, in order to get a view from there of the portion of the front of the Victoria and Albert Museum from which the scaffolding is now uncovered. The architecture from that point looks very bright and sparkling in effect, and



Plan of the New Portion of the Victoria and Albert Museum.

the portrait sculpture in niches comes out admirably. The niches in this portion of the building are filled with portrait statues of eminent architects; those in the corresponding position on the other side of the façade are to represent sculptors; statues of painters are to fill the centre portion, and statues of craftsmen are to occupy the niches on the return front towards Exhibition-road. On these works sixteen among the most able of the younger sculptors of the day have been employed, each sculptor taking two figures. An important point in regard to these stone sculptures is that the stone out of which they are carved has been built into and bonded to the walls, and the carving then executed *in situ*, so that there will never be any trouble from the failure of cramps and the possible danger of the falling out of a figure in consequence. The party then entered the building, which of course is at present only in a shell state inside; but by reference to a large plan displayed in the centre hall Sir Aston explained the arrangements of the new portion of the building, of which we give the plan. It will be seen that on entering the central hall the spectator has the whole length of the building visible to him to right and left along the western and eastern courts. The original fan shape of the plan had been departed from when the architectural courts were built with an axis placed at right angles to the line of Cromwell-road at that point; and this occasioned the special treatment of the plan of the front façade, in order to keep the western portion at right angles to have the eastern portion at right angles to the axis of the architectural courts. Care had been taken, in setting out the plan, to provide for vistas which might lead up to important works of art. The West Central Court and East Central Court have been planned in a basilica form, with side aisles divided off by columns, the aisles being finished with a cross-vault ceiling; the intention being to place here works of ecclesiastical art in a surrounding somewhat suggestive of a church. There will be no elaborate decoration, however, as the principle throughout the treatment of the interior is that the exhibited works are to be the decoration, and that the building is only, as it were, a case to contain them. The North-Western Court, a square reduced by the large niches to an octagon, will probably be used for the exhibition of sculpture. The smaller galleries will be used for collections of works of special character; one for silver work, another for textiles, and so on. The walls are all to be finished internally in a substance called "cranham," which, while sufficiently hard, will admit nailing into it for the fixing up of such smaller works or cases as may be hung to the wall. In passing through the building, Sir Aston pointed out that the large arches which form partial architectural divisions, such as those across the western and eastern courts, and those in the entrance hall, are all of the same centres and dimensions, so as to give a note of unity to the principal features of the interior. After traversing the principal parts of the building, the visitors were invited to a tea provided in the room adjoining the main refreshment-room of the old buildings, when a member expressed, on behalf of those present, their thanks to Sir Aston Webb for his invitation and for the lucid and interesting description which he had given them of the main points in the two buildings they had been visiting.

The Tomb of Agamemnon.

Mr. Phéné Spiers and M. A. Wielems (Austria) were the joint Chairmen at the Grafton Galleries on Friday night, when Mr. Cecil Smith, LL.D., Keeper of Greek and Roman Antiquities at the British Museum, lectured on "The Tomb of Agamemnon." The lecture was illustrated by a series of dissolving views.

Mr. Phéné Spiers said it was an easy task to introduce Mr. Cecil Smith, for he was so well known in connexion with his researches at the British Museum. Mr. Smith's presence on that occasion was extremely apposite, because they owed to him to a great extent the discovery of the missing portions of the shafts which flanked the doorway of the Tomb of Agamemnon at Mycenæ. Mr. Smith saw some photographs of pieces of stone, and recognised at once they were of the greatest importance, and he accordingly went over to Westport to the

house of the Marquis of Sligo, and found that these fragments, which would be described to them, were some of the missing portions of the two shafts of this tomb. The lecturer would give them an account of all earlier researches, and show them slides made from special drawings, and would tell them all that was known of the tomb up to the present time, and of the greatest and most important task which had fallen to him—the putting of the fragments of the shafts together.

Mr. Smith said: "The British Museum has recently become possessed of a monument, or, rather, a part of a monument, of great interest in the history of Greek architecture, and it is with much pleasure that I take the opportunity kindly offered me by the Committee of the Architectural Congress of presenting here the first published account of it. Through the generosity of the Marquis of Sligo three portions of shafts of the columns which decorated the doorway of the Treasury of Atreus at Mycenæ have been presented to the nation. With the help of casts from portions existing elsewhere, and with the addition of one or two fragments which were already in the British Museum, we have been enabled to restore and set them up, so that for the first time since the earthquake or vandalism which overthrew them we can now see them once more approximately in the form in which they stood at least 1,000 years B.C.

Of course, it must be understood that the rediscovery of the shafts does not actually afford any new data for the restoration which were not previously in existence. The portions of the columns which already existed in different museums, compared with the traces left on the monument itself, were sufficient to permit of such a restoration, which has, indeed, been more than once attempted on paper; but the new material enables us to determine the true dimensions beyond all doubt, and makes such a restoration more worth attempting.

The history of classical architecture has thus taken an important step into the misty background which enshrouds its origin. Of these origins we have been gradually learning to know something more in the last twenty years, and particularly through the great discoveries of the last seven years in Crete. The excavations of Dr. Evans at Knossos and of Professor Halbherr at Phaestos have shown us that it is here we must look for the origins of all Hellenic culture. At present, however, the centre of interest both at Knossos and Phaestos lies in a period which is far remote from the Classical age of Greece—before the first temple of Classic order arose on Greek soil. The age of Minos, from which it descended, had already pressed into legend. The real connecting link between the two is offered by the remains of Mycenaean populations on the mainland: above all, the fortress towns of Mycenæ and Tiryns, of which the colossal cyclopean masonry of their walls has resisted the ravages of time. But though the spade on these sites has revealed for us a marvellous picture of the domestic life and thought of the Mycenaean world, of their architecture, it has laid bare but little beyond the ground plans. Of the elevation of the Mycenaean palace or house our knowledge must still be based largely on inference. There is, however, one class of remains of which the conditions of construction have favoured a more complete preservation, and that is, the so-called treasuries or tombs, which were intended to be covered with earth, and which the kindly soil has reserved for us more or less entire. Such buildings have been discovered at Orchomenos, in Boeotia, at Menide and Sparta, in Attica, and, above all, at Mycenæ, where is the most famous of all—the 'Treasury of Atreus,' or 'Tomb of Agamemnon.'

Before the XIXth century such visitors as travelled in Argolis regarded this building as the Tomb of Agamemnon. Peter Laurent, in his 'Recollections of a Classical Tour,' made in 1818-19, on page 46 says: 'This vault was for a long time denominated the Tomb of Agamemnon, and Chateaubriand in his itinerary mentions it as such.' 'This traveller,' he goes on to say, 'certainly did stop in his hasty gallop across the Peloponnese to look at Mycenæ through a spy-glass from the road and to devote some moments to his romantic feelings heated by so near a view of the kingdom of Agamemnon; but it

should be recollected that Agamemnon and all those who were murdered at the banquet by Ægisthus are represented as having been buried within the citadel.' That represents fairly well what was the accepted view at that period, a view which seemed to receive confirmation from the description of Pausanias, who mentions the 'subterranean buildings belonging to Atreus and his children where their treasures were kept.' Comparison with other similar structures which have awaited the excavator more or less intact has shown that Chateaubriand was right and Pausanias was wrong—the buildings were tombs. Moreover, they were, properly speaking, not really subterranean. The ordinary mode of construction was as follows:—Into the side of a hill a broad passage-way (dromos) is driven, open to the sky, and lined on each side with masonry leading up to the doorway of the chamber itself. This chamber is hollowed out of the earth (sometimes partly built up and covered with heavy rocks and earth) in dome or beehive shape, and lined with regular concentric courses of squared masonry, narrowing gradually to a capstone at the summit.

A curious example of such a tomb in actual use occurs on an Attic vase in the British Museum, representing the beautiful myth of Glaukos and Polydeides. Here the beehive-shaped tomb chamber is shown in section, with the two figures inside, and a small tripod surmounting it as a kind of tomb monument. This vase dates from the middle of the Vth century B.C.; it is hardly probable that the beehive tomb continued in use down to that date, but it shows at least that the tradition of it had survived, and, indeed, it may well be that the Athenians of the time had access to some of the examples surviving from a previous age. For these tombs were not merely intended for the reception of the dead. The Greeks were from very early times devoted to ancestor worship; by death they thought the mortal put on immortality, and the tomb was not only his resting place, but a shrine at which his kinsfolk would at recurring intervals pay him semi-divine honours.

In two instances (the Treasury of Atreus and the similar tomb at Orchomenos) a smaller side chamber is added at right angles to the axis of the tomb, and entered by a doorway in the centre of the right-hand side. In the case before us this is excavated out of the rock, but the roughly-hewn walls have probably been faced with a revetment now lost. Probably this side chamber was intended to receive the remains of the less important members of the family—the poor relations—or the more precious of the offerings. In some of the later tombs the main receptacle is provided with a niche or pocket at one side to hold the offerings, possibly as a reminiscence of this custom.

As the tomb chamber served the purpose of a shrine, it was necessary that it should have a worthy passage and doorway; but the Treasury of Atreus is the only example in which the architectural features are so imposing and the wealth of decoration so elaborate.

Before the beginning of the last century the tomb was already filled, and the upper part of the entrance was laid bare. Fragments of the richly-sculptured decoration of the façade were still lying *in situ*; some small portions of these decorations have found their way into various museums, but the greater part has entirely disappeared. It is possible, however, to reconstruct with more or less probability the main features of the architecture. The doorway itself is measured from the floor, which is some 4 in. lower in the gangway than at the sides, probably owing to denudation, is 18 ft. 1 in. high and 9 ft. wide at the base, narrowing to 8 ft. 3 in. at the lintel. The edge of the masonry immediately around it is enriched with two moldings, of which the edges are curved, and on either side with a semi-column in dark grey limestone, engaged—that is, with the flat or split surface attached to the wall. It is these columns which are the principal subject of my paper this evening.

In the year 1811-12 the second Marquis of Sligo visited Greece, and during his stay seems to have interested himself, as so many of the visitors at that time did, in acquiring a small collection of antiquities.

Unfortunately, no record appears to have been preserved in the family papers of the details of Lord Sligo's researches. The proceeds seem to have been, for the most part at any rate, removed to the family estate at Westport, county Mayo, and it is only from an examination of these that an idea can be obtained of the field of his labours. There is, however, one mention in the literature of travel which associates him with the Treasury of Atræus. Laurent, in the work already quoted, describing that monument, says: "During the stay of Lord Sligo excavations were made in this building under his direction and that of Seli, the Pasha of Tripolizza; we were informed that the result of these researches was the discovery of the shafts of two columns without either capitals or bases; these were immediately presented to his lordship, who carefully transported the treasure to England."

Among the papers of Lord Elgin at Broomhall my colleague, Mr. Arthur Smith, has recently found letters from Lusieri, the Neapolitan artist employed by Lord Elgin, which throw a somewhat different light on the affair. In one of these, dated September 2, 1810, he says: "Veli Pasha de la Morée a fait excavation à Argos et Mycènes; il y a trouvé différents morceaux de sculpture vendus à Messrs. Knight et Fazakerly et deux colonnes données au Marquis Sligo," and in another, dated September 4, 1811: "Veli Pasha de Tripolizza ayant entrepris des excavations dans la Morée a achevé celle du Tombeau d'Agamemnon où il n'a pas trouvé que quelques morceaux de marbre. Dans un autre près de l'ancien théâtre d'Argos il trouva des petites statues d'un sculpture médiocre, qu'il fit vendre bien cher à M. Fazakerly, il fit présent d'autres marbres et vases à Milford Sligo, qui lui contenterait aussi beaucoup, et qui valaient bien moins." Veli Pasha's excavation does not appear to have amounted to very much so far as the Treasury of Atræus was concerned. During the early years of the century the site was visited and described by several travellers. Dodwell was there in 1801-06. Gell at about the same time, Leake paid his second visit in 1806, and in 1801-05 the architect employed by Lord Elgin, Sébastien Ittar, of Catania, made drawings of what was then visible. This last is also credited with an excavation, but this probably refers to some small clearing which was necessary for the purpose of making the drawings and plans. One thing is certain from the evidence—that already before Lord Sligo's visit the columns were no longer in position; the space in front of the doorway and the mole of the dromos or passage of approach were still half choked with soil, which probably contained some of the remains of the decorative facing of the façade. Leake, in his "Morea," page 374, says: "On my former visit to Mycenæ there were several large fragments of these semi-columns lying on the ground; I can now only find one or two very small pieces." This was in 1806. Two small fragments came to the British Museum with the Elgin collection, and are said by Dodwell to have been found by the excavators of the Earl of Elgin; two more from the Institute of British Architects in 1843, and a few others are scattered in European museums.

A comparison of the views of the building drawn before and after Lord Sligo's visit seems to prove that Veli Pasha must have confined his attention possibly to the interior, but mainly, at any rate, to that part of the dromos immediately in front of the doorway. In 1878 the Archaeological Society of Athens commissioned M. Stamatakis to make a complete clearance of the entire soil and rubbish encumbering the monument. A drawing made shortly before this shows the condition much as in Gell's and the Elgin drawings, only on the sides near the entrance are traces of sinkings in the soil, which may very likely be those caused by Veli Pasha's excavation. The columns were each carved, as the marks of attachment show, in two solid blocks, each about 8 ft. long, joined together halfway up; weighty objects such as these could not be easily moved, and when in the first disintegration of the building they fell forward from their place they would probably be not far away from their original position. One half column was carried out probably by the builders of a Turkish mosque. In 1812 Baron Haller, the companion of Cockerell in the famous enter-

prise at Egina, saw it at Argos lying outside the great mosque there; subsequently Colonel Mure (1838) describes what was probably the same half column as 'forming the architrave of a building at Nauplia, formerly a Turkish mosque, in which the Courts of Justice held their sittings.' It has now been rescued, and is worthily set up in the national museum at Athens. From 1812 onwards the remaining three halves of the columns remained *perdus*. It was only last year that the Earl of Altamont, son of the present Marquis of Sligo, in the course of studying the ancient monuments at Westport, was led to the conclusion that certain columns in the collection were of unusual importance. He made careful drawings and photographs of them, which were brought to the British Museum, and the probability that the Westport objects were the missing decorations of the Treasury of Atræus was at once evident on a consideration of the facts already stated. Lord Altamont soon afterwards paid a visit to Mycenæ for the express purpose of comparing his measurements with the traces left *in situ*, and the result leaves hardly any doubt that the surmise is correct. The credit of this interesting discovery is thus due to Lord Altamont.

The reconstruction of the columns was a matter of some trouble, in which I was fortunate in having the assistance of Messrs. Pinker and Holcombe, our skilled masons at the Museum. The first question was to decide which shafts belonged to which side. For this purpose I asked Mr. Bosanquet, Director of the British School at Athens, who very kindly had drawings made for me of the bases which were still *in situ*. These bases are formed out of bluish-yellow breccia blocks, which are sunk to the level of the lowest steps and bedded with cement, the block being, as may be seen, considerably larger in plan than that part of it which forms the stepped base. An instance of the absence of symmetry which obtains all through the construction of the Treasury is shown in the upper surface of the left-hand base, of which the plan, instead of being rectangular, takes the form of a trapezium. Fortunately, the same irregularity has been observed in making the cramp-holes to receive the lower shafts of the columns, and, as we fortunately possess the lower edge on one shaft, with its cramp-holes, it was easy to decide that the two larger portions of shaft, forming nearly one entire column, must belong to the left-hand base. This column is larger in section than the other by 1 in. all the way up. It has thus, with the ornamental pattern to help us, been possible to deduce with practical certainty the exact position of every fragment. The upper portion of the right-hand column is the part which has been already mentioned as built into a mosque at Argos, and now at Athens. In the Athens Museum it is set up by the side of a partial restoration of the two capitals. Unluckily, the Turkish architect, whether because he objected to a carved face on his lintel or for some other reason, has sliced off a wide strip of the front throughout the whole length. The slide before you shows the two capitals with the original fragments existing at Athens inserted in a kind of dummy restoration. By the kindness of the authorities at Berlin and Karlsruhe I was enabled to get casts of the important fragments there preserved. The Athenian dummies required some small corrections, which the other fragments enabled us to make, and it then became perfectly clear that one cap was of appreciably larger dimensions than the other. It was thus an easy matter to determine which capital belonged to which column. In our restoration throughout a distinction is observed between pure restoration in plaster and casts inserted from originals which still exist. The latter are coloured a slaty bluish tint, while the restoration is in buff. In the slide before you it may be seen that, although all is in plaster, sufficient of the original is represented to make the completion of the cap justifiable. As there was no apparent variation in the pattern all round, it was sufficient to take a squeeze of the original portion and repeat it as long as was required.

In most of the former restorations of these capitals it may be remembered the angles of the patterns on the echinus are made to run outwards from a diamond-shaped centre. Curiously enough, this error is not found in

the earliest, that of Lord Elgin's architect, Ittar, but seems to have begun with Donaldson, although he based his design on Ittar, and it has continued, together with an entirely unworthy rendering of the charming leaf patterns below the echinus, even down to that excellent work of Puchstein—'Das Ionische Capital.' Now I hope it is laid for ever. In the slide before you you see the columns as set up in the British Museum. The bases have been reproduced as nearly as possible in a material which was the nearest approximation to the original procurable—a marble called *brèche d'or*. The originals presented by Lord Sligo can be clearly distinguished in the slide. What is not quite so clear is the small piece of the leaf pattern under the right-hand echinus, which came to the Museum with the Elgin collection, and the fragment on the right-hand shaft presented in 1843 by the Royal Institute of British Architects. These little waifs have at last returned to what I trust is their original home.

I have already alluded to the absence of precision in the working of these columns, which amounts almost to carelessness. Both in the shafts and in the capitals an instance of this is to be seen in the way in which the pattern is not worked out to the edges. On the shafts especially, the edges where they meet the wall are left altogether unworked, so that a straight edge can be passed along them and it is perfectly true. This may be partly due to the desire to strengthen a fragile part, but that does not account for the neglect of the pattern, which sometimes extends as much as 4 in. from the edge. It looks as if the columns had been sculptured with the decoration after they were fixed in position. If that were so, on the outer edges particularly, it would be difficult to get this point of view, and so the artist may have thought it of less importance.

The shaft, which is 18 ft. $\frac{3}{4}$ in. high, is 1 ft. 10 in. in diameter at the lower extremity and 2 ft. at the upper, showing a taper downwards of 2 in. This peculiarity, which is also found, of course, in the pillar of the well-known Lion Gate at Mycenæ, is of common occurrence in the Minoan period in Crete, although not by any means universal. In the temple fresco at Knossos no less than three such columns are shown of slightly varying forms. These columns may for various reasons be inferred to be of wood, and hence their rather squat form, and the base or socket in which the central one rests. The Atræus columns are far more attenuated, having in the shaft $\frac{3}{4}$ diameters, against only $\frac{5}{8}$ at Knossos. This is only what one might expect in the translation from wood into stone, and for the same reason we may be prepared for the minute base at Mycenæ. What is the reason of this tapering form? Various theories have been suggested. M. Perrot supposes that it came about through the necessity of pointing the end of the wooden post in order to fix it in the ground, but he seems to me to stultify his argument by an attempt to explain the base. 'Experience,' he says, 'taught men later to interpose a slab or cube of stone between the post and the rain-soaked soil.' Surely, if the slab of stone is there, the sharpening of the extremity is rather a drawback than otherwise? I do not know that I can suggest a more satisfactory solution. Certainly it is to Egypt that we must look, and in Egypt there is one form of column—that imitated from the bundle of reeds—which tapers towards the base. Whatever the origin, there is no doubt that the downward taper answers a special service here, where it serves to correct as it were to the eye the outward slope of the two sides of the doorway.

The practice of decorating the shafts of columns is, of course, native in Egypt. It is interesting to observe that in the palace of Tell el Amarna Mr. Petrie found the fragments of a column shaft decorated with a pattern closely resembling that of the Atræus columns. Now there is evidence at Tell el Amarna of the influence of Cretan or Minoan artists having been at work there, and I think we may conclude that this style of decoration grew out of the contact of Cretans with Egypt. The decoration of the echinus is unusual; the nearest parallel in later times is perhaps the series of Doric capitals at Paestum, which are given in Schuchhardt's 'Ionische Capital,' pages 48 and 49. The function of the columns here is probably

mainly decorative, as they are not calculated to support much superincumbent weight beyond that of the lower projecting courses above the doorway. The question of the decoration of the facade above the doorway is one of considerable difficulty. We are bound, I think, to assume a devetment of sculptured slabs, but though several suitable fragments exist, it is only an assumption that these belong to this part of the building, and not one scrap remains in its original place. I hope before long to obtain casts of all these fragments, and, after examination of them, to visit Mycenæ and see whether any certain data can be laid down beyond what we already know. Meantime, it may be of interest to show on the lantern some of the restorations that have been attempted."

The lecturer proceeded to present a series of views and drawing of various restorations, and pointed out that the lions' heads shown in Ittar's drawing appeared to him to be wrong. A rough sketch was shown by Cockerell, which the lecturer thought probably first suggested the idea of filling in the niche by two lions—an idea which was taken up by Donaldson. Until, however, the lions were discovered, the question whether or not the niche was filled in this way must remain vague. With reference to the restoration prepared by Mr. Phené Spiers, Mr. Smith expressed the opinion that it was the most satisfactory restoration we have had of the facade. Mr. Phené Spiers had filled in the niche with lions, and the only suggestion he (the lecturer) would make was that the lions should have had their faces outwards. He thought also that the round ornaments were not quite in their right position. With regard to a pencil drawing by Cockerell, Mr. Smith thought the artist must have had some means not known now to get to the top of the dome, as it shows the method of the construction of the last stones immediately surrounding the cap stone.

In conclusion, Mr. Smith said:—"When Mr. Cockerell was in Athens at the beginning of last century a Turkish official one day asked him how Englishmen amused themselves in Greece. His reply was, 'In examining antiquities and ancient cities celebrated in the accounts of historians.' The next questions were, 'Do those same historians in their accounts ever tell you where to find sequins?' When we look back on the roll of distinguished names of Englishmen who played so prominent a part among the pioneers of archaeology in Greece—Dodwell, Leake, Gell, Cockerell, and others—without hope of sequins, but merely for the advancement of science, I think we may claim before even an international audience that England has done something to deserve the heritage of Greek originals which has fallen to her share, and of which the columns shown this evening are the latest and not the least important example."

Sir Henry Howarth said that it was very seldom that one met with a student either of archaeology or science who had the gift of describing with great precision of language and without useless rhetoric an admirable monument like that. It was Mr. Smith's quick eye which first recognised the importance of these fragments, and they could hardly appreciate, unless they knew the history of the past few months at the museum, the pains and care and skill which he had shown in restoring this gateway. One thing struck him, which was, how it was that architects who had designed so many classical buildings, both in ancient and modern times, abandoned this most beautiful and graceful method of dealing with pillars. Pillars were very difficult things to ornament. Here, however, they had a method of decorating pillars which to him seemed graceful, and which did not in the slightest degree appear to weaken the supports. He hoped they might see someone attempt to imitate in a measure this method of treating pillars and pilasters.

Professor Baldwin Brown asked the lecturer whether he had made up his mind as to the reason for the tapering downwards of the columns, which, of course, was not the ordinary way for columns to taper in later architecture, and also whether he had formed any idea of the origin of the ornamentation of the columns—whether it was transferred from some other material, or whether it was developed on the stone itself. Like all present, he had listened with great interest to the lecture. Not long ago he was on the spot, and it

revived one's impression to see the whole thing brought forward in a lucid manner.

Mr. J. D. Grace said he would like to know whether in the course of the many excavations which had been made any trace of the metal lining of the interior had been found.

Mr. H. H. Statham proposed a hearty vote of thanks to Mr. Cecil Smith for his exceedingly learned and interesting paper.

Mr. Baggallay seconded the motion.

Mr. Phené Spiers said that, as far as he could gather, Professor Baldwin Brown asked the reason for the tapering downwards of the columns. There was no possible doubt whatever as to the columns tapering downwards in the frieze discovered at Knossos. The frieze which had been reproduced on the screen that night showed a decided tendency in that direction, and Dr. Evans had found traces of the ends of the columns still remaining, and also impressions of their form in one or two cases they occupied in portions of the palace. He was therefore able at once to decide that these columns tapered downwards with a considerable diminution of diameter. As for the reason why the columns should be put into position, it would seem that the Cretans, who were the first people they knew of to use them (because they are not found in Egypt), were sufficiently acquainted with the qualities of timber to know that the trunk of a tree, when cut off and utilised, would support an equal weight whether put into the natural position or turned upside down. They also found that when reversed it lasted twice as long, because the rain could not penetrate the outside. There was another reason which was probable. The wooden architraves carried by these columns were rather large, and had to carry cross beams, and therefore as wide a support as possible was needed, given by the increased dimension of the upper diameter. The columns they found at Mycenæ followed in all respects the downward taper of those at Knossos, but there was this great difference, that the one was in wood and the other in stone. From the decorative point of view, and utilised as they were in the Tomb of Agamemnon, there was no reason why they should not follow the same custom; but it was certain that if the column had been an isolated feature it would not have been strong enough to carry any such weight as that required. Therefore, it was, he thought, as a decorative feature attached to the tomb that the column in stone was made to taper downwards. He had one apology to make. He would not have ventured to have made a restoration had he not been absolutely obliged to do something of the sort. He found that there was not a single drawing of any kind which had the slightest resemblance to the actual features now set up in the British Museum. He found that the drawings made by Lord Elgin's artist were quite wrong. They were beautiful drawings, but the details were all wrong, and he was forced to make a restoration himself, to publish in a new edition of a work he had written.

The motion was then carried.

Mr. Cecil Smith, in reply, said he had tried to deal with the question of the tapering downwards of the columns in his paper. Mr. Grace had asked if any traces had been found of the metal linings of the roof. He believed that no portion of the metal had been found at all, but a few of the nails which fastened the decoration had been known to exist. It was only assumption that the decoration was of metal, but there were reasons for supposing it was. Mr. Baldwin Brown asked what was the origin of the decoration of the columns. He believed it extremely likely that the decoration on the column also originated in metal. It was necessary in a climate which was very bad in the winter that wooden columns should be protected as far as possible by a coat of metal, and this spiral decoration was the commonest form of decoration of all Mycenaean decorated work. He thought it very likely that the wooden column, having first been covered with a coating of metal, in imitating the wooden column in stone they also imitated the metal covering of the wood in the stone. He should be glad to assist anyone in the gathering who would care to visit the British Museum and see the restoration.

at the Grafton-street Galleries, there being no meeting at the Institute premises. The subject under discussion was "A Statutory Qualification for Architects," and the chair was taken by Professor Clason (Sweden), and Mr. E. T. Hall was the English Chairman. The Secretaries were Mr. J. T. Cackett (Northern Architectural Association) and Mr. E. Chujo (Japan).

Five papers on the subject had been prepared, the following being abstracts:—

Mr. J. S. Archibald (architect, Montreal, Quebec) said that the subject was a delicate one for the profession to discuss, as motives can be so misrepresented; but for want of advocates outside the profession all the necessary agitation must come from within. The charge has been made that it is only another species of "trades unionism," but on consideration it will be found that the principles underlying the formation of "trades unions" are wholly different from those which actuate us. The former is purely a movement to regulate the compensation and earning powers of the individual, whilst the latter is a movement to raise the standard of professional practice and to safeguard public interests.

Generally speaking, there are two sides to architecture, viz., the æsthetic and the utilitarian. As regards the latter, especially in its constructional aspect, there can be no difference of opinion as to the necessity for the most careful examination before being permitted to design and erect buildings. The object of an architect's labour is to prepare, generally speaking, for habitation by humanity. Human life has always been looked upon as valuable beyond price and compensation. It is recognised in the practice of medicine and law, why should it not be recognised in the practice of architecture where requirements are demanded combining science, chemistry, and law?

We are hedged about by legislative enactments which at their root must have emanated from the conviction that the practice of architecture was a responsible one, calling for particular training and study. Architects are compelled to erect buildings under the direct superintendence and dictates of the law. The only inference to draw is that the practice of the profession is of such a nature that the individual cannot throw off all responsibility the moment the contract is complete. The logical sequence would also be that the law would make provision that all who enter into the practice of the profession would be found fully competent to carry out the spirit and dictates of such enactments.

It is obvious that such competence can only be established by a series of examinations. This is not always the most satisfactory method, but for want of a better we needs must adopt it. Such examinations must be all-embracing and welded by powers beyond the faintest tinge of suspicion, and removed in the public eye from all question of self-interest.

With respect to the æsthetic side of the professional practice the standard of qualification is more difficult to set; but there is a basis which no one should be permitted to evade. We are all influenced to a greater or less extent by our environment. If in such an environment beauty is absent and ugliness predominant, depravity and a low moral condition will usually be found amongst the people. On the other hand, beauty is usually accompanied by refinement, a higher state of civilisation, and, as a rule, a higher moral condition amongst the people. It is therefore incumbent upon our legislators to recognise such influences. Such influences have been recognised from time immemorial. Plato has discussed the question fully in his *Republic*, and even in those days he argued that State superintendence should be extended over sculpture and building "so that they may be prohibited from exhibiting all forms of vice, intemperance, and meanness."

A sense or perception of the beautiful is to be found within the soul of every human being. It should be our pleasure to encourage it at all times, to influence our community with its leaven of goodness, and it should be the duty of the State to recognise such influences and to grant a statutory qualification to prevent influences other than that of the good to be over her people.

The Province of Quebec Associations of

SATURDAY'S PROCEEDINGS.

Statutory Qualification for Architects.

On Saturday members of the Congress met

Architects is the pioneer (on the western side of the Atlantic at any rate) of statutory qualification for architects. This law was founded in 1898 as an amendment to the charter of incorporation. It was granted, as it was deemed expedient for the better protection of public interests and in order to enable the public to distinguish between qualified and unqualified architects and to insure a standard of efficiency in the persons practising the profession and for the advancement of the art of architecture. This law reads, "No person can take or make use of the name or title 'architect' unless he is recognised under this Act and as a member of the Association." The machinery is provided for the carrying out of a system of examinations and for the enforcing of the law.

The Title and Diploma of Architect.

M. Louis Bomnier (Paris) read a paper on "The Title and Diploma of Architect," the following being an abstract:—

Science is not an individual possession; it is the result renewed over and over again of acquisitions previously made. If certain more favourably gifted individuals, or those who come upon the scene at the precise moment when an idea which has become mature is disclosed to the world, increase this property all of a sudden, and illuminate their epoch by the radiance of their intellect, then the regularity of its evolution is so much a necessity that the innovators who see too far are often not understood by their contemporaries. In the same manner reactions only succeed in stopping progress for a short time.

In the region of art, where individuality would explain itself more easily, if some artists of the plastic arts seem some times to be able to do without teaching, these exceptions only occur among those who cultivate specially and exclusively one branch of their art, vibrations of light, movements of lines, etc. And even they cannot escape from artistic heredity, from the teachings of their surroundings. Organised societies, therefore, are right to endeavour to transmit and to increase this intellectual wealth, the acquired results, the raw material for future progress. Thus we have, in art as well as in science, methodical teaching.

In architecture, which is at the same time the outcome of art and of science, more than in any other art, teaching is a necessity. Technical teaching, a deep study of the requirements, a reasoned knowledge of the materials, judicious application of the processes, and artistic teaching, grouping of masses, harmony of lines, taste in details.

These two teachings which form a whole can, it is clearly understood, be theoretical only. They cannot be separated without giving incomplete results—either draughtsmen or builders, but not architects. Not architects: that is to say, not artists, whose mind, formed of logical ideas and of decorative feelings, is ready to undertake any studies, any adaptations, any kind of progress, able to choose from among the several solutions proper to satisfy the engineer, the best—that is to say, the most harmonious, the most beautiful. If the teaching is necessary for the transmission of the acquired results, it cannot be really efficient and useful unless it be accompanied by a sanction pointing out clearly the person to whom, amongst all others, may be entrusted with perfect safety the fortune of private persons and the budget of the State, the health of the individuals and the hygiene of the population, the preservation of the art treasures of a country, the improvement of the comfort of family and social life.

The sanction is the diploma.

The diploma which is the consecration of long scholastic studies, preparing the architect for all eventualities, cannot and must not be obligatory in a free country: it is only an indication and, as it has been rightly called, a powerful presumption of artistic and professional capacity. It naturally corresponds with a want which, for a great number of years, has been puzzling the mind of architects, and which forms part of the programme of every Congress. This want has received full and complete satisfaction in France. The facts are there to prove it—they are evident.

The campaign was started as far back as 1840

Since that remote period the Central Society of French Architects took the initiative, and during more than twenty years, by means of controversies, reports, and steps, it fought the good fight until the day when, in 1863, M. Eugene Guillaume obtained from the Government the decree instituting the diploma.

After a period of modesty and obscurity, during which the first possessors of the diploma, without a bond, without influence, without protection, and treated as intruders, were the object of attacks as furious as they were stupid on the part of short-sighted architects, the architects with a diploma formed an association in 1877.

During a great number of years they struggled only to live, to hold on. Little by little their numbers increased. When they had become 200 the hostilities grew less; when they became 500 they were at last recognised.

There are to-day 750 distributed all over France, at the Institute, in all the great State administrations, in those of the provinces, and of the large towns. They constitute special groups in the Colonies and in foreign countries, in Switzerland, in the United States, laureates of the public competitions, propagating, to the best of their endeavours in the general interest and in conformity with their programme, the cult of the high studies of architecture.

In 1912 they will be 1,000.

This striking development and this untested prosperity of the diploma in France show what an impious want was answered by its creation. We are of opinion that, in the interest of all concerned, it is necessary to surround the title of architect with guarantees and to sanction it by means of the diploma.

M. Gaston Trélat (Paris) also contributed a paper. The following are the author's summary and conclusion:—

Diplomas are a good thing in proportion as the studies which they represent magnify and elevate the title of architect to the height which society prescribes in order to understand its aspirations. But they might easily become a cause of deterioration or, what is equivalent, of incapacity to understand anything but the knowledge and applications belonging to a special education. Then a diploma, taken as the criterion of every application of art or of useful knowledge, would be the height of human inanity.

Individual efforts are nowadays more necessary than ever in consequence of the movement that one can remark everywhere, and which is of a nature to raise up initiatives on all sides. As the syntheses of the collective interests it is the duty of States to ensure the free expansion of work, and consequently to oppose everything which might resemble a privilege. At a time when knowledge tends to become more general every day competition ought to be freer than ever. Interests, narrowly understood, often lead men to desire, with selfish blindness, to create small artificial states within the great State which is under the control of the parliamentary delegation. This is a danger to which thinking men have no right to close their eyes. These small artificial states are always causes of disorder in employments. They are calamities both in regard to the development of human intelligence and to the organisation of society. Factitious authorities appear, thanks to these small states, with interests opposed to the collective interest. In their exclusive preoccupations of persons or clans these authorised simulacra could not be equal to the exigencies of contemporary evolution. They are misleading powers which would become obstacles to the requisite rectitude of the efforts which initiatives individually directed would naturally be led to produce.

Conclusion.—When they are confined to being stimulations to work for young people diplomas are an excellent thing. But they would become detestable if they were to trammel the free activity of the technician in later life.

The field of action is never opened wide enough to the aptitudes that society comprises. The advanced civilisations of Europe are often a cause of weakness in individual production. To understand this one has only to cast one's eyes on younger peoples where

(Continued on page 145.)

Illustrations.

COMPETITION DESIGN FOR PEACE PALACE AT THE HAGUE.



WE give this week the design sent in competition for the Peace Palace at the Hague by Messrs. Russett & Cooper.

The following extracts from the report accompanying the design will sufficiently explain the objects kept in view by the authors:—

"The court-house and library are planned as one building, separated internally, with intercommunication on the principal floor at a central point.

The building is treated in a broad manner with the restraint imposed by the small amount of funds at one's disposal. A refined type of Renaissance is chosen as a most fitting expression of the purpose of the edifice. The form the dominant feature is an open tower, which bears a harmonious relation to the general mass and grouping.

This tower would serve as a shrine for a monumental statue of Peace, and also as a conspicuous landmark indicating the building.

THE LION GATES, HAMPTON COURT.

The Lion Gates, opposite the Hampton Court entrance to the Chestnut Avenue Bushey Park, were designed by Sir Christopher Wren in his original plan for the laying-out of the Royal gardens. The intention was that they should form an entrance to a carriage drive leading from the avenue straight up to the palace.

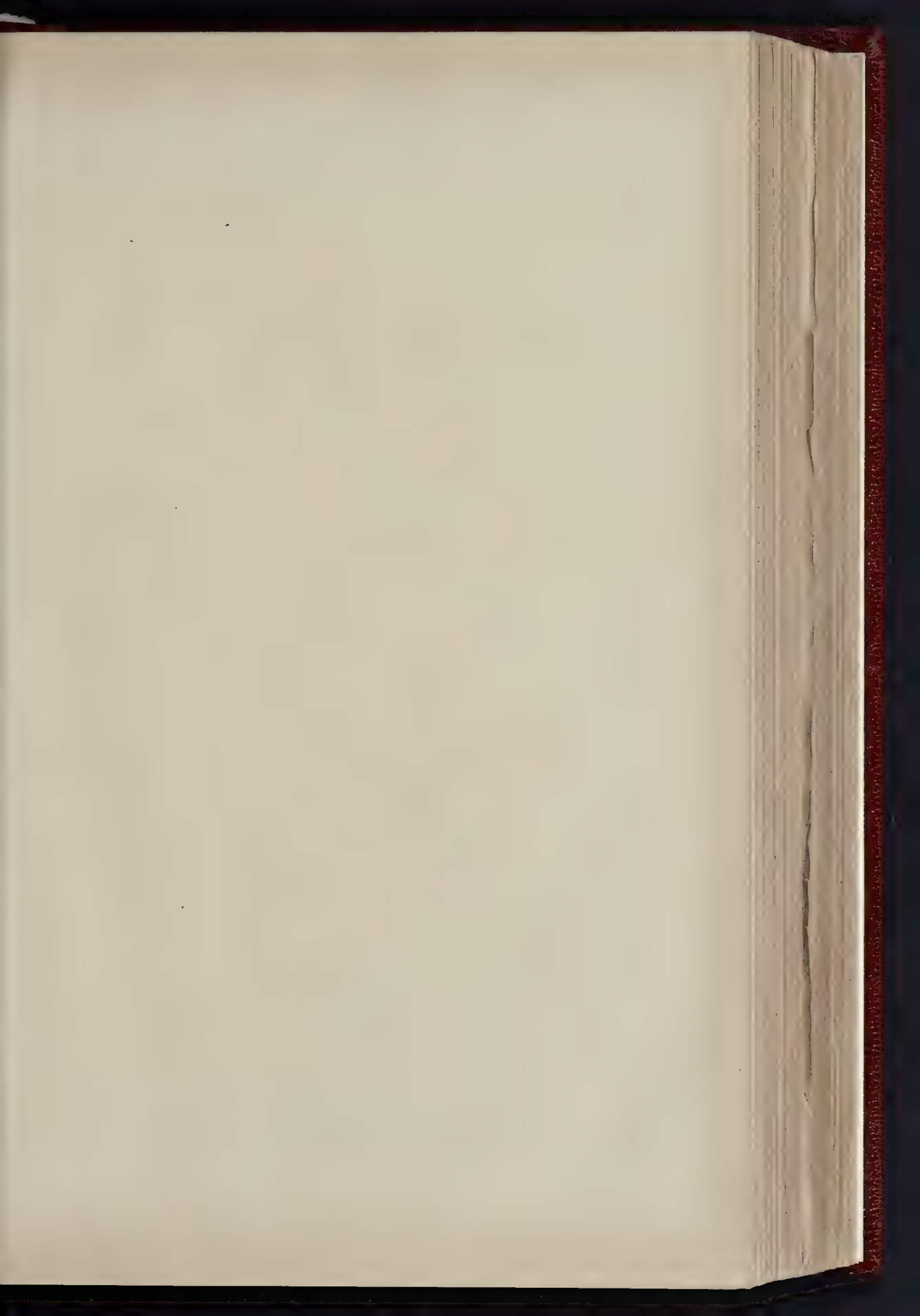
The wrought-iron gates themselves consist of a large central gate to admit carriages, and two smaller ones for the use of pedestrians on either side, the whole flanked by massive stone piers. The ironwork was most probably designed by the Frenchman, J. Tignon, who was engaged on so much of the wrought-iron work in the palace grounds, including the beautiful screens facing the river the stone piers being attributed to Wren.

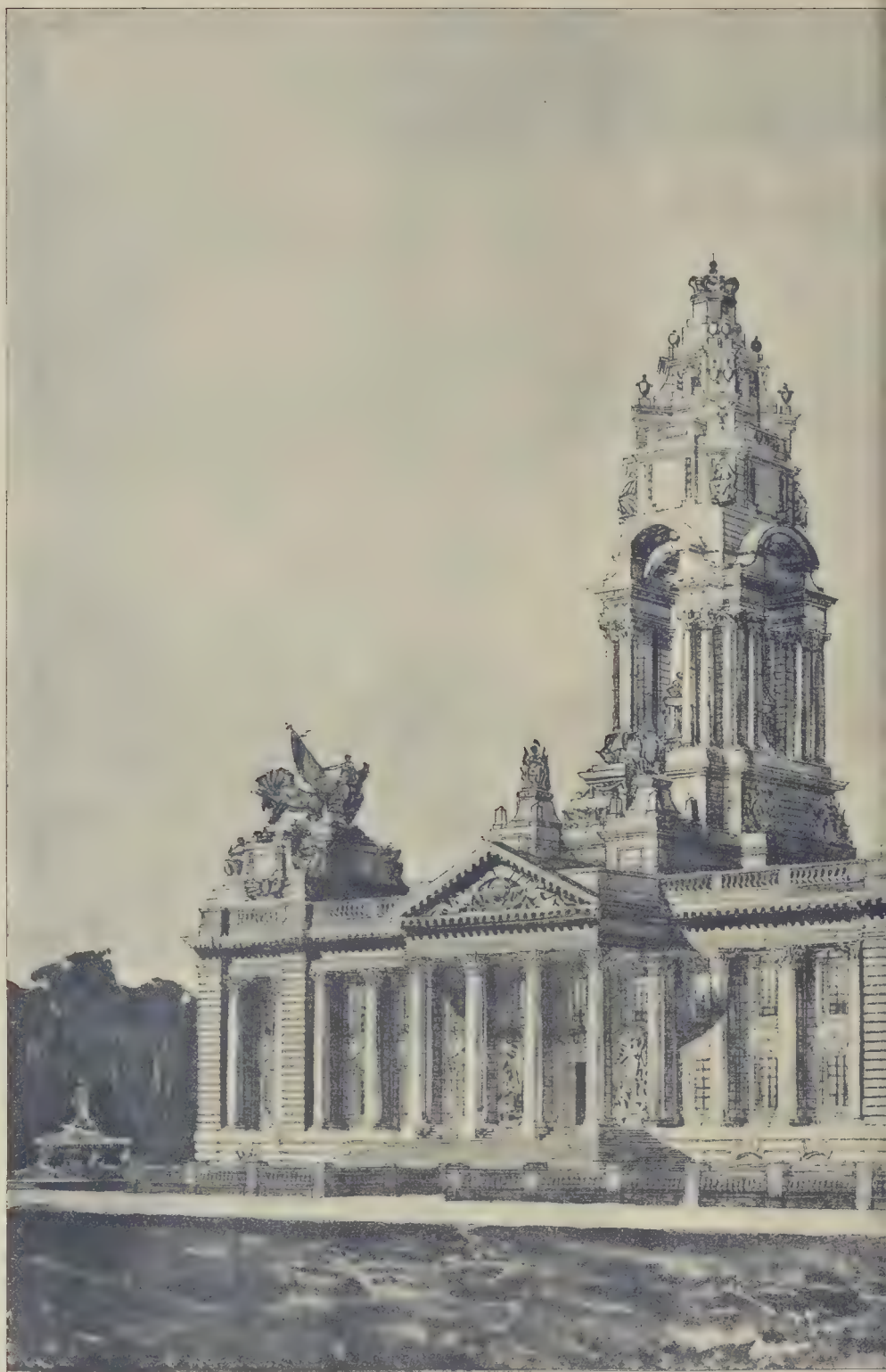
The drawing is by Mr. Arthur F. E. Poley.

Archaeological Societies.

BRITISH ARCHAEOLOGICAL ASSOCIATION.—The Association will this year hold its Congress at Nottingham, from July 25 to July 31. On Wednesday, the 25th, will be the opening of the Congress at the Exchange at 2.15, where the members will be welcomed by the Mayor, and then proceed in carriages to St. Mary's Church and to St. Peter's; visit also the Castle, the Municipal Art Museum, and the site of the Norman and Edward buildings. In the evening a paper will be read by the President, Mr. Charles Keyser, on "Norman Architecture in the County of Nottingham." On Thursday, the 26th, Rufford Abbey will be visited, and the evening there will be a paper by Mr. I. Chalkley Gould on "Some Nottinghamshire Strongholds." On the 27th there will be visit to Newark and the Church of St. Mary Magdalen; to Egmanton Church and to moated mound adjoining; Laxton Church with the Everingham monuments, and the best earthwork remains of the Norman type in the county. In the evening a paper by Mr. R. H. Forster on "Margidunum," and another on "Earthworks of the Moated Mound Type," by Dr. T. Davies Pryce, the 28th, Newark Castle, the death-place of King John; Hawton Church, and Southwell Cathedral. On the 30th, visits to A. Hucknall Church, Hardwick Hall, Bolsover Castle, and Mansfield Church; in the evening, a paper by Mr. J. G. N. Clift, J. Hon. Secretary, on "The Walls of Nottingham." On the 31st, visits to Bottesford Church and the Village Cross.

CHURCH MISSION-ROOM, PLATT BRIDGE.—The foundation-stone of a new Church of England mission-room at Platt Bridge, was laid recently by Mr. J. C. Eekersley, M.A., J.P. The building, being erected on a piece of land which forms part of the vicarage grounds in Victoria-road, the room will accommodate a congregation of about 200. The architects of the new building are Messrs. H. Wills & Son, and the builders and contractors Messrs. H. & F. Lomax, of Platt Bridge.





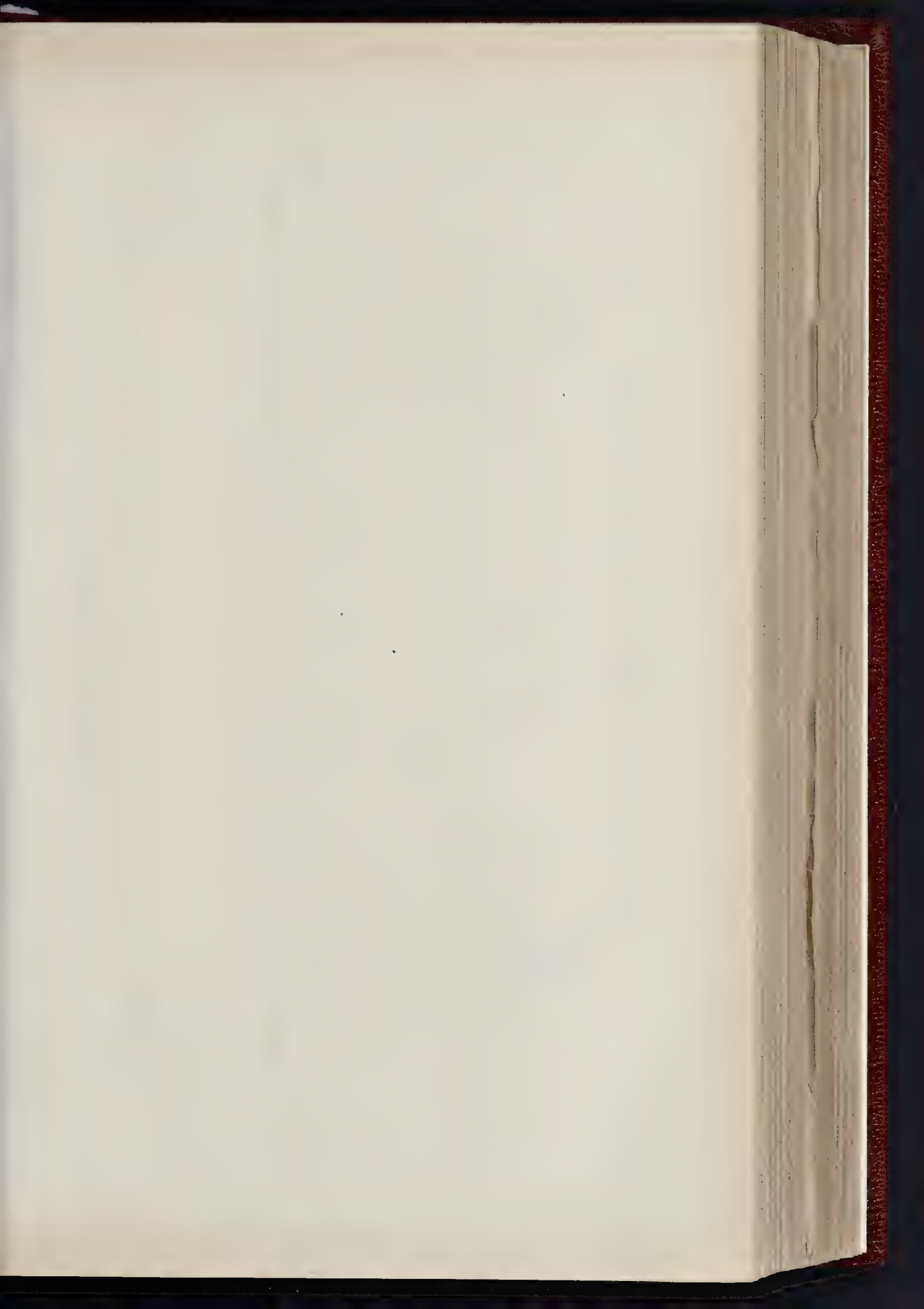
COMPETITION DESIGN FOR THE PEACE PALACE

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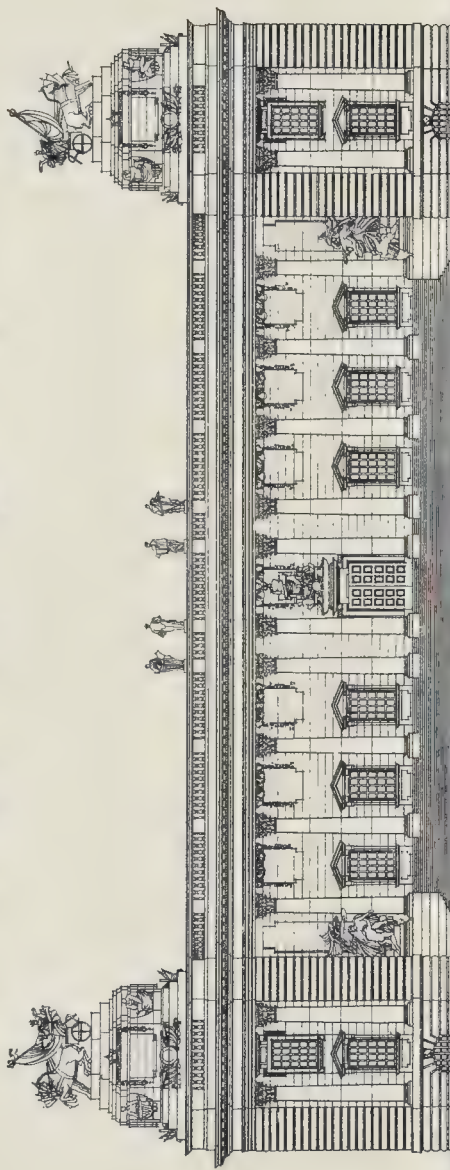
PHOTO BY L. C. 4 A. S. EAST, 100 N. STREET, FORTY-ONE E.

AT THE HAGUE.—By MESSRS. RUSSELL & COOPER
VIEW.

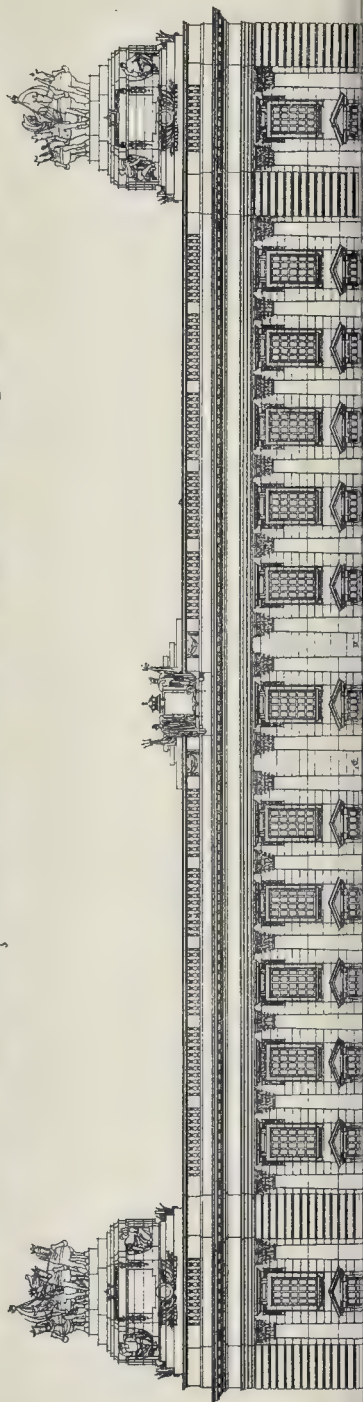


THE BUILDER, JULY 28, 1906.

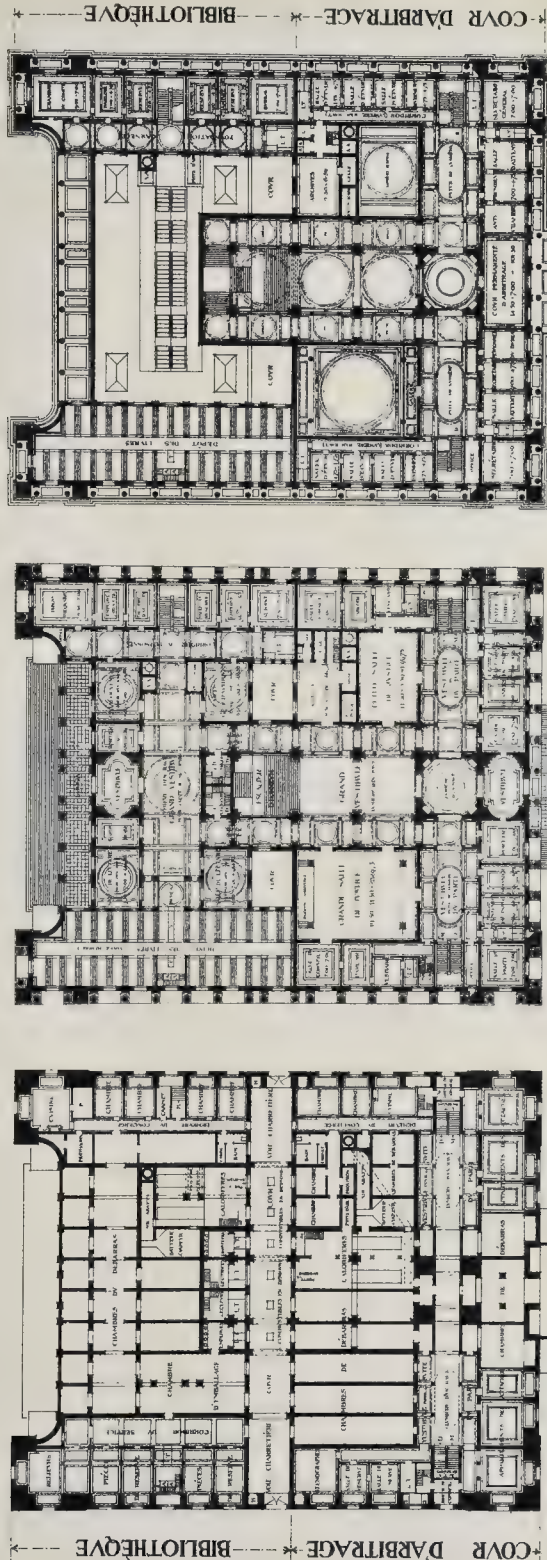
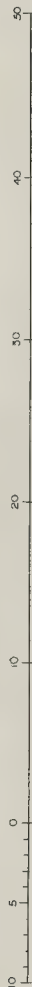
PALAIS DE LA PAIX



LA FAÇADE PRINCIPALE · BIBLIOTHÈQUE



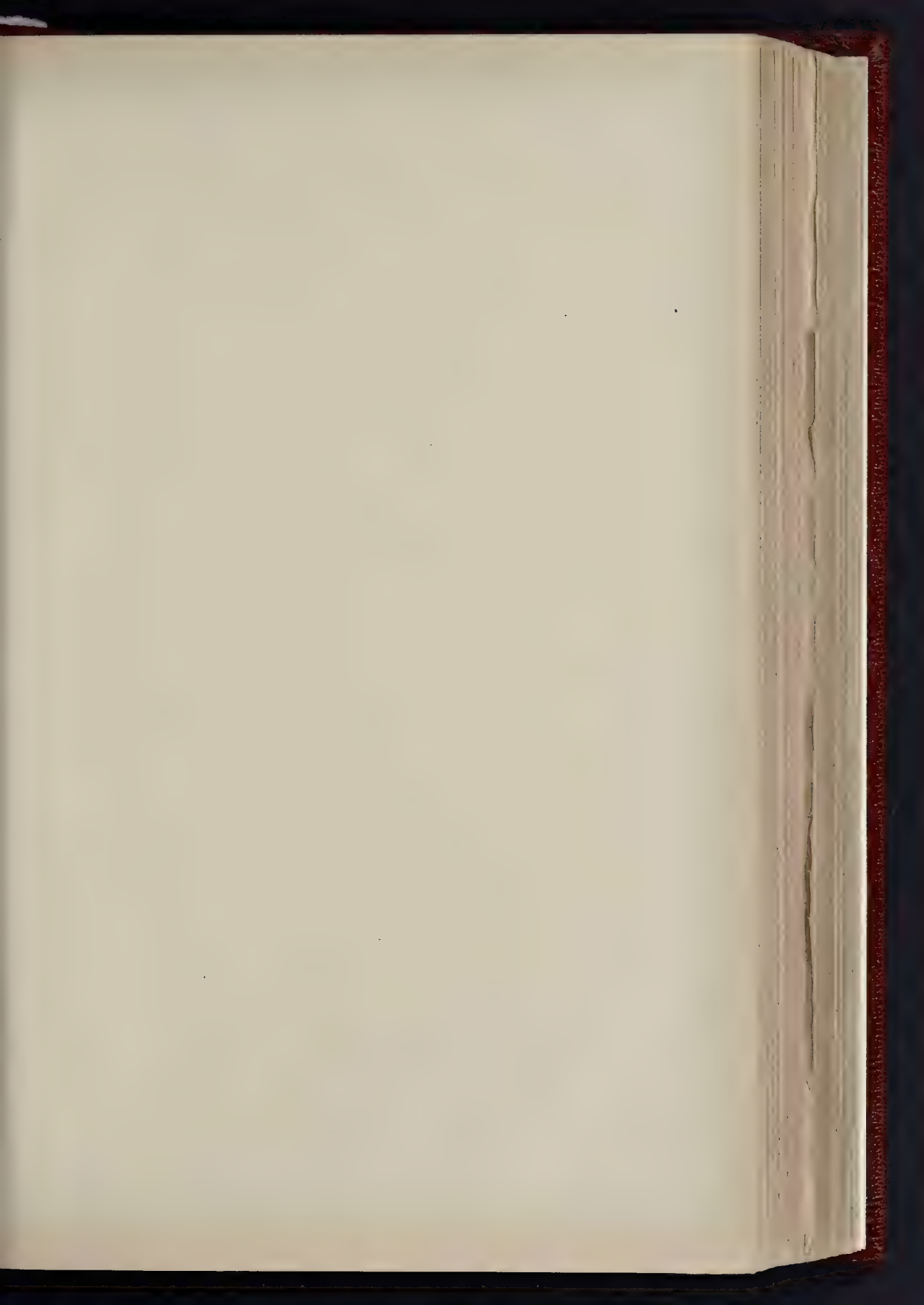
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COMPETITION DESIGN FOR THE PEACE PALACE AT THE HAGUE.—By MESSRS RUSSELL & COOPER.
ELEVATIONS AND PLANS.

PHOTOGRAPHED BY THE ARCHITECTS' DRAWING OFFICE, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100.



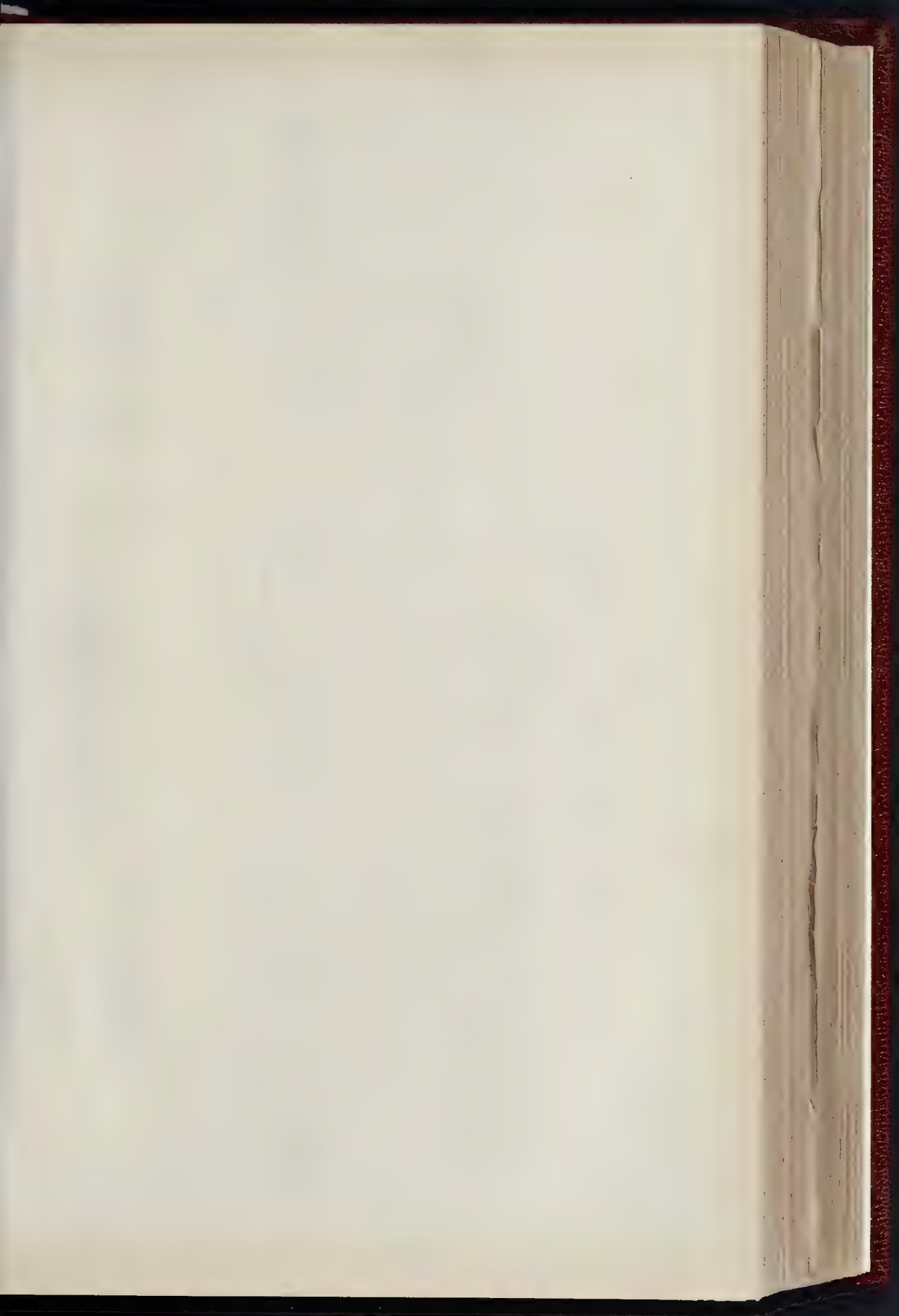


THE LION GATES, HAMPTON COU



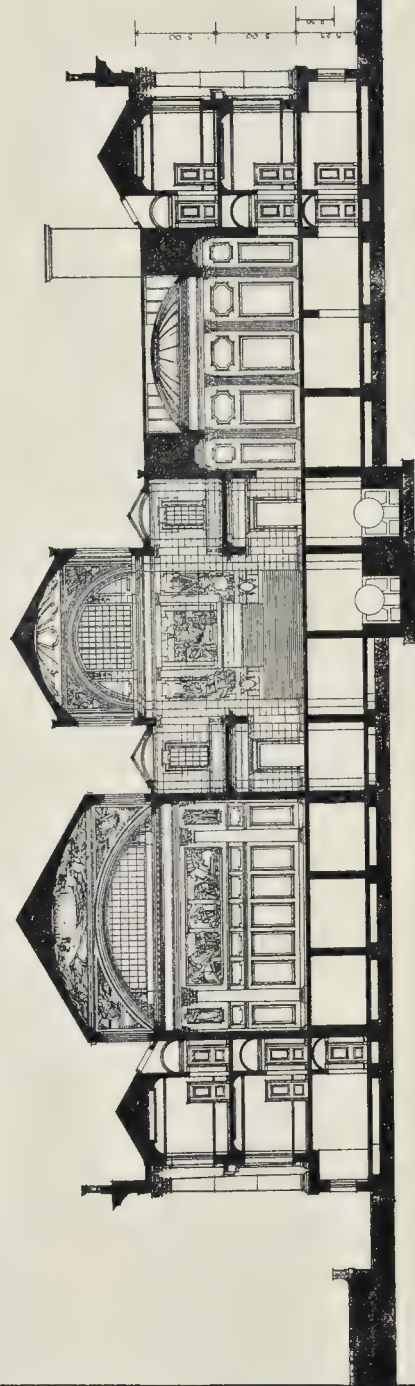
Arthur F. E. Poley Del
May 15th 1906

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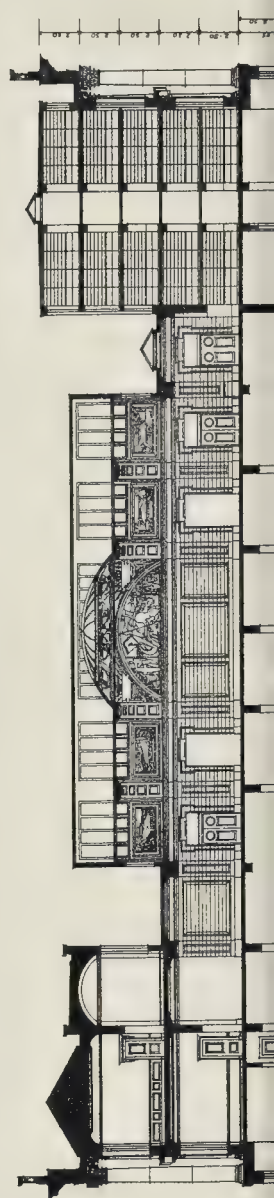


THE BUILDER, JULY 28, 1906.

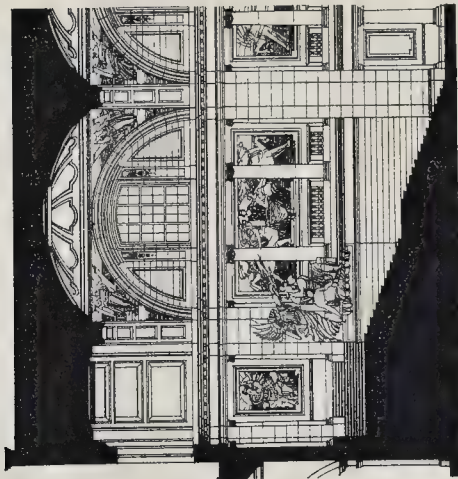
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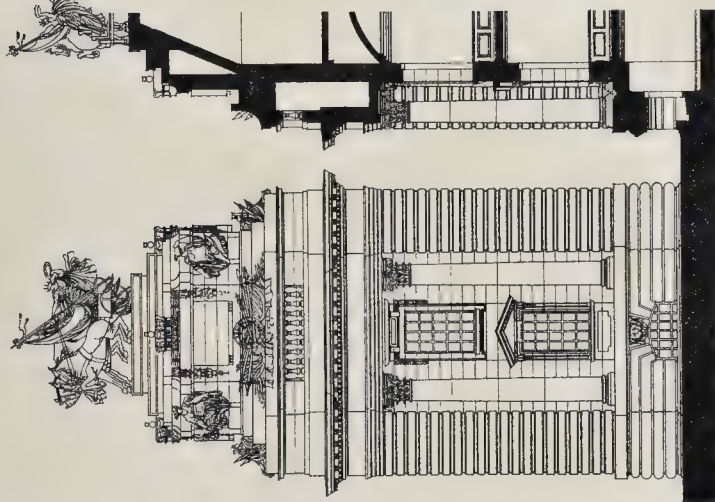
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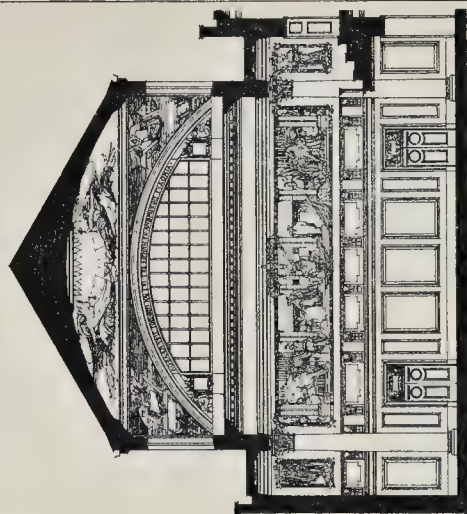
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L'ESCALIER D'HONNEUR



LA TRAVÉE DE LA FACADE



LA GRANDE SALLE DE JUSTICE

UNITED STATES DEPARTMENT OF AGRICULTURE, BUREAU OF PLANT INDUSTRY, WASHINGTON, D. C.

COMPETITION DESIGN FOR THE PEACE PALACE AT THE HAGUE.—BY MESSRS RUSSELL & COOPER

SECTIONS AND DETAILS.

THE INTERNATIONAL CONGRESS OF ARCHITECTS.

(Continued from page 144.)

the social organisation encourages individual worth, which might serve as examples to us.

I repeat this opinion: though the diploma is for the student a verification of his efforts, it becomes eventually an incident without influence on the career of a man of worth. One must go forward without ever looking behind.

Herr Otto Wagner (Imperial and Royal Superintendent of Works, Professor of the Imperial and Royal Academy of the Plastic Arts) read a paper on behalf of the Society of Austrian Architects. The following is an abstract of the paper:—

Legal Authorisation of the Architects.—On this point we beg to make the following observations. On all sides the endeavour of artists to favour the progress of art is strongly prominent. Nay, they are, in fact, the only promoters of art, since the public, entirely absorbed as it is in the acquirement of riches and in politics, has lost almost every sentiment for art. It can, therefore, be understood that the desire makes itself manifest to protect art, and it is thought that this end will be obtained by giving the title of architect a legal recognition.

This legal backing, as has been shown before, is not possible. But neither is it necessary at all, because it is not the question of admitting legally recognised architects to the construction of artistic buildings, but that only the very best be produced. If, therefore, the State, the country, or a city, or its administrations, respectively make use of a senate of art, there is in this way created an artistic control from which it can best be hoped that the desired goal will be reached.

If the architect is given a legal authorisation, it cannot, therefore, be a question of the artistic capacity of the architect, but an official control can only be admitted with regard to his professional quality. But this control is very easy, since all authorities have their well-organised Boards of Works which can exercise control when giving their consent for the construction.

The legal process must therefore consist in that the architect by his signature accepts the responsibility for the plans made by him, and that he covers himself by the contractors of the various parts of the work, who have in their turn to produce the calculations made and revised by them.

The answer to Question V. must therefore be as follows:—

The architect has the right to construct any building by the plans made and revised by him if these have been passed by the artistic and technical control.

Mr. Robert Walker (Cork) also read a paper, of which the following is an abstract:—

In calling the attention of the Congress to Subject No. V. on the programme, it will be convenient to say here that there is parliamentary precedent to be found in the Statute Books of the House in which Registration Bills have passed into Acts with a view to conserving the interests of the professions and the public in their relations each to the other.

Without giving a long list of the professions so dealt with, it will be sufficient to name the cases of solicitors, barristers, physicians, and surgeons. The Medical Act is apposite to the requirements of the Architects Education and Registration Bill.

The words "statutory qualification for architects" are consonant with the interests and well-being of the communities and peoples throughout His Majesty's vast jurisdiction, from the peasant in his cottage to the dwellers in royal palaces.

It will be seen, therefore, that this subject is in touch with the interests of the whole community, and is so far-reaching in its common interests that it extends to all the countries of the earth.

It is pre-eminently a subject of international interest, and is fittingly placed on the programme of this Congress.

The word "architect" is derived from two Greek words, *ἀρχις* and *τέκτων*, and signifies "chief constructor," which would appear to involve complete control and guidance, from the inception of the design to its final completion in fitness, strength, and beauty.

The word "qualification" signifies that the architect (or the chief constructor) should be duly qualified to undertake those responsible duties by the acquisition of an irreducible minimum of general and expert knowledge and technical education and equipment, in accordance with a curriculum laid down by the General Council, when appointed by Parliament under the stipulations of a Bill which when it passes becomes law, making compulsory "Statutory Qualification for Architects" by placing the Bill on the Statute Book as the "Architects Education and Registration Act."

The necessity for such an Act appears to be conceded generally owing to the consideration that has been given to the subject during the past twenty years.

The members of recognised architectural bodies should be registered on their proving their membership or on verified lists being sent to the Registrar by the secretaries of those bodies.

The stumbling-block which has chiefly and ostensibly retarded the progress of such a measure for all those years, coupled with apathy, indifference, and jealousies, is precisely the same as that which blocked the Medical Act for thirty years, from 1828 to 1858, namely, that Parliament declined to pass a measure which made no provision for the vested interests of the unqualified men who assumed the functions of medical practitioners, and were accepted by the public in ignorance of their want of expert and technical equipment. It may be possible to come to some arrangement on this matter by way of compromise with the Select Parliamentary Committee.

A time-limit of, say, five years may be agreed upon, during which practitioners could prove that they were in practice prior to the passing of the measure.

There appears to be no doubt but that the trend of opinion is in the direction of obtaining statutory qualification for architects, which will protect the members of the profession and the public in the prescribed parliamentary form of an Education and Registration Act having the short title "Architects Act."

The sooner such a measure is placed on the Statute Book the sooner will the evil complained of disappear. It will not impair the status and privileges or invade the membership of existing architectural bodies.

The placing of the names of persons having what the Legislature denominates vested rights does not confer the right to membership in any of the existing bodies.

"Statutory qualifications" are qualifications enjoined and required by a curriculum, prepared by a competent authority, made compulsory by statute, and tests applied by competent examining bodies whose functions commence when the competent teaching bodies have completed their work; the results of the tests are then recorded and published in a book called the Register.

When the Bill reaches the Committee stage memorialists in favour of it and petitioners against it would be heard at length, when clauses may be amended, struck out, or new clauses inserted by agreement. Should the Committee find that the preamble was proved, it would be sent back by them to the House, and if passed it would then become law and be placed on the Statute Book as the "Architects Act."

Want of qualification on the part of persons employed as architects may result in injury to life or health, discomfort, pecuniary loss, law suits, embarrassments, and much loss and damage without a remedy.

Any means that can be devised even to tend towards guarding the public against the evils attendant on incompetency will be hailed with satisfaction by the profession and the public alike. Reforms should come from within, and it is clearly the duty of the profession to initiate and work out this movement.

The papers having been read (Mr. G. A. T. Middleton reading Mr. Walker's paper),

M. Augustine Rey (Paris) said that society accused them of imperilling the public health by faulty buildings. The exact contrary was the case. Society was killing them by leaving the profession open to the first-come. The remarkable Reports to which they had just listened told them so. Mr. Archibald, M. Bonnier, and Mr. Walker had proved it to

them. A law dealing with architects was wanted. This law would, in the first place, protect the lay public, and, in the second place, the members of the profession. It was imperative that a minimum examination should teach the public that no one may use the name of architect till he had passed such a minimum examination, involving a high guarantee of ability. But let them, first of all, agree among themselves. Let this all-important question be discussed at several meetings during the next Congress two years hence. Once all societies of architects combined for the purpose of studying this matter they would have made the greatest and most important advance, and one which would save the profession from the indifference in which society seemed inclined to leave them.

In answer to an English questioner, M. Bonnier explained that the course of study at the Ecole des Beaux-Arts in Paris may extend over a period of eight years or longer. There are examinations in mathematics, art subjects, etc., etc. The courses of the second or elementary course cover a period of two or three years, and the courses of the first class three to five years. There is an oral examination on the laws relating to building, etc., on professional practice, and other subjects. And this, together with the written examination, secures the diploma given by Government.

Professor Nagy, Hungary, said he was commissioned by the Association of Hungarian Architects to report upon the movement in Hungary in regard to the question. The enormous amount of technical work done in our age and the great development of the arts, had led up to certain undesirable conditions in various countries of the world. Un-desirable competition arose between architects and those who were not. The mass of the public were, on matters of architecture, more or less ignorant in all parts of the world. In many nations there was an attempt to protect the architect's interests and the interests of architecture in the same way that the interests of lawyers and others have been protected, and to resort, to a certain degree, to a system of compulsory qualification for architects.

The oldest National Congress of Hungarian Architects and Engineers decided to bring forward a motion in favour of the legal recognition of the titles and practice of "architect, engineer, and mechanical engineer," and the Association of Hungarian Engineers and Architects had been commissioned by the Congress to prepare a Bill providing for the compulsory qualification and practice in the different technical branches of these professions. This had been done, and the Bill had been accepted by a majority of the members of that Congress. The measure had since been transferred to the Government, and would, he hoped, soon be brought before Parliament. According to the Bill, the right to practise as architects, engineers, and mechanical engineers and to assume such titles would be reserved to those who had proved their qualification as required by poly-technic and academic studies; only qualified architects would be allowed to act as official experts and designers of buildings of importance. All that was proposed to be done was to constitute what was called a technical chamber; that was to say, a legally constituted union of architects, engineers, and mechanical engineers, and the Bill, with proper explanations, had been printed.

Mr. C. Hubbard said that the question of registration was one which had become of increasing importance to architects in England. There was no doubt that they were all anxious to do the best that they could to raise the status of the profession, and it was only a question as to the best means that should be adopted. It had been suggested that it was the duty of the architects to teach the public. No doubt that might be the duty of architects, but, if he might suggest it, he thought that their first duty was to teach themselves before they could be in a position to teach the public. At the present time the doors of the profession were thrown wide open; all might enter, and a formidable adversary had entered the ranks, i.e., the limited liability companies. The large art decorators came in, and by their system of advertisement—a system which was precluded to the legitimate architect—they were in a better position than architects to "educate" the public. Their view of the whole question

was absolutely opposed to the view of qualified architects. They catered to supply the public with what they wanted, and whether the public wanted good or bad architecture they were ready to supply it, and would continue to supply it unless architects took some active means to keep them out of the profession. It was one of those cases in which they must all work together in order to protect themselves and raise the status of the whole profession.

Mr. R. Walker (of Cork) said he had listened with great interest to the observations which had fallen from different speakers, and he was greatly impressed with their remarks. His trouble was this: What was going to come out of the Congress? He regarded congresses which had come and gone lately as one of the biggest factors in uniting all parts of the earth together, and he had a great feeling of fraternity towards them. The people who attended congresses came with an open mind and they were prepared to extend to each other what knowledge they possessed for the common good. Some most pertinent remarks on the subject of registration had been made, and the last speaker made some sound observations as to the matter. What had the Congress done for architecture? He recognised that hands had crossed oceans and continents, and the frontier question did not affect them as architects. He was glad to hear what had been done in Canada for architects. The Bill was promulgated by civil engineers—civil engineers somehow or other managed to step in before architects and secure all the big plums. Instead of calling this proposed Bill a Registration Bill, he noticed that in the programme it was called a Statutory Qualification for Architects. Do not let them deceive themselves; it was precisely the same thing, and it was to be procured in one and the same way.

Mr. A. North (Tasmania) said he had been instructed by the Royal Victorian Institute of Architects, to which he belonged, to support the proposals made for registration, and in doing so he could not do better than read the instructions which had been given him: "The following résumé of the work of the R.V.I.A. is compiled by resolution of the council of the Institute. I am directed to forward a copy to you, as a member of the Institute, in order that, when the respective subjects are dealt with in the Congress, the action of the Institute in its endeavours (a) to place the members of the profession upon a legal status by registration, (b) to further the education of the architect by university and other teaching, and (c) to modernise the building regulations of our cities, in order that iron, steel, and other modern construction may be adopted.

Registration.—The accompanying draft outline Bill was prepared in 1891 by the R.V.I.A. and the general body of practitioners. It was submitted to the Legislative Council in 1892, but was then rejected. It has not been re-introduced since. The need of registration, however, remains as great as ever. During the past fourteen years registration has been made compulsory in many of the professions, and before long it will be necessary for the Institute to move again in this direction, both in the interests of the public and the profession. The demand for registration is shared by all competent members of the profession, whether members of the R.V.I.A. or not.

Education.—In addition to awarding prizes for the best work done yearly in the building construction and architectural classes at the Working Men's College, Melbourne, the council arranges annually R.V.I.A. competitions for subjects in design, measured work, and sketching, and awards medals and substantial money prizes and certificates for the best work in each division. This year, however, the new regulations for Diploma of Architecture at the Melbourne University have been issued (a copy being forwarded to you herewith). The scheme was prepared by a joint committee of the Faculty of Engineering at the university and by the council of the R.V.I.A. Mr. A. Henderson (one of our past Presidents) has been appointed lecturer in the subject, and Mr. Percy Oakden (also past President) represents the Institute upon the Faculty of Engineering for 1906. The work is thus directly in touch with the Institute.

Modern Methods of Construction.—In order that modern methods of construction may be

applicable to our larger cities, the Institute is (at the request of the Melbourne City Council) preparing a list of suggestions for improving the building by-laws of the city. Copies of the building regulations of the principal cities in Great Britain and America have been courteously forwarded on application for our guidance, and the first interim report was forwarded to the City Council last September. We ask that provision be made in the revised by-laws for the erection of iron and steel structures, and for buildings composed wholly or in part of reinforced concrete. We further request that in the new regulations a clause be inserted whereby any method of construction in use in the cities referred to in an annexed schedule, although such construction be not provided for in the Melbourne Building Regulations, may, with the sanction of the official referees, be adopted in Melbourne. It will necessarily be some time before the amendment of the proposed regulations can be effected, as the work of revision is by no means an easy task.—Signed, John Nittle, Hon. Secretary." After what had been said by the readers of the papers and others, he need not add much. Although they had failed as yet to obtain legislation in Australia on the subject of registration, they had been successful in obtaining a Chair of Architecture at the Melbourne University, which was an official recognition by the Government of architecture. So far as testimony was concerned, the Victorian Institute was absolutely unanimously in favour of registration.

Mr. Ellis Marsland said he wished to enter a friendly protest that a subject of this importance should have been relegated to the last day of the Congress, when a counter-attraction had been provided—an arrangement which was not made on any other morning of the week. This subject was of much greater importance than the subject discussed on Thursday, i.e., the education of the public, as until they had educated the architect it was quite impossible to educate the public. If they endeavoured to educate the public at the present time, he was quite sure they would be in the position of the blind leading the blind, or they would be divided into two parts, and they would hear that Codling was the friend, not Short. The great point in this matter of the registration of architects, or the statutory qualification of architects—they were both identical—was public confidence. They must secure public confidence, which at the present time was wanting. They found men boasting that they could do without architects—not men unable to afford architects, but men who were in a high position in the country. They boasted that they could do without architects, and a case occurred recently when a party of architects went to a noble lord's residence. Unfortunately for the noble lord, he did not know that they were architects, and in showing them what he had done and what additions he had made to his building, he made the proud boast that he had done without architects. That showed that there was a certain amount of public confidence in the architect. But few people knew what the architect was, and they did not care very much. Architects wanted to counteract this tendency and feeling by making it compulsory for any architect or anyone who practises the profession of architecture to be properly qualified before he does so. What had been said in favour of the subject had been said over and over again, and he desired to move the following resolution, i.e.: "That it is desirable in the interests of the public and the profession of architecture that all practitioners should have a statutory qualification."

Mr. W. W. Thomas seconded.

Mr. C. A. Cowper (Melbourne) said he entirely approved of the resolution. As the delegate of the Royal Victoria Institute of Architects of Australia he had been instructed to support any such resolution. As they had heard from Mr. North, a Bill had been introduced into the Australian Parliament some time ago, and a smaller Bill would shortly be introduced with a view to bringing about compulsory registration. When the syllabus of the Congress reached them in Australia, they were glad to see that this subject was to be discussed, and he could assure the meeting that his Institute would be very glad indeed to hear that this resolution was carried, if it should be carried. It would very much strengthen their hands in bringing about what

they believed was a very necessary reform—a reform which would do both the profession and the public a great deal of good.

Mr. G. A. T. Middleton said that as one who, like Mr. Walker, had taken a great interest and part in the matter for full twenty years, he should like to express his extreme pleasure to hear that morning the unanimous expression of opinion on the matter. There had not been a single dissentient voice from any country represented there. All were agreed that there should be a statutory qualification for architects. It might be brought about in one country by one means and in another country by another, but the principle remained the same in each case, and it was the principle they were there to affirm that morning, and he hoped that they would do so. Mr. D. Morgan (Cardiff) said that as one who came from South Wales and Monmouthshire he was entirely in sympathy with the proposition made, having to come into competition, as he did, with an outfitter, who was developing the profession of architecture, and getting the full percentage. That was proof that in that part of the country they needed legislation very badly.

Mr. F. G. Green (Cape Colony) said that as delegate from Cape Colony he had very great pleasure in supporting the motion. Some of them might have noticed that at the opening of the new City Hall and Municipal Buildings at Cape Town he brought the matter forward, referring also to the question of the education of the public also. He thought the public were to a large extent to blame. Very often gentlemen about to build houses left it to the ladies, and often accompanied them to certain districts to look at houses already erected. They liked this or that, but they did not inquire who the architect was, but who was the builder, and they went to the builder and asked him to erect a building like the one they had seen and admired. In addition to registration of architects, there should be some security against the multiplication of buildings done by an architect in the first place and then copied by builders afterwards.

The Chairman said he did not wish to curtail discussion, but a late hour had been reached, and he should like to know what the pleasure of the meeting was as to continuing the discussion or not. He would put the question to the meeting.

It having been agreed to discontinue the discussion,

The Chairman said he was placed in a difficulty as to the resolution. There had been several gentlemen present who had come prepared to speak against such a resolution, but as the time had gone on they had departed. Moreover, the subject of the statutory qualification of architects was an abstract one, and if the question were, is it desirable in the interests of architecture all over the world? it could be dealt with. But, as far as he understood, the papers read dealt with the question of the statutory qualification of English architects, which was not the subject before them.

Mr. Walker said that the whole of his paper was written at short notice for the purpose of submitting his views to the Congress, and the observations he made afterwards were for the purpose of uniting the various countries represented.

Several members called upon the Chairman to put the resolution.

The Chairman said he was in control of the meeting, and he should put the resolution in due time, but for the time being he wished to address the meeting. Mr. Walker's paper was all about the procedure by which the Bill should go to the British Parliament, and the subject for discussion was whether the statutory qualification for architects would be desirable for all countries, not for England alone. They had had a discussion dealing with the application of such a qualification to England, and a comparison had been made between the Diploma of Architecture in France; but that diploma, which it was a great honour to hold, did not bar other people from practising in architecture. They had heard that the architects of Hungary had decided to put forward a Bill, but it had not yet passed, and therefore there was no evidence as to the working of such a measure. Mr. Rey also made a speech on the subject, in which he said, not that statutory qualification for architects was essential to the practice of architecture, but that it was desirable to show that men practising

architecture had a minimum of knowledge. That was a good thing, though a very different thing. That was the difference, and it was an essential difference. As they all knew, the subject had, from the English standpoint, been gone into thoroughly by a committee of the R.I.B.A. He did not want to worry the International Congress with the matter, but he would point out that the investigation of that committee was a very thorough one, taken part in by eminent men all over the country. What was said was this: If statutory qualification were found to be desirable years hence, there was no reason against resorting to it then; but in the meantime it was desirable to try the method of the French diploma first. He was bound to put the resolution, but he suggested that the phraseology be varied so as to refer to the public of all nations, seeing that the present was an international congress. It was an impropriety to ask an international congress to agree to such a resolution applying to England alone.

Several members remarked that it did not say so.

Mr. Walker:—It is evidently intended to mean all the countries represented.

The Chairman:—That is what it should do. It being understood that the resolution should apply to all the countries represented, a vote was taken, and the chairman declared the motion carried.

The Late Lady Curzon.

Mr. E. W. Fritchley moved, and Mr. Chujo seconded, the following resolution, which was carried in silence:—

"Resolved, that the secretary be requested to convey to Lord Curzon the sympathy of this Congress of Architects at the sad bereavement he has had in the death of Lady Curzon. This Congress feels it owes a debt of gratitude to Lord and the late Lady Curzon for their efforts in the preservation of ancient architectural monuments of Indian arts and manufactures appertaining to our profession."

On the motion of Mr. Hubbard, seconded by Mr. Walker, a vote of thanks was accorded to the Chairman for presiding, and the Chairman having replied, the meeting terminated.

Visit to Greenwich.

A party numbering about 300, including a large proportion of foreign members, visited Greenwich Hospital in the afternoon. They were received by the Resident Architect, Mr. A. L. Perfect, C.E., and, after a short description of the buildings and their history had been given by Mr. Edgar A. Hawkins, A.R.I.B.A., the visitors were conducted by these gentlemen, together with Messrs. W. Arthur Webb, F. Dare Clapham, and H. Tanner, jun., A.A.R.I.B.A., to all the most interesting parts of the buildings. Great interest was shown in the original drawings by Wren, Stuart, John Webb, and Yenn, some of which had never before been shown to the public. Tea was served at the Ship, and the party returned to London by steamer.

The Banquet.

The farewell banquet was held in the Victoria Rooms, Hotel Cecil, Strand, in the evening, Mr. John Belcher, A.R.A., presiding.

There were also present:—

Tomás G. Acebo
Maurice B. Adams
J. Alard
Francis R. Allen
Louis Ambler
George M. Anderson
Mrs. Lary Anderson
R. Angel
Señor Arbos y Tremanti
J. S. Archibald
Maurice Andouin
J. T. Bahlie
F. G. Baker
F. G. Baldwin
Mr. Baldwin
R. S. Balfour
James Barbour
Miss Barbour
H. Barrillet
C. V. Bartauineux
A. E. Bartlett
Mrs. Bartlett
J. Bartlett
F. Bartok
L. Beier
John Belcher
Mrs. Belcher
A. H. Belcher
Mrs. A. H. Belcher
E. Layton Bennett
Mrs. Layton Bennett
L. L. Benoist
Mme. Benoist
Julius Benzick
Max Berg

J. J. Caluwaers
Mme. Caluwaers
M. E. Cannizzaro
Prof. S. H. Capper
H. P. L. Carl
H. T. Carl
Eugène Chastel
Alexis Chausse
S. Chujo
H. Chatfield Clarke
Mrs. Chatfield Clarke
Miss Chatfield Clarke
Max Clarke
Prof. Clason
M. L. Cloquet
C. Closet
Robert Cochrane
G. F. Collinson
Gav. Coltellacci
Paul Comhen
Albert S. Conrad
H. C. Corlette
R. W. H. A. Cosway
J. D. Crace
A. Hunter Crawford
Mrs. Hunter Crawford
Mrs. Crespin
Mme. Crespin
H. O. Cresswell
A. W. S. Cross
G. P. B. Blackburne
Thomas W. Cutler
Joseph Cuyper
V. Dahlerup
Mme. Dahlerup
Mlle. Dahlerup
Daily Graphic
Daily Mail
Daily Telegraph
Comm. A. D'Andrade
G. P. B. Blackburne
Daniel
Charles Danne
H. Daumet
Mme. Daumet
G. De la
L. Davoust
Frank Miles Day
Mrs. Day
G. Deane
H. A. A. Deglano
Mme. Deglano
A. Delpy
G. De la
Mme. De Vestel
Emile De Vreux
Mlle. De Vreux
W. D. Dick
B. D. Dick
R. Burns Dick
R. Dicks
J. P. Dittmars
W. H. Dore
Miss M. Douglas
D. G. Dyer
Mlle. Dujaudin
C. Dunch
J. B. Dunn
Charles Dupuy
W. S. Eames
Bodo Ebbardt
F. E. Pearce Edwards
Luis Elizalde
Robert Elksich
Sir Wm. Emerson
Lady Emerson
Rudolf S. Entblom
C. W. English
S. Ericson
Emil Eszech
P. Farachon
Henri Favarger
Mrs. Favarger
Bernhard Feisch
Claude W. Ferrier
E. Ferrua
Hamster F. Fletcher
W. A. Forsyth
George Fox
A. Francois
P. M. Fraser
E. W. Fritchley
Alfred Frithworth
F. Von S. Fürstenburg
Edward Gabriel
F. Galassi
Matt. Garbutt
P. Gate
J. Giboz
Mme. Giboz
J. S. Gibson
Mrs. Gibson
Albert Giescke
Cass Gilbert
G. B. Giovenale
Wm. Glover
T. Gocke
P. Gottereau
Alex. Graham
S. W. Grant
Greek Minister
F. G. Green
T. Frank Green
E. Greenop
Mrs. Greenop
B. L. Greenwood
Paul Gaudet
W. Banks Gwyther
J. Hagedorn
Frau Hagedorn
Edwin T. Hall
H. A. Hall
S. H. Hamp
S. C. Hanson
Henry T. Hare
Mrs. Hare
Miss Hare
Georges Harmand
Evan Harper
Arthur Harrison
Stockdale Harrison
H. Helmer

E. Henard
J. Macintyre Henry
Albert Hielmann
J. T. Hich
A. Hoffman
Paul Holise
T. E. Hooper
Adolf Hopfner
Jesse Horstall
Mrs. Horstall
J. Nixon Horsfield
Mrs. Nixon Horsfield
George Hubbard
Mrs. Hubbard
Paul Huber
J. Hubert
C. E. Hutchinson
W. B. Itner
Clifton James
T. E. Lidiard James
J. J. Joass
W. O. Joass
Mrs. Joass
J. Johnson
Mrs. Johnson
Elijah Jones
Prof. Eliot Jones
Herr Kammerer
Frau Kammerer
Dr. Robert Karch
George A. Karch
Gustavo de Keersmaeker
Mrs. Kelley
James T. Kelley
Albert Kelsey
E. A. Kent
W. E. Klenning
J. C. Kfoed
Joseph Kommer
Mme. Kommer
Mlle. Paula Kommer
Mlle. I. Kommer
F. Krah
A. H. Lamont
H. V. Lanchester
Carl Lance
Paul Le Ciers
V. A. Le Foll
Mme. Le Foll
Mlle. Leroyer
W. J. Locke
London News Agency
Jose T. Lopes
R. S. Lorimer
Mrs. Lorimer
Werner Lundt
Mervyn Macartney
Alex. McElbion
C. D. Maginnis
C. E. Malloes
Mrs. Malloes
A. L. A. Marcel
Mme. Marcel
A. Marchand
D. G. Marks
Ellis Marsand
Leonard Martin
Mrs. Leonard Martin
C. Mason
A. Metaxas
Mme. Metaxas
F. D. Millet
P. de Moulerena
John B. Mitchell-Withers
Mrs. Kyrle-Money
J. M. Moore
Rudolf S. Entblom
Mrs. Moore
C. Moretti
David Morgan
P. Farchon
Morning Post
Carl Muller
H. Muthesis
Bernhard Nagy
Mme. Nagy
H. P. Nédot
Mlle. Antoinette Nédot
Mlle. Genevieve Nédot
Netherlands Minister
W. Lister Newcombe
Mrs. Newcombe
C. Nizet
Prof. T. Nolan
W. Churchill Noland
Paul Normand
G. Northover
The Duke of Northumberland
C. T. Novi
Rev. P. O'Brien
Joseph Oswald
A. N. Paterson
Mrs. Paterson
E. Harding Payne
H. Dighton Pearson
I. M. Pearson
Herr Peschl
L. Petterson
S. Perkins Pick
H. Pieper
Clément Piernay
A. Piron
W. Pite
W. H. Pitman
Count Plunkett
Countess Plunkett
Frau Posenbacher
H. Posenbacher
George B. Post
J. M. Poupinel
Mlle. Jeanne Povel
F. A. Powell
Mrs. Powell
W. E. Randall, jun.
Mrs. Randall
Cav. P. Rapisarda-Rizzo
Carl Rehorst
Walter Reid
Mrs. Walter Reid
A. Reinberg
Frau Reinberg

F. Reinboth
G. Magni Rem-Picci
Repulles y Vargas
B. Rerrich
Aug. Rey
A. Richard
P. L. Anna-Tadema
Alex. Ritchie
Mrs. Ritchie
E. Richter
T. M. Rickman
R. Reim
Moritz Riessbrodt
Hugh Roberts
J. B. Robinson
Percy Robinson
Mrs. Percy Robinson
A. D. Rogers
Mrs. Rogers
J. Roschaert
Mme. Roschaert
G. Roussé
Lucien Roy
Mme. Roy
G. Rozet
A. W. Ruddle
Miss Ruddle
E. J. Russell
J. Rust
G. Rutan
Miss Eleanor Rutan
E. O. Sachs
Mrs. Sachs
G. Salaré
Mme. Salaré
R. Salin
A. Salm
H. Sandret
Mme. Sandret
Mlle. Sandret
G. Sandy
Mlle. Schaeffer
B. Schulze
H. Schuster
Fran Schuster
A. H. Scott
J. T. Shadlow
H. Shepherd
Shard Showbrooks
Mrs. Showbrooks
B. Priestley Shires
Werner Siebel
E. Sieckel
O. Simon
Mme. Simon
John Slater
Mrs. Slater
F. Adams Smith
Mrs. Adams Smith
A. Snyers
J. A. Soares
H. Sonnenhai
Prof. Soubre
A. Soude
F. Staadt
Mlle. Stalstrom
Standard
H. Heathcote Statham
Mrs. Statham
John William Stevens
Mrs. Stevens
Leonard Stokes
Mrs. Stokes

Ralph Straus
Dr. J. Stübgen
Otto Sturm
G. Süßenguth
Arthur Sykes
T. Szanior
Sir L. Anna-Tadema
Imre Teller
Sir Henry Tanner
H. Tanner
J. C. Tanner
H. O. Tarbolton
A. A. Tavasistjema
H. G. Taylor
A. T. Taylor
Sir John Taylor
Prof. Tchilof
L. Tengborn
A. H. Ryan-Tenison
Mme. Ventura Terra
Carlo, His Thirion
Chas. Thirion
A. Brumwell Thomas
Miss Thomas
H. Howard Thomson
Times
Miss Tinney
Julia Tixler
G. Oakley Totten, jun.
G. Trélat
H. Inizo Triggs
Percy B. Tubbs
Mrs. Percy Tubbs
Raymond Unwin
Francisco de Urcola
L. Urcola y Velada
H. Vail
Prof. F. Van Dyck
M. Van Veenyck
J. Verdo
Carl Verlohr
C. E. Wessbury
Otto Wagner
Frau Wagner
Benjamin Walker
C. Howard Walker
Mrs. C. Howard Walker
Mrs. Walker
J. W. Walker
A. G. Ware
F. Foster Warner
S. Warwick
Sir Aston Webb
Lady Webb
W. Henry White
Mrs. W. Henry White
G. Wickman
Mme. Wickman
A. Wilemans
E. J. Williams
J. A. Williamson
Frank W. Willis
R. G. Wilson
W. Wonnacott
R. Selden Wornum
Mrs. Wornum
Hans Wright
Mme. Wright
T. C. Yates
Clyde Young
Mrs. Clyde Young
G. P. K. Young

The Chairman said that the first toast he had the honour of proposing was that of His Majesty the King. The toast was always received by Englishmen with enthusiasm, and he anticipated that on this occasion it would be doubly honoured, for not only had His Majesty accorded the honour of his patronage to the Congress, but he was held in esteem, he believed, by all the guests. His Majesty had done a great deal in the interests of peace, and peace was a necessary condition if the arts were to flourish. Long may we all enjoy the blessing of peace, and may the reign of His Majesty be distinguished by a great advance in the art of architecture.

The toast having been suitably honoured, The Chairman proposed the toast of "Queen Alexandra, the Prince and Princess of Wales, and the other members of the Royal Family." The Prince of Wales was the honorary President of the Congress, and no doubt, but for his many duties, he would have taken a more active part in the Congress, for all the members of the Royal Family had inherited a love of art, and many of them were accomplished artists.

Sir William Emerson then proposed "The Foreign Delegates," i.e., Professor Otto Wagner (Austria), M. J. J. Caluwaers (Belgium), Etatsraad Vilhelm Dahlerup (Denmark), M. J. T. Cuypers (Holland), M. H. Daumet (France), Dr. Stübgen (Germany), M. J. Berzich (Hungary), Signor Cannizzaro (Italy), Mr. S. Chujo (Japan), Senhor Ventura Terra (Portugal), M. Böker (Russia), Señor Don Velasquez Bosco (Spain), M. Gustav Wickman (Sweden), and Mr. George O. Totten, jun. (United States). He said that the toast placed in his hands and which he had the distinguished honour and pleasure to propose was that of the delegates accredited by foreign Governments to attend the Congress. Their presence in England had afforded infinite satisfaction and pleasure. The result of the Congress, the success of which had been

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greatly due to their friends from other countries, could be only good, and he meant good in the highest sense of the word; not only good to the architectural profession, for that would be benefiting only a small portion of the community, but good to humanity at large. For this had been a great cosmopolitan meeting, and the questions discussed affect all nations. The wide scope of the discussions could be gathered from a glance at the subjects of the papers. They ranged from the conservation of ancient monuments and the planning and laying out of towns and streets to the statutory qualification of architects, the collaboration with and control by architects of artists and craftsmen, the question of competitions, the ownership of drawings, and to reinforced concrete. All these were questions not only of importance to architects, but affecting the health and happiness, the convenience and comfort, and the pleasure of the public, to whatever country they might belong. It was clear that on the proper laying out, extensions of towns and construction of houses and buildings, the sanitary welfare of the public depends, as well as their convenience and comfort in transit and transport, and also their happiness by the pleasure that artistic structures might convey to their aesthetic sense. All these papers, contributed by various members of the Congress, had been invaluable, and had shown such care, research, and thought in their preparation that it would be invidious to mention any names in particular. They had learned much from their foreign friends, and such meetings impressed both on the public at large and themselves as a profession the necessity to consider architecture not merely as an art, nor merely as a practical and useful science. It must be looked at from both points of view, for without the artistic element it was not architecture, and without a careful consideration of the practical and scientific questions of building, rendering it useful for its particular purpose, however beautiful it might be to the eye, it was a failure. The history, habits, and customs, and the loftiness of the ideals and the civilisation of people who had long passed away, were judged of most accurately in future ages by the remains of their architectural monuments and buildings, which had outlasted those who erected them. Hence the importance of such questions as had been under discussion to all great nations of the earth if they would leave behind them handsome and noble records of their aspirations, endowments, and governments. The Congress had also had the effect of bringing together and creating intimate acquaintance and friendship with many men of many countries, and in relation to the widespread feeling of an universal *entente cordiale*, it must be greatly encouraging to such a sentiment, for we learn by such meetings as these that in every country, no matter what it might be, there were equally thoughtful, unselfish, good, clever, and kindly personalities; in fact we found them one and all what in common English parlance we called "jolly good fellows." It was only to be regretted that, with so many various schemes for our mutual edification and for the entertainment of our visitors during the week, that the time had been far too short for them to see much of the interesting old and historic architectural monuments of the country. Many beautiful old country mansions and halls would have been well worth a visit, and, of course, only a few of our castles, cathedrals, and abbeys could possibly be examined. Still, the best possible had been done to show the most in the shortest time. One thing at least we had as Englishmen learned from our distinguished visitors, and that was how great a charm there was in the felicitous expression of nice feeling and sentiment, as conveyed in their many charming short speeches. The British did not as a rule express themselves with ease and felicity at a moment's notice, whilst our continental friends invariably did so in the happiest manner; nevertheless, the inner feeling of the Britisher was no less warm. He could only repeat it had been a source of the greatest pleasure to see their professional brethren, and he trusted they would take away with them a reciprocal feeling of the truly cordial and warm sentiments of respect and esteem which Englishmen entertain for them, and he was sure he was right in saying that all would endorse his expression of these sentiments.

The toast was received with the greatest

enthusiasm, as were the replies of the various delegates.

M. Daumet, in reply, said:—Ladies, gentlemen, and dear colleagues,—We have just spent a memorable week in London. The International Congress of Architects will leave pleasant memories to those who have been fortunate enough to take part in it or in the meetings, even though these latter were somewhat confusing to those who did not possess the gift of tongues. Everything has gone off with perfect courtesy, including both the visits and the excursions so ably organised by our colleagues of the Royal Society of British Architects. What gratitude we owe to its honourable President (Mr. Belcher) and those who aided, and to the amiable and obliging Secretary (Mr. Locke). These gentlemen were able, with perfect understanding, to foresee and provide for everything, and imparted to our stay a special element of cordiality. The inaugural meeting of the Congress in the Guildhall was particularly fine and imposing, and the reception at the Mansion House and Burlington House were most brilliant, while nothing could have been more charming than the excursion to Windsor—that picturesque whole to which each sovereign of Great Britain has for centuries added his share, and in which are stored so many historic remembrances and priceless treasures of architecture and masterpieces of great painters. We shall not soon forget the hours spent in those University towns, where scholarly traditions have produced the lights of science and literature in buildings of characteristic architecture. We remain charmed and subjugated by the variety of aspect presented by halls constructed with such art, by the beauty and poetry of gardens with their lofty trees, which have sheltered so many of the illustrious sons of this fair country. It is impossible to analyse so many and varied impressions without turning our thoughts to those who founded or encouraged such great institutions and the monarchs who have protected them. It remains for the President of the International Congress of Architecture to perform the most agreeable of his functions, and to give thanks with all his heart, on his own behalf and on behalf of his colleagues of every nation, for all the attentions which they have received at the hands of British architects. Gentlemen, I venture to propose a toast to the everlasting concord and friendship between artists, to the architects represented by our delegates, and, finally, to the King and to the august Princes and Princesses of his family, the protectors of our art, which they have deigned to honour by becoming patrons of the International meeting, which comes to a close this evening in a brotherly feast.

The toast was honoured with great enthusiasm.

M. Böker (Russia) said that on behalf of the Russian members of the conference, which had been brought that day to so successful a termination, he begged to offer their most hearty thanks for the warmth and cordiality of the reception which had been accorded them in England, and the memory of which would never fade from their mind. They would have much pleasure in telling their friends in Russia of the kindness that they had met with in England, and of the magnificent productions of architectural art, both ancient and modern, which they had had the pleasure of admiring. It was difficult for him to find words eloquent enough to express the gratitude they felt, but he trusted that their thanks might make up by their depth and sincerity what they lacked in eloquence of expression. He was sure he was rightly interpreting the feeling of the Russian members of the Congress in proposing the very good health of their kind and hospitable English friends.

M. Gustav Wickman, of Sweden, and Mr. Chujo (Japan) both replied in English, and expressed their thanks for the hospitality of the welcome they had received.

Mr. Totten (America) said that on behalf of the delegates of the United States, the members of the American section of the Permanent Committee, and the American architects present, he desired to express to their cousins of Great Britain their sincere appreciation and thanks for all the courtesies which had been so graciously and cordially extended to them. The debt America owed their mother country, from whom they had

inherited their customs, literature, laws, and the language, which they were said to speak indifferently well, was almost beyond measure. It was to her, too, they owed the best they had in art, that which came to them by inheritance at the time of George III.—which they called colonial—which they called their own. For the inspiration of their monuments they must ever turn to the glories of Athens and the splendour of Rome; but for the inspiration of that which was most near and dear to their hearts, the home, they must look to good old England, the creator and builder of the home. There had ever been a kindness between them; with kindness would come interest, with interest knowledge. Kindliness, interest, knowledge—these were the strands which would form the cord of union that might ever bind them closer and closer together. The next Congress was to be held in Vienna. On behalf of his countrymen he had the honour to extend to them a most cordial and hearty invitation to hold the following one in America. In extending this invitation he begged to assure them that they would endeavour to the utmost to make the meeting equal to and, if it were possible, an even greater success than the great Congress just closing.

Mr. Cass Gilbert, of the American Institute of Architects, said he had to propose the toast of "The Royal Institute of British Architects and its President." He, the representative of the youngest nation, had been selected to lay this tribute of homage at their feet in the country to which they looked for representative government. It had been said in this country that they should have a national art, and the feeling had grown that they should express themselves in their own way; but while they had no apologies to make for what they had done, humble as might be their own opinion of it, they thought the time had not yet come to them to have an art of their own. They had unusual conditions in their practice, and perhaps they met those unusual conditions with a certain ingenuity but with a certain lack of that quality which made a great art. Americans came to Europe to study in France, Germany, Greece, Italy—to all the great nations of the world. They might go as far as Japan for inspiration in that personal art which was so beautiful. Sixty-nine years ago the Royal Institute of British Architects was founded not then called the Royal Institute—and the time therefore approximated to their time as understood in a little story that he would venture to tell it. One of their landscape artists, Mr. Armistead, having planned a great estate, visited the owner, who said to him: "Mr. Armistead, this is a beautiful thing you have done, but there is one defect in it. That knoll over there is a little barren. What would you do with it?" Mr. Armistead's reply was: "I would plant it with oaks." "But," said the owner, "that is a matter of sixty years." Said Mr. Armistead: "I was looking sixty years ahead." It was that sentiment which inspired them. They were looking sixty years ahead. Those who founded the Institute were looking sixty years ahead, and could they see them that night—in all the glory of that assembly, with all Europe represented there; and see some of the finest men of the Continent and elsewhere who had come to do honour to their profession—he thought their pleasure would be very great. A great Archbishop once said: "There is a time when the truth should be told: let us praise ourselves." He (the speaker) had come to praise the Royal Institute of British Architects. He ventured to hope that the Institute would go forward in the great work it had started. They had laid the foundations in America at least of that tradition of practice which made for equity between man and man. Upon the Statute of the Practice and Charges of American Architects had appeared for twenty-five years the scale adopted by the Royal Institute of British Architects, and that American architects had followed. To the Institute they looked, and he begged them to go forward in their great work—work of which they had seen ample evidence in England. Might the future bear out the promise of the past.

The toast having been enthusiastically agreed to.

Mr. Belcher thanked them on behalf of the Institute. The kind words spoken by Mr.

G. E. Phillips, Acton.
W. H. A. Rowbotham, London.
* J. Rycroft (Special Examination), Heaton, Bradford.
W. P. Ryatt, Heading-leigh, Leeds.
J. F. Salway, Reading.
V. G. Santo, Shrewsbury.
W. P. Schofield, Leeds.
H. Shackleton, Keighley.
J. Smith, Glasgow.
E. A. Sprules, Sutton.
F. G. Stockdale, London.

C. E. Thickpenny, Watford.
W. I. Travers, Kensington.
E. H. Walker, Doncaster.
E. G. Walker, Bayswater.
* H. V. Ward (Special Examination), Liverpool.
R. Watson, North Shields.
B. C. Westwick, Mansfield.
* A. Woodson (Special Examination), Tile-hurst, Reading.

The following table shows the number of failures in each subject of the Final Examination—

I. Design	36
II. Mouldings and Ornaments	34
III. Building Materials	11
IV. Principles of Hygiene	18
V. Specifications	6
VII. Construction, Foundations, etc.	20
VII. Construction, Iron and Steel, etc.	20

* The candidates to whose names an asterisk is prefixed entered for the Special Examination, which is for architects in practice not less than twenty-five years of age, and chief assistants over thirty. Such candidates are exempted, by special resolution of the Council, from the Preliminary and Intermediate Examinations, and from submitting "Testimonies of Study."

THE LONDON COUNTY COUNCIL.

The usual weekly meeting of the London County Council was held on Tuesday in the County Hall, Spring-gardens, Alderman Evan Spicer, Chairman, presiding.

Loans.—On the recommendation of the Finance Committee, it was agreed to lend Bermondsey Borough Council 2,000l. for electric lighting; Camberwell Borough Council 500l. under Baths, etc., Acts; Lambeth Borough Council 4,088l. for paving work; Metropolitan Asylum District Managers 64,320l. for various purposes; St. Marylebone Borough Council 45,600l. for electric lighting purposes; St. Pancras Borough Council 1,271l. for various purposes; Stepney Borough Council 3,000l. for a public convenience; Shoreditch Borough Council 23,555l. for electric lighting purposes; and Wandsworth Borough Council 3,000l. for improvements. Sanction was also given to the following loans—Islington Borough Council 26,487l. for paving work; and Islington Borough Council 4,200l. for paving works.

Vauxhall Bridge: Proposed Models of Propylæa.—The Improvements Committee recommended:—

"(a) That expenditure on capital account not exceeding 440l. be sanctioned for the erection at the west approach to Vauxhall Bridge of two full-sized models of the suggested propylæa.
(b) That two full-sized models of the suggested propylæa be erected at the west approach to Vauxhall Bridge, in accordance with design No. 1 submitted to the Improvements Committee on March 28, 1906; and that the Committee be authorised to arrange for the execution of the work."

Mr. Lewin Sharpe moved that the matter be referred back for further consideration. He was quite sure that the members of the Council were agreed that the propylæa were out of scale and unnecessary. The matter had not had the consideration it should have had. He did not oppose the matter on the ground of expense. He thought that the architect of the bridge, the general features of which he most heartily agreed with, had, in this instance, lost scale and proportion.

Mr. Waterlow seconded the motion, which, after a short discussion, was carried, thirty-six voting for it, and eight against.

Opening of No. 17, Fleet-street.—The Local Government, Records, and Museums Committee recommended, and it was agreed:—

"(a) That the 'council chamber' at No. 17, Fleet-street, E.C., be opened to the public on week-days (except Good Friday and Christmas Day) between the hours of 10 a.m. and 2 p.m.
(b) That during the time the room is not open to the public it be available for hire for the purposes of meetings; and that the Local Government Records and Museums Committee be authorised to act on behalf of the Council in the matter.

(c) That arrangements be made for the sale in the room of the handbook relating to No. 17, Fleet-street, and of the most important of the Council's publications.

(d) That pending the settlement of permanent arrangements for the custody of the room during the time it is open to the public, the employment temporarily of a female caretaker at the wages of 5s. an hour be authorised."

The Works Committee.—The Works Committee submitted a statement of works completed during the half-year ended March 31, 1906. In statement I. are included the

accounts for seventeen works, in respect of which complete specifications and bills of quantities have been prepared. The statement contains all the works completed in the half-year, and, although the cost of two works has exceeded the final certificate, the net balance of cost below certificated value is 52,589l. 14s. 8d. The Committee reported on February 20, 1906, that, although Aldwych and Kingsway had been opened for traffic, they feared it would be impossible to report, before December, 1906, the complete financial result of the execution by them of the formation of those thoroughfares, and the tramway subway beneath them. There were small portions of the work yet to be done, but completion is delayed owing to the non-demolition of certain dwellings which the Improvements Committee are not in a position to deal with at present. The Council, on July 3, 1906, approved an arrangement for dealing with these portions, and the Committee were thus able to report the figures of cost and value of the whole of the improvement (with the exception of the portions above referred to) as follows:—

Holborn to Strand Improvement

Section reported on February 2, 1904	20,050
Sections reported on February 20, 1906	85,276
Sections reported on July 17, 1906	218,465
Total	323,791

"The balance of cost below final certificate is therefore 55,160l. 14s. 1d. We attribute this result in a great measure to the fact that we have been enabled to execute this large work, although it was cut into sections and referred to us at different times, with practically one organisation and control. We have also benefited by the general aid, but the estimates were made, in the price of materials."

In statement II. is included the cost of the annual cleaning of the central offices and the Education (central) office. Statement III. shows the results of the execution of jobbing works during the year 1905-6, the balance of cost below schedule value being, in the case of general jobbing works, already reported, 2,037l. 19s. 10d., and in the case of Education jobbing works, 12l. 16s. 8d.

The total cost of the works included in the statements now presented does not represent the whole turnover of the department, because much of the expenditure on these works occurred previous to the last year in question, for on the 1905-6, much of the expenditure during the six months was upon works which are still unfinished. The approximate expenditure on works executed by the department during the half year was 350,000l., and the turnover for the year 1905-6 was 650,000l., as compared with 602,000l. for the previous year. Certain percentages are added to the expenditure on labour and materials charged to each work in respect of general and establishment charges which cannot be debited direct to individual work, i.e., charges such as interest on and repayment of loans, salaries and office wages, and a proportion, approved by the Council, of the salaries of the staff of the various departments at the central offices. These percentages are fixed by us each year, and are such as to discharge all expenditure charged to general and establishment charges account respectively. The percentages adopted, for the 1905-6, were, for estimated works, 1 and 3½, and for jobbing works 2 and 5 respectively.

The number of estimated works referred to us for execution, and not yet included in the half-yearly statements of completed works submitted to the Council, is thirty-six, representing an estimated expenditure of approximately 1,456,000l. In addition, works to the estimated value of about 20,000l. are in course of execution on the basis of actual cost. As required, we report that, so far as can at present be foreseen, the only work in progress in which it is anticipated that the accepted estimate will be exceeded is the erection of the Basing-road school.

Our order of reference requires us to obtain the approval of the Council to any excess of cost over final certificate of value of works executed by us, and we recommend that the excess, amounting to 121l. 14s. 10d. and 227l. 6s. 10d., of actual cost over final certificate in respect of the erection of the Faroe-road school for mentally defective children and the Peterborough school for physically defective children respectively, be approved.

After a brief discussion, the recommendation was carried.

Tramways.—The Highways Committee recommended, and it was agreed:—

"(a) That the estimate of expenditure, on capital account, of 13,800l., submitted by the Finance Committee, in connexion with the diversion of gas and water mains, the laying of cable-ducts, and the sinking of trial holes, preliminary to the work of constructing the tramways between Hammersmith and Putney, authorised by the London County Council (Tramways and Improvements) Act, 1902, be approved.
(b) That the estimate of expenditure, on capital account, of 6,520l., submitted by the Finance Committee, in connexion with the widening of the southwestern approach to Putney Bridge, necessitated by

the construction of the authorised tramways between Hammersmith and Putney, be approved.

"(c) That expenditure, on capital account, not exceeding 11,600l., be sanctioned for the diversion and alteration of water and gas mains along the route of the authorised tramways between Hammersmith and Putney, and for the sinking of trial holes in connexion therewith, inasmuch as far as necessary with the Metropolitan Water Board and the companies concerned; that the Highways Committee be authorised to arrange for the execution of such works."

Holborn to Strand: The Northern Frontage of the Strand between the Two Churches.—The Improvements Committee submitted the following Report:—

"The Council will remember that on July 28 and October 20, 1905, we reported fully on suggestions which had been made for altering the northern frontage of the Strand at the part affected by the Holborn to Strand improvement. These suggestions were made by Mr. Hano Thornycroft, R.A., by an association of private persons known as the Further Strand Improvement Committee, and by the Royal Institute of British Architects. The Council's architect upon our instruction also prepared a plan. The objects were (a) to bring the church of St. Mary-le-Strand into alignment with the centre of the Strand; (b) to make the direction of the Strand aim at the front of the church of St. Clement Danes and not at one corner of it, and (c) to secure for the

Accepted estimate.	Final certificate of work done.	Cost.
£ s. d.	£ s. d.	£ s. d.
20,050	20,190 13 6	18,674 1 2
85,276	91,383 6 5	77,673 3 9
218,465	217,240 6 4	177,506 6 3
323,791	328,814 5 3	273,653 11 2

future a good view of the Courts of Justice to all approaching that building from the Strand on the west. The cost of adopting these suggestions was estimated by us at 360,000l., 249,400l., 74,000l., and 63,000l., respectively. The Council on October 20, 1905, decided to make no alteration in the existing line of frontage, on the grounds that not one of the proposals offered sufficient advantage to justify the Council in incurring the great expense which would be involved. This resolution, with a copy of our report, was communicated to Mr. Thornycroft, to the Royal Institute of British Architects, and to the Further Strand Improvement Committee.

Since that date we have had before us the under-mentioned memorials, etc., asking that the matter may be reconsidered:—(i.) A memorial signed by Sir Edward J. Poynter, P.R.A., Mr. Hano Thornycroft, R.A., Mr. G. Jackson, R.A., Mr. B. Norman Shaw, R.A., and several other prominent artists and architects; (ii.) a letter from the Royal Institute of British Architects, dated from the Architectural and Artistic Association; and (iv.) a memorial from the Further Strand Improvement Committee, the Royal Academy of Arts, the Institute of Bankers, the Savings Institution, and others.

A meeting of persons interested in this last proposal was held at the Royal Academy in March last, when a resolution was passed to the effect that the memorials submitted should be treated as a case against the Council's plan. A deputation consisting of Lord Claud Hamilton, Sir Edward Poynter, P.R.A., Mr. Hano Thornycroft, R.A., and others, presented before us when Mr. Blomfield, speaking on its behalf, criticised the frontage line adopted by the Council, contending that it would be most inconvenient for the Council to incur the expense of altering the north-east, which would be necessary in order to enable the traffic to clear the Gladstone monument, whereas the advantages of a straight run from St. Mary-le-Strand to the monument were obvious, and that the architectural vista in each direction would be lost. Mr. Blomfield pointed out that St. Clement Danes Church, with the new buildings to be erected on the Council's land, would block the view of the Law Courts; that the general axis line of the Council's scheme would not be parallel to the axis line of St. Mary-le-Strand Church, so that the church would be left out of relation to the general scheme; that, as the frontage line left more than half of St. Clement Danes out of account, the two churches would not be brought into touch; that the position of the Gladstone monument would emphasise the absence of any consecutive idea; and that, by the southward dip of the alignment, the view down the Strand to the west of St. Mary-le-Strand Church would be intercepted by the church. He suggested that, in general, the Council's proposals appeared to have grasped the full possibilities of the case; that it limited itself to the ground between Wellington-street and St. Clement Danes, whereas it should have taken into consideration the whole space from Wellington-street to the east end of the Law Courts; that if this were done, a superb architectural vista would be assured; that the Law Courts would be brought into relation with the important new buildings which would occupy the ground to the west; that the churches of St. Mary-le-Strand and St. Clement Danes would fall into their natural positions, and that a great beauty and interest, standing clear in what might be made one of the finest roads in the world, and that thus, at a relatively small cost, London would gain architecturally the unspeakable increment of the money spent in the past upon all those excellent buildings.

The scheme advocated by the Further Strand Improvement Committee provides for the addition to the public way in the Strand of a small part of the central portion of the crescent site, and of a small part of the site at the eastern end of the crescent site. It is proposed to alter the position of the eastern spur street between the Strand and Aldwych; this will have the effect of

The Committee recommended accordingly. Mr. Harvey said he felt that this subject interested London as a whole. It was such an important matter that he urged the Council not to come to a hasty decision. He moved an amendment that the recommendation be referred back to the Committee, with instructions to report as to the possibility of adopting the suggestions of the Council's subcommittee on the proposed F. W. Straus Improvement Committee.

Capt. Swinton proposed that, in order to meet the views of the distinguished objectors, there should be a slight rearrangement of the ground plan of the proposed block by tilting

of ered blic y.	Estimated cost of altering vaults, paving, etc.	Total cost of adopting suggested alteration of frontage.	Cost of erecting buildings on land given up.
400	£ 10,000	£ 249,400	£ 82,800
000	8,000	58,000	11,825

up, naming East Aldwych—a street unnecessarily wide for any traffic it would be called upon to carry—by some 5 ft. Thus, without curtailing the building area or spending money, they would secure the necessary space.

On Capt. Swinton's proposition the Council decided by a large majority:—"That the consideration of the question be postponed until the Improvements Committee report as to the advisability of setting back the present northern line of frontage in the Strand between St. Mary-le-Strand Church and the eastern end of Aldwych, so that an area of land approximately equal to the additional land surrendered for the widening of the Strand may be appropriated out of the frontage of Aldwych, with a view to avoiding any reduction of the area of land available on the island site for building purposes."

Brixton—London County Council School of Building: Proposed Extension.—It was agreed:—

(a) That the estimate of expenditure on capital account of 1,203, submitted by the Finance Committee, in respect of the erection and reproduction of drawings, printing, and lithography, quantity surveyor's fees, and other sundries incidental to the work of enlarging, and carrying out alterations at the London County Council School of Building, Brixton, be approved.

(b) That, subject to the consent of the Board of Education to the preliminary plans, expenditure on capital account not exceeding 1,203 for the purposes referred to in resolution (a) be sanctioned.

New School Works.—It was also agreed:—

"That the estimate of expenditure on capital account of 122, submitted by the Finance Committee, in respect of taking out and lithographing preliminary plans, and erecting a junior mixed school on the Rushmore-road site (Hackney, S.), be approved.

"That, subject to the approval of the Board of Education to the preliminary plans, expenditure on capital account not exceeding 122, be sanctioned in respect of the work referred to in the previous resolution.

"That the estimate of expenditure on capital account of 108, submitted by the Finance Committee, in respect of taking out and lithographing preliminary plans, and erecting an infants school on the Rosendale-road site (Wands- worth), be approved.

"That, subject to the approval of the Board of Education to the preliminary plans, expenditure on capital account not exceeding 108, in respect of taking out and lithographing quantities in connection with the works referred to in the previous resolution, be sanctioned.

"That the estimate of expenditure on capital account of 482, submitted by the Finance Committee, in respect of erecting a school for the accommodation of physically defective children, at the Clapham-road school for the deaf (Clapham) into a school for the accommodation of physically defective children, be approved.

"That the Cavendish-road school for the deaf (Clapham) be converted into a school for the accommodation of seventy-two physically defective children; that expenditure on capital account not exceeding 214, for the purpose referred to, be sanctioned; and that the consent of the Board of Education be sought to the proposal.

"That the supplemental estimates of expenditure on capital account, as follows submitted by the Finance Committee, in respect of the acquisition of out-landings, and the erection of buildings, and other expenses in connection with the undermentioned sites, be approved:—Islington, S—Richard-street, 40; Limehouse—Northey-street, 600; Poplar—Riverside, 100.

"That additional expenditure on capital account be

Annual rateable value of land and buildings.	Loss in rates per annum.			Total.
	To other rating authorities at 3s. 8d. in the £.	To the Coun- cil at 3s. in the £.		
£	£	£		£
12,080	2,326	1,904		4,230
2,364	433	355		788

to form on a portion of the site in Mortimer-road (Chelms).
Brixton—Santley-street: Painting.—It was agreed:—
(a) That the resolution of July 10, 1906, so far as it relates to the acceptance of the tender of H. Kent for painting the exterior of the buildings comprising the interior and exterior of the Santley-street school (Brixton), be rescinded.
(b) That the tender of Rice & Son, amounting to £2,000, for painting the exterior of the buildings comprising the interior and exterior of the Santley-street school (Brixton), be accepted.
Selected List of Contractors.—The following recommendations were agreed to:—
That the resolutions of June 26, 1906, of July 10, 1906, so far as they relate to the acceptance of the tenders of H. Kent (i) for executing repairs to the buildings in the Greenwich and Lewisham (Group 1) Municipal Areas upon the printed schedule of prices; and (ii) for painting the interior of the Wood's-road school (Peckham), be rescinded.
That the tender of W. Scayer & Son, amounting to £391, for painting the interior of Wood's-road school (Peckham), be accepted; that expenditure not exceeding £391, be sanctioned for the purpose; that the Council do prepare, and obtain execution of the necessary contract; and that the seal of the Council be affixed thereto.
That the name of Mr. H. Kent be removed from the selected list of contractors to be invited to tender for works to Council schools.
That the name of Mr. H. Kent be entered upon the list of persons and firms from whom the Council will not accept tenders.
That the name of Ginger, Lee, & Co., be removed from the selected list of contractors to be invited to tender for the removal and re-erection of iron buildings.
That the name of John Selbourne & Co., who are on the selected list of contractors to tender for works to Council schools, be removed from the list of contractors to tender for a period of three months.
London Building Acts (Amendment) Act, 1905: Projecting Shops.—The Report of the Building Act Committee contained the following paragraph:—
"We have recently had before us a deputation from the Association for the Amendment of the Projecting Shop Clauses. The sections of the London Building Acts Amendment Act, 1905, dealing with projecting shops are sects. 10 and 12. Sect. 10 provides that where any part of a building which is used or adapted to be used as a shop projects for more than eight feet above the ground level of a building of which it forms part, and in which any persons are employed or sleep, the projection of such shop shall be provided by the owner with a canopy or awning of canvas or of material not less than 5 in. thick. The section also deals with the construction and piling of cowls and awnings of projecting shops. Sect. 12 requires the provision of means of escape in the case of fire from buildings coming within the scope of sect. 10, where such buildings have more than two stories above the ground level.
On behalf of the deputation it was urged that in addition to the actual cost of carrying out the requirements of sect. 10, the alterations inevitably entailed would be a source of constant expense and damage to stock, and that the requirement of the section, that lantern lights should not be less than 5 ft. from the main front of the buildings, rendered it impossible to comply with the requirements of the section without recourse to artificial means. The deputation also claimed that the number of lives and property endangered in the past under projecting shops was so great as to justify the imposition of so heavy a burden on the owners of existing shops, and asked that the Council would endeavour to amend the section so that the cost of carrying out the subsection enacts that the cost of alterations should exist as well as to new buildings.
The matter was one of the earliest to engage our attention, and it was one of the first to be adopted in carrying out the provisions of the Act."

and we have always been of opinion that, provided reasonable means of escape could be otherwise secured, the Council should take advantage of the power given to it in subsec. 4 of the section to grant complete or partial exemption wherever possible, and the fact that no appeal has yet been made against our decisions would appear to show that the demands made by us on behalf of the Council have not been unreasonable.

We have received 553 applications for exemption from the provisions of the section, of which 296 have been dealt with during the six months ending June 30, 1906; of these, eighty-five were granted and sixty-two refused. In twenty-three cases partial exemption was granted. In 113 cases the applicants were invited to submit proposals in lieu of compliance with the provisions of the section, in ten of which the alternate proposals have been submitted and accepted. In five cases no action was taken.

At the request of a member, the Report was taken back.

Means of Escape in Case of Fire from Factories, Workshops, etc.—The same Committee reported as follows, the recommendation being agreed to:—

"On June 22, 1902, the Council approved a statement, with reference to the requirements in respect of the means of escape in case of fire from factories, workshops, etc., in accordance with the provisions of the Factory and Workshop Act, 1901. Since that time the London Building Acts (Amendment) Act, 1905, dealing with the means of escape from buildings other than factories and workshops has come into force, and we are of opinion that the statement should be revised in order to include the Council's requirements under this Act. We recommend that the statement separately submitted by the Building Act Committee with reference to the Council's requirements in respect of the means of escape in case of fire from factories, workshops, and other buildings, in accordance with the provisions of the Factory and Workshop Act, 1901, and the London Building Acts (Amendment) Act, 1905, be approved."

New County Hall: Designs.—The Establishment Committee reported as follows:—

"Now that the London County Buildings Bill 1906, has passed through both Houses of Parliament and is expected to receive the Royal Assent, on July 20, we desire to submit our suggestions with regard to obtaining designs for the new county hall.

The Council will remember that the site has an area of 5.6 acres, and is bounded on the west by the River Thames, on the south by the approach to Westminster Bridge, on the east by Belvedere-road, and on the north by the premises occupied by the works department, and that the site, together with the land occupied by the works department, has an area of about 7.5 acres.

With reference to the course to be taken by the Council for obtaining designs for the new offices, it may be mentioned that, at the request of the consideration of the matter a communication was received from the Royal Institute of British Architects expressing a hope that it might have the privilege of advising the Council in the matter of the securing designs of this important building, in which "an exceptional opportunity will occur of realising the educational value of the art of architecture and of fostering the art and crafts of the day." We expressed our willingness to receive and consider any suggestions which the Royal Institute might desire to make as to the best means of securing the erection of a "dignified building," suitable for the administrative needs of the Council, and subsequently the Royal Institute expressed the opinion that the only way of securing such a result, "by some means or other, a strongly individualised personality to deal with the problem under properly defined conditions," and the Institute suggested that the method most likely to achieve that result would be to institute a competition. In support of this view the Institute called attention to the fact that the designs for the following buildings were all so selected:—The Houses of Parliament and the Foreign Office in London; the Hotel de Ville, the Opera House, and the Palace of Art in Paris; the Houses of Parliament in Berlin; the Central Library, New York.

The Institute pointed out that in the case of some of the buildings referred to there was a preliminary and a final competition, and expressed the opinion that this is the method best suited to the requirements of the Council. It was further suggested that, with the view of securing that some of the leading architects should take part in the competition, several should be invited to compete in the final stage. At the same time the Institute forwarded the heads of a scheme for giving effect to the suggested competition.

Careful consideration has been given to the suggestion of the Royal Institute of British Architects, and also to the report from the architect of the Council on the courses which could be followed, viz., unlimited competitions, limited competitions, appointment of a nominated architect, appointment of an official architect, and appointment of an official architect in collaboration with a nominated architect of eminence.

After full consideration of the various suggestions, we are strongly of opinion that the Council should have a competition and that the scheme should be on the following lines:—That the competition be divided into two stages (a) the preliminary (b) the final; the preliminary stage to be open to architects of any nationality, and that not less than ten and not more than fifteen of the best designs shall be selected in private by assessors; the final stage to be open to (1) the authors of the designs selected by the assessors in the preliminary stage, and (2) not exceeding eight leading architects to be invited by the Council to send in designs before a certain date of the period within which designs must be sent in for the preliminary competition.

* See opposite page.

We think that there should be two assessors for the preliminary stages of the competition and three for the final, and that Mr. W. S. Kiley, the Council's architect and Mr. Norman Shaw, the senior architectural Royal Academician, should be nominated to act in both stages, and that the competitors in the final stage should vote for the third assessor who will only act in that stage.

We suggest that each of the competitors in the final competition should be paid a fee of 50 guineas, and we will report next week as to the remuneration of the assessors. We also expect to be in a position to report as to the date by which the designs should be deposited at the county hall.

If the Council endorses our views and decides to have a competition, the Council's architect should prepare detailed particulars of the accommodation required by the Council, having regard to the functions of the Council itself, the work of its committees and of the several departments, and the intricacies of their detailed workings both in their relations to each other and to the public. When fully matured, these particulars would be submitted as the basis of the competition. The instructions to competitors would indicate that the particulars showed the minimum accommodation, and that license would be permitted to depart therefrom in any details which might be considered necessary for the development of the elevations. Following the principle recognised by Government departments in the buildings for the War Office, the Local Government Board, and the Admiralty, we propose to make it a condition that the successful competitor, if appointed, shall collaborate with the Council's official architect, who should have discretionary power in all matters relating to the internal economy and construction of the building.

We are forwarding to the Finance Committee a supplemental estimate in respect of the fees for the assessors and the competitors in the final stage of the competition, and we trust that that Committee will be in a position to submit the estimate to the Council before the adjournment for the internal recess. We recommend that the Establishment Committee be authorised to take all the necessary steps for obtaining the necessary plans and arranging for the competition on the lines indicated in the foregoing report, for securing designs for the new county hall to be erected on the Westminster Bridge site.

The consideration of the matter was adjourned.

The Council adjourned soon after nine o'clock.

APPLICATIONS UNDER THE LONDON BUILDING ACT, 1894.

THE London County Council at their meeting on Tuesday dealt with the following applications under the London Building Act, 1894. The names of applicants are given between parentheses:—

Lines of Frontage and Projections.

City of London.—Balconies, oriels, and a projecting hood at Nos. 108 to 111, Fleet-street, City (Messrs. Stree & Houchin for Messrs. T. Cook & Son).—Consent.

Fulham.—Buildings on the south-western side of Farm-lane, Waltham-green (Messrs. A. Krauss & Son for the London and District Motor 'Bus Company, Ltd.).—Consent.

Fulham.—Four houses on the northern side of Harrington-road, Fulham, with flanks abutting upon Napier-avenue, Ranelagh-avenue and Cromwell-avenue (Mr. A. Dawkins for Mr. R. B. Mason).—Consent.

Hammer-smith.—An office building on the northern side of Great Church-lane, Hammer-smith, over the Metropolitan District Railway (Mr. H. King for the Metropolitan District Railway Company).—Consent.

Kensington, South.—Additions at the rear of No. 22, Pembroke-road, South Kensington, to abut upon Pembroke-villas (Mr. G. M. Silley for Professor G. Moir).—Consent.

Lewisham.—Completion and retention of a dwelling-house adjoining No. 106, Bargery-road, and of a dwelling-house adjoining No. 113, Inchmery-road, Catford, with the flanks of such houses abutting upon Thornesbech-road (Messrs. Norfolk & Prior for Mr. J. Watt).—Consent.

Marblebone, East.—The retention of a projecting porch in front of Bute House, Avenue-road, Hampstead (A. F. Faulkner for Mr. W. Willett).—Consent.

Marblebone, East.—Two projecting hoods at Nos. 53, 54, and 55, Berners-street, St. Marblebone (Mr. L. A. Hayes for Messrs. A. Sanderson & Sons).—Consent.

Norwood.—Buildings on the western side of Caldecote-road, Coldharbour-lane, Norwood, with flanks abutting upon Barent-road and Venetian-road (Mr. A. A. Carter).—Consent.

St. George, Hanover-square.—An oriel window in front of No. 125b, Mount-street, St. George, Hanover-square (Mr. H. P. Monckton for Mrs. J. Miller).—Consent.

Wandsworth.—Retention of a hoarding abutting upon Woodwell-road and North Side Wandsworth-common, Wandsworth (Mr. C. Brawn).—Consent.

Wandsworth.—A projecting one-story shop in front of No. 38, Brookwood-road, Wandsworth (Mr. R. G. Leslie for Mr. J. W. Blackwell).—Consent.

Wandsworth.—Porches to nineteen houses on the southern side of Upper Tooting-park, Upper

Tooting, eastward of Trinity-road (Mr. W. C. Poole for Mr. F. Eaton).—Consent.

Width of Way.

Deptford.—Retention of a boundary wall and gates to the yard in front of a two-story addition at the relief office of the Greenwich Union, Mary Ann's-buildings, High-street, Deptford, at less than the prescribed distance from the centre of the Greenwich Railway (Mr. L. Jacob for the Guardians of the Greenwich Union).—Consent.

Lewisham.—A building upon the site of Nos. 61 and 63, Loampit-vale, Lewisham, at less than the prescribed distance from the centre of the roadway of Shrubbery-road (Mr. A. W. Osborn for Messrs. G. A. Hurvey & Co.).—Consent.

Paddington, North.—An urnal on the western side of North Wharf-road, Paddington, at less than the prescribed distance from the centre of the roadway of such street (Mr. E. B. Newton for the Paddington Metropolitan Borough Council).—Consent.

St. Pancras, West.—A one-story addition at No. 21, Cumberland-mews, Regent's-park, at less than the prescribed distance from the centre of Cumberland-mews (Messrs. E. J. Saunders & Co. for Mr. C. B. Ullathorne).—Consent.

Width of Way and Lines of Frontage.

Strand.—A projecting flue to the Savoy hotel extension on the northern side of Somerset-street, Strand (Messrs. Colcutt & Hamp).—Consent.

Hackney, South.—Houses with shops upon a site at the corner of Cassland-road and Brookfield-road, Victoria-park, Hackney (Mr. G. H. Lovegrove for Mr. G. S. Shaw).—Refused.

Hammer-smith.—A building on the eastern side of Willow-vale, Uxbridge-road, Hammer-smith (Mr. A. G. Channer for Mr. J. Watt).—Refused.

Wandsworth.—A mortuary building on the southern side of Ram-road, Wandsworth (Mr. H. G. Hills for the Wandsworth Metropolitan Borough Council).—Refused.

Width of Way and Height of Building.

Westminster.—An addition to Nos. 28-32, Victoria-street, Westminster, to abut upon Great Chapel-street and Dacre-street (Messrs. Griffin & Woodall for the Westminster Trust, Ltd.).—Refused.

Width of Way and Construction.

St. Pancras, East.—Retention of a shed at the rear of No. 129, Camden-road, St. Pancras, abutting upon Sandall-road-mews (Mr. B. Douthwaite).—Consent.

Lines of Frontage and Construction.

Battersea.—Retention of a shed of a temporary character on the eastern side of Queen's-road, Battersea, southward of No. 324 (Mr. J. L. Williams).—Consent.

Hackney, Central.—A wood and iron church on the southern side of Dursley-road, Hackney (Messrs. J. Harrison & Co. for Mr. H. P. Ford).—Refused.

Space at Rear, Construction and Alteration of Building.

St. George, Hanover-square.—An iron and glass conservatory on the rear portion of the roof of the Bath Club, to abut upon Berkeley-street, St. George, Hanover-square (Mr. J. Johnson for the directors of the Bath Club Company).—Consent.

Width of Way and Space at Rear.

Bermondsey.—A building to abut upon Tower-bridge-road and Grange-walk, Bermondsey (Messrs. Barlow, Roberts, & Thompson).—Consent.

Space at Rear.

Paddington, South.—Modification of the provisions of section 41 with regard to open spaces about buildings, so far as relates to the proposed erection of a private hotel over the Lancaster-gate station of the Central London Railway, Stanhope-terrace, Bayswater-road, Paddington (Mr. D. Joseph).—Consent.

Whitechapel.—A modification of the provisions of section 41 of the Act with regard to open spaces about buildings, so far as relates to the proposed erection of an addition at the rear of No. 4, Fulborne-street, Whitechapel (Mr. C. H. King for the Metropolitan District Railway Company).—Consent.

Formation of Streets.

Whitechapel.—A deviation from the plans approved on 1st December, 1903, for the formation of new streets for carriage traffic, to lead out to the south side of Leashurst-road, Lewisham, to Fernbrook-road, so far as relates to an alteration in the position of the boundaries of a portion of Fernbrook-road, near its junction with Stancheur-road (Mr. E. H. Harrison for Mr. J. Johnson).—Consent.

Norwood.—A deviation from the plans approved on 20th February, 1906, for the formation or laying out of a new street for carriage traffic to lead from Trinity-road to Norwood-road, Lambeth, so far as relates to an alteration in the gradients of the proposed street (Mr. C. Death).—Consent.

Wandsworth.—That an order be issued to Messrs. Holloway Brothers, sanctioning the formation or laying-out of three new streets for carriage traffic upon the Magdalen-park estate, Wandsworth.—Consent.

Buildings for Supply of Electricity.
St. George, Hanover-square.—The application of Mr. C. S. Peach, on behalf of the Westminster Electric Supply Corporation, Limited, for the construction of a motor generating-station at Eccleston-place, St. George, Hanover-square.—Consent.

The recommendations marked † are contrary to the views of the local authorities.

Competition.

WESLEYAN CHURCH, WALLINGTON, SURREY.
In the competition for this new church the committee have awarded first place to the design of Mr. Frank Windsor, of Croydon, whose design has been accepted from a selection of thirty-two submitted names of architects, with a final selection from drawings submitted by six. The second premiated design was awarded to (the late) Mr. W. D. Church, of South-place; and the third premiated design to Mr. H. A. Woodington, of Jernyn-street. Accommodation is provided for 600 seatings, and the plan has large central nave with ambulatories. Exterior work to be carried out in Kentish rag, and the architect's estimate, without tower, is £6,400.

BOOKS RECEIVED.

A HANDBOOK OF REINFORCED CONCRETE. By F. D. Warren. (Crosby Lockwood & Son. 10s. 6d.)
WORKING HINTS FOR SECTION GAS PRODUCERS. By A. FLUESCHEIM. (Office of The Gas and Oil Engine Record. 1s.)

Correspondence.

THE LIGHTING OF LINCOLN CATHEDRAL.

Sir,—Anything more crude than the efforts made by some inartistic person to light this cathedral by electricity could not well be imagined. To those who have seen the building recently I need not give a description, but perhaps you will allow me to say a word or two as a protest against this clumsy job.

The main scheme for lighting the nave and choir has been to project out from the sills of the triforium openings plain iron rods or bars about 6 ft. or 8 ft. long, supported by diagonally fixed supports or struts placed at an angle of perhaps 45°, and from the horizontal bars to suspend wires, at the ends of which small clusters of lights are fixed. The effect of all this, viewed from either end of the nave, is a ridiculous row of horizontal and angular bars, mixed up with the beautiful lines of the architecture. At the east end of the nave, next the transepts, there are iron-bar arrangements having the appearance of hay-racks, to which the lights are attached. All this is really incredible, unless one had the evidence of ocular demonstration, as I have had.

The cathedral has been marred by this forest of iron bars and wires, for which there was not the slightest necessity. The building could have been easily lighted without one inch of iron bar or wire being obtruded upon the gaze of those who delight in the glorious architecture of this magnificent fane.

Did the Dean and Chapter allow this thing to be done without the approval of a competent architect? I fear they did.

In the hope that some well-to-do person, who may look upon this abomination with the same horror that I do, and may also hand over to the Dean and Chapter as much money as will pay for the removal of the present system, and the substitution of a new and artistic one, I venture to call attention to a matter which is really a disgrace to the intelligence and artistic feeling of England.

WILLIAM BUTLER,
Athenaeum Club, Dublin.

THE FIRST TUSSAUD EXHIBITION.

Sir,—I noticed in your issue of July 7 (Notes of Old London, p. 8, col. 3, a statement to the effect that Madame Tussaud exhibited her waxworks for the first time in London at the Lyceum Theatre.

There is, in the neighbourhood of Camberwell Grove, a tradition to the effect that Madame Tussaud first exhibited in London, at the Old Grove House Hotel, Camberwell Grove. There is in this house a fair-sized upper room, with three tall windows, which has been pointed out to me as the place of exhibition. It is now a meeting-room of some piscatorial club.

A friend of mine says he has seen the statement

re Madame Tussaud confirmed in an old History of Camberwell, to be seen in the Camberwell library. I have not seen it myself.

Of course, at that time (about a century ago) Camberwell may not have been included in London. On that point I confess ignorance.

The Old Grove House, with its adjoining coach-vault, is perhaps one of the quaintest and most beautiful bits of Old London still remaining with us. I am afraid it has only about four years' "life" before it.

A. C. CONRADE.

METROPOLITAN ASYLUMS BOARD.

The usual fortnightly meeting of the managers of the Metropolitan Asylums District was held on Saturday, last week, at the offices, Victoria Embankment, E.C.

Joyce Green Hospital.—Among the correspondence received was a letter from the Local Government Board asking for details of the actual cost of the work comprised in the total expenditure of 1,214 11s. 7d. in connexion with the provision of additional bathroom and lavatory accommodation at this hospital. The matter was referred to Committee.—On the recommendation of the Finance Committee it was agreed to apply to the Local Government Board for sanction to the expenditure of a sum not exceeding 7,000, on the erection of a goods reception station, porter's lodge, and staff cottages at the hospital.

Brook Hospital.—On the recommendation of the Hospitals Committee it was agreed to instruct the Engineer-in-chief to prepare a scheme for the provision of additional storage accommodation for steam coal at this institution. It was stated that at present a large amount of steam coal is stored in the open, inconvenience arising from dust being blown into the adjoining wards, etc.

Darenth Asylum.—It was agreed, on the recommendation of the Works Committee, that certain paving works at this asylum should be carried out direct about at a cost of £500.

Milford.—Messrs. Fowler & Hugman were appointed to measure up the variations on Messrs. J. Linfield & Son's contract for alterations and other works at this home at a commission of 2 per cent. on the additions and 1 per cent. on the omissions. The amount of the contract is 2,820.

Waterham Asylum.—The Asylums Committee submitted a report dealing with the question of additional messroom and sleeping accommodation for the male staff at this asylum. The Committee submitted a sketch plan which provided for taking the roof off the existing messroom, recreation room, mess kitchen, scullery, corridor, and a portion of the clothing stores, and building thereon a superstructure, which would include a recreation room (33 ft. by 27 ft.), and twelve cubicles, together with bath, lavatory, and water-closet. The existing recreation room was to be converted into two messrooms, one for attendants and the other for the stores' staff. The approximate estimate for this work was 2,600. It was agreed that the alterations should be carried out.

MEANS OF ESCAPE IN CASE OF FIRE.

At the London County Council on Tuesday the following Building Act Committee statement was submitted:—

Statement of Council's requirements in respect of means of escape in case of fire from Factories and Workshops Act, 1901, and the London Building Acts (Amendment) Act, 1905.

Means of Escape in Case of Fire.
Note.—Applicants are advised to obtain copies of the Acts of Parliament mentioned below.

London Building Acts (Amendment) Act, 1905.
By the provisions of sects. 7 and 9 of the London Building Acts (Amendment) Act, 1905, the duty is imposed upon the London County Council of ensuring that the following buildings shall be provided with such means of escape in case of fire as can be reasonably required under the circumstances of the case:—

High Buildings and Twenty-person Buildings.—(a) Any high building, i.e., a building having any story the level of the upper surface of the floor whereof is at a greater height than 50 ft. above the level of the footway (if any) immediately in front of the centre of the face of the building in which such story is situated, or, where there is no such footway, above the level of the ground before excavation.

(b) Any building in which sleeping accommodation is provided for more than twenty persons, or which is occupied by more than twenty persons, or in which more than twenty persons are employed, or any new building which is constructed or adapted to be occupied by more than twenty persons, or which is constructed or adapted for the employment therein of more than twenty persons.

Note.—Dwelling-houses occupied as such by not more than one family are exempt from the provisions of sects. 7 and 9.

Projecting Store.—By the provisions of sect. 10, in every new and existing building in which any persons are employed or sleep, part of which is used, or adapted to be used, as a shop, and projects 7 ft. or more beyond the main front of such building, the roofs over the projecting portions are required to be constructed of fire-resisting materials not less than 5 in. thick. Provisions are also made with regard to the position and construction of lantern lights and ventilating cowls in such roofs.

Rooms Over Premises Used for Storage of Inflammable Liquid.—By the provisions of sect. 11, buildings used in part for the storage of inflammable

liquid, and in part for living-rooms, etc., are required to be provided with:—

(1) Adequate safeguards to prevent the spread of fire from the part of the building used for the storage of any such inflammable liquid to any room used as a living-room, workshop, or work-room, constructed over, or communicating directly with, any part used for the storage of such inflammable liquid; and

(2) Means of ready escape from such room in case of fire.

Means of Access to Roof.—By the provisions of sect. 12, every existing building having a shop projecting 7 ft. or more from the main front of the building, and to which sect. 10 above referred to applies, and every other existing building, except a dwelling-house occupied as such by not more than two families, and every new building shall, if having more than two stories above the ground story, or if exceeding 30 ft. in height, be provided (unless and except so far as the Council shall otherwise allow) with a dormer window or a door opening in a suitable position on to the roof, or a trap-door in a suitable position, with a fixed or hinged step-ladder, or other proper means of access to the roof, as specified in such sect. 12, and with a sufficient parapet or guard rail where reasonably practicable and necessary to prevent persons slipping off the roof. The provisions of such section do not apply to buildings falling within either sects. 7 or 9 above-mentioned.

Conversion of Buildings.—Under the provisions of sect. 13, buildings shall not, without the consent of the Council, be converted, whether by change of use involving structural alterations or not, in such a manner that the buildings when so converted will not be in conformity with the Act.

Means of Escape to be Maintained.—Under the provisions of sect. 14, all means of escape provided under this Act or otherwise shall be kept and maintained by the owner of the building in good condition and repair, and efficient working order, and no person shall obstruct or render less commodious, or permit or suffer to be obstructed, or rendered less commodious any such means of escape.

Factory and Workshop Act, 1901.

Factories and Workshops.—The provisions of sects. 14 and 103 (1) (d) of the Factory and Workshop Act, 1901, require that each factory, workshop, or laundry, in which more than forty persons are employed, shall be provided with such means of escape in case of fire for the persons employed therein, as can reasonably be required in the circumstances of each case.

Statement of General Requirements.

The Council, on being approved the following statement with reference to the requirements in respect of the means of escape in case of fire to be provided in accordance with the provisions of the before-mentioned Acts, with a view to assisting owners and others in submitting applications and proposals to the Council thereunder. This statement must not, however, be taken as binding upon the Council, but only as a general guide or indication, since each case is, after full consideration of the varying circumstances, dealt with on its merits; and nothing herein contained must be taken as in any way interfering with, or derogating from, the powers of the Home Office, the Council, the District Surveyors, or any other authority whatsoever under the Factory Act, the London Building Acts, or any other Act, or under any by-laws that may be made under sect. 15 and sect. 153, subsect. 3, of the Factory and Workshop Act, 1901, or under any by-laws or regulations relating to the construction of buildings or otherwise, or as constituting any consent, sanction, allowance, or permission under any such Act, by-law, or regulation, but all such Acts, by-laws, and regulations must be fully observed and complied with notwithstanding anything herein contained.

Applications.

Particulars Required.—Applications for the Council's certificate in respect of the means of escape from new buildings, and applications with proposals to meet the Council's requirements in respect of the means of escape from existing buildings, or for exemptions from any of the provisions of the above Acts should state:—

(a) The Act and section of the Act under which application is made.

(b) The number of persons for whom sleeping accommodation is provided, and the number of persons occupying or employed on, or intended to be occupied or employed on, the various floors of the premises, specifying approximately the numbers of males and of females.

(c) The trade (if any) carried on, or to be carried on, on each floor, with particulars of machinery, power, etc.

(d) In the case of existing buildings, the date of the erection of the building.

(e) The name and address of the owner and the occupier (if any).

(f) Particulars of the occupation, or proposed occupation, of the building. If in different occupations, particulars with regard to each part should be furnished.

Plans Required.—Applications should be accompanied by complete plans, sections, and elevations, drawn to a 1-in. or 2-in. scale (one-eighth preferred), and by a block plan to a 1-in. scale showing the premises and the surrounding buildings and thoroughfares, such block plan having the north point indicated. These plans should show (as far as may be necessary for the purpose of the application) the means of escape proposed to be provided.

Means of Escape.

Number of Staircases.—The means of escape required depend, *inter alia*, upon the following circumstances:—

(a) The area and disposition of the building.

(b) The number and the distribution of the persons for whom the means of escape are to be provided.

(c) The use of the building.

(d) The nature of the construction of the building.

(e) In the case of a building used for trade purposes the nature of the materials and goods stored or manufactured in the building.

Means of Escape.—It may, however, be laid down as a general principle (subject to the exceptions hereinafter mentioned) that at least one enclosed and protected staircase and exit will be required, and, in addition, an alternative means of escape from each floor by one of the following means:

(a) Another enclosed and protected staircase and exit in the same building.

(b) A suitable staircase in another block, to which access is given by doorway openings in the party or division walls, or, in addition, an alternative means of escape from each floor by one of the following means:

(c) External gangways or balconies affording access to adjoining or adjacent buildings.

(d) An external iron staircase.

(e) Any other suitable arrangement which the Council may accept having regard to the circumstances of any particular case. No arrangement which is not permanently fixed in position, or which requires manipulation in part or in whole in order that it may be used in case of emergency, can be accepted.

Position.—Where there are two or more means of escape from any floor, they should be placed as far as practicable from each other so as to be approached from any part of the floor area independently of any one fire risk on that floor.

Escape by Roof.—(f) If all cases where considered necessary by the Council some means of escape from the roof of the building, or the roof of the adjoining premises should be provided.

Cases in Which One Staircase May be Deemed Sufficient.—(g) In small premises, and in some cases where it is possible to provide a staircase in a central position, one enclosed staircase, approached from each floor only through a lobby ventilated directly into the external air, may be accepted provided that the premises are not used for the storage or manufacture of inflammable or explosive materials, but in no case shall this apply where any part of the floor space is more than 50 ft. from the exit to the staircase.

Maintenance.—Periodical examination should be made of all means of escape provided to ascertain whether they are in good condition and repair, and in efficient working order.

All persons who are employed in or who occupy buildings in which means of escape have been provided should be made acquainted with the position and nature of such means of escape.

In hotels, boarding houses, etc., notices should be displayed in each bedroom giving information as to the position and nature of the means of escape in case of fire, and the corridors, staircases, and exits should be efficiently lighted during the night.

Details of the Construction, etc., of Means of Escape.

1.—Enclosed and Protected Staircases.

A.—Internal Incombustible Staircases.

Enclosure.—(a) The staircases, including landings, lobbies, and passages from one flight to another, should be enclosed by walls, not less than 9 in. thick, the outer edges of the steps and landings being properly supported.

(b) The staircases should be ceiled with iron and concrete where they are not carried up above the roof, or where they are carried up above the roof and are liable to attack by fire from an adjoining structure.

Materials to be Used.—(c) The staircases, including the flooring in the lobbies, approach passage ways, etc., should be constructed of incombustible materials with solid square or spandril steps, which should be supported at both ends on brickwork. The steps and landings should be not less than 6 in. thick.

(d) Spandril steps where used should be of the following thickness:—

(i) For staircases 3 ft. 6 in. wide, not less than 3 in. thick in the smallest part.

(ii) For staircases 4 ft. 6 in. wide, not less than 4 in. thick in the smallest part.

B.—Internal Fire-resisting Staircases.

Materials to be Used and Enclosure.—(a) The staircases, including the treads, stringings, carriages, landings, joists, and floors, should be constructed of oak, oak, jarrah, karri, or other hard timber of not less than 12 in. finished thickness (no fir or pine must be used), and the enclosure to the staircase should be a solid partition of incombustible, fire-resisting material at least 3 in. thick, carried up through the thickness of the floors.

(b) The ceilings and soffits of the staircases and landings (if any) should be of plaster or cement.

(c) A close balustrade of a suitable height should be provided where necessary to the outer string of the staircases.

II.—External Iron Staircases.

(a) The staircases, including the stringers, bearers, and supports, should be of iron, and constructed throughout upon dead bearings to the satisfaction of the District Surveyor.

(b) The steps and landings should be constructed of solid or perforated iron plates (if perforated plates be used no perforation should exceed $\frac{1}{2}$ in. across each way).

(c) The risers should be of iron, either solid or of a close pattern.

(d) Where an iron staircase is in general use the treads and landings should be finished with a surface of approved non-slippery material, as (a) finished from perforated iron or clacquered iron plates.

(e) All windows and similar openings by or near any such staircase should be glazed with fire-resisting glass, and, where necessary, the sashes and frames should be fixed.

(f) A balustrade of a close pattern at a suitable height should be provided on each side of the flights and round the landings. If balusters be used, they should be not more than 6 in. apart.

(g) The staircases should deliver into the exterior, at the ground level, into a public way or thoroughfare, or some large open space.

III.—Generally as to Staircases.

Position.—(a) Internal staircases should be placed next to an outer wall, and be so arranged that persons enter them from any floor level in the direction of descent.

Lighting and Ventilation.—(b) Internal staircases should be properly lighted and ventilated by windows.

Treads and Risers.—(c) The treads of the staircases should be not less than 10 in. wide clear of nosings, and the risings not more than 7 in. high.

Handrails.—(d) Staircases should be provided with handrails fixed upon both sides, and the rails should round the landings and closed into the end of newel walls where these occur.

Width of Staircases, etc.—(e) Where the doorways or staircases are used as means of escape by not more than 200 persons, they should be not less than 3 ft. 6 in. wide.

(f) Where the doorways or staircases may be used as means of escape by more than 200 persons, or by more than 100 persons on any one floor, they should be not less than 4 ft. 6 in. wide.

Doorways to Staircases.—(g) The doorways for access to and exit from the staircases should in all cases be of the width in the clear mentioned above when the doors are open.

(h) All doorways leading to staircases should be provided, where necessary, with fire-resisting lobbies, and should be fitted with doors of fire-resisting materials (oak, oak, jarrah, karri, or other hard timber of not less than 12 in. finished thickness) in two folds hung so as to open in the direction of exit, or to swing both ways clear of steps, landings, passages, and footways. Such doors must be fitted with springs, weights, or other approved appliances to close them after use.

The frames of the doors should be fitted solid to the walls or partitions.

Steps, Landings, and Landings.—(i) Staircases should be arranged in straight flights, without winders; each flight should consist of not more than fifteen steps; landings should be provided at the top and bottom of each flight; the steps and landings should be of the full width of the staircases.

Landing Spaces.—(j) Landing spaces not less than 2 ft. 6 in. wide should be provided between the steps of the flights and the escape doorways leading to and from the staircases.

Supports and Enclosures.—(k) All supports to internal fire-resisting staircases and their enclosures should be of fire-resisting materials, and all iron-work supporting internal staircases and their enclosures should be protected with non-combustible or non-conducting external coating not less than 2 in. in thickness.

Doors Allowing Access to Roof.—(l) Doors at the head of staircases leading to a roof should be glazed in the upper panels with ordinary glass.

IV.—External Iron Gangways and Balconies.

Materials to be Used.—(a) These gangways and balconies should be supported on dead bearings and be provided with solid floors of incombustible materials; if perforated iron flooring be used, perforations should not exceed $\frac{1}{2}$ in. across each way.

Balustrades.—(b) A close balustrade not less than 3 ft. 6 in. high should be provided to these gangways and balconies.

V.—Enclosure and Position of Lifts.

Position.—(a) Lifts, excepting passenger lifts constructed within the open wells of staircases and enclosed only with metal grilles, should not be placed near to or connected with staircases, or connected directly therewith by means of openings or otherwise.

Enclosure.—(b) In buildings where fire-resisting floors are provided, lifts should be enclosed with incombustible materials and fire-resisting doors or shutters. When the shaft of the lift is carried up to the roof it should be enclosed through the roof, and, if covered, this enclosure should be protected on the outside with strong wire gauze.

(c) In other buildings where there are large floors undivided into partitions, fire-resisting lifts, if placed as far as practicable from the staircases, exits, etc., may be enclosed with fire-resisting materials to a height of 4 ft. above each floor level, and above this with stout wire-mesh gauze.

VI.—Buildings Used for the Storage of Inflammable Liquid.

Buildings for Storage of Inflammable Liquid.—(a) Rooms in which inflammable liquid is stored should be separated from other parts of the building by brick walls and fire-resisting floors and ceilings.

(b) Doorways for access to such rooms should be fitted with self-closing, fire-resisting, or iron doors.

(c) Adequate ventilation should be provided.

(d) Living-rooms, workshops, or workrooms constructed over or communicating directly with any part of a building used for the storage of inflammable liquid, should be provided with exit doorways giving access to some safe position as far as practicable from the storage, and with doors hung to open in the direction of exit with only such fastenings as can be easily and immediately opened from the inside.

VII.—General.

Guard Rails.—(a) Proper guard rails should be provided to the routes of escape on roofs, etc., and round skylights, lantern lights, and ventilating cowls on the roofs of projecting shops.

Gangways.—(b) Clear gangways should be kept up to and between all staircases, gangways, and exits on all floors.

Escape Doors.—(c) All escape doors should be made so as to open in the direction of exit, or to swing both ways, clear of steps, landings, passages, etc.

(d) All doors usable as means of escape from both sides should swing both ways and be kept free from all fastenings.

(e) All such doors must, if required to be provided with fastenings during the time persons are upon the premises, be fitted during such time with automatic bolts only.

(f) In buildings other than residential buildings a portion of the upper panels of all fire-resisting doors usable as means of escape should be glazed with clear fire-resisting glass, and it is suggested that a portion of the upper panels of all other principal exit doors should be glazed with clear glass, the glass to be at such a height as will enable persons approaching the doors in opposite direction to see each other.

Windows to Open.—(g) Windows on the floors above the ground floor facing the public way, street, thoroughfare, or open space, should be made to open easily at all levels to a sufficient height and width to allow a full-grown person to pass through in case of need.

Windows and Doors.—(h) Windows and doors opening on to a street, or escape staircases, balconies, bridges, etc., should be marked with the words in large letters "Exit in Case of Fire."

Theatres, Music-halls, Concert-halls, etc.

Premises to be used for music, dancing, stage plays, or entertainments of a like kind are specially dealt with by the Metropolitan Police Act, 1874, and the Building Acts (Amendment) Act, 1878, and the Metropolitan Board of Works (Various Powers) Act, 1892, and special regulations relating to such premises have been made by the Council.

General Building News.

CHURCH, ELLER, LANES.—The Bishop of Manchester recently laid the foundation-stone of the new church of St. John's, Eller. The estimated cost of the new church is 6,000*l.* The new church is to be in the late Decorated style, and on the plan consists of chancel, a nave of six bays, and north aisle of corresponding length. Four large circular piers will carry a tower and spire at the crossing. On the north side is the organ chamber, with choir vestry, and clergy vestry on the east side of the same. The tower arch on the south side will be temporarily walled up until the south aisle is built. The church is lighted by five two-light clerestory windows on each side, a five-light tracery-headed window at the east end, and a four-light in the south gable. The tower will be carried up 52 ft., and finished with a parapet and coping, with two-light belfry windows. A square turret staircase is carried up to the parapet at the south-east angle. The tower will eventually be surmounted by a spire 88 ft. high to foot, with lucerns on four sides. The building will be heated by low-pressure hot water. The work is being carried out by the following local firms:—Masonry, Arthur O. Thomas; carpenter and joiner, James Hatch & Sons; tiling, R. Hall & Sons; plumbing and glazing, Rushion & Finch. The church is being built from the design and under the supervision of Messrs. Austin & Paley, Lancaster.

COUNCIL SCHOOL, BYFIELD, NORTHAMPTONSHIRE.—The foundation-stone of Byfield School was laid on the 28th ult. The school, when completed, will provide accommodation for 72 infants and 120 older scholars. There will be a schoolroom, two classrooms, a schoolroom for infants, and a babies'-room, with a cloak-room for girls and infants, and another cloak-room for boys. The classrooms and schoolrooms will have pitch-pine block floors, glazed brick dados 4 ft. high, and plaster above. Glass blackboards will be placed on the walls opposite the scholars; the corridors and cloak-rooms to be paved with hard red Staffordshire quarries, with glazed brick dados 6 ft. high. Each room has supplementary windows near the ceiling to enable cross-ventilation, in addition to fresh-air mist ventilators in the walls, and extract ventilators in the ceilings. The plaster work to be coloured green, and the whole of the internal woodwork stained and varnished. The exterior will have a base of local stone, with rough-cast above, the roofs being finished with Brosley tiles of a brindle colour. The whole of the external woodwork to be painted green, except the sashes, which will be white. The total cost of the building, including furniture, fittings, etc., but exclusive of the site, is 2,280*l.*, the builder being Mr. T. Higgs, of Northampton, and the architects are Messrs. Law & Harris, of Northampton.

COUNCIL SCHOOL, CHELTENHAM.—The ceremony of laying the foundation-stone of the new school at Naunton Park—the first of two Council schools which the Education Committee have resolved on erecting took place a short time ago. The new schools will consist of three departments, viz.—boys', girls', and infants', with a central hall, 78 ft. by 35 ft., jointly for the boys and girls, and a separate hall for the infants, 48 ft. by 24 ft. The classrooms, twenty-one in all, surround the central halls, and are approached therefrom by glazed doors. There are seven for boys, seven for girls, and seven for infants, giving a total of 1,100 scholars. The walls are plastered, with Portland cement dados, and the floors laid with pitch-pine blocks upon cement-concrete. The walls of lavatories, cloakrooms, corridors, and central halls all have dados of glazed bricks, brown in colour, and plastered above. There are some two or three rooms also, where scholars may take their meals. The interior woodwork throughout will be lightly stained and varnished. The warming is by hot water upon the low-pressure system, and for artificial lighting gas will be employed. The exterior walls are to be faced with a rich red brick covered with grey terra-cotta mouldings, and the roofs covered with Brosley tiles. Messrs. Chatter & Smithson are the architects, and the contract has been let to Messrs. Crane, Ltd., Nottingham, at 12,577*l.*

COTTAGE HOMES, BRADFORD.—In the course of a month the cottage homes for deserving aged poor which have been erected at Daisy Hill by the Bradford Board of Guardians, will receive their first tenants. The buildings are completed, and their cost has been £6,600. The architects were Messrs. Empsall & Clarkson. The cottages, twenty-eight in number, which, with the administrative block, occupy three sides of a large, square enclosed site, are only the first instalment. By-and-by forty more dwellings will be put up, the general scheme being to group them around three spacious quadrangles. The outside walls are faced with cement rough cast, windows and doors having dressings of stone. Adjoining quarries have supplied stone for the slating of the roofs. Each cottage comprises a combined sitting and bedroom, 16 ft. square, with a small scullery and larder attached. There is no painted woodwork, all is of American oak. The administration block, which alone has a second floor, has a splendidly-equipped kitchen, in which will be cooked the principal meal of the day for the whole colony. In the buildings immediately to the right and left of the caretaker's establishment there are dining and recreation rooms, each of which has a verandah provided with seats. These rooms will be used for Sunday devotions. Each of the outer blocks has a bath-room, one for males, the other for females.

TROUSNOM MEMORIAL, REDRUTH.—The memorial building erected by the Trounsom family to the memories of Messrs. Thomas and Samuel Trounsom, of Redruth, was opened recently. Mr. Sampson Hill, architect, prepared the plan for the work, the cost of which was about £1,100. **WESLEYAN HALL AND SCHOOL, LYTCHAM.**—The foundation-stones of the new mission-hall and school in Albert-street, Lytcham, were laid a short time ago. The new structure will cost £3,000. It will be 72 ft. long, 42 ft. wide, and 28 ft. in height from floor to ceiling. The whole of the building will be of brick with Enfield facings and terra-cotta dressings, covered with Venechelli slates. The floor will be of wood blocks on concrete, with the exception of the porches and cloakroom, which will have tiled floors. A wood dado 3 ft. 6 in. in height will run round the walls throughout. The heating will be on the low pressure water system. Ventilation will be by means of air inlet brackets, ceiling gratings and exhaust ventilation in the roof. Accommodation has been provided for 500, but in the inclusion of the gallery, which runs over the vestibule, 80 extra sittings will be provided. Mr. Herbert Wade, Blackpool, and provided. Mr. Herbert Wade, Blackpool, are the joint architects, and Mr. Hy. Mogridge, of Lytcham, has secured the general contract, and Messrs. Saunders & Taylor, of Manchester, will carry out the heating and ventilating arrangements.

MUSIC HALLS, WILLESDEN AND TOOTING.—Arrangements have now been completed by Mr. Walter Gibbons to build music-halls at Willesden and Tooting. It is hoped that the Willesden Empire will be ready for opening next Christmas and the Tooting Hippodrome next Easter. In both cases the architect is Mr. Frank Matcham, whose plans provide for the erection of buildings with holding capacities of close upon 4,000 people. The site of the Willesden Empire is in High-street, Willesden, and that of the Tooting Hippodrome at the junction of Tooting-broadway and Mitcham-road.

MISSION-HALL, HIGH FELLING.—A new mission-hall is being erected at High Felling, at a cost of about £2,000, including furniture. The architects are Messrs. Hicks & Charlewood, of Newcastle, and the contractor is Mr. Wm. Hall, of Beisham. The building is of pressed brick, with stone facings, etc.

NORTH-EASTERN HOSPITAL FOR CHILDREN.—Mr. C. A. Leighton prepared the plans and designs for the nurses' home and the laundry which have just been added to the hospital in Hackney-road at an outlay of £2,500. The nurses' home stands in the grounds, and affords accommodation for sixty nurses, with sitting-rooms and separate bedrooms.

PROPOSED NEW HOSPITAL AT POOLE.—Plans for a proposed new hospital at Poole have been prepared by Mr. Walter Andrew, architect, Parkston.

Sanitary and Engineering News.

COMBINED DRAINAGE.—The President of the Local Government Board has written to the Secretary of the Council of the Metropolitan Borough Council on combined drainage, intimating that he is prepared to consider the representations in the memorial proposed to be submitted to him, but that he does not consider it necessary to trouble a deputation to attend.

ROYAL SANITARY INSTITUTE.—At an examination in hygiene on its bearing on school life, held in Cardiff on July 20 and 21, one candidate presented himself and was awarded a

certificate, viz.: D. T. Williams (Cardiff). At an examination in sanitary science as applied to buildings and public works, held in Cardiff on July 20 and 21, seven candidates presented themselves, and the following two candidates were awarded a certificate:—F. C. Chant (Salisbury); R. Lindon (Plymouth).

Foreign.

FRANCE.—A group of scientific establishments is to be erected on a large plot of land in Paris belonging to a religious community, at the angle of Rues St. Jacques and Gay-Lussac. These buildings will be utilised for the Chemistry Institute of the University of Paris, for the Museum of comparative sculpture of the Sorbonne, and for the Oceanographic Institute founded by the Prince of Monaco.—Among the "Envois de Rome" which have been exhibited at the Ecole des Beaux-Arts are measured drawings of the Basilica Emilia, in the Roman Forum, by M. Helbard, and some studies in the restoration of the ancient town of Selinus (Selinonte) by M. Hulot.

The "Société de Protection des Paysages de France" has demanded the preservation of the fountain of Vauluse, and has also protested against a scheme for connecting Mont St. Michel with the mainland, on the ground that it will spoil the picturesque character of the spot. The Municipality of Calais have commissioned MM. Decroix and Puget to carry out a new Hotel de Ville, at a cost of 250,000 francs.—The Municipality of Chalons-sur-Saône are erecting a bridge over that river. It will be 186 metres long and is being constructed of reinforced concrete, at a cost of 300,000 francs.—The Municipality of Valenciennes are spending nearly a million francs in important street improvements and architectural schemes, including the enlargement of the Public Library.—The Municipal Council of Paris have commissioned M. Roll and M. Cormon to decorate the vaults of the grand front gallery of the Petit Palais, the central dome of which is being decorated by M. Benard. M. Chartrain and M. Georges Picard have been commissioned to decorate the vaults of the two semicircular galleries at the end of the front gallery; and M. Baudouin, the favourite pupil of Puvion de Chavannes, has been appointed to paint in fresco the gallery which immediately surrounds the central garden.—The new Hotel de Ville at Corbeil has just been inaugurated.

A decorative fountain is shortly to be erected at Beauvais by the Société des Amis des Arts de l'Oise, as a gift to the town. The sculptor is M. Henri Gréber.—Another fountain of an important monumental character, has been inaugurated at Reims, the joint work of MM. Paul Gasq, Auban, Baralis, and Kary (sculptors), and of M. André Nayoux (architect). This fountain comprises a massive column in stone and bronze, crowned by a globe on which is a winged Victory; at the base a group of symbolical figures represent Commerce, Labour, and the Republic, at the feet of which latter is crouched a figure personifying the Marne. The square subbase is adorned with figures representing water genii, who hold vases from which the water flows.—The Municipality of Lyons have had a large group of schools erected, which bears the name of "Ecole des Jacobins."

The jury in the competition for a municipal hospital at Carcassonne have awarded the first premium to M. Bertrand, of Paris.—It is proposed to nominate a fourth Inspecteur-Général des Bâtiments Civils, in place of the late M. Scellier de Gisors. M. Paulin, a former Grand Prix de Rome, and Professor at the Ecole des Beaux-Arts, is spoken of. The monument to Chopin, by M. Froment Meurice, is in process of being set up in the Parc Monceau, at Paris. The sculptor, who is one of the best pupils of Chapu, represents Chopin seated at the piano; at his feet is a seated figure of a woman in an attitude of grief; above is a winged figure symbolising the genius of music.—The Municipality of Troyes has commissioned M. Bailey, architect (Saintes), and M. Monceau (Paris) to carry out a Hotel de Ville and a new Post-Office.—M. Patouillard Denoniere has been commissioned to carry out the Ecole des Beaux-Arts at Nancy.

M. Roger Balin has been commissioned to carry out the restoration of the tower de la Lanterne and the tower of St. Nicolas, at Rochelle, which are classed as Monuments Historiques.—There is talk of raising a monument to Leonardo da Vinci, at Amboise, where he died in 1519.—A historical art exhibition has been opened at Besançon, especially devoted to the works of Fragonard.—The vault of the ancient church of Lamourguier, at Narbonne, has fallen in. It was a curious example of XIIIth century work. No attempt will be made to restore it.—The whole quarter of the Bourse at Marseilles is to be rebuilt. It occupies about 65,000 square metres, of which about 30,000 is to be devoted to new and well-built habitations. About 30 million francs are to be expended.—The death is announced, at the age of eighty-eight, of M. Ambroise Alfred Baudry, architect, brother of the celebrated painter Paul Baudry. He

had been a pupil of Hippolyte Lebas and of Louvet. Having been charged with an archaeological mission in Wallachia and Bulgaria, he exhibited at the Salon a number of interesting drawings after the monuments of the two countries; and obtained successively medals at the Salon of 1867, at the Great Exhibition of the same year, at the Salon of 1870, and at the Great Exhibition of 1878. He designed the monument erected in Père Lachaise to the memory of his brother.

GERMANY.—The Town Hall at Nuremberg has been restored at a cost of about 300,000 francs, of which 125,000 francs have been spent on the restoration of interior mural decorations (some of which are by Dürer) under the direction of Professor Hagenmüller.—The new Church of St. Mark, at Stuttgart, is being erected from plans by Herr Dolmetsch, at a cost of about 450,000 francs.—The St. Godehard Church at Brandenburg has been restored; the exterior restoration was carried out under the superintendence of Herr Schramm, whilst the work of interior decoration was under the direction of Herr Blane.—In the competition for new buildings to be erected in Frankfurt the first premium of 4,000 marks was awarded to MM. Reinhardt and Süsenguth, and the second premium of 3,000 marks to Herr Oppenheim.—A new museum is to be erected at Speyer from designs by Professor Gabriel Seidl, at a cost of about 730,000 francs.—At present every taxpayer contributes to the upkeep of street-paving. This is held to contradict the economical principle of give and return. Therefore the Berlin Association of House-Owners has decided to petition the Common Council to institute a tax for the upkeep of street-paving which shall be borne only by the owners of road vehicles.—Public baths apparently do not pay in the Fatherland. Herr Höglander therefore proposes to increase the attractions of these institutions by producing artificial waves in the water. The cooler temperature thus attained would be more strengthening and would be particularly beneficial to those suffering from neurasthenia. Last summer, experiments for mechanical movement were carried out in the Sternberg Lake, near Munich.

—This year, on the occasion of the great Art Exhibition in Berlin, the Emperor awarded the Gold Medal for Art to the architect, Herr Franz Schwechten, of Berlin.—The competition for the cemetery buildings, Frankfurt-on-the-Maine, was won by Messrs. Reinhardt & Süsenguth, of Charlottenburg. The plans are admirable, and the elevations dignified in their broad, simple treatment.—On July 3 a fire broke out in St. Michael's Church, Hamburg. It was probably caused by carelessness on the part of the workmen engaged in repairing the clock. The tower, 131 metres high, the roof, and the interior of the church were completely destroyed, besides twenty of the surrounding buildings. The church, dating from 1661, had been struck by lightning in 1750 and rebuilt by Prey & Sonnin. It could seat 3,000 worshippers, and was considered the finest church in Hamburg.—St. Paul's Church, Munich, designed by Professor G. von Hauberrisser, was consecrated on June 25.

—On April 23 were opened the new buildings of the Girls' School, Basel, from designs by Th. Hünerwadel. The façades towards the streets are of yellow Dürkheimer sandstone; the roof is slate. The cost amounted to £37,000 francs, or 33.35 francs per cubic metre measured from the floor of the basement to the upper side of the main cornice.—The Deutsche Bank, Berlin, is successfully cooled by an installation of running water, temperature 12° C., which not only purifies it. This system is 35 per cent. more economical than the usual methods employed for cooling the air in crowded halls.—In August last was opened the bridge over the Syra Valley, Plauen, Saxony. It has a span of 90 metres, which at that date was the largest span of any stone bridge in the world. On the removal of the centring the crown settled 15 cm. without causing any visible cracks. The stone, Phyllite, is faced with cement 7 cm. thick, composed of one part of cement to five parts of silver sand, grooved so as to simulate blocks of granite. Proposals have been set on foot in Vienna to erect a memorial to Wagner.—In Lower Austria prices in the painters' trade have risen 30 per cent. owing to the increased rate of wages and cost of materials.—For many years the upper portion of the Cathedral Tower, Freiburg, Baden, has leaned eastward considerably. It has finally been decided to adopt the American method of dealing with overhanging structures, and to hoist the upper portion 15 metres back into position. The weight of masonry to be lifted is 4,000 tons, and the work will take two months to complete.—The restoration of St. Sebaldus Church, Nürnberg, has, after eighteen years' reached completion. The work was undertaken by Professors G. von Hauberrisser of Munich and J. Schnitz of Nürnberg, at a cost of 14 million marks.—The bronze doors of Hildesheim Cathedral, cast in 1015 A.D., have just been analysed and found to contain lead in the remarkable proportion of 11½ per cent.—On May 25 the Royal Technical University, Hanover, celebrated its jubilee. It was founded seventy-

five years ago by Karmarsch, who directed it for over forty years. The greatest number of students was attained in 1902-3, when its classes were attended by 1,296 men and 282 ladies. In 1899 the University acquired the right of conferring degrees in engineering. In a lecture on the planning of cities Herr Polivka, of Prague, mentioned the noteworthy fact that in Cologne, where the houses surrounding the Cathedral have been pulled down at great expense, in order to add to the stateliness of the building, voices are now raised demanding that for the self-same reason the houses be rebuilt. Herr Polivka further said that to be a work of art a building must be of such dimensions that the eye can take it in as a whole, in its height as well as in its breadth. In the old houses in Prague the angle of vision rarely reached 39°, whereas in modern houses the angle is increased often to 57°.

AUSTRIA.—Since May 14 all building operations have been suspended in Vienna owing to the lock-out organised by the Society of Builders. The movement was joined by the Society of Tradesmen of Lower Austria, and the numbers thrown out of work amounted to 80,000. This lock-out was the counter-stroke to the boycotting of several contractors who refused to give a minimum daily wage of 5k, and declined to acknowledge the delegates appointed by the workmen. After repeated efforts, terms were arranged on June 28, when it was agreed that this year nausna should receive 4,66k, and the two following years, 5,04k, whilst, in case of dispute, a Commission should sit consisting of three workmen and three contractors.

GRAND DUCHY OF BADEN.—In his annual report on trade and industry in the Grand Duchy, Mr. Ladenburg, the British Consul, observes that under the steady growth of population and wealth the building trade throughout the numerous branches is always active. Year after year more factories have to be built, or old ones enlarged; the number of new and expensive public edifices is astonishing, and, besides, there is a host of fresh dwelling-houses. The new generation of prosperous citizens abandon the gloomy old town houses where their forefathers have vegetated for centuries, and move into the suburbs. The ancient towns and cities level moat and rampart, and change them into public gardens, promenades, wider roads, and ever-spreading villa quarters, bright and cheerful. Apparently the change from a people into a nation is the most important event in the life of a community and race. Every-where beside Old Germany rises New Germany. One would suppose it to be the richest country in the world. At least, a foreigner might so regard it. But the change does not extend beyond the towns. The country still belongs exclusively to the stolid, unchangeable "bauer," and the grand and beautiful country houses, parks and gardens of other lands are almost totally missing. The interior of the new houses is more remarkable than the exterior; it is eminently artistic, and boasts a new style of furniture that is very tasteful.

THE BUILDING TRADE IN GERMANY.—Mr. Consul-General Francis Oppenheimer, writing from Frankfurt-on-Main respecting the trade and commerce of Germany for 1905, observes that the building trade continued lively throughout the year. It was characterised by a tendency, more marked in the rising cities, to do away with comparatively recent and still sound buildings, and to replace them by modern ones; for there is a systematic endeavour to utilise the available space to the best commercial advantage. Many of these schemes were not so much dictated by need as prompted by speculation, for the large building concerns which exist in all important cities must be kept occupied; if there are not sufficient orders they work out schemes of their own, which are carried through with the ready financial assistance of the large banking concerns. There can be no objection, Mr. Oppenheimer thinks, to such a proceeding as long as the upward tendency lasts and as long as proper care is used, but speculative building soon leads to over-speculation, and even to-day there are signs of an over-speculation in several of the larger towns. The estate market was particularly lively during the year. The items which changed hands in Frankfurt during 1905 numbered 1,782, and represented a value of 153,736,463 marks, a figure which until then had not been reached; in 1904 the turnover had been 1,122 items, representing a value of 118,030,000 marks; in 1903, 1,347 items, representing a value of 107,400,000 marks, and in the preceding years, with the exception of 1899, the value of the turnover did not reach 100,000,000 marks. The mild winter favoured the building trade, which also greatly benefited the iron trade, as modern buildings consist to a great extent of iron construction. Towards the end of the year, however, building was somewhat checked by the stiffness of the money market. The labour market was firm throughout the year; the statistics of the unemployed dropped as low as 0.6 per cent., a rate which has only seldom been reached, and which really signifies that at that time there were practically no unemployed. In fact throughout the year complaints never ceased concerning the scarcity of labour, a

number of industries have for years been compelled to draw their workmen from abroad. Thus the percentage of foreign workmen in the coal mining districts continues on the increase: the building trade is forced to engage foreign workmen, and some works, such as ground works, are practically exclusively carried out by foreigners. These foreign workmen originate to a great extent from Italy, Switzerland, Austria, Hungary, Russia, Galicia, and Roumania. A number of German concerns interested in the slate business lodged a complaint that a number of buildings erected at the expense of the Government were covered with foreign slate, while German quarries could have furnished the material required of similar quality, and at the same prices. In reply the Secretary of State for Public Works instructed the respective authorities to insist that an order of February 12, 1903, should be adhered to without exception in the erection of public buildings: namely, that native produce must, under similar conditions, invariably be preferred to foreign.

Miscellaneous.

PROFESSIONAL AND BUSINESS ANNOUNCEMENTS.—The Pulsometer Engineering Company have opened offices in Manchester at 206, Corn Exchange Buildings, Cathedral-street, with Mr. George Thompson as manager, and their agency with Messrs. F. B. Welch & Co. is terminated.

CHURCH BUILDING SOCIETY.—The Incorporated Society for Promoting the Enlargement, Building, and Repairing of Churches and Chapels held its usual monthly meeting on 19th inst. at the Society's house, 7, Dean's-yard, Westminster Abbey, S.W., the Rev. Canon C. F. Norman in the chair. Grants of money were made in aid of the following objects, viz.:—Building new churches at Plaistow, S. Matthias, Essex, 100l., and Farnham Common, S. John the Evangelist, near Slough, 100l.; and toward enlarging or otherwise improving the accommodation in the churches at Llanfihangel Cwmdu, S. Michael, Brecon, 70l.; Brixworth, All Saints, near Northampton, 20l.; Dalton-le-Dale, S. Andrew, near Sunderland, 35l.; Hinxton, S. Mary Magdalene, near Droghda, 10l.; Landisat, S. Dingat, near Llandowry, Carmarthenshire, 30l.; North Petherton, S. Mary-the-Virgin, near Bridgwater, 30l.; and Rushden, S. Mary, near Buntingford, Herts., 20l. Grants were also made from the special Mission Buildings Fund towards the completion of the Caius College Mission Church, Battersea, Surrey, 60l. (making in all 150l.), and towards building a mission church at New Durham, in the parish of Belmont, near Durham, 10l. The following grants were also paid for works completed:—Little Ilford, S. Barnabas, Essex, 150l., making in all 250l.; Enfield, S. Luke, Middlesex, 100l.; Northampton, Christ Church, 200l.; Chobham, Holy Trinity, Surrey, 10l.; Kirby Woodhouse, S. John, near Nottingham, 60l.; Bounds Green, S. Gabriel, Middlesex, 180l.; Abertillery, S. Michael, Mon., 100l., making in all 200l.; and East Tilbury, S. Catherine, Essex, 20l. In addition to this the sum of 206l. was paid towards the repairs of sixteen churches from trust funds held by the Society.

BREAKING UP OF STREETS.—A circular letter has been sent by the London County Council to the Metropolitan Borough Councils respecting the breaking up of streets by public companies and others having statutory powers to do so. The Highways Committee of the London County Council are of opinion that arrangements should be made for works carried out by companies to be as far as possible executed simultaneously at certain times of the year, and they desire to know whether in the event of the County Council promoting legislation to enable them to make regulations to govern the breaking up of streets with a view to securing that regard should be had to the convenience of the public, the economy of space under the streets, and other matters affecting the public interest the Borough Councils would be prepared to support the London County Council in its application.

BUILDING OPERATIONS AND BOROUGH COUNCILS.—The London Master Builders' Association have sent a circular letter to the Metropolitan Borough Councils stating that the Association have had under consideration the regulations and requirements of the various Borough Councils and other public bodies controlling building operations in the Metropolitan area; that they desire to secure uniformity of procedure and practice by the various authorities, and that the Committee of the Council of the Association dealing with the matter would esteem it a favour if the Works Committee of the Council addressed would appoint a time for a conference to discuss the various matters affecting builders—such as licenses for hoardings, opening of roadways, and similar questions—a list of which the Committee of the Association would submit beforehand.

GROVE HALL, BOW BUILDING SITE.—A large company was present at the Market-Turner last, when the above estate was submitted to

auction by Messrs. Mark Liell & Son. The estate consisted of 11½ acres, and is free from building restrictions, and realised 22,300l. It was purchased for building purposes.

Legal.

THE WEST-END ANCIENT LIGHT CASE.

The hearing was concluded last week in the Chancery Division of the case of Sandans, Ltd. v. Duven, the action brought by the plaintiff for an injunction to restrain the defendant from building so as to obstruct their ancient lights. (The facts of the case were fully reported in last week's issue of the Builder.)

Mr. Justice Warrington, after the conclusion of Mr. Upjohn's address on behalf of the plaintiff, and without hearing evidence on behalf of the defendant, in giving judgment, said that the real question that he proposed to determine, and which was sufficient to dispose of the action, was whether upon the plaintiff's evidence there was sufficient proof that the ancient lights of the plaintiff's which had been preserved, had been interfered with in a legal sense. In his judgment, if plaintiff's house were an old house in the technical sense and the defendant's building had been erected according to the plans which they had put forward, then there would have been a sufficient case to give a cause of action. But it was not a case of an old house, but a new house, in which certain alterations had been made in several windows receiving light which previously passed through apertures in the old house. Taking the case by the test laid down in the case of *Warrington v. Duven*, the plaintiff was entitled to and to whether the erection of the defendant's building would render the plaintiff's house substantially less comfortable than it was before these things were complained of. Judging the case by this view, he came to the conclusion that the action failed and gave judgment for the defendant with costs.

Mr. W. H. Upjohn, K.C., and Mr. Peterson appeared for the plaintiffs; and Mr. Warrington, K.C., Mr. George Cave, K.C., and Mr. Rolt for the defendants.

TARMAC PAVING ACTION AGAINST THE BRIGHTON CORPORATION.

The case of the King of the Mayor and Corporation of Brighton came before the Court of Appeal composed of the Master of the Rolls and Lords Justices Moulton and Farwell, on the 23rd inst., on an application to advance the hearing of an appeal from a judgment of the Divisional Court, consisting of the Lord Chief Justice and Justices Ridley and Darling (reported in the Builder of May 1, 1906). In this case the Divisional Court made absolute a rule nisi for a writ of certiorari to remove into the Court certain orders and resolutions made by the Council of the Borough in July and August, 1905, whereby it was ordered that the treasurer of the Borough should pay to the Public Works Committee two sums of 2,500l. and 550l. upon the grounds that the expenditure called in question was wasteful, extravagant, and unnecessary, and, therefore, illegal, and that the Corporation had no authority or jurisdiction to make such orders. The rule was obtained on the ground that the cost incurred for laying a certain portion of the Madeira-road at Brighton with tarmac for the purpose of an automobile competition was *ultra vires*.

In the result the application was refused, the Master of the Rolls asserting that the applicants had no more right to have the case expedited than other litigants who had cases coming on at that Court.

FERRO-CONCRETE PILES:

ALLEGED INFRINGEMENT OF PATENT.

MR. JUSTICE WARRINGTON in the Chancery Division last week delivered a considered judgment in the case of Mouchel & Hennibbie v. E. Coignet, Cowlin, & Sons & G. C. Workman for alleged infringement of letters patent No. 10,293 of 1897 granted to François Hennibbie of improvements in piles, quays, and retaining walls, or structures.

The defence was a denial of infringement and a plea that the patent was bad for want of novelty.

Mr. Cripps, K.C., Mr. A. J. Walter, and Mr. Colfax appeared for the plaintiffs; and Mr. Aubrey, K.C., and Mr. J. C. Graham for the defendants.

Mr. Cripps, in opening the case, said the substance of the dispute would be whether or not there was subject matter in the patent. He said the patent in question was a very novel one, relating to a reinforced or ferro-concrete pile, the patentee, Hennibbie, being a gentleman who was represented in this country by the plaintiff, Mouchel. What the patentee had done was to realise for the first time that you could drive a concrete pile without that pile being shattered by the enormous weight of the money which drove the pile. That was a complete novelty in engineering

Thousands of these piles had been driven with the best results, and now these concrete piles were taking the place of the wooden piles. The patentee seemed to have found out that by using these ferro-concrete piles he had got all the advantages of the wooden pile without any of its disadvantages. The plaintiffs' case was that the defendants had made use of piles of concrete with longitudinal bars of iron cross-tied by clamps and metal caps substantially as described in the plaintiff's specification. The learned counsel read Hennibique's complete specification, which was headed "Improvements in piles, quays, and retaining wall or structures." The patentee, in the specification, said that, "beton, or concrete strengthened with iron or steel, had already been employed in building construction in various ways, and in the formation of girders and beams of strengthened beton many advantages were obtained by a rational mixture of iron or steel and cement. A capital point for the construction of a practical girder or beam was to connect the bars of metal forming the cord of tension with the cord of compression by means of suitable stirrup pieces, and in a former patent of his he indicated improvement which introduced in the stirrup or cross-pieces which in a girder made of beton placed by the part of the suspension rods of the lattice work of metallic girders and insured a perfect resistance of the girder to the severing action under a binding strain. The patentee said he had applied these principles to the construction of piles, sheet piles, and solid uprights or standards which, by responding to the special conditions of their arrangement or employment, might, according to the strains, the loads, and the pressures to which they were subjected, be assimilated to girders, whether placed on two or more supports or embedded at one end, and so forth. The patentee's claims were as follows:—(1) Piles or sheet piles of iron embedded in beton and cross-tied by means of stirrups or cross-pieces, or of their arrangement or employment, might form a solid girder practically constructed for supporting the weight of an upper building or construction or any desired lateral horizontal pressures, substantially as described in the drawings. (2) Sheet piles of strengthened beton such as described, characterised by longitudinal grooves, the groove on one sheet pile serving as guide for the ramming of the adjacent sheet pile to a projection formed in the lower part of each sheet pile in proximity to the point; the ultimate filling with cement of the interval between the grooves enabling adjacent sheet piles to be connected together in a perfect manner, thus forming an absolutely tight wall, substantially as described. (3) In piles of the kind described, a metal cap substantially as therein before described, shown in the drawings, for use in ramming, enabling the head of the pile or sheet pile to be entirely encased and to distribute the pressure of the blows of the ram uniformly on all the faces of the head by means of an interposed cushion of beton. (4) The application of piles and sheet piles of strengthened beton, such as described, to the construction of any works or foundations in bad soil, to dams for hydraulic works, quays, and sustaining walls, the consolidation of slopes and the like and their combination with beams or girders of strengthened beton, cross-beams, tie beams, and the like, for the construction of indeformable monolithic structures, such as described, in conjunction with planks of strengthened beton for the formation of overhanging stagings, fronts of quay walls, and other like works.

Evidence having been given in support of the plaintiff's case, defendants' case was opened by Mr. Astbury. They did not dispute the piles of strengthened concrete were unknown in England before the plaintiff's patent, but said that strengthened concrete was known and used for many building purposes, and their contention was that the alleged invention was merely the application of the material to another purpose constituting no new invention. They further said that such application had been anticipated.

In the result, Mr. Justice Warrington held that there was sufficient invention to support the patent, and that there had been no anticipation. He further held that there had been infringement by Messrs. Cowlin & Sons in the works they were carrying out at Bristol, and granted an injunction against them with costs. He considered, however, that plaintiffs had failed to prove any infringement against the two other defendants, for whom he entered judgment with costs.

MOOT POINT UNDER THE PUBLIC HEALTH ACT

THE case of the Mayor and Corporation of Chorley v. Nightingale came before a Divisional Court of King's Bench, consisting of Justices Kennedy and A. T. Lawrence, on the 19th inst., on the appeal of the plaintiffs from a judgment of the county court judge of Chorley, an action brought by the plaintiffs to recover from the defendants a proportion of the expenses incurred by the Corporation in paving and making-up a portion of a street. The facts of the case sufficiently appear from the following judgment:

Mr. Justice Kennedy, in reading the judgment

of the court, said the appellants asked the court to reverse a decision of the learned county court judge that the respondent could not be charged with a share of certain expenses incurred by the local authority in paving and otherwise making-up a portion of a road or street called Pilling-lane, the question on the appeal turning upon the applicability of the latter portion of the Public Health Act, 1875, section 150, to the facts of the case. On a prior appeal from the county court in the action, it had already been decided that Pilling-lane was an ancient highway repairable by the inhabitants at large. The question then left open by the Divisional Court was, whether the road or street on which the work to the cost of which the respondent was alleged by the appellants to be liable as a frontager to contribute, was done, ought to be treated as a road or street which consisted partly of a highway and partly of added roadway, so as to constitute a street or road of which only a part was repairable by the inhabitants at large within the meaning of the concluding portion of section 150; and therefore a street or road in respect of which, according to the concluding words of that section, the same proceedings might be taken and the same powers be exercised as fully as if the whole of such street or road was a highway repairable by the inhabitants at large. The county court judge, by his judgment, had negatived this proposition. Hence the present appeal. The contention of the appellants was based on the following facts: The old highway, so far as it actually could be used, either by foot passengers or vehicles—the roadway as it were—was bounded by a ditch some 8 ft. broad and 4 ft. deep. This ditch bordered the roadway on the further side of the roadway from the respondent's land. The whole space, including both roadway and ditch, known as Pilling-lane, had from the first been situated within the line of fences—that was to say, there had always existed a hedge or fence both on the side of the respondent's land and on the opposite side, where the land abutting upon the ditch was now owned by the Chorley Colliery Company, and the whole space between the old fences had always been delineated and described as Pilling-lane. The ditch was necessary for the preservation of the roadway. The land on the side owned by the Chorley Colliery Company sloped down towards the road, and the whole of the water from that watershed had naturally drained into the ditch. The water used to pass along the ditch for a certain distance, and was then conveyed under and across the roadway by a conduit on to the land of the respondent. Within the last twenty years a pipe had been placed in the ditch and the ditch had gradually been filled up. This, of course, had added the width of the ditch to the roadway as a space which could be traversed by foot passengers and by carriages. Further, in recent times lessees of the land of the Colliery Company, who had built cottages along their side of Pilling-lane, had, for the convenience of their tenants, altered the line of boundary on their side of Pilling-lane by withdrawing it for a space of about 2 ft. 6 in. from the outer edge of the ditch on that side. No material alteration had been made in the line of the ancient fence of Pilling-lane on the respondent's side of the lane. In that state of facts the contention of the appellants was in the first instance twofold. It was based partly upon the 2 ft. 6 in. addition to the area of Pilling-lane which he had mentioned and partly upon the filling-up of the ditch and the consequent increase of the traversable roadway by some 8 ft. of width. But in the argument addressed to the court by counsel for the appellants, the 2 ft. 6 in. extension—which the county court judge called "the slight alteration to Pilling-lane on the Colliery side"—was not seriously insisted upon as a material point in the case. The appeal was rested upon the "widening," as it was called, of the road by the addition to the space, which was admitted to be an ancient highway, of the surface area created by the filling-up of the ditch. This court was not prepared to say that the learned county court judge was wrong in point of law. So far as it was a judgment of fact, if there was any evidence to support it, this court could not reverse it. He had found, after hearing the evidence and viewing the locality, that the ditch was wholly situated between the old fences of Pilling-lane; that the ditch and conduit were constructed for the passage of water flowing down from the watershed and were necessary to the existence of Pilling-lane, and formed a necessary part of Pilling-lane as a highway; that there had been a dedication of the whole area between the two original fences of Pilling-lane, and that Pilling-lane had not been widened. The principal argument of the appellants' counsel was that a ditch could not in point of law be treated as part of the land dedicated to the public as a highway. It was argued that land could not be treated as part of the highway which could not be travelled over by the foot, or (if it were a carriage-way) by the carriage of the traveller. The court was instructed for the purpose of the correctness of that view. It appeared to that court that the whole of a space including a ditch might be dedicated to the public as a highway, the ditch being treated as an obstruction or excavation,

subject to which, so long as the obstruction or excavation continued to exist, the highway was dedicated; but the surface of which, if by natural or other causes the ditch was filled or silted up wholly or partially, thereupon became wholly or *pro tanto* land which must be treated as part of the original highway. They did not see how the Colliery Company or their predecessors in title could legally have extended their boundary to the roadway side of the ditch and so enclosed the area of the ditch, even if by a system of drainage they had rendered the maintenance of the ditch unnecessary for the preservation of the roadway itself. On these grounds they came to the conclusion that the judgment in the court below ought to be affirmed, and the appeal would accordingly be dismissed with costs.

ACTION AGAINST ST. PANCRAS BOROUGH COUNCIL.

THE case of Westlake v. the St. Pancras Borough Council came before Mr. Justice Neville in the Chancery Division this week.

Mr. C. E. Jenkins, K.C. (with him Mr. Beaumont), in opening the plaintiff's case, said his clients were somewhat numerous, having several interests, and by the action they sought to restrain the defendants from so carrying on certain works of theirs adjacent to the property of the plaintiffs in such a way as to create a nuisance. The plaintiffs also claimed damages for past acts of the defendants. The nuisance alleged was first a nuisance caused by vibration set up by the engines used by the defendants in carrying on their business as suppliers of electricity in St. Pancras. The defendants had a large generating station opposite to the plaintiffs' premises and the plaintiffs' case was that these engines caused a vibration to their premises of a nature which made their houses less comfortable and at times really intolerable. Plaintiffs alleged that the nuisance was something more than temporary, and the vibration caused injury to their premises structurally and affected the inhabitants thereof prejudicially. The other ground of complaint arose in connexion with certain dust destructor works that the defendants had on the same site as their electric generating station. The defendants brought to these works the refuse of the parish for the purpose of destroying it. Defendants had also to get rid of cinders used in their works and the nuisance the plaintiffs complained of was the scattering around from the chimney shaft a sort of grit or dust which covered the plaintiffs' premises if the wind was in that direction and thus interfered with the health of the occupants of the premises and also prevented them from carrying on their respective businesses as beneficially as formerly. Plaintiffs also complained of a nuisance by smell caused by the burning of the refuse and also by a process of what was called "damping down" the chimneys. That was a general view of the case. The defendants had become the undertakers in the year 1894, and they acquired their land about that time. In 1894 they started the supply of electricity in the borough and erected on the land an engine house and put in it five reciprocating engines. The generating station was carried on for a considerable time with those five engines, but when the vibration was caused to neighbours by those engines did not matter, because an action was not brought. But in 1902 the defendants decided to largely increase their engine equipment, and in May, 1903, they had got in their engine-house three engines at work of from 700 to 900 h.p. each. The effect of this addition was to set up a serious nuisance by vibration. In 1904 Mr. Westlake, one of the plaintiffs, complained about it in writing, and in November, 1903, the owners of certain houses in Great College-street adjacent to the defendants' works brought an action against the defendants, seeking an injunction to restrain them from causing a nuisance by vibration and also in the way they carried on their dust destructor. In that action, which was tried before Mr. Justice Joyce, the defendants denied any vibration at all, but they set up as an alternative defence that these were probably defects which for the moment somebody might possibly complain of, and that this was due to the engines not being properly balanced and that they said they could put right. In that case, however, the injunction was granted against the defendants, but a stay of the injunction was granted on the footing that within that time the defendants would balance the engines properly, and then there would be no nuisance to anybody. The present plaintiffs were awaiting the result of that action. The defendants, having got the stay, occupied the six months in trying to improve the balancing of their engines, no doubt, but also in buying out the plaintiffs in that action, and he (counsel) rather thought they had bought up the whole of the side of Great College-street abutting on their works. The result of that was that the defendants did not worry any more about the injunction, and ultimately, after complaints had been made, the present action was commenced on December 30, 1905.

The case was proceeding when we went to press.

Patents of the Week.

APPLICATIONS PUBLISHED.*

18,414 of 1905.—A. M. ROBERTSON: *Sliding Skylight Window.*

This relates to a sliding skylight window made of cast iron with glass let into the sliding panel. The window is set on the roof between the joists, and in opening the panel slides under the boarding between the rafters.

19,656 of 1905.—M. J. ADAMS: *Lavatory Basins.* This relates to the emptying of what are known as "tip-up" lavatory basins. A waste passage or receiving channel is formed thereon so that when the lavatory basin is tipped the water passes over from the basin into this passage or receiving channel, and from here it is carried to the drain by way of a suitable pocket or funnel, into which it flows from the exit to the passage or receiving channel. The lavatory basin is pivoted to a suitable bracket or otherwise.

21,091 of 1905.—W. S. LAMSON: *A Composition of Matter to be used for Filling the Grooves of the Metallic Plates or Frames of Stair Treads.*

This relates to a composition of matter for filling the grooves of the metallic plates or frames of stair treads, consisting of carbonium, magnesium chloride, and magnesium oxide. The mixture is placed in the grooves of the plates or frames commonly used, and allowed to stand for about four to five hours, and if the surface of the composition is of considerable width may then be smoothed down with a mason's trowel, or otherwise to the tops of the grooves.

27,073 of 1905.—L. HANSON: *Gates.*

This relates to a gate, having hinges adjustable along a vertical rod, and thereby adapted to be swung at any desired height above the ground, and consists in the arrangement of ropes or the like connected to the latch by the intermediary of bell-crank levers, and extending therefrom to winding drums carried by side posts, whereby the latch may be raised and the gate opened.

23,182 of 1905.—T. BRAY: *A Window Sash Lock.*

This relates to a lock for window sashes, mortised into a meeting-rail of the lower sash, and having a bolt which is shot by a spring, and is withdrawn and held back by screwing in a key. As soon as the key is taken out of the lock the spring forces the bolt forward, which enters the square hole in the striking plate, and the two sashes are locked together, and can only be opened by the key. The bolt being bevelled, the act of closing the window will cause the striking plate to force back the bolt until the meeting rails of the sashes are even, when the bolt, forced by the spring, will shoot through the square hole in the striking plate.

205 of 1906.—H. A. GEORGE: *Safety Catch for Window Sashes.*

This relates to a safety catch for window sashes, and consists of a hollow tumbler fashioned from sheet metal having an enlarged head and short, curved tail, the said tumbler being pivotally mounted on a fitting having an inverted "U" shaped vertical head forming a saddle for the tumbler, and horizontal base flanges for attachment to the upper edges of the lower window sash, the head of the said tumbler engaging with a slot or slots in the vertical side of the upper window sash, or in a metal plate screwed thereto, or with an angular catch projecting from the inside edge of the said side of the upper sash, in such manner as to lock the two sashes together, holes being provided in the tumbler and fitting in line with one another to receive a pin, which, when inserted through the said holes, locks the tumbler in its fallen position.

3,333 of 1906.—T. CROSS: *Walls or Partitions and Means for Constructing the same.*

This relates to the construction of walls or partitions, and consists in the arrangement of suitable blocks which during erection form, owing to their shape, a series of grooves into which a metal band of hoop iron or the like is nailed, this band being also secured to the boundary or wall up to which the partition is built, and if need be to the floor.

5,178 of 1906.—W. R. CARY & C. R. CARY: *Brick Tongue.*

This relates to a brick tong comprising two angular members, one of which has a holding jaw and an intermediate slotted portion, and the other of which has a holding jaw at one end of its opposite end pivoted in the slot.

5,696 of 1906.—A. N. BARTHOLOMEW: *Spring Window Wedge.*

This relates to a spring window wedge for windows and is characterised by forming the wedge of double-horn shape, and attaching a chain thereto for the purpose of screwing the wedge to the window easily.

* All these applications are in the stage in which opposition to the grant of Patents upon them can be made.

7,720 of 1906.—C. C. CHANCEY.—*A Glass-retaining Device for Sashes.*

This relates to a glass-retaining device for sashes, and consists in arranging the undercut groove or recess in a more open manner than is usual, so that the woodwork does not overlap the glass, and so that the recess may be as shallow as desired without preventing it performing its function of holding the putty against falling out.

10,286 of 1906.—E. LORENZ: *Brackets for Supporting Scaffolding and the like.*

This relates to a bracket for supporting scaffolding and the like, comprising a back having an anchor plate or like member, a sole, and a stay connecting said back and said sole, the ratio between the depth of the sole and the weight thereof being such that the friction between the anchor plate and material on which it takes a hold, after due allowance for all unfavourable influences, is sufficient to overcome the tensile strain tending to pull the bracket away from the body to which it is attached.

23,280 of 1905.—F. MURRAY: *Traps for Drainage.*

This relates to traps for drainage, and consists in the combination in a self-closing gully or gully-trap of a metal ring with bevelled inner face secured to the gully by means secured through the wall of the gully, a further metal ring and a thin sheet india-rubber ring, this latter resting upon and overhanging the ring, and the former resting upon the india-rubber ring and holding it in position by screws, and a ball float in the gully adapted to rise with the back flow of the water in the drains, and become seated against the india-rubber ring.

SOME RECENT SALES OF PROPERTY: ESTATE EXCHANGE REPORT.

July 5.—By J. G. VILLAR (at Cheltenham). Charlton Kings, Glou.—The Ham Hill Farm, 22½ a. 2 r. 7 p. f., y.r. 208l. £1,000
The Coxon Farm, 50 a. 0 r. 16 p. f., y.r. 130l. 2,675

July 11.—By BENJAMIN & WOOD (at Hull). Sutton-on-Hull, Yorks.—"Tilworth Grange" and 21 acres, l. p. 2,425

July 13.—By BRIDGMAN & SON (at Waltham Cross). Waltham Cross, Herts.—High-st., "Verancke House" (laundry and stable), l. y.r. 55l. 900
Chestnut, Herts.—Church-l., "Holly Lodge," l. y.r. 60l. 850

July 14.—By R. LUSCOM & SON (at Pateley Bridge). Fountain's Earth, Yorks.—"Belk's Farm," 26½ a. 0 r. 11 p. f., y.r. 100l. 625

By SALTER, SIMPSON, & SON (at Norwich). Bechborne, Norfolk.—"East Farm," 288 a. 3 r. 4 a. f., y.r. 200l. 3,500
Five enclosures, 14 a. 0 r. 11 p. f., y.r. 15l. 250

July 16.—By RUCKLAND & SONS. St. Pancras.—83, Charington-st., u.t. 38 yrs., g.r. 6l. 10s. y.r. 57l. 10s. 420

By BROSSE, TAMES & CO. Bow, —10, Caxton-st., u.t. 40 yrs., g.r. nil, y.r. 28l. 250

By KING & CHAMBERLAIN. Ewhurst, Surrey.—Part of "Mapledrake's Farm," 19 a. 3 r. 25 p. f., y.r. 35l. 600
"Lion's Field," 5 a. 1 r. 24 p. f., y.r. 15l. 150

By SIMMONS & SONS. Maidenhead, Thicket, Berks.—"Stubblage House" and 4½ acres, l. p. 10,000
"Stubblage Farm," 227 acres, l. p. 10,400

Bentley, Hants.—A freehold and copyhold holding, 22½ acres. 1,250

Four copyhold cottages. 300

By DILLEY, JONES & BEAD (at St. Ives). Fostonston, Huon.—The Home Farm, 63 a. 0 r. 24 p. f., l. p. 2,500

The Gables Farm, 237 a. 2 r. 17 p. f. and c. 5,000

Hilton End Farm, 57 a. 1 r. 11 p. f., y.r. 50l. 1,000

Red Hill Farm, 25½ acres, l. p. 2,745

Various enclosures, 80 a. 2 r. 30 p. f. (in lots). 2,050

An Oxley Holt, 7 a. 1 r. 28 p. f., l. p. 800

Gooseberry Tree Orchard, 7 a. 2 r. 1 p. f., l. p. 2,650

"Pleasant View," c. y.r. 32l. 600

Two freehold cottages. 250

June 17.—By CARTWRIGHT & ETCHESS. Pimlico.—12, Sussex-st., u.t. 24 yrs., g.r. 9l., c.r. 65l. 400

By DAWSON, SON, & TERRY. Surbiton, Surrey.—Ellerton-rd., "Brookwood," u.t. 9½ yrs., g.r. 5l., c.r. 30l. 300

Fulham.—15, Exmouth-rd., u.t. 45 yrs., g.r. 3l. 10s., w.r. 35l. 8s. 285

By RUTLEY, SON, & VINE. Easton-road.—17, George-st., u.t. 18 yrs., g.r. 20l., p. 290

Holloway.—Crayford-rd., l. p. 100 a. 21, u.t. in 60 yrs. 550

Tabley-rd., l. p. 74 7/8, reversion in 60 yrs. 200

Harleiden.—30, Baker-rd., u.t. 79 yrs., g.r. 7l., p. 275

By HENRY TUNNELL. Belvedere, Kent.—Lower Park-rd., "The Homestead" and "Langrick," c. 10 a. 10 r. 10 p. f., l. p. 550

Norman-rd., freehold yard and stable, l. p. 220

By WYATT & SON (at Havant). Havant, Hants.—1, 3, 5, and 7, Selborne-rd., l. p. 400

8 and 10, Waterloo-rd., l. p. 300

West-st., a freehold building, u.t. 45 yrs., g.r. 10l. 160

By THOMSON & CO. (at Penryn). Kirkcaldy, Cumberland.—A freehold and copyhold farm, 134 a. 3 r. 22 p., y.r. 105l. 2,500

By DOLMAN & PEARCE (at Camden Town). Kentish Town.—29, Raglan-st., u.t. 18 yrs., g.r. 6l., w.r. 30l. 2136

32, Mansfield-rd., u.t. 71 yrs., g.r. 7l. 10s., c.r. 52l. 675

108, Mansfield-rd., u.t. 71 yrs., g.r. 7l. 10s., c.r. 55l. 675

Haverstock Hill.—327, Queen's-cres., u.t. 42 yrs., g.r. 8l., c.r. 55l. 475

By J. & S. MORTON (at Masons' Hall Tavern). Holborn.—Red Lion-pas. The "Queen's Arms," p.h., u.t. 13½ yrs., y.r. 75l. with goodwill. 1,600

July 18.—By FISTER & CRANFILL. Wandsworth.—Wandle-rd., l. p. 6l., reversion in 50½ yrs. 150

By FULLER, HORSLEY, SONS, & CASSILL. Hackney Wick.—Windsor-rd., The "Atlas" Antique Colour, etc., Works, area 54,000 ft. p. 5,000

By HAROLD GRIVIN. Battersea.—14, 16, and 18, Hubert-st., u.t. 37 yrs., g.r. 6l., w.r. 92l. 8s. 240

12, 14, and 16, Usk-rd., y.r. 75l., also l. p. 32l., u.t. 46 yrs., c.r. 23l. 340

44 and 46, Usk-rd., u.t. 46 yrs., g.r. 4l., c.r. 52l. 230

130 to 138 (even), Usk-rd., u.t. 37 yrs., g.r. 6l., w.r. 104l. 430

Streatham.—39 and 41, Stockfield-rd., u.t. 87 yrs., g.r. 14l., y.r. 74l. 705

By THOMSON, REICHERTS, & CO. Stamford Hill.—Leabourne-rd., etc., freehold building land, area 9 a. 2 r. 2 p. (in lots). 11,375

By MULLETT, ROOPER, & CO. Paddington.—97, Marylands rd., u.t. 56½ yrs., g.r. 10l., c.r. 60l. 550

By PARKHOUSE & PEARSON. Hammersmith.—5, Lamington-st. (a.), u.t. 73 yrs., g.r. 6l., w.r. 36l. 10s. 310

By F. F. F. & L. STENO. Ashford, Middlesex.—Bridge-rd., freehold building land, area 3½ acres. 375

By NOYES & HOWES (at Sydenham). Sydenham.—64 and 66, Kirkdale, u.t. 16 yrs., g.r. 16l., c.r. 80l. 295

By EDWIN EVANS & A. WELLINGS (on the Estate). Tooling.—Crownborough-rd., etc., 502 plots of freehold building land (in lots). 16,018

July 10.—By H. J. BLISS & SONS. Hackney.—30 to 44 (even), Treadway-st., l. p. 247l. 12s. 2,615

84, 86, 38, 40, 42, 44, 46, 48, 50, Temple-st., l. p. 254l. 16l. 2,050

Bethnal Green.—55 to 61 (odd), Fuller-st., u.t. 12 yrs., g.r. 50l., w.r. 145l. 12s. 110

By CHRISTOPHER & SONS. Regent's Park.—Osmington-st., g.r. rents 40l., u.t. 16 yrs., g.r. 9l. 305

Edmonton.—1 to 6, Wellington-ter., u.t. 87 yrs., g.r. 16l., c.r. 80l. 500

Norbury.—Norbury Crescent, etc., l. p. 414l., reversion in 39 yrs. 12,695

By L. FARMER & SONS. Willesden.—1, Hillside, u.t. 61 yrs., g.r. 5l. 8s., w.r. 55l. 305

By W. A. HEAD. Clapham.—40 and 61, Fendalme-rd., u.t. 64 yrs., g.r. 12l. 12s., y.r. 71l. 610

Balham.—10, The Terrace, u.t. 23 yrs., g.r. 7l. 10s., c.r. 36l. 340

By C. C. & T. MOORE. Commercial-rd., East.—10, 20, 29, and 40, Watney-st., l. p. 3,600

By NEWBORN. Somerstown.—1 to 9, Wilsted-cottages, u.t. 18 yrs., g.r. 50l. 10s., w.r. 157l. 6s. 270

By NEWBORN, SHEPARD, & EDWARDS. Clerkenwell.—Queen-well-close, l. p. 12l. 10s., reversion in 37 yrs. 310

Canonbury.—61 and 63, Canonbury-rd., u.t. 12½ yrs., g.r. 10l., c.r. 80l. 230

Hanley.—151 and 153, Old-st., l. p. 6l., c.r. 70l. 950

Tottenham.—1a, 3a, 5a, and 7a, Tynemouth-rd., with workshops and yard, u.t. 90 yrs., g.r. 44l., c.r. 177l. 1,050

Bowes Park.—53, Palmerston-rd., y.r. 72l. 1,160

31, 33, and 35, Russell-rd., u.t. 72½ yrs., g.r. 18l., w.r. 67l. 16s. 580

By SIMMONS & SONS. Kensington.—2½ to 35 (odd), Hatfield-rd., u.t. 31 yrs., g.r. 22l. 10s., w.r. 200l. 4s. 900

Southwark.—1 to 13, Princess-pk., l. p. 2,500

Lambeth.—14 to 18, Wootton-pl., and 11, Windmill-st., l. p. 120l. 18s. 850

Camberwell.—14 and 16, Alendale-rd., u.t. 66½ yrs., g.r. 11l., y.r. 64l. 635

By WATSON & LEE. Broomfield, Essex.—"Pudding Fields," 3 a. 1 r. 22 p. f., l. p. 100

"Windmill Farm," 12 a. 0 r. 37 p. f., l. p. 270

Little Waltham, Essex.—A freehold h.h. with out-houses, and 7 a. 1 r. 0 p. f., l. p. 100

"Low Cottages" and 1 a. 0 r. 21 p. f., l. p. 630

July 23.—By BIRLEY & SONS. Rotherhithe.—12, Hothfield-pl., u.t. 66 yrs., g.r. 2l. 12s., w.r. 31l. 4s. 225

By BROWITT & TAYLOR. Bermondsey.—1 to 11, Bowley's-buildings, area 4,600 ft. f., w.r. 165l. 24s. 830

By C. H. BROWN. Walworth.—51, Carter-st., u.t. 38 yrs., g.r. 5l. 15s., c.r. 45l. 330

By H. DONALDSON & SONS. Dalston.—16, 24, and 26, Greenwood-rd., u.t. 46 yrs., g.r. 16l. 10s., y.r. 110l. 975

By FULFERS. Strand.—No. 6, l. p. 140, reversion in 14½ yrs. 7,210

Kensington.—Rockley-rd., "York House," l. p. 65l. 650

King's Cross.—2, 4, and 6, Ernon-st. (a), u.t. 13½ yrs., g.r. 10l., c.r. 100l. 8s. 800

Islington.—24, Almeda-st., u.t. 25 yrs., g.r. 8l., y.r. 40l. 240

SALES OF PROPERTY.—Continued on page 162.

List of Competitions, Contracts, etc.

For some Contracts still open, but not included in this List, see previous issues. Those with an asterisk (*) are advertised in this Number: Competitions; —; Contracts, iv. vi. viii. x.; Public Appointments, xvii.; Auction Sales, xxviii.

Certain conditions, beyond those given in the following information, are imposed in some cases, such as: the advertisers do not bind themselves to accept the lowest or any tender; that a fair wages clause shall be observed; that no allowance will be made for tenders; and that deposits are returned on receipt of a bona-fide tender unless stated to the contrary.

Competitions.

SEPTEMBER 20.—**Sunderland.**—SCHOOL.—Sunderland Borough Council invite designs from local architects in competition for a proposed school on the site of the Day Industrial School, The Green. Premiums of 50l., 20l., and 10l. are offered for first, second, and third selected designs respectively. Instructions to competitors and photographs plan of the site may be obtained from Mr. John W. Moneer, A.M.Inst.C.E., Borough Engineer, at whose office at the Town Hall designs are to be delivered from, cost before 12 o'clock at noon on September 20 next.

No DATE.—**Oldham.**—SCHOOL.—Oldham Education Committee invite competitive designs from architects practising in the Municipal Borough for a new school at Richmond Street, Westhill. Copies of instructions to architects may be obtained on application to Mr. J. Rennie, Secretary, Education Offices, Oldham.

Contracts.

BUILDING.

JULY 28.—**Bristol.**—SCHOOL.—Bristol Education Committee invite tenders for alterations and additions at Mina road Council School. The plans may be inspected at the office of Mr. Peter Addie, at the Council House, and on payment of a deposit of 2l. 1s. a copy of the specification may be obtained. Tenders, duly endorsed, must be delivered at the Office of the Education Committee, Guildhall before 10 a.m. on July 29.

JULY 30.—**Darlington.**—SIGNAL CABIN.—North Eastern Railway Directors invite tenders for the erection of a signal cabin at Darlington, near Hull. Plans, specification, quantities, and indentures may be seen at the offices of the Company's Engineer, Mr. W. J. Cadworth, at York, or District Engineer, Mr. E. Smith, at Paragon Station, Hull, where detailed quantities and form of tender may be obtained on personal application. Sealed tenders, marked "Tender for Signal Cabin at Darlington," to be sent to the Engineer, Mr. W. J. Cadworth, at York, not later than July 30.

JULY 30.—**Leeds.**—WAREHOUSE ADDITION.—For the whole or any of the following trades, viz.: Brick, layer and mason, carpenter and joiner, plumber and glazier, ironmonger, painter, slater's, and plasterer's work required for the building of additional stories to warehouse premises in Skinner-lane, Leeds, also for brick-setting No. 1 Levensham, application to Messrs. Thomas Winn & Sons, architects, 84, Albion-street, Leeds, on or before July 30, when bills of quantities will be duly forwarded.

JULY 30.—**West Boldon.**—ADDITIONS.—West Boldon Wesleyan Chapel Trustees invite tenders for proposed additions, comprising classrooms, etc. Plans may be inspected at the offices of the architect, Messrs. W. & T. R. Milburn, F.R.I.B.A., 20, Fawcett-street, Sunderland. Tenders will be received up to 12 o'clock noon on July 30.

JULY 31.—**St. Cleer.**—ADDITION TO FARMHOUSE.—Tenders are invited for the erection of an addition to farmhouse at Little Pellaucum, in the Parish of St. Cleer, near Looe. Plans and specifications may be seen at the office of Mr. Meneer Oliver, architect, Bodmin, from whom all particulars can be obtained. Sealed endorsed tenders are to be sent to the architect on or before July 31.

AUGUST 1.—**Darlington.**—SCHOOL ADDITIONS.—Darlington Borough Council invite tenders for the execution and bricklayer's work required in the additions and alterations to the Gurney Pease Memorial Schools, Albert Hill. Plans and specifications may be seen, and bill of quantities and form of tender obtained, at the office of Mr. George Winter, Borough Surveyor, Town Hall, on depositing a cheque for 2l. 2s. Tenders, endorsed "Schools," must be sent to Mr. Hy. C. Stevenson, Town Clerk, not later than noon on August 1.

AUGUST 1.—**Richmond.**—PREMISES.—The Darlington Co-operative and Industrial Society, Ltd., in connection with the erection of branch premises at Richmond, Yorkshire. Quantities can be obtained on application to Mr. L. G. Ekins, architect, Co-operative Wholesale Society, Ltd., West Blandford, Newcastle-upon-Tyne. Plans may be seen, if desired, at the offices of the society, Priestgate, Darlington. Tenders to be sent in not later than August 3, under cover of a letter to Mr. H. S. Oppen, Town Clerk, Town Hall, Widnes, not later than noon of August 1.

AUGUST 2.—**Rigg.**—HALL.—The various works in connection with reconstruction of Rigg, Cretina. Plans and specifications at Mount Pleasant School

Estimates, sealed, and marked "Hall," to be lodged with Mr. Farquhar, Mount Pleasant, Rigg, Cretina, not later than August 2 next.

AUGUST 2.—**West Hampstead.**—HOUSE.—Tenders are required by the Midland Railway Company for stationmaster's house at West Hampstead. Plans and specifications may be seen and particulars obtained at the engineer's office, Derby Station, on and after July 26. Sealed tenders (by post) to the Secretary of the Way and Works Committee, Midland Railway, 14, Abchurch-lane, London E.C. 4, not later than August 3.

AUGUST 3.—**Tonnawr.**—STABLES.—Stables at the Railway Inn, Tonnawr, near Pontrhydyfen. Plans and specification can be seen at the Railway Inn, or at office of Mr. T. Roderick, architect, Ashurst House, Aberdare, where bills of quantities can be obtained. Endorsed tenders to be sent in to architect not later than August 3.

AUGUST 3.—**Witherniewick.**—SCHOOL WORKS.—The Education Committee of the East Riding of the County of York invite tenders for the carrying out of additions and alterations to the office, at the Council school, Witherniewick. Persons desirous of tendering for the work may see the drawings, specification, and obtain forms of tender, on application to the Building Surveyor, County Hall, Beverley, or at the school during the usual hours. Tenders, endorsed "Witherniewick School," to be forwarded not later than August 3 to Mr. John Bicker, Parish Clerk, to the East Riding Education Authority, County Hall, Beverley.

AUGUST 4.—**Hayle.**—STABLE BUILDINGS.—Stable buildings, etc., at Hallanck, Hayle, in the occupation of Mr. J. H. Richards, where the plans and specifications may be seen. Tenders to be sent to Mr. S. Lawrey, Helneth, Guisal, on or before August 4.

AUGUST 4.—**Lyme Regis.**—HOTEL.—The Directors of Messrs. Mitchell Toms & Co., Ltd., invite tenders for the erection of an hotel adjoining the railway station at Lyme Regis, Dorset, in accordance with drawings and specifications to be seen at the office of Mr. A. W. Yeomans, F.R.I.B.A., architect, Cornhill, Chard, any day after July 26, between the hours of 9 a.m. and 5 p.m. of necessary information can be obtained, and also form of tender, upon which alone proposals will be received. Bills of quantities will be supplied on payment of 5l. 5s. Sealed tenders must be delivered to the Secretary of the Corporation, before 10 a.m. on August 4, endorsed "Hotel, Lyme Regis."

AUGUST 4.—**Wales Kiveton Park.**—SCHOOL ADDITIONS.—West Riding Education Committee invite whole or separate tenders for works in connection with alterations to Wales Kiveton Park provided School. Plans may be seen, and quantities obtained, on application to office of Mr. J. Vickers-Edwards, County Architect, County Hall, Wakefield. A deposit of 1l. is required. Cheques to be sent to the West Riding Treasurer, County Hall, Wakefield. Sealed tenders, properly endorsed, to be sent to the architect not later than 10.30 on the morning of August 4.

AUGUST 8.—**Bishopwearmouth.**—CEMETERY LODGE.—Bishopwearmouth Burial Board invite tenders for proposed additions and alterations to the South-east Lodge, Bishopwearmouth Cemetery. Drawings and conditions of contract may be seen, and bills of quantities and form of tender obtained, at the Borough Engineer's Office, Town Hall, Sunderland. Sealed tenders addressed "To the Chairman of the Bishopwearmouth Burial Board," must be delivered at office of Mr. F. M. Bovey, Clerk to the Board, Town Hall, Sunderland, before 12 o'clock noon on August 8.

AUGUST 8.—**Ipsleworth.**—IRON STAIRCASE, VERANDA, ETC.—Brentford Union invite tenders for the above, to be erected at Ipsleworth. Plans and specifications can be seen at office of the architect, Mr. W. H. Ward, Paradise-street, Birmingham. Tenders to be sent to clerk to the Guardians, Union Offices, Ipsleworth, W., by August 8.

AUGUST 8.—**Terrington St. Clement.**—HOTEL.—For the erection and completion of a dwelling-house at Hay Green, Terrington St. Clement, for the Old Slager Lodge of Oddfellows, Lynn. Drawings, specifications, and conditions may be seen, and further particulars obtained, of Mr. Herb. T. Tulson, architect, 16, Railway-road, Lynn. Sealed tenders to be delivered to the architect not later than noon, August 8, endorsed "Tender for House, Terrington."

AUGUST 11.—**Aberfan.**—HOTEL.—The Trustees for the Trustees of the Methodist Church, Plans and specification can be seen at the office of Mr. William Doveswell, architect, Fehars. Tenders, endorsed "Hotel," to be sent to the Rev. Moses Davies, Aberfan-road, Aberfan, on or before August 11.

AUGUST 11.—**Seaford.**—BOARDING-HOUSE.—For boarding-house proposed to be erected at Seaford, for the Seaford West Company, Ltd. Names of intending contractors to be submitted to Mr. Wm. Lambie, Estate Office, Chichester-road, Seaford, from whom schedules of quantities may be obtained in due course on a deposit of 3l. 3s. Tender, sealed and endorsed "Tender for Boarding-house," not later than August 11.

AUGUST 13.—**Barrow-in-Furness.**—COTTAGES.—The Corporation invite tenders for the erection and completion of two cottages in Buccleuch-street, Barrow for the habitation attendants. Further particulars and bills of quantities and forms of tender

may be obtained upon application at the office of the Borough Engineer and Surveyor, Town Hall. Sealed tenders, endorsed "Tender for Abolition Attendants' Houses," must be delivered at the Town Clerk's Office not later than 12 o'clock noon on August 13.

AUGUST 15.—**Lostock Hall.**—SCHOOL.—Lancashire Education Committee invite tenders for the erection of a new public elementary school at Lostock Hall, near Preston. The plans may be seen, and bills of quantities obtained, at the office of the County Architect, Mr. Henry Litter, 16, Ribblesdale place, Preston, by payment of a deposit of 2l. Tenders must be delivered before 12 o'clock noon on August 15, 1906, sealed and endorsed, to Mr. W. S. Woodcock, Council Offices, Bamber Bridge, near Preston.

AUGUST 18.—**Maesteg.**—CHURCH HALL, Bethana Church, Maesteg, require plans for the extension of their hall and chapel. The plans, with terms for carrying out the work, to be sent to Mr. Thos. Rees, Secretary, 16, Bank-street, Maesteg, not later than August 18. Information can be obtained from the Rev. Iorwerth Jones.

AUGUST 20.—**Wimbledon.**—CARP SHED.—Wimbledon Corporation invite tenders for the supply, delivery, and erection complete, at the Depot Queen's-road, Wimbledon, of a carp shed, about 165 ft. long by 30 ft. span, with open sides and consisting of galvanised corrugated iron roofing, steel roof trusses, and rolled-steel stanchions. Detailed plans and specification may be inspected, and forms of tender obtained, on application to the Borough Engineer and Surveyor, Kew Hall, Wimbledon. Sealed tenders, on the forms and enclosed in the envelopes provided, to be delivered at the Town Hall on or before noon on August 20.

AUGUST 20.—**Boola.**—RESIDENCE.—The Trustees of the Catholic Parish of Knockanore invite tenders for the erection of a curate's residence, with out offices, etc., at Boola, Co. Waterford, according to plans and specification, which can be seen at the offices of Messrs. J. Hodnett & Son, solicitors, Yaughall. The tender should contain the genuine signatures of two solvent persons willing to be bound as sureties for the contractor for the due execution of the works within the specified time. Tenders to be sent through the post addressed to Rev. Edmund English, C.C., Templemore, Co. Limerick.

NO DATE.—**Coleford.**—HOUSE.—A doctor's residence at Coleford, in the County of Gloucester, for Dr. J. Rowland Payne. Names to Mr. Ernest G. Davies, M.A., architect, 17, Bridge-street, Hereford, and at Mammoth, when plans, specification, and form of tender will be supplied.

NO DATE.—**Deephawite.**—HOUSE.—Tenders are invited for the value of the plasterer's, plumber's, and painter and glazier's work required in the erection of a house at Deephawite, near Miththorpe, for Mr. W. Marshall. Plans may be seen, and quantities obtained, on application at office of Mr. W. A. Nelson, architect, 28, Stricklandgate, Kendal.

NO DATE.—**Leeds.**—LABORATORIES.—Builders desirous of being selected to tender for the proposed mixing of metallurgical laboratories of the University of Leeds, should apply in writing (stating whether all or separate trades) to Mr. Paul Waterhouse, architect, Staple Inn Buildings, Holborn Bars.

NO DATE.—**Leeds.**—WATERING SCHEDULES.—Quantities can be obtained on application at offices of Mr. Stephen Ernest Smith, F.R.I.B.A., 12, South-parade, Leeds, for the various works required in the erection of a watering shed in Whitehall road, Leeds, for Messrs. William Lupton & Co.

NO DATE.—**Melton Mowbray.**—PREMISES.—The Melton Mowbray Co-operative Society, Ltd., invite tenders for the erection of central premises to comprise four shops, assembly-rooms, warehouse, etc., on their land in King's-road. Builders desirous of tendering may see the plans upon application in writing to the Secretary at the Society's Office, King's-road, when further particulars may be obtained as to time for delivery of tenders, etc.

NO DATE.—**Seacombe.**—METHODIST SUNDAY SCHOOL.—New Primitive Methodist Sunday School, Seacombe. Quantities and all information on application to Mr. Hy. Harper, architect, 54, Long-road, Nottingham.

NO DATE.—**Tarrington.**—PARISH ROOM.—A parish room, corrugated iron on brick foundation, at Tarrington. Plans and specifications can be had from the Rector, Tarrington.

ENGINEERING, IRON, AND STEEL.

JULY 30.—**Dublin.**—ELECTRIC LIGHTING.—The Improvements Committee of the Corporation of the City of Dublin invite tenders for the electric lighting of the main drainage pumping station, situated upon the Pigeon House-road. Specification, with general conditions and form of tender, may be inspected at the office of the City Electrical Engineer, First-street, Dublin, and may be obtained from him on payment of 10s. 6d. Tenders (sealed and marked "Tender for Electric Lighting of Pumping Station") must be addressed to the Chairman, Improvements Committee, City Hall, Dublin, and be delivered not later than 12 o'clock noon on July 30. Each tender must contain the names of two sureties, who will be prepared to execute a joint and several bond for the due performance of the contract in a sum of 20 per cent. of the contract price.

JULY 30.—Littleover.—BRICK CULVERT.—Derbyshire C.C. invite tenders for the rebuilding of a brick culvert situated on the Burton-road, near The Pastures, Littleover. The drawings and specification may be seen, and form of tender obtained, at the office of the County Surveyor, St. Mary's Gate, Derby, between the hours of 10 a.m. and 4 p.m., except on Saturdays, when they may be seen between 10 a.m. and 1 p.m. Tenders, which must be upon the form provided, are to be delivered to Mr. J. W. Horton, County Surveyor, County Offices, Derby, on or before July 20.

JULY 30.—London.—TIRES AND FILES.—The Bengal and North-Western Railway Company Directors invite tenders for the supply and delivery of (a) carriage and wagon tires; (b) files, as per specifications to be seen at the company's offices. Tenders, addressed to Mr. Alexander Inat, Managing Director, 237, Gresham House, Old Broad street, London, E.C., and marked "Tenders for Tires," or as the case may be, are to be lodged not later than noon on July 30. For each specification a fee of 10s. will be charged, which cannot, under any circumstances, be returned.

JULY 30.—Warrington.—STEEL SHAFT.—Warrington Sanitary Works Committee invite tenders for the supply of a mild steel concentric shaft, 74 in. square by 17 ft. 9 in. long, Office up, about 100 ft. and having twenty four cast iron baster arms attached, all in accordance with particulars to be obtained from Mr. R. Wilson, Manager, Longford Road, Warrington. Tenders, which must be addressed "The Chairman, Sanitary Works Committee, Town Hall, Warrington," endorsed "Tender for Concentric Shaft," and delivered not later than July 20.

JULY 31.—London.—STEEL SLEEPERS.—The Secretary of State for India in Council is prepared to receive tenders from such persons as may be willing to supply steel sleepers for the construction of railways. May be obtained on application to the Director-General of Stores, India Office, Whitehall S.W., and tenders are to be delivered at that office by 2 o'clock p.m. on July 31.

AUGUST 2.—Aylesbury.—etc.—BRIDGE REPAIRS.—Bucks C.C. invite tenders for repairs to Holman's bridge, Buckingham-road, Aylesbury; also for taking down and rebuilding the stone wing walls to the N. arch of Ickford bridge, near Thame. Plans and specifications may be seen, and further information obtained, at the office of Mr. R. F. Thomas, County Surveyor, County Hall, Aylesbury, where tenders must be delivered before 11 a.m. on August 2.

AUGUST 2.—Knockraha.—WATERWORKS.—Cork R.D. will on August 2, up to the hour of 12 o'clock noon, receive tenders for construction of waterworks at Knockraha, according to plan and specification, which may be inspected at the board-room, Cork Workhouse. Each party tendering is required to give the names and addresses of two solvent sureties who are willing to join in a bond for the due performance of the work. A deposit of 10s. is required with each tender. Mr. John Cotter, Clerk of Council, Board-room, Workhouse, Cork, will receive tenders.

AUGUST 4.—Stoke.—BOILER.—Stoke-upon-Trent Electricity Committee invite tenders for the supply, delivery, and erection of a water-tube boiler. Specification and form of tender may be obtained from Mr. P. J. S. Tiddeman, Borough Electrical Engineer, on payment of a deposit cheque of 2s. 2s. Tenders to be sent in, addressed "The Chairman of Electricity Committee, Stoke-upon-Trent," endorsed "Tender for Boiler," not later than August 4.

AUGUST 7.—Baggeridge.—RAILWAY.—Great Western Railway Directors invite tenders for the construction of a branch line to Baggeridge Colliery, near Dudley, about one and three quarter miles in length. Plans and specifications may be seen, and forms of tender and bills of quantities obtained, at the office of the new works engineer at Paddington Station, London, between the hours of 10 a.m. and 4 p.m. Tenders, addressed to Mr. G. K. Mills, Secretary, and marked outside "Tender for Baggeridge Branch," will be received on or before August 7.

AUGUST 7.—Cradley.—GOODS SHED.—Great Western Railway Directors invite tenders for the erection of a corrugated iron goods shed, offices, etc., on the Spencers End Goods Branch, Cradley. Plans and specification may be seen, and forms of tender and bills of quantities obtained at the office of the engineer at Wolverhampton Station, between the hours of 10 a.m. and 4 p.m. Tenders, addressed to Mr. G. K. Mills, Secretary, Paddington Station, London, and marked outside "Tender for Goods Shed, etc., Cradley," will be received on or before August 7.

AUGUST 7.—London.—GIRDERS.—Great Western Railway Directors invite tenders for the supply of about 250 tons of steel bridge girders and other iron and steel work of British manufacture. Plans and specification may be seen, and forms of tender and bills of quantities obtained, at the office of the engineer at Paddington Station, London, between the hours of 10 a.m. and 4 p.m. Tenders, addressed to Mr. G. K. Mills, Secretary, and marked outside "Tender for Girder Work," will be received on or before August 7.

AUGUST 7.—Panteg and Cwmbran.—FOOTBRIDGES.—Great Western Railway Directors invite tenders for the erection of footbridges in steel at Panteg and Cwmbran, Monmouthshire, respectively. Plans and specification may be seen, and forms of tender and bills of quantities obtained, at the office of the engineer at Paddington Station, London, between the hours of 10 a.m. and 4 p.m. Tenders, addressed to Mr. G. K. Mills, Secretary, and marked outside "Tender for Footbridges," will be received on or before August 7.

AUGUST 7.—Penrith.—WALLS, ETC.—Penrith U.D.C. invite tenders for the building of river walls and construction of a steel girder bridge across the River Rymon in connexion with their main outfall sewer. General conditions, specifications, bills of quantities, and forms of tender, may be obtained, and drawings inspected, at the Town Hall upon receipt of a deposit of 2s. Full particulars may be obtained from the engineers Messrs. Rierley, Holt, & Co. of Blackburn and Blackpool, or from their resident engineer Mr. J. J. Knewstubb, Town Hall, Penrith.

Sealed tenders, endorsed "Penrith Sewerage—Contract No. 3," must be delivered to Mr. George Wainwright, Clerk of the Council, Town Hall, Penrith, not later than August 7.

AUGUST 7.—Weymouth.—VIADUCT.—Great Western Railway Directors invite tenders for the reconstruction of the viaduct carrying the Weymouth and Portland line over the backwater at Weymouth, and the erection of a new station adjacent thereto. Plans and specification may be seen, and forms of tender and bills of quantities obtained, at the office of the engineer at Paddington Station, London, between the hours of 10 a.m. and 4 p.m. Tenders, addressed to Mr. G. K. Mills, Secretary, and marked outside "Tender for Works at Weymouth," will be received on or before August 7.

AUGUST 8.—Dewsbury.—METERS, PIPES, ETC.—Dewsbury Gas Committee invite tenders for the supply and delivery during the period ending July 31, 1907, of (1) sulphuric acid; (2) wet and dry gas-meters; (3) cast-iron gas and water pipes. Specifications and forms of tender may be obtained on application to the gas engineer, Mr. Chas. A. Craven, Gasworks, Savile Town, Dewsbury. Tenders, under sealed covers, endorsed "Sulphuric Acid," "Meters," or "Cast-iron Pipes," as the case may be, to be sent to Mr. H. Ellis, Town Clerk, Town Clerk's Office, Town Hall, Dewsbury, not later than August 8.

AUGUST 8.—Isleworth.—WIRING, TELEPHONES, AND BELLS.—The Brentford Union invite tenders for the alterations and repairs to buildings at Isleworth. Specifications and particulars may be had on application to Mr. W. H. Ward, Paradise-street, Birmingham. Tenders to be sent to the Clerk to the Guardians, Union Offices, Isleworth, W., not later than August 8.

AUGUST 9.—Bolton.—BOILERS.—The Electricity Committee of the Bolton Corporation invite tenders for the supply and erection of two Lancashire boilers. Specifications and forms of tender may be had on application to Mr. Arthur A. Day, A.M.Inst.C.E., M.I.E.E., Borough Electrical Engineer, S.W. Road, Bolton, and after July 25, tenders, endorsed "Tender for Boilers," to be delivered not later than 12 o'clock noon, August 9, addressed to the Chairman of the Electricity Committee, Town Clerk's Office, Town Hall, Bolton.

AUGUST 9.—Painkwick.—RESERVOIR.—Stroud Water Company Directors invite tenders for supplying materials and constructing a reservoir at Painkwick. Also for the providing and laying of about 9,163 yds. of 6-in., 4-in., C.I. mains, and 14-in., 1-in., and 3-in. galvanised pipe, together with the necessary heads, T's, valves, and fittings. Cash to be paid in Painkwick, Gloucestershire, in accordance with plans and specifications, which may be inspected at the company's office, 13, Kendrick-street, Stroud, on Mondays and Fridays. Tenders, which must be endorsed "Extension to Painkwick," are to be sent to the Secretary of the Company, 181, Queen Victoria-street, London, on or before August 9.

AUGUST 9.—Swansea.—STEEL RAILS.—The Swansea Harbour Trustees invite tenders for the supply of 150 tons of new, slightly defective, or second-hand flat-bottomed steel rails, weighing about 75 lbs. to the yard. Delivered free at the Prince of Wales Dock, Swansea. Tenders, sealed, and marked outside "Tenders for Rails," should be addressed and delivered to Mr. Talourd Strick, Clerk, Harbour Office, Swansea, at or before 10 a.m. on August 9.

AUGUST 11.—South Shields.—TRAMWAY CONSTRUCTION.—South Shields Tramways Committee invite tenders for the construction of a new line, and the carrying out of the permanent way and track, including steel rails, points, crossings, and other auxiliary work, for the extension of the Corporation Tramways, 3 furs 120 cts. double line, equal to about 6 furs 240 cts. single track. Copies of the specifications and bills of quantities, including conditions and form of tender, and also forms of contract can be obtained, and the general and detail drawings seen, at the office of Mr. S. E. Burgess, A.M.I.C.E., Borough Engineer, 10, South Shields, on or before August 11. Tenders, on forms supplied, sealed and endorsed "Tender for Tramways Permanent Way, Boldon Lane Extension," must be delivered to Mr. J. Moore Haydon, Town Clerk, at his office, Court Buildings, South Shields, on August 11.

AUGUST 13.—Dublin.—IMPROVEMENT WORKS IN CONNECTION WITH STEAM GENERATING APPARATUS AND HOT WATER SUPPLY.—Dublin Public Health Committee invite tenders for calorifiers, drying horses, economiser, and masonry work, in connexion with the steam generating apparatus and hot water supply for the baths and wash-houses, Tara-street, Dublin, in accordance with plans and specification, copies of which may be inspected at the office of the City Architect, Municipal Buildings, Cork Hill, Dublin, daily, from 11 a.m. to 4 p.m., Saturdays excepted. Copies of the plan, specification, and form of tender may be obtained from the City Architect's office, and a list of 31. Sealed tenders, addressed to the Chairman of the Public Health Committee, are to be delivered at the office of the Public Health Committee, Municipal Buildings, Cork Hill, not later than 4 p.m. on August 13.

AUGUST 21.—Sheffield.—CONVENIENCES.—Sheffield Health Committee invite tenders for the work required in connexion with underground conveniences adjoining the Town Hall in Surrey-street. Specification and plans may be seen, and quantities obtained, at the office of the City Engineer, C.E., City Surveyor, Town Hall, Sheffield, on payment of 1s. 1s. (2s.). Tenders, endorsed "Town Hall Conveniences," are to be sent in not later than 6 p.m. on August 21. Full particulars may be obtained from the Members of the Health Committee, City Surveyor's Office, Town Hall, Sheffield.

AUGUST 21.—Swansea.—LOCK GATES.—The Swansea Harbour Trustees invite tenders for three pairs of steel lock gates, together with three pairs of direct acting hydraulic presses for opening and closing the same, with all necessary valves, pipes, and connexion. On and after July 10 drawings may be inspected between 11 a.m. and 4 p.m. at the office of the Trustees' Engineer, Mr. A. O. Schenk, 1, John C. Pugh-street, Swansea. Tenders, and copies of the drawings, specification, conditions, and forms of, and instructions for tender may be obtained of Mr. Talford Strick, Clerk, Harbour Office, Swansea on payment of 5s.

MISCELLANEOUS.

JULY 30.—Epsom.—PETROLEUM.—The Epsom R.D.C. invite tenders for the supply of about 7,000 gallons of Royal Dymally American refined petroleum, delivered in 500 gallon lots as required to the Gull-fall Works, Cobham, Surrey, between August 1, 1906, and March 31, 1907. Particulars and form of tender can be obtained from Mr. F. A. Pringle, Surveyor to the Council, Waterloo-road, Epsom, to whom samples must be sent. Tenders to be forwarded to Mr. W. O. Reader, Clerk, "Lonsdale," Epsom, not later than July 30.

JULY 30.—Settle.—ROAD ROLLERS.—The Settle R.D.C. invite tenders for the supply of a 10-ton steam roller, single cylinder, fitted with attachment for Morrison's scraper. Further particulars can be obtained from Mr. W. A. Stuart, Surveyor to the Council, Town Hall, Settle. Sealed tenders, with detailed estimate, and stating date for delivery, must be sent to Mr. T. E. Pearson, Clerk, Town Hall, Settle, not later than 12 o'clock noon of July 30.

JULY 30.—Wigston Magna.—SCAVENGING.—Wigston Magna U.D.C. invite tenders for the cleansing of earth closets, privies, ashpits, and cesspools, removal of house refuse from premises, and the cleansing of the streets in Old Wigston (All Saints' Central, and St. Andrew's parishes), from August 1, 1906, to March 31, 1907. Particulars and form of tender can be ascertained from Mr. W. G. J. Clark, Sanitary Inspector to the Council, Blaby-road, Wigston Magna. Tenders, under sealed covers, must be sent to Mr. A. H. Burgess, Clerk to the Council, 1, Berkeley-street, Leicester, not later than 10 a.m. on July 30.

JULY 31.—Bedwelly.—FURNITURE.—Bedwelly Guardians invite tenders from furniture manufacturers for furnishing the new board-room at the Tredgar Workhouse. Drawings and specification may be seen, and further particulars may be obtained from Messrs. James & Morgan, F.F.R.I.B.A., architects, Charles-street Chambers, Cardiff. Tenders, sealed, and marked "Furniture," must be delivered to Mr. Herbert J. C. Shepard, Clerk to the Guardians, Tredgar, not later than July 31.

JULY 31.—Rhonda.—TRAMWAY MATERIALS.—Rhonda District Committee invite tenders for the supply of the following tramway materials, delivered free on rail at the Old Dunraven sidings of the Taff Vale Railway, Blackheath, Glam.: (1) 80 to 110 tons short railings, 12 in. by 4 in., in lengths of 12 to 35 ft.; to the yard; (2) the necessary quantity of fish plates and bolts to match the rails offered; (3) ten to twenty sets of points and crossings (long and short) and switches, 12 in. by 4 in.; (4) 2 to 4 tons of the tramroad is 2 1/2 in.; (4) 2 to 4 tons of dogs; (5) 2,000 to 4,000 B.A. sleepers, rectangular, 6 ft. by 12 in. by 4 in.; (6) 2,000 to 4,000 half-round bolts, 1/2 in. by 4 in. Tenders may be offered for the whole or any of the above items, and tenderers are requested to state the earliest date upon which they are prepared to guarantee delivery of goods. Any further particulars required may be obtained upon application to Mr. J. E. Hughes, Waterworks Engineer, Tredegar, Glam. Tenders, which must be endorsed "Tender for Tramway Materials," and addressed to "The Chairman of the Waterworks Extension Committee," at the Council Offices, Pontre, Glam., must be delivered not later than 10 a.m. on July 31.

AUGUST 1.—Bathgate.—CUTTING TRACKS.—Bathgate District Committee invite tenders for cutting tracks for cable in connexion with the supply of lighting system. Specifications may be obtained from Mr. J. G. B. Henderson, County Clerk, Linthouse, Glasgow. Tenders, which must be enclosed in an envelope "Tender for Tranching," must be returned to him not later than August 1.

AUGUST 1.—Bathgate.—ELECTRIC CABLE.—The Bathgate District Committee invite tenders for laying 1,170 yds. of electric cable. Specifications may be obtained from Mr. J. G. B. Henderson, District Engineer, Linthouse, and sealed tenders, endorsed "Tender for Cable," must be returned to him not later than August 1.

AUGUST 1.—Widnes.—TURNING DOWNS, ETC.—The Corporation of Widnes invite tenders for the taking down and reconstruction of dwelling-house No. 14, Appleton, and certain outbuildings at Victoria Park and recreation ground. Plans and specifications may be seen, and forms of tender obtained, upon application to Mr. John S. Sinclair, A.M.I.C.E., Borough Surveyor, Widnes. Tenders, endorsed "Taking Down of 14, Appleton," must be delivered to Mr. H. R. Appleton, Town Clerk, Town Hall, Widnes, not later than noon of August 1.

AUGUST 3.—Nottingham.—URINAL FITTINGS.—Nottingham Health Committee invite tenders for taking out the old fittings and supplying and fixing new urinal fittings and making other alterations to the existing urinals at Derby-road and Commercial-street, St. Ann's Well-road. Plans may be seen, and specifications and forms of tender obtained from Mr. Frank B. Lewis, City Architect, Guildhall, on payment of a deposit of 11s. Sealed tenders to be delivered to Mr. Edmund C. Johnson, Town Clerk, Guildhall, Nottingham, at or before 10 a.m. on August 3.

AUGUST 4.—Darlington.—SCAVENGING.—Darlington R.D.C. invite tenders for the scavenging of the whole of the township of Haughton-le-Skerne. For form of tender and conditions, apply to Mr. John Robinson, Sanitary Inspector, Union Offices, Darlington. Tenders to be sealed, and marked "Tender for Scavenging Haughton-le-Skerne Township," to be sent to Mr. Chas. H. Leach, Clerk to the Council, Union Offices, Darlington, before noon on August 4.

AUGUST 11.—Achnach.—ROAD ROLLERS.—Achnach R.D.C. invite tenders for the hire of a 10-ton steam roller, etc., from October 1, 1906, to November 30, 1906, and from March 1, 1907, to May 31, 1907, are invited. Particulars may be had on application to Mr. Joseph Everest, Clerk to the Council, St. John's Hill, Shrewsbury; or the Surveyor, Mr. T. Fortune, 1, St. John's Hill, Shrewsbury, for a man and horse for the use of the steam roller, and the work with the steam roller. Sealed tenders must be sent to Clerk not later than August 11, marked on outside "Steam Roller" or "Man and Horse," as the case may be.

PAINTING, etc.

July 30.—**Barnstable**.—PAINTING.—Tenders are invited for the colouring and painting of certain rooms in the Art School. Specifications may be obtained from the caretaker. Tenders, in writing, to be delivered to Mr. George W. F. Brown, The Square, Barnstable, Secretary, marked "Tender for Painting," on or before July 30.

July 30.—**Croydon**.—PAINTING.—Croydon Guardians invite tenders for internal painting and decorating work at the Union Offices. The specifications, conditions of contract, and form of tender may be obtained at the office of Mr. Henry Berney, architect, 194, Gorsefield, Croydon. Surveyor to the Guardians, upon depositing the sum of 2l. 2s. The contractor will be required to enter into a contract and bond, with two sureties approved by the Guardians, for the due performance thereof. Sealed tenders, marked "Tender for Painting," etc., addressed to Mr. Harry List, Clerk to the Guardians, Union Offices, Mayday-road, Thornton Heath Surrey, must be delivered not later than 4 o'clock p.m. on July 30.

July 30.—**Gravesend**.—PAINTING.—Gravesend Education Committee invite tenders for the internal decoration of King-street and Northam-road Schools. Specification may be seen at the Borough Surveyor's Office, Town Hall, and endorsed tenders are to be delivered to office of Mr. H. H. Brown, Town Clerk, 10, Windmill-street, London, before July 30.

July 30.—**Warrington**.—PAINTING.—Warrington Electricity and Tramways Committee invite tenders for (a) Painting tramway poles and brackets; (2) painting electric light standards. Particulars can be obtained on application to Mr. F. V. L. Mathias, Borough Electrical and Tramways Engineer, Howley, Warrington. Tenders must be sealed with wax, endorsed "Tender for Painting Poles," and delivered not later than 12 o'clock noon on July 30, addressed to the Chairman of the Electricity and Tramways Committee, Town Hall, Warrington.

July 31.—**Manchester**.—PAINTING.—Manchester Libraries Committee invite tenders for painting at the Bradford Library. Specification may be obtained on application to the City Architect, Town Hall, Manchester, on payment of 1l. 1s. Sealed tenders (enclosed in the official envelope) will be received at the City Architect's Office not later than 9 a.m. on July 31.

August 2.—**Manchester**.—PAINTING.—Manchester Parks Committee invite tenders for painting required at Ardwick Green, Birch Fields, Chorlton, Gorton, Bradford, and Whitworth Parks. Specifications may be obtained at the City Architect's Office, Town Hall, upon payment of 1l. 1s. each. Separate sealed tenders enclosed in the official envelope to be delivered at the above office not later than 9 a.m. on August 2.

No DATE.—**Colchester**.—PAINTING, etc.—For painting and decorating Eldon, Chapel, Colchester. Messrs. Baker & May, architects, Colchester.

No DATE.—**Longton**.—PAINTING.—Painting, Colouring, etc., at the under-mentioned schools within the borough, viz.: Woodhouse, Florence, High-street, Edensor, St. James's, Nornacoct. Specifications and other particulars may be obtained on application to Mr. J. W. Wardle, A.M.I.N.C.E., Borough Surveyor, Court House, Longton.

ROADS, SANITARY, AND WATER WORKS.

July 30.—**Amble**.—STREET WORKS.—Amble U.D.C. invites tenders for public street improvements in High-street and Percy-street. Plans and particulars of the work can be seen at the surveyor's office, where tenders will be received up to July 30, at 6 o'clock W. Gibson, surveyor, 94, Queen-street, Amble.

July 30.—**Romford**.—KERBING.—Romford R.D.C. invite tenders for supplying and fixing best quality new Norway granite kerb (flat), as follows, viz.:—Hornchurch Parish, about 940 ft.; Rainham Parish, about 575 ft.; Umminster Parish, about 475 ft. Specification, with form of tender annexed, and particulars may be obtained on application to Mr. George Lapwood, Highway Surveyor, Victoria-road, Romford. Sealed tenders, endorsed "Tender for Kerbing," must reach Mr. William Smith, Clerk, Council Offices, 13, North-street, Romford, not later than July 30.

July 30.—**Warrington**.—STREET WORKS.—Warrington Paving and Sewerage Committee invite tenders for the forming and paving of the following streets:—Part-street, Navigation street (footpath). Drawings, specifications, etc., may be seen, and forms of tender, bills of quantities, and all further information obtained at the office of the Borough Surveyor, Town Hall, on payment of a deposit of 1l. 1s. Tenders must be delivered before 12 o'clock on July 30.

July 31.—**Featherstone**.—ASPHALTING.—For asphaltting portion of playground, Featherstone Provident School (boys). Contractors to make own

measurements. Head master will point out portion. Further particulars at Education Offices, Knottley. Tenders to Mr. Chas. Harris, by July 31.

July 31.—**Gosforth**.—ROAD WIDENING.—Gosforth U.D.C. invite tenders for taking down and setting back the boundary wall of the South Gosforth Council School, Station-road; under-setting the north wall of the school building, and forming the added width of roadway. All particulars may be obtained from Mr. Geo. Nelson, Engineer and Surveyor to the Council, Council Chambers, High-street, to whom application should be made for quantities. Tenders, endorsed "Road Widening, etc., South Gosforth Council School," to be sent to Mr. E. Sheraton Holmes, solicitor, Clerk to the Council, Council Chambers, Gosforth, not later than July 31.

July 31.—**Knottley**.—ASPHALTING.—For asphaltting portion of playground (about 800 yds.). Knottley Weald-road Provident School. Contractors to make own measurements. Further particulars of Mr. Charles Harris, Education Offices, Knottley. Tenders to be forwarded by July 31.

July 31.—**New Hunsanton**.—STREET WORKS.—The U.D.C. of New Hunsanton invite tenders for the making up of part of Northgate in New Hunsanton. The specification and plan can be seen, and particulars obtained, at the office of the Surveyor of the Council, New Hunsanton. Tenders, addressed to Mr. J. S. B. Glasier, Clerk to the Council, Council Offices, New Hunsanton, and marked on the outside "Tender for Private Street Works," to be sent to him on or before July 31.

August 1.—**Linton**.—SEWERAGE WORKS.—Repton R.D.C. invite tenders for the provision, laying, and jointing of about 1,800 yds. of 9-in. stoneware pipe sewer, with 12 manholes and lampoles, and the construction of a small sewage tank, laying out irrigation area, and other works. Plans and specification may be seen, and bills of quantities obtained, at the office of the engineer, Messrs. Wilcox & Raikes, of 65, Temple-row, Birmingham, on payment of a deposit of 3l. 3s. Sealed tenders, in envelopes supplied, endorsed "Linton Sewerage, Contract No. 1," to be delivered at children's, 10, Chamberlain, Clerk to the Council, Union Offices, Burton-on-Trent, not later than 12 noon on August 1.

August 1.—**Merthyr Tydfil**.—CRUMBLING AND SEWERAGE.—The Corporation of Merthyr Tydfil invite tenders for the supply and delivery of the following pipes, viz.:—910 lin. yds. 30-in. glazed socketed stoneware pipes, 440 lin. yds. 12-in. glazed socketed stoneware pipes, 1440 lin. yds. 8-in. glazed socketed stoneware pipes, 50 lin. yds. 30-in. mild steel tubes. The above to be delivered at Quaker's Yard, or Tredegar, as may be directed. Plans and specifications may be seen, and forms of tender obtained, on application at the office of the Borough Engineer. Sealed tenders, endorsed "Sewer Pipes," to be sent to Mr. T. Aneuryn Bevan, Town Clerk, Town Hall, Merthyr Tydfil, not later than noon on August 1.

August 2.—**Rickmansworth**.—STREET WORKS.—Rickmansworth U.D.C. invite tenders for the construction of about 600 yds. of stoneware pipe sewer with manholes and other incidental works in connection therewith in Copthorne-road, Rickmansworth. Drawings and specifications may be seen, and quantities, form of tender, and all other particulars obtained, on application to the Council's Surveyor, Mr. A. Freeman, at his office, Church-street, Rickmansworth. Sealed tenders, endorsed "Tender for Private Street Works," must be delivered to Mr. H. Lomas, Clerk to the Council, Council Offices, Church-street, Rickmansworth, before noon on August 2.

August 2.—**Dallas**.—WATER SUPPLY.—The works in connection with introducing a water supply to the village of Dallas, for the C.C. of Elginshire. Plans and specification may be seen with Mr. Charles C. Doig, C.E., Elgin, and offers will be lodged with him on or before August 3.

August 7.—**Hemsworth**.—THORPE AUDLIN WATER SUPPLY.—The R.D.C. of Hemsworth invite tenders for the supply of 1,982 lin. yds. of cast-iron socketed water main pipes, 3-in. diameter. They also invite tenders for the forming and filling of trenches and the laying and jointing of about 1,982 lin. yds. of 3-in. cast-iron water mains at Thorpe Audlin, near Pontefract. Plans, etc., may be seen at the office of Mr. T. H. Richardson, surveyor, Hemsworth. Tenders are to be sent to Mr. John Scholefield, Clerk to the Council, Hemsworth, near Wakefield, not later than August 7.

August 8.—**Bedlingtonshire**.—SEWERAGE WORKS.—Bedlingtonshire U.D.C. invite tenders for the construction of the following lengths of sewers, inclusive of manholes, gullies, connections, and other works:—1,288 lin. yds. 18-in. earthenware pipe sewer, 161 lin. yds. 15-in. earthenware pipe sewer, 72 lin. yds. 12-in. earthenware pipe sewer, 27 lin. yds. 9-in. earthenware pipe sewer, 91 lin. yds. 18-in. cast-iron outlet pipe sewer. Drawings and specifications may be seen, and quantities,

form of tender, and all other particulars obtained, by appointment at the office of the Surveyor to the Council, Mr. J. E. Johnston, Front-street, Bedlington. Sealed tenders, endorsed "Tender for Sewer, Bedlington Bank Top," to be sent to Mr. Charles D. Forster, Clerk of the District Council, 24, Grainger-street West, Newcastle-on-Tyne, on or before 9 a.m. on August 6.

August 8.—**Buglawton**.—SEWERAGE WORKS.—Buglawton U.D.C. invite tenders for the construction of about 1,965 yds. of 6-in., 9-in., and 12-in. pipe sewers, with the necessary manholes, lampoles, ventilating shafts, and other works connected therewith. Drawings and specifications may be seen, and bills of quantities and forms of tender, and all information obtained at the office of Mr. C. Russell Hall, Engineer and Surveyor, Chapel-street, Congleton, on payment of 5l. 5s. for each contract. Sealed tenders, endorsed "Sewerage Works," to be delivered to Mr. Arthur Andrew, Clerk, Waggs-street, Congleton, not later than August 8.

August 8.—**Farnworth**.—PAVING, etc.—The Farnworth U.D.C. invite tenders for sewerage, leveling, paving, metalling, flagging, channelling, and other works improving Fletcher-street and Lucy-street. Plans, sections, specifications, and draft contracts may be seen, and quantities obtained, from the surveyor, Mr. W. J. Lennax, 13, Fore-street, Bolton. Tenders, endorsed "Tender for Paving, etc.," to be sent to Mr. W. Tyldesley, Clerk, Council Offices, Farnworth, not later than 4 o'clock on August 8.

August 13.—**South Shields**.—Roads.—South Shields Corporation invite tenders for the masonry, pavements, and roadworks required in the lowering of roads, widening of carriageways, setting back kerbs, forming footways, rebuilding road gullies, etc., in connection with the construction of the Hudson-street and Boldon-lane extension of the Corporation Tramways. Forms of tender may be obtained at the office of Mr. S. E. Burgess, M.I.C.E., Engineer and Surveyor, Chapter-row. Tenders, endorsed "Tender for Masons, Pavements, and Roadworks," to be sent in to the Town Clerk's Office, Council Buildings, South Shields, not later than 12 noon on August 13.

August 13.—**Kerridge**.—SEWERAGE.—Bollington U.D.C. invite tenders for the construction of the sewerage of Kerridge. The works comprise about 1,855 yds. of 7-in. and 8-in. stoneware pipe sewers, together with manholes, lampoles, and other appurtenant works. Plans may be seen, and quantities and form of tender may be obtained, at the office of the Engineer, Mr. W. H. Radford, C.E., Albion-chambers, King-street, Nottingham, on deposit of 2l. 2s. A copy of the plans may be seen at the office of Mr. S. Knight, Clerk, Council Offices, Bollington. Sealed and endorsed tenders to be sent in to Mr. Samuel Knight, Clerk to the Council, Council Offices, Bollington, near Macclesfield, on or before August 13.

STONE, MATERIALS, AND STORES.

July 30.—**Chelmsford**.—GRANITE.—Chelmsford Guardians require 100 tons of rough granite for breaking by casual paupers. The granite must be delivered into the store at the Union House, Wood street, Chelmsford, on or before August 30 next. Persons desirous of tendering for the above supply may obtain forms of tender on application to Mr. W. W. Duffell, Clerk, 55, High-street, Chelmsford.

July 30.—**East Dereham**.—GRANITE.—East Dereham U.D.C. invite tenders for 400 tons (more or less) of 24-in. broken granite, and 400 tons (more or less) of 12-in. broken granite, to be delivered free at the East Dereham Station of the Great Eastern Railway Company before the end of November. Forms of tender may be obtained on forwarding a stamped addressed foolscap envelope to the Surveyor, Mr. H. G. Himson, Theatre-street, East Dereham. Sealed tenders, endorsed "Tender for Granite," to be sent to Mr. B. H. Vores, Clerk to the Council, not later than July 30.

July 30.—**Hipperholme**.—GRANITE.—The Hipperholme U.D.C. invite tenders for the supply of dress and granite for the ensuing year. Tender forms may be obtained from Mr. G. Wharton Thompson, surveyor, on or before July 30.

August 1.—**Cavan**.—GRAVEL.—Cavan U.D.C. will, in the Court-house, Cavan, on August 1, at 4 o'clock p.m., consider tenders for the supply of 1,000 tons of gravel and 300 tons of rough stones (for steam-rolling purposes), at — per ton, to be delivered at such times, in such places, and in such quantities (for spreading purposes) as the Town Surveyor may direct. The gravel will require to be broken to pass through a 2-in. ring. Tenders to be prepared, sealed and registered, and addressed to the Chairman, U.D.C., Cavan.

August 5.—**Egypt**.—FILES.—Tenders are required by the Egyptian War Department for 336 doz. files. Tender forms may be obtained from Lieut. Col. J. H. Western, Queen Anne's Chambers, Westminster, and are returnable to him by August 3.

Public Appointments.

Nature of Appointment.	By whom Advertised.	Salary.	Applications to be in
*CLERK OF WORKS	Donbitchshire County Council	3l. 3s. per week	Aug. 11
*CLERK OF WORKS	Covenry Education Com.	2l. 10s. per week	Aug. 25

Auction Sales.

Nature and Place of Sale.	By whom Offered.	Date of Sale.
*MACHINERY, IRONMONGERY, Etc.—At Phenix Saw Mills, St. Leonards-road, Poplar, E.	Joseph Hibbard & Sons	Jy. 31, A.G. 1
*GRAND FREEHOLD BUILDING SITE, 7 and 8, Poultry, E.C.—At the Mart.	Edwin Fox & Bousfield	Oct. next

SALES OF PROPERTY.—Continued from page 158.

By EDWIN EVANS.		
Batterssea.—16 and 18, Bridge-rd. West, yr. 56l.	1955	
1, also 182, yr. 182, venient in 20 yrs.		
By CHARLES B. BARNES.		
Clapham.—75 and 67, Rectory-gt., ut. 524 yrs.	675	
gr. 64, 65, yr. 751.		
14 to 20 (even), Liston-rd., ut. 60 yrs., gr.	1,250	
282, yr. 1674.		
Batterssea.—109, 111, 113, 115, 117, 119, ut. 374	580	
yr. 182, w.r. 922, 08.		
By A. M. NEWCOMBE.		
Bermondsey.—55 and 68, Malby-st., and 26,	135	
Larnac-st., ut. 7 yrs., gr. 104, w.r. 1144, 08.		
<p><i>Contractions used in these lists: F, gr. for freehold</i> <i>gr. for ground-rent; p. for purchase; r. for rent; l. gr. for</i> <i>improved ground-rent; gr. for ground-rent; p. for rent;</i> <i>fr. for freehold; c. for copyhold; l. for leasehold; p. for</i> <i>possession; e.r. for estimated rental; w. for weekly</i> <i>rental; g. r. for ground-rent; y. for yearly rental;</i> <i>u. for unexpired term; p. s. for per annum; yrs. for</i> <i>years; la. for lane; st. for street; rd. for road; sq. for</i> <i>square; pl. for place; ter. for terrace; crs. for crescent;</i> <i>av. for avenue; p. s. for garden; u. for unimproved</i> <i>land; p. s. for public-house; o. for office; s. for shops; c. for court.</i></p>		

MEETING.

SATURDAY, JULY 28.
Northern Architectural Association.—An Excursion Meeting. Members to assemble at Stockton Station at 3.56 p.m.

TERMS OF SUBSCRIPTION.

"THE BUILDER" (Published Weekly) is supplied DIRECT from the Office to residents in all parts of the United Kingdom at the rate of 12s. per annum (52 numbers) PREPAID. To all parts of Europe, America, Australia, New Zealand, India, China, Ceylon, etc. 20s. per annum.

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PRICES CURRENT OF MATERIALS.

* Our aim in this list is to give, as far as possible, the average prices of materials, not necessarily the lowest. Quality and quantity obviously affect prices—a fact which should be remembered by those who make use of this information.

This information.		BEICKS, &c.	
	£ s. d.		
Hard Stocks	1 10 0	per 1000 alongside, w river.	
English Stocks and Gravel	1 7 0	" "	
Pickled Stocks for Frazzles	2 17 6	" "	delivered
Flemons	1 8 0	" "	at railway dep t.
Best Fire Bricks	1 14 0	" "	" "
Best Farcham Red	3 12 0	" "	" "
Best Red Pressed			
Bunton Facing	5 0 0	" "	" "
Best Blue Pressed Staffordshire	3 15 0	" "	" "
Do. Bullnose	4 0 0	" "	" "
Best Stourbridge Fire Bricks	3 14 0	" "	" "
GLAZED BEICKS.			
Best Ivory and White Glazed			
Stretchers	12 0 0	" "	" "
Headers	11 0 0	" "	" "
Quoins, Bullnose, and Flats	16 0 0	" "	" "
Double Stretchers	19 0 0	" "	" "
Double Headers	15 0 0	" "	" "
One Side and two Ends	19 0 0	" "	" "
Two Sides and one End	20 0 0	" "	" "
Spalls, Chamfered, Squins	20 0 0	" "	" "
Best Dipped Salt Glazed Stretchers, and Headers	12 0 0	" "	" "
Quoins, Bullnose, and Flats	14 0 0	" "	" "
Double Stretchers	14 0 0	" "	" "
Double Headers	14 0 0	" "	" "
One Side and two Ends	15 0 0	" "	" "
Two Sides and one End	15 0 0	" "	" "
Spalls, Chamfered, Squins	14 0 0	" "	" "
Second Quality White and Dipped Salt Glazed	2 0 0	" "	less than best.
s. d.			
Thames and Pit Sand	7 0	per yard, delivered.	
Thames Ballast	5 6	" "	
Best Portland Cement	27 0	per ton.	
Best Ground Blue Lias Lime	19 0	do.	

NOTE.—The cement or lime is exclusive of the ordinary charge for sacks.

STONE.

BATH STONE—delivered on road wag-	s.	d.
gons, Faddington Depot	1	6½ per ft. cube
Do. do. delivered on road wagons,		
Nine Elms Depot	1	8½ " "
PORTLAND STONE (20 ft. average)—		
Brown Whitbed, delivered on road		
wagons, Faddington Depot, Nine	2	1 " "
Elms Depot, or Pimlico Wharf.....		
White Haselbed, delivered on road		
wagons, Faddington Depot, Nine		
Elms Depot, or Pimlico Wharf.....	2	2½ " "

STONE (continued).

Anacaster in blocks.....	s. d.	1	10 per ft. cube, deld. rly. depot
Beer "	1	6	" "
Greenish "	1	10	" "
Darley Dale in blocks "	2	4	" "
Red Crossed "	2	2	" "
Closeburn Red Freestone "	2	4	" "
Red Mansfield "	2	4	" "
YORK STONE—Robin Hood Quality.			
Scrapped random blocks.	2	10	" "
6 in. sawn two sides land- ing to sizes (under 40 ft. super.)	2	3 per ft. super., "	" "
6 in. rubbed two sides ditto, ditto	2	6	" "
3 in. sawn two sides slabs (random sizes)	0	11 3/4	" "
2 in. to 2 1/2 in. sawn one side slabs (random sizes)	0	7 1/2	" "
1 1/2 in. to 2 1/2 in. ditto, ditto	0	6	" "

HARD YORK—

Scalloped random blocks.	3	0	per ft. cube,	31
in. sawn two sides landings to sizes (under				
40 ft. super.)	2	8	per ft. super.,	32
6 in. rubbed two sides				
ditto	3	0	"	33
3 in. sawn two sides slabs (random sizes)	1	2	"	34
2 in. self-faced random flags	0	5	"	35

Horton Wood (Hard Bed) in blocks 2 0 per ft. cuba. dald.

6 in. sawn both	2 7	perft.	super.deld.	rlly. depôt.
sides landings				
3 in. sawn both				
sides random				
slabs	1 0			
2 in. do.	0 8½			

SLATES.

In. In.		S. d.	
20	× 10 best blue Bangor	12	2 6 per 1000 of 1200 at r. d.
20	× 12 " " "	13	17 6 " "
20	× 10 first quality	18	0 0 " "
20	× 12 " " "	13	15 0 " "
16	× 8 " " "	7	5 0 " "
20	× 10 best blue Fort- madoc	12	2 6 " "
16	× 8 " " "	6	12 6 " "
20	× 10 best Europa un- fading green...	15	17 6 " "
20	× 12 " " "	18	7 6 " "
18	× 10 " " "	13	5 0 " "
16	× 8 " " "	10	5 0 " "
20	× 10 permanent green	11	12 6 " "
18	× 10 " " "	9	12 6 " "
16	× 8 " " "	6	12 6 " "

THE

TILES.		d.	
Best plain red roofing tiles ..	42	0	per 1000 at rly. depot
Hip and Valley tiles ..	8	7	per doz. "
Best Broseley tiles ..	50	0	per 1000 "
Do. Ornamental tiles ..	50	6	per 1000 "
Hip and Valley tiles ..	4	0	per doz. "
Best Ruban red, brown, or branded do. (Edwards)	57	6	per 1000 "
Do. Ornamental do.	60	0	per 1000 "
Hip tiles ..	3	0	per doz. "
Valley tiles ..	3	0	per doz. "
Best Red and white shire do. (Peakes) ..	51	9	per 1000 "
Do. Ornamental do.	54	6	per 1000 "
Hip tiles ..	3	1	per doz. "
Valley tiles ..	3	8	per doz. "
Best "Rosemary" brand plain tiles ..	48	0	per 1000 "
Best Ornamental tiles ..	50	0	per 1000 "
Hip tiles ..	40	0	per doz. "
Valley tiles ..	3	8	per doz. "
Best "Hambill" plain tiles, sand-faced ..	50	0	per 1000 "
Do pressed ..	47	6	per doz. "
Do. Ornamental do.	50	0	per doz. "
Hip tiles ..	3	8	per doz. "
Valley tiles ..	3	6	per doz. "

WOOD

BUILDING WOOD.		At per standard.	
Deals: best 3 in. by 11 in. and 4 in.	£ s. d.	£ s. d.	
by 9 in. and 11 in.	13 0 0	10	15 0
Deals: best 3 by 9	13 0 0	10	14
Deals: best 3 by 9	13 0 0	10	14
8 in., and 3 in. by 7 in. and 8 in.	11 0 0	10	12 0
Battens: best 2½ by 6 and 3 by 6	0 10 0	0	13 0
Deals: seconds	1 0	0	13 0
Battens: seconds	0 10 0	0	13 0
2 in. by 4 in. and 2 in. by 5 in.	9 0 0	10	10 0
2 in. by 4 in. and 2 in. by 5 in.	8 10 0	0	9 10
Foreign Sawn Boards			
1 in. and 1½ in. by 7 in.	0 10 0	0	more than 13 0
3 in.	1 0 0	0	battens.
	At per load of 50		
Fir timber: best middling Danzig or Menzel (average specification)	4 10 0	0	5 0
Small timber (8 in. to 10 in.)	4 0 0	0	4 10
Small timber (8 in. to 10 in.)	3 12 6	0	3 15
Small timber (6 in. to 8 in.)	3 0 0	0	3 10
Small timber (6 in. to 8 in.)	3 0 0	0	3 10
Flitch-pine timber (30 ft. length)	4 10 0	0	4 15

JOINERS' WOOD

White Sea: first yellow deals,					
3 in. by 11 in.	24	0	0	...	25 0
3 in. by 9 in.	22	0	0	...	23 0
Battens, 2 $\frac{1}{2}$ in. and 3 in. by 7 in.	6	10	0	...	18 0
Second yellow deals, 3 in. by 11 in.	18	10	0	...	20 0
3 in. by 9 in.	17	10	0	...	19 0
Battens, 2 $\frac{1}{2}$ in. and 3 in. by 7 in.	13	10	0	...	14 10
Third yellow deals, 3 in. by					
11 in. and 9 in.	13	10	0	...	15 0
Battens, 2 $\frac{1}{2}$ in. and 3 in. by 7 in.	11	0	0	...	12 0

WOOD (continued).

[illegible]

JOISTS, GIRDERS, &c.

	Joists, Girders, &c.	London, or delivered
		Railway Vans, per ton.
		£ s. d.
Bolled Steel Joists, ordinary	7 0 0	... 7 10 0
sections		
Compound Girders, ordinary	9 0 0	... 10 0 0
sections		
Steel Compound Stanchions	12 0 0	... 13 0 0
Angles, Tees, and Channels, ordinary		
sections	9 0 8	... 10 0 0
Flitch Plates	9 0 0	... 10 0 0
Cast Iron Columns and Stanchions		
including ordinary patterns	7 10 0	... 8 10 0

METALS. P

[illegible]

LEAD, &c.

	£ s. d.	£ s.
LEAD—Sheet, English, 3lb. and up.	19 7 6	...
Pipe in coils	19 7 6	...
Cast—Sheet	22 17	...
Compo pipe	22 7 6	...
ZINC—Sheet	33 0	0
Sheet—Montagne	32 15	0
Silesian	32 15	0
COPPER—		
Sheet—English	0 1 1	...
Thin	0 1 2	...
Copper nails	0 1 0	...
BRASS—		
Sheet—English	0 1 0	...
Thin	0 1 1	...
Tin—English ingots	0 1 10	...
SOLDER—		
Flux—Bakers	0 1 3	...
Turner's	0 1 11	...
Blowpipe	0 1 0	...

ILLUSTRATIONS.

Selected Design for St. Pancras Central Library.....	Messrs. S. B. Russell and T. Edwin Cooper, F.F.R.I.B.A., Architects.
First Premiated Design for Reddish Free Library and Fire Station.....	Messrs. Dixon & Potter, Architects.
House at Chasellas, near St. Moritz.....	Mr. H. Inigo Triggs, Architect.
Competition Design for the Peace Palace at the Hague.....	By Mr. Stanley D. Adshead, F.R.I.B.A.

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Report of the Motor-car Commission.



HE long-expected Report of the Royal Commission on Motor-cars has at length appeared. The Report is in the form of a Blue-book of some eighty pages, including

two "annexes" dealing with the law of foreign countries and the administration, maintenance, and construction of roads in France, the Netherlands, and Germany. In the first place, we will shortly summarise some of the recommendations of the Commission, reserving any comments on these recommendations.

As to speed the majority of the Commission recommend the abolition of the speed limit contained in sect. 9 of the Motor-car Act, 1903, leaving control to be exercised under sect. 1 alone, which is to be amended so as to make it applicable to all cases of reckless or negligent driving to the common danger, with an express provision against road racing. The Report contains a recommendation that the local authorities should deal with the speed in towns, villages, and at dangerous points, but suggests that even at such places it shall only be an offence where the speed exceeds 12 miles, but in special circumstances it is suggested that the local authorities may apply to the Local Government Board to exert the powers conferred by sect. 8 of the Motor-car Act to impose a less speed.

One needed reform is advocated in

paragraph 31, that the Highway Acts should be amended so as to compel drivers to keep on the near side of the road: At present this rule is only applicable "when meeting another vehicle," and motorists drive all over the roads when no other vehicle is in sight. The Commission recommends that the speed of heavy motor-cars weighing from two to three tons, having non-resilient tyres, shall be reduced from 8 to 5 miles an hour.

Pausing here, we should point out that the Commission in their Report say that they find on the evidence that it is in the country that the chief causes for complaint exist. The reason for this is twofold; in the first place the roads are unencumbered by traffic; and, secondly, the police are not present in any numbers. The chief constables from counties were all in favour of the retention of a speed limit, and some of them were of opinion that it facilitated conviction. In country districts there is often only one constable, who has night duty and is in bed by day, and it is almost impossible for a private individual to obtain a conviction unless an actual accident has occurred. In the above recommendations it would appear that the Commission have overlooked the defenceless condition of dwellers in the country, and the recommendations, if carried out, would practically legalise a speed of 12 miles even round corners through villages. The Commission in paragraph 28 recognise the danger of excessive speed by night, but the Report contains no suggestions how this should be obviated. By night the danger-posts advocated in the Report are invisible, and

hence even at dangerous places the motorist may continue in ignorance at a high speed, and the roads after dark will be veritable death-traps.

So far speed has only been considered in regard to safety, but when we turn to the Report in connexion with the dust question we find that, although the Commission find that motor-cars raise comparatively little dust when travelling at speeds below 10 miles an hour, and that the amount of dust increases very greatly from 12 to 20 miles speed, yet they are not prepared to make any recommendation making dust production a statutory offence. We venture to think from the extracts of the evidence published in the Report, that the Commission have hardly realised what the dust question means outside suburban areas and where roads are not watered, and the dissatisfaction that will be felt by their Report on this part of the subject.

The Report says that little can be done to mitigate dust, in the build of the cars themselves, so the Commission turns to the treatment of the roads. It finds that the best kind of road is the road with solid foundations, surfaced with granite or similar hard stone, the binding material being screened gravel or chippings of the stone used; whilst to meet exceptionally heavy traffic the German method is recommended for consideration, armouring a metalled road surface with stone blocks or "random setts," the French tarring system being advocated on dusty main roads. But the Commission do not seem to have had their attention drawn to the serious ill-

effects such very hard roads have on horses' hoofs. We have already drawn attention to this point, and horse owners are as entitled to consideration as motorists. The Commission recognise the serious question of extra expenditure, but we doubt whether their recommendation that the licence duties should be raised and devoted by a special department to the roads is calculated to meet this difficulty. The Report contains some valuable suggestions, but we hardly think its recommendations go far enough, were future legislation to be kept within its limits. Those members of the public who are suffering so severely in health, comfort, and property from the dust nuisance, which is by no means exaggerated, will naturally ask themselves why, if this nuisance can be put an end to by a speed limit of 10 miles—a speed which maintained up and down hill far exceeds that of horse traffic—this limit should not be at once imposed, leaving it to be removed when and after the roads have been made fit to carry such traffic. The Report seems to have put the cart before the horse and the horse behind the motor.

THE VIA CAVOUR AND THE IMPERIAL FORA IN ROME.

By DR. ASHBY, DIRECTOR OF THE BRITISH SCHOOL AT ROME.

ONE of the most important problems which confronts the municipal authorities of modern Rome is that of the connexion between the Via Cavour and the Piazza Venezia. The Via Cavour has been for some years in existence between the railway-station and the north-east side of the Forum

Romanum, where it stops abruptly, the only method of communication between it and the Piazza Venezia, one of the most important centres of traffic in modern Rome, being by several narrow streets, which are quite inadequate for present needs.

There is, however, considerable controversy as to the line which should be taken by the new street, which will have to be some 70 ft. in width, and the question is one which largely concerns archaeologists as well as city engineers, inasmuch as the area of the Imperial Fora, between the Capitol and the Quirinal, is directly affected. Professor Lanciani delivered a few weeks back an interesting lecture in which the merits of the various projects were shortly discussed from the archaeological standpoint. The three most important are shown in the accompanying plan, that of Signor Tolomei being marked A A A A, that of Signori Crimini and Testa B B B, and the original project of the Government as C C C.

The original project of the Government was to follow—though at a considerably greater width—the existing Via Salara Vecchia and Via Cremona, and so reach and follow the north-east side of the monument to Victor Emmanuel. This would, as a glance at a plan of Rome will show, involve the probable destruction of a considerable portion of the Forum of Caesar and the Forum of Trajan, and has been somewhat modified, so as to pass a little further to the north-east without incorporating the two existing streets, and thus avoiding the south-western hemicycle of the Forum of Trajan, and also the presumed site

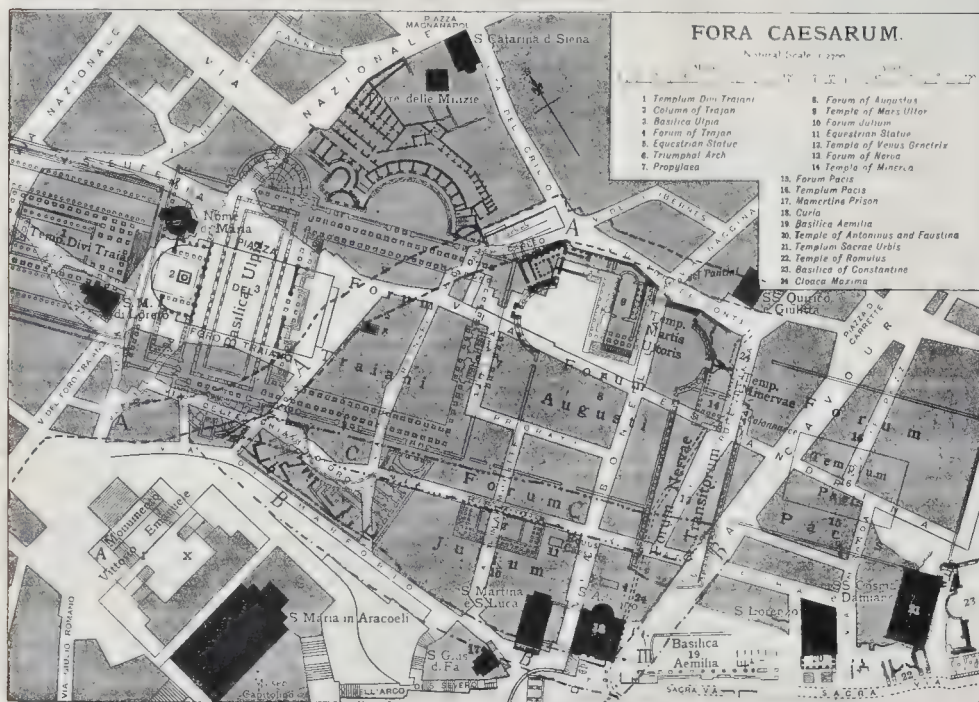
of the temple of Venus Genetrix, partly under the Via Cremona.

Two of the Government architects, Signori Crimini and Testa, have proposed another plan—that of keeping close under the monument, and then following the line of the Via di Marforio, under the slope of the Capitol, and reaching the Forum immediately to the north-east of the Arch of Septimius Severus, where the demolition of the Church of S. Martina would be necessary. From this point it would be necessary to carry the road on a viaduct across the Comitium and in front of the Curia; it would then turn at right angles and join the Via Cavour. This scheme has the merit of avoiding the Imperial Fora altogether, passing to the south-west of them, and the loss of the Church of S. Martina, a baroque structure which does not fit well with the buildings surrounding the Forum, would not be a very great one.

On the other hand, the construction of a viaduct across the Comitium is a thing which would be extremely detrimental to the appearance of the Forum.

The other projects are based upon the idea of keeping on the other (the north-east) side of the group of Fora. One scheme, that of Signor Ceas, indeed, proposes to avoid them altogether; but this could only be done by joining the Via Nazionale when it was already some way up its ascent of the slopes of the Quirinal, and would lead to great expense, and the demolition of several buildings of modern Rome, such as the Prefecture and the two churches at the north-west end of the Forum of Trajan.

That of Signor Arnaldo Tolomei, which seems to meet with the approval of many



Plan of the Fora Caesarum (reproduced by permission from Messrs. Macmillan's "Guide to Italy").

archæologists, including Professor Lanciani himself, would make the new street leave the Via Cavour on the north-east side of the Tor dei Conti (involving the destruction of the Church of SS. Quirico e Giulitta, which, though ancient, possesses little interest in its present condition), and pass immediately on the north-east of the splendid external wall of the Forum of Augustus. It would follow this where it turns westwards along the Via di Campo Carleo, and so reach the interior of the Forum of Trajan, which it would cross diagonally, so as to reach the north-east side of the monument of Victor Emmanuel.

But the great objection to the latter part of the scheme is that it would remove any possibility of exposing to view the Forum of Trajan as a whole, and would cross it in such a manner as to spoil its effect, with no regard to the lines upon which it is orientated. An alternative proposal has, therefore, been made, to follow the line of the porticos which surrounded the Forum on the south-east and south-west. This would, however, involve two turns at right angles in a short distance, which would be of some hindrance to traffic; and Professor Lanciani was inclined to recommend that the level of the new street should be sunk almost (if not quite) to the ancient level of the Forum of Trajan, which is here only 10 ft. or 12 ft. below the modern level, and should thus find its way across the Forum at the points where it might prove that ancient remains of importance were lacking. He confessed, however, that from a practical point of view it might be better if the project of Signori Crimini and Testa were adopted, as a part of the street had already been prepared for by the demolitions which have been carried out in order to make the monument to Victor Emmanuel more conspicuous, and, being less costly, there was more likelihood of its being promptly carried into execution. In any case, it seems pretty clear that the best thing that can be done is to carry out some scheme which will not prejudice the question of the future excavation of the Imperial Fora. Professor Lanciani was inclined to conjecture, from the discoveries that have already taken place, that their state of preservation is likely to be slightly better than that in which the buildings of the Forum Romanum have been found to be. We know, of course, that the temple of Minerva and the adjoining portion of the wall of the Forum Transitorium, with the arch known as the Arcus Noe in the Middle Ages (an arch in the enclosing wall of the Forum like the Arco dei Pantani still existing in the wall of the Forum of Augustus), which appear in many of the views of Rome of the XVth century, were destroyed early in the XVIIth; but the stylobate of the temple appears to be still in existence, and in a good state of preservation. With regard to the Forum of Augustus, Signor Tolomei's project would have the advantage of exposing to view the lower part of the splendid enclosing wall; and we might hope for similar results in the north-western hemicycle to those obtained in the south-eastern in 1888, when objects of considerable interest, including fragments of inscriptions recording the deeds

of the great generals of Republican Rome, were brought to light.

Of the state of preservation of the Fora of Julius Cæsar and Vespasian (the latter of which is hardly affected by the present question), and of those portions of the Forum of Trajan which have not been excavated, we are less able to judge; but it would be difficult to say what could have more historical (and in all probability archæological) interest and importance than the complete excavation of the whole series of Imperial Fora, and their connexion with the Forum Romanum. It is most earnestly to be wished that the continuation of the Via Cavour to the Piazza Venezia, which, in some form or another, is a thing of imperative necessity for the life of modern Rome, may be so managed as not to prejudice the possibility of the realisation of what at present may be merely an archæologist's dream, but which, one may be allowed to hope, will be converted into reality in the not very distant future. If it is possible to enter upon the most extensive and costly demolitions to render visible the monument to Victor Emmanuel, modern Rome ought not to find greater difficulties in bringing to light the remains of the Fora which perpetuate the memory of men whose names are among the greatest in her history, and recall the most glorious periods of her dominion over the nations of the civilised world.

NOTES.

The National Physical Laboratory.

SOME difference of opinion exists with regard to the question whether commercial tests of structural and other materials ought to be conducted by the National Physical Laboratory. It is open to doubt whether the institution is entitled by the scheme laid down in the Report of the Treasury Committee to undertake investigations of the kind. The Executive Committee of the laboratory do not appear to share this view, and contend that the published results of mechanical and physical tests hitherto made for private firms are of general scientific interest, and that the tests consequently come within the category of work that may properly be undertaken by the institution. Unfortunately it happens that, owing to the conduct of such tests, private firms are exposed to State-aided competition, a principle that has never been favourably received in this country. While concurring with the view that the status of the laboratory ought not to degenerate to that of a commercial establishment, we cannot but feel that cases may often arise where scientific tests suggested by industrial firms would be legitimate objects of inquiry, even if some contribution were made towards the cost involved. The subject is one of some difficulty, and we hope that the Royal Society, to whom it has been referred by Government, may be able to suggest some *modus vivendi* that will be acceptable to all parties concerned.

A Light Case.

A CURIOUS point in connexion with the law of light appears to have been decided in the case of *Ankersen v. Connelly*. The defendant had acquired some old houses for the purpose of

pulling them down and erecting new buildings on the site. The new buildings were erected in such a manner that the owner of the adjoining land could not use his land for building purposes without obstructing the ancient lights of the defendant. It appears, however, that before the erection of the new buildings he could have built on his own land without causing any obstruction, but the report is silent as to how this result was brought about by the alteration in the structure. In these circumstances the plaintiff applied to the Court for a declaration that the defendant was entitled to no easement for light over his land. The Court found that the defendant had so increased the burden on the plaintiff's land that the plaintiff could erect nothing on the land which would not create a nuisance in respect of the light which passed through the old apertures, and that as the defendant had brought this about by his own act he had practically destroyed his own right to the light or rendered it impossible for him to enforce the right by action, and the Court granted the declaration sought for.

Testing Materials by Sand Blast.

ABRASION tests of structural materials, whether conducted by grinding machines or by tumblers, do not lead to reliable conclusions. In the former class of apparatus, the detached particles are apt to increase the grinding effect or to reduce it by filling up the interstices of the material, and the grinding medium itself becomes worn after a time so that its effect diminishes. In the latter class of apparatus the interstices of the material become filled up and so lead to inaccurate results. A new method by which such difficulties and errors attending the use of existing apparatus can be avoided, is afforded by a modified form of the sand blast apparatus as applied in the Prussian Royal Testing Laboratory at Gross-Lichterfelde. Tests there conducted on various kinds of building stone, road metal, timber, linoleum, and other floor-covering materials, show that exposure to the sand blast for the short period of two minutes is sufficient to furnish a reliable indication of the structure and relative resistance of any material. The method is specially suitable for tests of building materials intended to be placed in position where they will be exposed to abrasive action.

A Great Culvert in Concrete-steel.

IN connexion with the scheme of the Newcastle-upon-Tyne Corporation for filling in the valley of the Ouseburn, a culvert of unparalleled dimensions is being constructed in reinforced concrete for the purpose of providing a new channel for the river. The valley in question separates the city from the suburb of Heaton, and through it the Ouseburn passes at a depth of about 120 ft. below upper ground level. Although comparatively small under normal conditions, the river is subject to sudden and severe floods in times of heavy rainfall, and for this reason the new culvert has been designed of most ample proportions. In cross-section it has the form of a semi-parabola, with the maximum width of 33 ft., and the height of 22 ft., internal measure.

These dimensions give an area of about 584 square feet, or nearly seven times that of the running tunnels on the Central London Railway. The total length of the culvert will be 700 yds., and the depth of earth ultimately to be filled in above its crown is about 98 ft. In spite of the enormous load thereby represented, the thickness of the concrete at the crown will be only 8 in., which may seem to suggest somewhat daring design, but it is stated on the authority of the city engineer that after searching investigation he was fully satisfied as to the adequacy of the proportions for resisting all stresses involved. The general scheme was prepared by Mr. S. F. Edge, when City Engineer of Newcastle, and the details of the reinforced concrete work were prepared by Mr. L. G. Mouchel, of Westminster, in accordance with the Hennebique system. At the present time, much of the excavation for the foundations has been completed, and, having erected a portion of the centring, the contractors are actively engaged upon the concrete construction. This work is one that ought to be inspected by any of our readers who may find themselves in the vicinity during its execution.

Protective Coatings for Iron and Steel.

THE statement was made a few months ago by an eminent engineer that no material had ever been invented which would effectually preserve iron and steel from the corrosive effects of the atmosphere. Of course, this must only be taken as applicable to materials applied like paint to form a protective coating, for we all know that Portland cement, in the form of grout, mortar, or fine concrete, is an absolute preservative if of good quality and properly applied, and that iron can be efficiently protected by the deposition of other metals upon its surface so as to form an impenetrable layer. But none of the various paints available afford permanent protection, because all of them are more or less porous and corrosion goes on beneath the coating. In a paper read before the "American Society for Testing Materials," Mr. Arthur B. Harrison describes some remarkable results obtained from experiments with a coating consisting of a mineral wax—akin to ozokerite—dissolved in a suitable medium. The author states that the material is not only impervious to air but appears to have so phenomenal a bond and affinity with all ferric compounds that it displaces moisture and destroys any rust that may have been present on the surface of the iron covered. We should very much like to hear more of this new preservative, and after a further lapse of time to learn whether the objects coated by the author are still free from corrosion.

Freezing Method of Tunnelling.

EXPERIMENTS are now being made by the Pennsylvania Railroad Company upon a new system of tunnelling for alluvial and water-logged soil, with the view of applying it in future operations beneath the East River, New York. The method may be thus briefly described. A small iron-lined pilot tunnel is first driven along the proposed line, and in it is installed a series of brine circulation

pipes capable of freezing the moist material within a radius sufficient to permit the enlargement of the tunnel to the required dimensions without the necessity for employing compressed air. Of course, air-pressure would still be necessary for driving the pilot tunnel, but on a smaller scale and therefore far less likely to blow holes through the bed of the river beneath which operations are being conducted. The result attained so far by the railway company is that the soil has been frozen for a distance of about 9 ft. in every direction outside the pilot tunnel, and it is hoped that it will be possible to obtain a frozen cylinder of 35 ft. external diameter, thus permitting the tunnel to be enlarged to the diameter of 25 ft. by an ordinary boring shield. If this method should prove to be a practical success it will do away with the delays and risks inseparable from the use of compressed air.

THE Journal of the Institution of Electrical Engineers.

published last week, contains a paper by Mr. P. Rosling on the "Rectification of Alternating Currents," which merits the attention of electrical engineers. The paper contains little that is new, but it gives a clear résumé of the relative merits of rotary converters and of the electrolytic and the mercury arc rectifiers. It is now the customary practice to build large generating stations in places where coal is cheap and where rents are low. As these stations are usually at a considerable distance from the distributing substations it is necessary to transmit the electrical power at high-pressures in order to avoid excessive losses due to the heating of the mains. At the substations the power is transformed into direct current for transmitting power to electric tramways or for lighting. This transformation is, as a rule, effected by means of ordinary transformers which supply low-pressure alternating currents to a special form of motor with a commutator, from the brushes pressing on which direct current is collected. The drawback to this solution is that common to all types of running machinery, namely, the necessity of supervision. The apparatus described by Mr. Rosling utilises certain physical phenomena in order to effect the rectification. In the electrolytic rectifier the current has no difficulty in passing from the lead to the aluminium through the ammonium salt, but cannot flow in the other direction owing to the non-conducting film which immediately forms on the lead when the current reverses. In the mercury arc rectifier, which has been developed so successfully in America by Professor Sleinmetz in connexion with arc lamp lighting, the current can only flow in the mercury vapour when its direction is from the graphite to the mercury electrode. The extraordinarily high efficiency of this type of rectifier justifies the labour and experimental skill that have been expended in perfecting it. The question that was raised in the discussion as to whether there was any risk of poisoning should a mercury lamp break is disquieting. The statement of the author that "very small quantities of mercury are not considered by the medical faculty

to be injurious to the system" is hardly a satisfactory answer.

Accidents Attributable to Motor Vehicles.

Up to the end of May last the number of motor-cars registered by the London County Council was 10,826, heavy motor-cars 777, and motor-cycles 5,937. The number of accidents within the Metropolitan Police District for the month of June brought to the notice of the police attributable to motor-cars and motor-cycles was 559. One hundred and seventy-eight of these caused personal injuries, and four cases ended fatally. Three hundred and ninety accidents were caused by motor-omnibuses, eighty being cases of personal injury, three proving fatal. Omnibuses, we presume, appear in the above figures as heavy motor-cars; if so, every two omnibuses caused one accident. If the month of June be taken as a unit, it would appear that some 3,096 cases of personal injury may be expected in the metropolis from motor vehicles in the course of a year. Accidents from tramcars are not included in the above figures, yet these vehicles have recently proved themselves formidable engines of destruction. Modern battlefields will soon compare unfavourably with our streets in respect to risk to the person, and we are not surprised that military experts are advocating the use of the motor in warfare.

Actions for Nuisance.

THE case of Westlake and others v. St. Pancras Borough Council contains the important lesson that if proceedings are to be taken in respect of nuisance it does not do to procrastinate. The plaintiffs were the owners and occupiers of some houses in St. Pancras, and they proceeded against the Borough Council in respect of nuisance, which it was alleged arose in connexion with a dust destructor of the defendants', which was about 120 ft. distant from the houses. The complaint was made in respect of smell caused by throwing water on heated clinkers, fumes, sparks, and gritty dust emitted by the chimney, and vibration caused by the running of the plant. The dust destructor was erected in 1894, yet the writ in this action was not issued until 1905, and, although delay is no absolute bar to obtaining an injunction, the circumstance seems to have influenced the Court in coming to the conclusion that as regards the first heads of nuisance the plaintiffs had not made out their case. As regards the vibration, however, there was some reason for delay. In 1904 other persons had taken proceedings, and had obtained an injunction, and the present plaintiffs had hoped that this would bring relief to them. The existence of vibration amounting to nuisance having been made out, on this head of their claim the plaintiffs succeeded, and an injunction was granted, the plaintiffs securing the costs of the action, except so far as they had been increased by the claim for those issues upon which they had failed.

Langport Rural District.

DR. S. MONCKTON COPEMAN'S Report to the Local Government Board on the general sanitary circumstances of the Langport Rural District (with special

reference to the occurrence there of outbreaks of diphtheria and smallpox, repeats the often-told story of bad water supply and drainage. It appears that in the lower part of the town of Langport are a series of eight open ditches or water-courses, and into these water-courses passes the whole drainage of this portion of the town, inclusive of excretal matter, slop-water, and other household refuse, both liquid and solid, together with storm-water and the drainage of slaughter-houses and other trade premises. Parts of these water-courses are under the houses, which are arched over them. In the smaller villages of the district water for drinking purposes is, for the most part, obtained from shallow wells, ditches, or ponds. Within the last few years the Rural District Council have inaugurated a public water supply for the towns and for many of the villages, from good sources; but at one village (Oath) water for drinking purposes is obtained from the river, while in other parts of the district it is obtained from wells, surface springs, and ditches. The wells, of which the majority are of no great depth, are also, as a rule, not properly covered and are insufficiently protected from surface pollution. The people inhabiting the cottages in Wagg Drove, Huish Episcopi, drink water from a stream by the side of that lane, which is liable, the whole length of its course, to pollution from the road, and for a great part of it from fields manured or used for grazing purposes. Through another village (Muchelney) runs one of the Rural District Council's water mains, but the owner of all the property in the village not only opposed the water-supply scheme at the enquiry held by one of the Board's Engineering Inspectors, but now refuses to have the houses in the village supplied with water from this source, notwithstanding the fact that the Medical Officer of Health has reported that most of the water obtainable in the village is absolutely unfit for drinking purposes.

Fontevault and the Royal Tombs. THE tombs at Fontevault of our first two Plantagenet Kings remind us of the time when a Count of Anjou inherited England and Normandy from his mother, together with Anjou, Touraine, and Maine from his father, and was, in right of his wife, lord of Guienne, Auvergne, and other fair provinces in western and south-western France. The project is revived of transporting to this country the monuments of Henry II. and his consort Eleanor, Countess of Poitou and Aquitaine, of Richard I., and of Isabella of Angoulême, second wife of King John. The Revolutionists rifled the graves of the Angevin princes in the abbey-church burial ground; the mutilated effigies were subsequently removed into the south transept, and by the care some years ago of M. Félix Bodin, the historian, were protected from further injury. The four recumbent and crowned figures are considered to be portraits, and retain traces of colouring. Henry II. and Richard I. wear royal robes, without armour, as in the case of the effigies of King John and Henry III. at Worcester and Westminster; the figure of Cour-de-Lion is of heroic size. Several members of the house of Anjou were buried within

the precincts of the Abbey, which the Breton peasant and crusader Robert d'Arbrissel founded in 1099 as an oratory in the valley of the Fons Ebraldi, near Montsoreau on the borders of Touraine and Anjou. The abbess presided over a community of nuns and monks who in 1459 exchanged their Benedictine rule for that of Augustine. The post of superior was always conferred upon one of the blood-royal; the last abbess, M^{me}. de Pardaillan d'Antin, a niece of M^{me}. de Montespan, enjoyed in 1789 an income of 100,000 livres. Despite certain scandals Fontevault became one of the richest and most important religious houses in France, and had numerous branch convents. Of its five churches the greatest yet remains, having been built, or rather begun, in 1125 by Foulques, fifth Count of Anjou. The church has an eastern apse with apsidal chapels, and presents an example of spherical vaulting. The nave has been partitioned off and converted into a dormitory, on two floors, of the Maison Centrale de Détention for some 2,000 prisoners. In the second court of the abbey is the curious XIIIth century Tour d'Evrauld, of which the middle stage is square and the lower and upper stages are octagonal on plan.

Cooper's Hill College.

THE career, extending over thirty-five years, of Cooper's Hill Royal Indian Engineering College, came practically to an end on July 26 with the close of the last regular session. The freehold estate at Cooper's Hill, famed for its situation by the Thames, near Egham, and the college buildings are offered for sale by order of the Secretary of State for India. The buildings comprise a chapel, President's house, seven private residences, lecture-halls, gymnasium, farm buildings, and so on. The College was established, mainly through Sir George Chesney's instrumentality, as an engineering school in 1871; telegraph and forestry departments were formed subsequently, and 980 men have entered the services in India, Egypt, South Africa, and elsewhere beyond the seas. Amongst the subjects taught were "building materials," "materials used in construction," "estimating," "geology," and "electro-technology," with special reference to requirements abroad, as well as civil and military engineering. The abolition of the College was resolved upon by the Secretary for India after the framing of some recommendations made in 1901 by a board of visitors, when it was estimated that the continuance of the establishment would involve a capital outlay of 40,000*l.*, a reduction of the fees, and the adoption of other measures to promote keener competition for appointments in India.

STATUE OF THE DUKE OF CAMBRIDGE.—Mr. Adrian Jones is engaged upon the execution of an equestrian statue of the late Duke of Cambridge, in his studio in Church-street, Chelsea.

THE JERNINGHAM COLLECTION.—It is announced that Mr. C. E. Jerningham has presented to the nation his valuable collection of Park and the neighbourhood, with the royal palaces, etc. In our number of February 20, 1904, we described some of the less familiar exhibits gathered by Mr. Jerningham. The collection has been placed in the King's Privy Chamber, Kensington Palace, where it will be open to inspection by the public.

LETTER FROM PARIS.

BEFORE breaking up for the recess, the Municipal Council have voted a considerable sum for the works of decoration to be carried out in the sculpture Gallery of the Petit Palais, to which allusion has already been made in our "Foreign" column. M. Besnard's work in the central cupola is to consist of four large allegorical compositions symbolising the history of French art in its principal epochs. This part of the work will probably be finished next year. In the vault extending on each side the mouldings will be treated with a dead gold surface, and M. Roll is to paint, on the side next the Seine, and M. Cormon on the Champs Elysées side, large compositions of which the subjects are not yet determined on. Of the two semi-domes at each end of the gallery, M. Chartran will decorate that at the end next to M. Cormon's work, and M. Georges Picard the one at the opposite end. In the open colonnade next the central garden M. Baudouin will decorate the vault with a fresco process of which he is the inventor, or at all events the reviver, and which he has already applied in various buildings in Rouen.

The cost of these different decorations is estimated at 250,000 francs; but as this does not include any provision for sculpture, it is probable that a further vote will be given for the provision of the statues and busts for which niches and pedestals have been prepared, and which are necessary to complete M. Girault's design. The walls also have to be covered with a revêtement of red marble slabs up to the springing of the vault, in order to harmonise the whole effect.

The Government has at last, on the principle "better late than never," completed and thrown open some of the rooms of the Château Malmaison. One can now see the "Salon Rouge" and the "Salon Jaune" of the Empress Josephine, completely furnished in the style of the period, with their former furniture and hangings. We can also see Napoleon's study and his armchair, and Josephine's harp. But there is a great deal more to be done before the Château is completely restored as it existed under the Empire.

At Versailles also some new rooms have been opened in the attic on the south side, in which visitors can find some hitherto unknown works connected with the history of the Revolution, the Consulate, and the Empire. We may notice also the examples of woodcarving and of Gobelin's tapestry which have been placed in the Salon de Mercure and the Salon d'Apollon. M. de Nolhac has also completely restored the apartment once occupied by M^{me}. de Maintenon.

The Metropolitan railway system which is now an integral part of the life of Paris has nevertheless occasioned a great deal of inconvenience above ground, and quite altered the aspect of the city in some places. The completion of the part of the line from Clignancourt to the Porte d'Orléans, which unites Montrouge with Monmartre, has been the occasion of extensive works which have caused a great deal of complaint. The place St. Michel is at present actually transformed into a builder's yard, where work goes on day and night. The iron structure of the future tunnel is at present visible on the surface, like the carcass of an immense whale, standing as high as the first floor of the houses; when finished, it will be sunk beneath the ground-level to form the connexion with the tube in the bed of the river. At every step, too, in the Avenue de l'Opéra, at the Halles, and in the Boulevards of Sebastopol, Strasbourg, and Saint Michel, are to be seen excavations and building yards in which is being carried on the work which has been too long delayed in consequence of the strikes.

The work of enlarging the Palais de Justice, on which over three million francs are to be expended, will shortly be commenced; also the demolition of the two National Schools of Decorative Art, which are to be rehoused in a single building to be erected in the Rue Denfert-Rochereau; and the Municipality are about to erect, along the borders of the Champ de Mars, two palaces intended for sporting exhibitions. These buildings will be separated from each other by a distance of more than 100 metres, so that after the demolition of the Galerie

des Machines, to be carried out shortly, Gabriel's fine façade of the Ecole Militaire will again be thrown open to view from the Champ de Mars.

The Institut has just awarded the Prix de Rome in the section of sculpture. The Grand Prix has been awarded to M. Blaise, a pupil of MM. Barrias and Coutan; two older pupils of the same sculptors, M. Gaumont and M. Prost, have respectively obtained the second and third prizes.

ST. PANCRAS CENTRAL LIBRARY COMPETITION.

LIMITED to six architects, this is the most important library competition since the Islington Central Library was won by Mr. Hare, and the designs were on view at the St. Pancras Town Hall during the latter part of last week. Messrs. Russell & Cooper, who have been placed first by the Assessor (Mr. Belcher), have successfully faced the difficulty of an angle entrance, and have developed a compact triangular block of buildings. The corner formed by the Angler's-lane and Prince of Wales-road is fairly open, and it is cause for wonder that no other competitor has seized the opportunity presented for an angle entrance. As we illustrate the perspective and the two principal plans with our plates this week, we need not describe them in detail. It will be noticed how the various departments are in touch and the minor details arranged. But the main staircase-landings are cramped and awkward as to handrails, nor would the beautiful series of architectural ceilings, as indicated by the circles on the ground-plan, be obtained in reality, having regard to the soffits of stairs. Externally, although the treatment is practically symmetrical on either side of the angle entrance, a distinction is made in that the south or more important elevation to Prince of Wales-road has detached columns between the windows, that on Angler's-lane has flat pilasters; to the former also the windows have low sills, and on the latter they are high up and the windows square. Future extension is indicated for first floor over the reference library, which would deprive that room of the indicated top-lighting and leave it inadequately lighted. With the top-light the position of the tables would do, but not otherwise, and the future dormer windows ought to have been omitted in the perspective. Practically, if the reference library were once built as shown, an upper story would never be added, and the high architectural front to Angler's-lane would thus be and remain rather a sham. In the perspective view the partly-enclosed fore-court at the entrance, nominally for bicycles, is omitted, much to the benefit of the design. While all the other competitors use or cut up practically the whole of the site, Messrs. Russell & Cooper have been able in their scheme to leave a clear piece of land more than a quarter of the total area of the site and with a frontage to the south "for other purposes"—a further point which cannot but have weighed heavily in the award.

We imagine the second place has been won by Mr. J. S. Gibson principally for his planning of the reference library, which is by far the finest room shown in any of the schemes; but its semi-circular recess does not back into the lending library very well. The juveniles' room, although without a separate entrance, is well planned and has its own lending department. The newsroom, however, shows a perfect forest of news elopes about the floor, which would render supervision difficult. The entrance is in the middle of the south front, and is the central feature of an imposing colonnaded façade, delightfully detailed. But the south-west corner is wasteful on plan and detached-looking in elevation and perspective. On this angle is an emergency exit and stair from lecture-room on the first floor almost important enough to have done duty as the main entrance. The access to this stair from the lecture room, 50 ft. by 30 ft., is through a 3-ft. door from the back of the platform! The future extension indicated has a somewhat haphazard appearance, and is not very convincing.

Messrs. Mallows & Cross, who are placed third, have staked everything on a symmetrical scheme of future extension, which makes a good triangular figure as blocked

out, but it is not easy to follow how the library would be worked as regards the additional rooms. Without the completed second and third sides of the triangle—which we cannot imagine could ever be required—the buildings, as seen from Angler's-lane, which is quite a respectable street, would present an unsightly appearance. The elevation to the south is some 200 ft. long, broken only by the projecting, pedimented entrance with dome above, and terminated at the east and west ends with bold semi-circular projections. The staircase-hall, 38 ft. by 34 ft., is ambitiously treated, and has a gallery to the four sides at the first-floor level, with the dome over all. The reading-room is on the left, the magazines' and juveniles' on the right, and the lending library in front opposite the entrance. This latter, about 125 ft. by 20 ft., is not the best of shapes for a lending library, even though the public space be in the middle of it, as is the case here. The reference library is on the first floor in the right wing of the façade, and balances the large lecture-room on the left wing. The small lecture-room and various staff-rooms are also on the first floor, over the lending library. This is the only design showing the reference-room on the first floor, which at once helps in the dignity and breadth of the elevation, and goes some way to give excuse or reason for the great upper landing or staircase gallery.

The remaining three designs have not been placed in order of merit by the Assessor. No. 1, by Mr. Maurice B. Adams, is the only one of the six in which an effort has apparently been made—for better or worse—to follow the character of the Public Hall hard by built some years ago. On plan the lending library is brought to the street front on the right of the entrance. The newsroom is on the left, with magazines through and beyond, and out of the way. The reference-room is opposite the entrance, while the juveniles are accommodated in a practically detached wing on the extreme right rear. The plan is too much cut up with passages, etc., and is wasteful in regard to projections and external walls. Possible future extensions are indicated at no less than five different points.

No. 4, by Messrs. Wimperis & Best, has a comparatively short main front of five bays, with pilasters at about 22 ft., centres between large semi-circular windows on the ground-floor. The pilasters are curiously chamfered as to the edges and tapered inordinately. High up under the entablature or cornice are a series of square windows, one to each bay, lighting the lecture room, and from which hang garlands connected to the capitals of what remains of the pilasters. The angles are finished with broad and strong rusticated quoins, contrasting very favourably with the weak angles of Messrs. Mallows & Cross's façade. With the magazine-room and juniors' room only to the south front, the reading-room on the Angler's-lane front gets rather a long way from the entrance. The reference-room is on the opposite side of the lending department, and is tilted inwards on plan to balance the newsroom, and is nicely away from street noises. In the lending library the bookcases are too crowded, and the future extension, although completing the figure of the plan, would be inaccessible for public use.

Messrs. Wills & Anderson, in No. 6, have the most generous lay-out on simple square lines, a good, sound plan resulting, though in more ways than one dimly reminiscent of the Hammersmith Central Library. The stairs go up similarly, but from the right as well as the left-hand side, and join on a landing over the porch with a further short flight up to a long top-lighted gallery on the first-floor level, 68 ft. 6 in. by 13 ft., leading to the lecture-rooms, and at either end. There is the same long counter opposite the entrance although there is not the same audacity as to spans of girders as there is at Hammersmith. In fact, the plan is if anything overworked with columns and piers. A public way on either side of the lending department inclosure takes you to the reference room in the rear of the site, which would, with the suggested future extension, make a fine room, albeit incidentally depriving the book store below of its daylight. The elevation is somehow lumpy and out of scale, and the central turret is unnecessarily large and not particularly elegant.

THE ROYAL ARCHAEOLOGICAL INSTITUTE AT WORCESTER.

AFTER an absence of over forty years the Royal Archaeological Institute again made choice of Worcester as the centre for its annual meeting. Many and great changes have taken place since 1862, but "the faithful city" still retains a few of its old half-timbered houses, and the much "restored" cathedral yet presents numerous points of interest to the archaeologist.

Tuesday.

The proceedings opened at noon on Tuesday, July 24, when the members and their friends, having assembled in the Guildhall, were cordially welcomed, in the name of the citizens by the Mayor of Worcester (Mr. W. J. Leicester).

The President of the meeting (the Earl of Coventry) was, unfortunately, unable through eye trouble to be present, but the President of the Institute (Sir Henry H. Howorth) responded to the kind welcome of the Mayor in a few well-chosen words.

After an adjournment for luncheon, brakes were in readiness to convey the party, about eighty in number, to Westwood House. Mr. J. A. Gutch, who had kindly undertaken to describe the building, was unable to attend, but his account of the house was read on his behalf by Mr. Hope. After calling attention to its unusual plan, consisting as it does of a central block with four limbs placed diagonally, Mr. Gutch pointed out that at first sight a student acquainted with the eccentricities of Elizabethan house-designers might suppose that here was an actual example in brick of those quaint designs which John Thorpe was so fond of drawing upon paper. But only the central portion of Westwood House dates from the time of Elizabeth, the four limbs having been added about the middle of the XVIIIth century. The original house was probably built by Sir John Packington "the lusty," a courtier of Queen Elizabeth, as a banqueting house, his own family seat being at Hampton Lovett, a few miles away. During the Civil War this old house was destroyed, and the Packingtons of the time, instead of rebuilding it, enlarged his secondary residence at Westwood by the addition of the four wings, and so converted it into one of the most striking mansions of the county.

The house has suffered much by the loss of its original laying-out, the walls that once divided up the gardens having disappeared; but the fine gatehouse remains. This opened into a large hexagonal enclosure, with the house in the middle, the stables at the opposite extremity to the gatehouse, and at the four other angles small towers, still existing, from each of which a wall extended up to the house.

The most noteworthy feature of the exterior of the house is the heraldic treatment of the parapet, where the more usual balustrades are replaced by the stars and wheat-sheaves that figure in the Packington arms. The entrance-porch is of striking design, and rather larger and more important than porches usually were.

Within the house little original work remains; continual occupation has naturally led to periodical renovation, and nearly all the old features have gone. The old staircase is not of a very satisfactory type, being rather long drawn out. The saloon has a fine chimney-piece and elaborate frieze, with a richly-decorated plaster cornice and ceiling of somewhat later date than the wings, but beyond these there is little of architectural or archaeological interest. Some good tapestries adorn the walls. By the kind courtesy of Mr. and Mrs. Ward every opportunity was afforded of examining the house and gardens, the view from the latter over the surrounding country being particularly fine. For Westwood House, unlike so many old mansions, is not built in a secluded valley but set upon a hill. The great charm, indeed, of the building is its picturesque and stately appearance from without. The party subsequently drove back to Worcester.

In the evening the members attended a conversation, by invitation of the Mayor of Worcester, at the ancient Guildhall, where a fine display of the city charters, the civic insignia, and water-colour drawings of old Worcester was set out. Some of the more important documents, as well as the State sword temp. William III. and the rest of the insignia, were described by Mr. Hope.

Wednesday.

Wednesday, the 25th, was devoted to excursions to Dudley and Halesowen. Leaving Worcester shortly before 10 o'clock, the party, in number about eighty, went by train to Dudley, and on arrival proceeded on foot to the summit of the Castle Hill, where Mr. W. H. St. John Hope described the remains of the castle. It was, he said, one of the fifty or sixty castles mentioned in the Domesday Survey, where Dudley is described as part of the estate of William FitzAnsculf, "et ibi est castellum ejus." This castle consisted of a lofty mount, crowned with a wooden tower, with appendant bailey or baileys, protected by palisaded defences. Portions of an early Norman hall and other structures remain incorporated with the buildings within the bailey, but the earliest of the masonry defences are of late XIIIth-century work, and include the very fine gate-house through which the castle is entered. The chapel, which stands above part of an extensive range of vaulted cellars, is of the same date. The great tower on the mount was partly "slighted" during the Civil War, but was an oblong structure with round towers at the corners, all of excellent work, apparently *temp.* Edward II. The rest of the buildings were replaced *temp.* Henry VIII. by a fine range of Renaissance character, the work of John Dudley, Earl of Northumberland. This was unhappily destroyed by fire in 1750, and there now remains only the greatly-dilapidated shell of the great hall, the kitchen, and the state apartments. The handsome portico and terrace, which formed the chief entrance, have almost entirely disappeared.

After luncheon the party went by special train to Halesowen, where the remains of the abbey were first inspected under the guidance of Mr. Hope. The abbey was one of Premonstratensian or White Canons, founded by Peter des Roches, Bishop of Winchester, in 1214, and the whole of the buildings seem to have been laid out and carried up at the same time soon after the foundation. Very little of the church is left beyond a fragment of the presbytery and parts of the south transept and south side of the nave; but these show that it consisted of a presbytery of four bays, with aisles of two bays, a central tower, and transepts, each with an eastern chapel, and a nave and aisles of seven bays. The whole church, including the presbytery and nave, was vaulted throughout. The site of the cloister is now occupied by farm buildings. The monastic buildings have disappeared, but part of the south wall of the frater remains, with traces of its vaulted undercroft and several of the upper windows. To the south-east, a little beyond the site of the infirmary, is an interesting two-storied *camera* of the XIIIth century. Although now degraded to a cart-shed, it retains its original roof and several of the transomed windows of the hall which formed the upper story. Into the walls are built several interesting relics, including a very diminutive effigy of a knight in mail and surcoat, probably commemorative of a heart-burial, and an early XIIIth century monumental slab with a canon in mass vestments kneeling beneath a Rood, Mary and John.

A move was next made by means of carriages to Halesowen village, where the interesting parish church was described by the Rector (the Rev. J. Hill). It was originally a large Norman church, with aisles to the nave and a taller over the crossing, but, owing to the fall of the tower in the XVth century, the cruciform plan has been obliterated and a new tower with spire erected about the middle of the length of the nave, with two bays of the older building west of it. The aisles have also been widened. The chancel once had a barrel vault. The most remarkable object in the church is the font, which has a bowl of the XIth century, with interesting strapwork of Scandinavian character on the sides and curious figures on the angles.

At the evening meeting the Rev. A. S. Porter read a paper on "The Medieval Tiles of Worcestershire," with special reference to the products of the famous Droitwich and Malvern kilns.

Thursday.

On Thursday, the 26th, a special rail-motor conveyed the party, to the number of about a hundred, to Broadway, whence the journey

was continued in carriages to Buckland. Here the old church was first inspected and described by the Rector (the Rev. E. T. Hull). The building is a typical example of a small Worcestershire country church, consisting of chancel, nave and aisles, and north porch, mostly of the XIVth century, with an added story to the tower. On the wall by the font is fixed some panelling with the quaint inscription, "THOMAS: IZARD AND JAMES SOUTHERN OF THEIR OWN CHARGE HAVE GIVEN THIS WAINSCOT AND BENCHIN TO CHVRCH IN THE YERE OF OVR LORD 1615." In the east window are three panels of a series representing the Seven Sacraments.

The old rectory-house, which was next examined, is a singularly perfect instance of a small XVth-century house, with the hall complete to its fine open roof and even to its shuttered windows, one of which still retains its original quarry-glazing with figures of birds. In one light is the name, William Grafton, of the rector who built the house, together with his rebus, a *graft* issuing from a *tun*. At one end of the hall is the solar block and at the other the usual kitchen, etc., approached by doorways from the screens.

The journey was next resumed to Broadway old church, which Mr. C. R. Peers showed to be a XIIIth-century structure, with a later chancel, and central tower added inside the old nave. The pulpit is a carved and painted one of the XVth century, and over the tower-arch is a rare example of the Royal arms of King Charles I. with the date 1642. Passing on to the village of Broadway the party examined before luncheon the charming XIVth-century manor-house of the abbots of Pershore. The building is now used as an artist's studio, and includes the hall, with the chapel, solar, and bedroom above a series of cellars at one end. The kitchen block is unfortunately destroyed, but the usual doors into it remain at the lower end of the hall.

After luncheon the party drove by way of the picturesque villages of Willersey and Weston-sub-Edge to Chipping Campden, where the church was first visited and described by the Rev. S. E. Bartleet. Externally the fine tower and general outline give promise of better things, but internally the architectural effect is distinctly poor, and recent scraping and plaster-stripping have made matters worse. The fluted pillars of the nave are of an uncommon type, and seem, like the rest of the church, which is practically all of one date, to belong to the closing years of King Henry VIII. With the exception of the well-known brasses and a good eagle lectern of brass given in 1610, but quite a century older, the church contains nothing of interest save several late and ugly monuments in the south chapel.

After a stroll down the picturesque main street of the town a visit was next paid to the ruins of the Old House near the church, built by Baptist Hicks about 1610, but burnt by its owner in 1645 to prevent its being taken by the Parliamentary forces. Only a fragment of the front of the house is left, but at each end of the terrace on which it stood is a quaint garden-house, and there are some other interesting remains attached to the site of the chief entrance. The party subsequently returned by special rail-motor to Worcester.

At the evening meeting Mr. W. H. St. John Hope, with the aid of large coloured ground plans and a number of excellent lantern-slides, traced the architectural history of the cathedral church of Worcester.

Mr. Hope based his remarks upon the well-known essay of Professor Willis in the *Archæological Journal*, but suggested, with regard to Wolstan's church, that the excrecent apical chapels at the east end were polygonal and not rounded, and that the *nave turris* which fell in 1175 was not that over the crossing, but more probably a single western one recklessly built above the two last bays of the nave towards the close of the repairs that followed the fire of 1113. Only upon such supposition, which had also been independently arrived at by Mr. Harold Brakspear, could the work now forming the last two bays of the nave be satisfactorily and historically accounted for. The "new work of the front" recorded to have been begun in 1224. Mr. Hope thought had originated in the desire to build a chapel for the shrine of St. Wolstan, in emulation

of similar extensions at Canterbury, Rochester, and elsewhere. He also showed from grants to the bishop entered on the Close Roll of oak trees for "cheverons" and making other timber, that the "new work of the church" was being roofed in in 1232. Lantern illustrations were shown of some of the quaint carvings in the spandrels of the arcades and of the interesting series of bosses in the vaulting of the north and south aisles of the cloister. The latter form a curious double Jesse Tree.

THE ROYAL COLLEGE OF ART: STUDENTS' WORK.

THE exhibition of students' work of the Royal College of Art, South Kensington, was opened last week in the iron buildings behind the Natural History Museum, and remains open during August. The exhibition more than maintains its standard of excellence, and in applied design shows better work than in previous years. This advance is a natural one; the students are in respect of the museum more fortunate than any other School of Art in the kingdom. Fortunately, the masters of the school realise their opportunity and responsibility; the numerous instances of carefully selected museum studies show a proper and greatly to be desired effect upon the designs for similar crafts and materials. The usual museum studies are supplemented by copies of some of the fine water-colour drawings of trees and foliage by the masters of water-colour, in which the museum is very rich. The result is apparent not only in design, but in the colour schemes generally. By studying the work of the past under intelligent supervision, the best hope for the future of the lesser arts lies. It does not kill originality or genius, but trains it and helps it to avoid the grosser errors of ignorance, which produces so much that is clever yet *outré* at the present day. Of the quality of some of the designs it is, of course, rather difficult to judge; those for wall-papers, for instance, are hung too near together, and are, besides, dependent on the "repeat." A large section of the exhibition is taken up with the home work of the students, illustrating the life and times of St. Francis of Assisi, which was the subject the literary instructor lectured upon during the year. Some of this work—merely rough sketches—is very powerful, notably that of Mr. Lionel Crane and Mr. M. Gant.

The work of the architectural students under the direction of Professor Eberesford Pite is, of course, what we are most concerned with. Here, again, it is the system that is being evolved that is so excellent, and which should bear such good fruit in the future. There has been so little system in architectural education in the past that any such work as that of Professors Pite and Lethaby, here and elsewhere, is to be warmly welcomed. The result is not to be judged by the works hung on the walls, good as much of it is; the effects will be far-reaching. That a number of rising architects should be receiving so good a grounding for their coming work is a matter of congratulation, and we imagine the effect will be even more marked on the quality of the lesser arts. No decorative artist and no teacher in art schools will ever be capable of sound structural composition and architectonic feeling who has not grasped the teaching of architectural truths. These are being taught at the Royal College of Art in a way that will stick by the student through life. Professor Pite's pupils come to him already as good draughtsmen; it does not, therefore, take long for them to master the relationship of plan to section and both to elevation, and they soon get over the preliminaries and settle to serious work. The characteristics of the principal styles of architecture are learned by lecture and drawing and impressed upon the student by a simple subject in design set in some particular style. Whenever possible, the drawings are made from an actual example, either at the museums or churches. One student, Mr. George, shows beautiful drawings of Mr. J. J. Stevenson's restoration of the mausoleum at Halicarnassos. The most important subject of design was for a monument to a naval hero in St. Paul's Cathedral, to occupy a similar position to that of the Wellington monument. This subject was led up to by a series of historical studies of the architectural use of sculpture. Such a subject as the foregoing is, of course, the most difficult of

worthy accomplishment in the whole field of design, and there are few architectural students in their second year who would make such excellent sketches as are here shown. The first rough sketches, scale drawing, perspectives showing the surrounding architecture, clay models, and quarter full size elevations are required, and make a formidable exhibition by themselves. Mr. Trent's design is fairly satisfactory; it is greatly influenced by Stevens. That of Mr. W. S. George shows the greatest promise; it has a fine monumental feeling without being heavy or uninteresting. The only disappointing feature of this section of the exhibition is the work of the last year's travelling student, Mr. A. E. Martin. The large subject he chose to measure was not worthy of so much labour, and the drawings have the appearance of such a discovery made late in the day. An entrance hall in Genoa is the best work shown. The modelling is under another roof. A feature of this year's exhibition is the models of figures of English artists, which will adorn the niches in Sir Aston Webb's façade to the new museum buildings; that these should be executed by students of the school is an excellent idea. Two good panels, the work of Mr. R. R. Goulden, which have been cast in bronze for the Institute for Physical Culture, are shown, and some good modelling from the nude, notably the work of Mr. Chas. F. Hill and Mr. Harry Parr. A new departure this year is that of metal work, of which some good examples are shown, and the pottery exhibits show improvement over last year. It is a step in the right direction to find the conjunction for the execution of crafts in conjunction with the studio.

CONGRESS OF THE BRITISH ARCHÆOLOGICAL ASSOCIATION AT NOTTINGHAM.

The sixty-third Congress of this Association was inaugurated at Nottingham on Wednesday, July 25, when the members assembled at the Exchange. After a brief announcement of the proposed visits to various places of interest by the President (Mr. Chas. E. Keyser), the party set out for St. Mary's Church, which was the first objective.

This church stands practically in the centre of the British Burgh, and was restored to a large extent during the last century. It, however, stands on the site of a much older church, which is referred to in Domesday Book in the passage, "the church with all things that belong to it is worth 100 shillings per annum." The present church was built about the year 1555, and, although there are no records to prove this, the date can be approximately fixed by the reference to it by Leyland in the year 1540, when he says,

"There be three parochie churches, St. Mary, St. Peter, and St. Nicholas, but the church of St. Mary is excellent, new and uniform in work." Another interesting reference to this church is found in the Foundation Deed of the Priory of Lenton to which was granted among other considerations by William Peveril, "the church of St. Mary, in the English Burgh of the town of Nottingham." This Foundation Deed was witnessed by Gerard, Archbishop of York, who succeeded to that diocese in 1100 and died in 1108. This gives approximately the foundation of Lenton Priory.

Bishop Baines (present Rector of St. Mary) said he was pleased to welcome the Association, and hoped that they would have a pleasant Congress. He then had a piece of flooring removed, and exposed one of the Early English piers, to show how the later Perpendicular work had been erected on the old base. The most interesting object seen was a curious carved alabaster panel, representing, it is suggested, the Pope giving his commission to St. Augustine to convert the inhabitants of these islands. St. Peter's was next visited, and here Mr. R. Evans, jun., met the Association and read a brief description of the most interesting points in the church. The earliest part of the building now extant is the south arcade, which is XIIIth-century work, and worthy of careful inspection. The chancel was entirely destroyed during the Civil Wars by the then Governor of the Castle (Colonel Hutchinson). The present chancel is modern, erected on the foundations of the original

one. The sacramental plate bears an inscription dated 1720, but the two flagons are evidently of an earlier date. The members then proceeded to Brewhouse Yard, at the base of the castle rock, and there inspected the rock-cut chambers, which, it is asserted, were used as the cellars and brewhouse of the castle, and there is seen in an adjoining yard the hoist by which the casks were raised to the castle level. A curious tube, 2½ in. in diameter, is cut in the rock from the cellar in a westerly direction toward the hoist, and was evidently used to shout instructions through between the foot of the hoist and the cellar. The next place visited was the series of rock-cut caves in the grounds of the Hermitage, of which a brief description was read by one of the members present. These caves appear to be the remains of a chapel and range of cells excavated out of a semi-circular sweep of sandstone rock, and at one period were fronted by the river and probably connected with the Priory of Lenton. A most interesting feature is the series of small holes cut in the rock and used as dove-cotes. We get three references to this chapel, Pipe Roll, 29th year of Henry III.: "In stipendiis duorum monachorum ministrantur in capella St. Marie de Rupe subitus castrum de Nottingham."

EVI.-I.-VIII.

Confirmation dated December 5, 1455, of letters patent, dated Westminster, June 20, fourteenth year of Edward IV., chapel is called St. Mary le Roche, and in an indenture between Edward IV. and Thomas Prior of the Monastery of Holy Trinity, Lenton, we find mentioned "the chapel of St. Mary, called le Roche."

In the evening a unique series of lantern slides (specially prepared for the occasion) of specimens of Norman architecture in the county were exhibited and described by Mr. C. E. Keyser, M.A., F.S.A. Particular interest attached to those showing examples of the "Sampler" stones.

Thursday, July 26.

Arriving at Mansfield the Association drove to the few remaining ruins of a palace of King John at Clipstone, where he was in residence at the time of the Welsh revolt; then through the village of Ollerton and the far-famed Sherwood forest, passing Major Oak and Parliament Oak. In the evening, Mr. I. C. Gould, F.S.A., read a most interesting paper on "Some Nottinghamshire Strongholds." Although Nottinghamshire was poorly represented, compared with several other counties as to earthworks, there were yet a few interesting promontory forts, of which Nottingham Castle site was a good example. Castle Hill, Workson, also Combs Farm, Mansfield, were of much the same type. Margidunum, a Roman fortress on the Fosse way, was a stronghold of importance. Of "mount and court strongholds" there were examples at Lowdham, Annesley, Egmonton, Laxton, and Aslockton. Of these Laxton was the most striking, as masonry was largely used there. The earthwork defending the southern approach to Newark is quite unique as a perfect example of a fort dating from the Royalist and Parliamentary struggles.

Friday, July 27.

Under the guidance of Mr. Cornelius Brown and Mr. I. C. Gould the party embarked on what proved to be a most interesting day in Newark and the district. St. Mary Magdalen's Church was the first objective, and here Mr. Brown, to whom our sincere thanks are due, described the church. On this site in Saxon times and down to about the year 1160 stood a church of which no trace exists, and of the Norman church which was begun about that time the crypt and the piers at the intersection of the nave and transepts are the only remains. The crypt has a quadripartite vaulted roof with flat segmental arches, and it seems to have extended further east and west than at present. The church consists of a nave and aisles, a chancel also with aisles, and north and south transepts. The western tower is in the lower stages a good example of Early English work, and was commenced about the year 1230. The west doorway is a fine example of the work of the period, with its richly-moulded orders springing from four jamb-shafts with foliated caps. The west window is a XVth century insertion, and

above this is a plain stage a few courses high, over which is an arcaded story, with four arches on each face with shafts and caps. Above this story the face of the stonework is enriched with trellis diaper. The top stage of the tower was added some eighty or ninety years later, and its four faces, with the exception of the angles, have been recessed behind the plane of the lower stage to obtain the effect of buttresses to the belfry stage. The tower is furnished with a projecting panelled parapet with angle pinnacles, and behind this brochures lead up to the fine octagonal spire. The south aisle of the nave was begun early in the XIVth century, and the nave started in 1390; the north aisle of the nave was finished before 1460, and the whole of the chancel completed about the year 1498.

There are two stone chantry chapels on the north and south of the altar; these were founded about 1500. The parclose and rood-screen, carved by Drawswerd, of York, is a fine example of the work of that period. There is a good series of Miserere seats in the chancel stalls. The Fleming brass, one of four largest in England, measure 9 ft. 4 in. by 5 ft. 7 in., and is composed of sixteen separate plates of metal. Fleming, who died in 1361, is represented in the civilian costume of the time holding in his clasped hands a scroll bearing the words, "Miserere mei Domine Deus meus." The figure is beneath a triple canopy of tabernacle-work, and the background is richly diapered. The XVIIIth-century chalice is worthy of note, and there are a few fragments of stained-glass.

After luncheon the train was taken to Tuxford, and thence after a short drive Egmonton Church was reached and briefly inspected. The church is Transitional, and contains some fragments of stained-glass and an incised alabaster slab near the altar to Nicholas Potwell with his two wives, dated twenty-first year of Elizabeth. Adjoining the church is a very perfect Norman stronghold of the mount and court type, which Mr. I. C. Gould described, and pointed out the platform upon which the ladder from the outer edge of the Fosse rested. There are remains of stone foundations in the inclosure at the rear, which should prove of interest if excavated. St. Nicholas Church, Tuxford, was visited, and here the most notable object was a canopied recess of the Decorated Period, within which was a representation of St. Lawrence on the Grid, carved in stone, with three figures bending over blowing up the fire with bellows. In the chapel are several carved alabaster effigies, together with a monument to Thomas White of the first quarter of the XVIIIth century. In the evening a paper, by Mr. R. H. Forster, on "Margidunum," was read, followed by one on "Earthworks of the Moated Mound Type," by Dr. T. Davies Pryce.

Saturday, July 28.

On arriving at Newark the history of the castle was outlined by Mr. Cornelius Brown, and the architectural features described by Mr. T. M. Blagg. The castle was commenced in 1130 by Alexander, Bishop of Lincoln, and in the year 1139 Stephen demanded its surrender and took possession. King John, after forcing the Wash and passing through Sleaford, arrived at Newark Castle, October 16, 1216, and died there three days later. In 1218 the castle again passed into the hands of the Bishop of Lincoln, who contrived to hold it until 1547, when it was exchanged for land elsewhere. It was garrisoned for the King during the Civil Wars, and after leaving the castle Charles surrendered to the Scots in a field close by. A curious series of diamond-shaped siege pieces was shown by Mr. R. Topham, and evoked much interest. Various points which deserved attention were then visited, perhaps the most noteworthy being the grand Norman entrance gateway and the stair turret to the east of the gateway, which is built in the usual Norman fashion as a continuous spiral vault. The vaulted chamber beneath the great hall was next seen, also the small cell by the side of the stair to the postern for the warder in charge of the gate, and finally the late XVth-century oriel window inserted by Thomas Scot, Bishop of Lincoln, from which a splendid view of the surrounding country can be obtained. After luncheon a start was made via the Beaumont Cross, originally erected about 1361, for All-Saints' Church,

lawton, which has an Early English nave and aisles, with Perpendicular clearstory, a Decorated chancel, and Perpendicular tower. The chancel was built about 1320 by Sir Robert de Compton, who is buried here, has the most beautiful Easter Sepulchre, and was alone worth the visit. It is divided into a triple-arched opening by richly-moulded buttresses, with beautifully-carved crocketed initials; the canopies are also richly crocketed. The base is divided into four panels, in which are represented the sentinels sleep before the tomb. In the arched recess above is a carved figure of Our Lord with the Magdalene at His feet, while above the canopy of this part is a representation of the Ascension. The sculpture of the whole sepulchre is so beautiful and delicate in every part that it would well repay detailed study. Though not unique as is the sepulchre, the sedilia, situated on the opposite side of the chancel, is still worthy of special mention, consisting as it does of three canopied seats richly carved in the upper part. The double piscina is noticed for the splendid initial to its canopy. The parish register was inspected with great interest, dating as it does from 1564, and the Vicar (the Rev. R. Washington) was cordially thanked for affording such a complete inspection of the church. Returning through Newark, Southwell Cathedral was soon reached and here the Rev. Arthur Sutton described the fabric. The nave, with its side aisles and north porch, north and south transepts, together with the western and central towers, are all Norman. The present choir was constructed in 1230, and is a fine example of XIIIth-century work. Over the north porch is a parvise, and one of the large pinnacles is pierced with round holes to act as a flue to a fireplace in the chamber. The great width of the openings of the triforium arcade, which are almost the same width as the nave arches below, is noticeable, and some discussion took place as to the use of a circular boss on the soffit of the crown of the arches of this arcade. The chapter-house is a good example of late XIIIth-century work, and the entrance doorway from the cloisters is remarkable for the delicately-carved materialised foliage. The sedilia of five seats has been a good deal restored, and is, together with the piscina, of the Decorated Period. Only one of the Norman windows remains in the nave, Perpendicular windows having been inserted in the XVth century. A roodscreen presents good, typical work of the XVth century. The tomb of Archbishop Sandys, who died and was buried here in 1558, is of some interest; it is an Elizabethan altar-tomb, and has a recumbent figure of the Archbishop in alabaster, a curious point being that the chasuble is worn over the rochet.

Monday, July 30.

The members arrived at Mansfield station about 9.30, carriages then conveying them to Ault Hucknell Church, where the Norman tympanum over the west doorway evoked considerable discussion, the consensus of opinion finally deciding it to be a representation of the legend of St. Margaret. In the nave there is a considerable amount of work, which is of early XIVth-century character. From thence a drive through picturesque country brought the party to Hardwick, where it was met by the Rev. F. Broadhurst, Vicar of Heath, who conducted the members over the celebrated Elizabethan house and described at considerable length the beauties of the numerous pictures and tapestries. The long gallery elicited much admiration. Some of the members then visited the Old Hall, now sadly decayed; it is, even in its ruined state, a fine example of XVth-century work, some of the boldly-modelled plaster-work in the upper rooms being greatly admired. It seems a pity that no steps have been taken to preserve this building, as it would appear that within only the last twenty years the floors and roof were in a fine state of repair. After luncheon, partaken of at the Hardwick Inn, the brakes were once more requisitioned and the party proceeded to drive to Bolsover Castle, which was either founded by William Peverel or his successor, the situation being an ideal one for a defensive position. The manor in which the castle of Bolsover, or Belesover, is situated is in the Saxon Kingdom of Mercia, and was owned at that date by Leoric; it was then granted by William the Conqueror to Peverel. We get in the

Domesday Book a reference to the fact that Bolsover was in the possession of William Peverel, but there is no mention made of a castle there; it would therefore seem probable that the Saxon works were simply occupied, and that no building operations occurred until a later period. We find that it was evidently built before the end of the reign of Stephen, for there is evidence that about that date the Peverel in possession was accused of poisoning the Earl of Chester and fled to the Priory of Lenton, near Nottingham, and when Henry II. ascended the throne, the castle of Bolsover was among the estates which he forfeited to the Crown. The earliest mention of Bolsover in the Pipe Roll is in the nineteenth year of Henry II. (1172), when Reginald de Lucy (the Sheriff) accounts for 40s. expended on works and 53s. 4d. for provisions for the garrison, which consisted of forty quarters of corn, twenty hogs, and sixty cheeses. There are other entries showing payments at various times for repairs, and in the second year of King John's reign we find that the park was enclosed at the cost of 302l.—a large sum in those days.

The remains of the castle are curious, inasmuch that they would appear to be an Elizabethan restoration of the original Norman structure, while much of the later portion of the work seems to have been the work of the famous Bess of Hardwick, whose passion for building was so well known. The more modern residential parts of the castle were built by Sir Charles Cavendish, who died in 1617. His son continued the buildings, the chief of which was the magnificent riding school and stables; some idea of the huge proportions of the building may be gathered from the fact that the great gallery is 220 ft. long. The castle was garrisoned by the Marquis of Newcastle for the King, but surrendered to the Parliament in August, 1644. The second Duke of Newcastle frequently stayed here; but the Countess of Oxford, in about 1740, removed the roofs of the buildings and sold the lead. In the keep are several very finely-carved alabaster mantelpieces, which elicited much admiration, as did also the panelling. The keep is practically the only portion of the structure which is now kept in a state of repair.

After leaving the castle, Bolsover Church was visited. This church, dedicated to Saint Mary and Saint Laurence, was erected early in the XIIIth century, and has suffered considerably by alterations during the days of Queen Anne, and in the year 1878 it was restored and the internal stonework refaced. The church is a somewhat plain structure, and the earliest work appears to be late Norman. There is, however, a little Early English work, but nothing particularly interesting. The tower, surmounted by a low broached spire, is of this period, while the nave is Decorated work. A small chapel was erected in 1618, to contain the Cavendish monument, which is of alabaster. There is also a monument specially to Henry Cavendish, Duke of Newcastle, which stands some 30 ft. high, which is said to have cost 16,000l., and is a remarkable specimen of the work of that period. There is in the church a carved stone, about 5 ft. by 3 ft., representing the Nativity; it appears to be either late XIIth or early XIIIth century work, and was discovered about 175 years ago, when it served the purpose of a step to the north door, having been probably placed in that position after the order of the Parliament in 1643 that all monuments of idolatry should be destroyed or defaced.

From Bolsover the members drove back to Mansfield, where, by the courtesy of Canon Prior, they inspected the church of St. Peter and St. Paul. The story of the church may be briefly set forth here. It originally consisted of a nave, chancel, and western tower, erected probably in the early part of the XIIIth century. In the beginning of the XIIIth century the north wall was taken down and an aisle added; the south aisle, which is of Decorated work, was added about 1286. The next step was the building of the north and south chapels, on either side of the chancel, and near the altar, looking into the south chapel, is a hagioscope, which very probably allowed a hermit, who seems to have established a cell here, to witness the celebrations of the Mass. The registers and some deeds restoring the chantry lands to the vicar and churchwardens were then exhibited, and the exterior of the building

examined. A curious feature of the external work is the number of broken incised slabs which have been used in the construction of the Decorated and Perpendicular portions of the building.

At the evening meeting the Sheriff of Nottingham (Councillor Samborne Cook) and Under-Sheriff (Mr. J. A. H. Green) attended, and showed the maces of the city and the Sheriffs' collar. Mr. Green then described the history of the maces from their origin to the present day; the joint honorary secretary then read a paper, tracing the history of the defensive works of the town.

Tuesday, July 31.

Upon arriving at Bottesford, the church was at once inspected under Canon Jackson's guidance, the magnificent Decorated crocketed spire eliciting much admiration. The Norman earthworks, situated near the church, were examined, and the interesting information was afforded by Canon Jackson that the street which runs parallel to the old earthwork is still called the "Rampar," and it was conjectured that this was a corruption from the original rampart. The stocks and whipping-post, which adjoin the remains of the cross, are in a wonderful state of preservation, and the hand irons are still in position. To return to the church, with its magnificent series of monumental effigies to the Rutland family, so admirably described by Mr. George Fellows. Here we have a most remarkable series of mediæval tombs, which are possibly unique. They were probably executed by the "Alabastermen," or "kerviers," of the town of Nottingham, the borough records of which town contain numerous references to this industry. The tombs are those of the families of Roos and Manners, and some were conveyed here from Belvoir Priory at the time of its demolition in 1543. The first monument to be referred to is a little figure of Purbeck marble, in hauberk and coif of mail, with sleeveless surcoat, and it is supposed to be the effigy of William D'Albini, who died in 1236. Against the south wall in the sanctuary is the alabaster altar tomb of Sir William de Roos, K.G., who died in 1414; he wears a conical bascinet, a camail of mail, a jupon with escalated edge, and the Collar of S.S.; the Garter is shown below the left knee. Across the chancel is the tomb of his son John, who was killed at the battle of Beaugency, in France, 1421; in this the camail has disappeared, and the bascinet is less conical, and taces appear fastened to the breastplate; he wears the S.S. collar, and it is worthy of note that the S.S. is reversed.

The next tomb in chronological order is that of Thomas, first Earl of Rutland, and his second wife, Eleanor; he died in 1543; was made a K.G. by Henry VIII., who created him Earl of Rutland in 1525. He is shown as wearing over his armour the robes and chain of a K.G.; the George and Rose depends from the Collar, and the Garter is shown below the knee. The lower part of the monument shows his offspring, all in different attitudes, while at the west end is shown the eldest son kneeling at a prayer desk. It was executed by Richard Parker, the "Alabasterman," and it is recorded that two sons, amounting together to 20l., were paid him for the work. The next tomb is that of the son of the first Earl, Henry, second Earl of Rutland and fourteenth Baron Roos. It is curious to notice that the legs which support the slab of this tomb are similar to the shafts which support the font, and are probably by the same hand. The armour worn by this figure is of the type known as a "suit of splints," or "splintered armour," the breastplate consists of a series of laminated plates, attached in much the same way as tassets were. Standing on the tester is a structure bearing shields of arms of the family. The tomb of the third Earl, which stands against the south wall of the chancel, is chiefly noticeable from the fact that the head rests on a mat, not on a helmet, as in those of his predecessors. It was probably the work of Gerard Janssen, of Amsterdam, who came to this country in the days of Elizabeth. There are several other tombs to members of the family.

In the chancel is a fine brass on the floor to Henry de Codynghton, who was rector of Bottesford in 1361 and died 1404. He is represented in a cope embellished with figures of St. Peter, St. John the Evangelist, and others, and is considered to be the finest brass in Leicestershire. Another brass, but not in

such good condition, is that to John Freeman, rector in 1420, with an inscription in "leoline verse."

After inspecting the registers, which are bound in sheets of parchment covered with manuscript, which it would be extremely interesting to decipher, and a few other objects of interest, the party had luncheon; a few of the more adventurous drove to Staunton Church, close by, and later all met and returned to Nottingham, whence most of the members returned to their habitations. Some few still, however, lingered, and visited Lenton Church, to inspect the font and afterwards to attend a garden party.

BUILDERS' AND CONTRACTORS' COLUMN.

The Construction of a Tube Railway.

ONE of the first steps in the construction of a tube railway is, of course, the sinking of the shafts, either permanent or temporary, by means of which access to the tunnels can be obtained. The shafts on the different tube railways in London naturally vary considerably in size, but the following sizes may be taken as fairly representing standard practice, viz.:—For staircase-shafts 18 ft. diameter, and for lift-shafts either 23 ft. or 30 ft. internal diameter, the former size being used where two lifts only are required in the shaft, and the latter size in cases where three lifts or two lifts and a staircase are to be put in one shaft.

For the sake of example, the construction of shafts 23 ft. diameter will be described, the methods employed in the other sizes being practically identical. These shafts are 23 ft. in diameter internally and 23 ft. 11 in. external diameter. They are composed of rings of cast-iron segments bolted together; each ring is 4 ft. deep as a general rule, although occasionally 18-in. rings are used in water-bearing strata. Each ring consists of twelve segments, and weighs approximately 8½ tons. The thickness of the skin of the castings is 1½ in., the flanges taper from 1½ in. to 1¼ in.; there are also two horizontal strengthening ribs ½ in. thick, and gusset-pieces are cast in between the bolt-holes. The vertical joints of the castings are machined, the horizontal are not, but simply have a chipping piece cast on. In each circumferential joint there are seventy-two bolts, and in each vertical five bolts, making a total of 132 bolts per ring.

The shafts are first sunk or forced into the ground as far as possible, after which the work is continued by underpinning. For facilitating the process of sinking the shafts a cast-iron cutting-edge is temporarily employed. This cutting-edge is 15 in. deep, and is composed of twelve segments and a hardwood key-piece about 4 in. wide, which can be cut out when removing the cutting-edge.

Before commencing to sink the shaft the site is carefully levelled and a stout centre-peg put in; the cutting-edge segments are then placed in position, accurately adjusted to a trammel and level and bolted up, after which the first ring of segments is placed in position on top of it, each segment being carefully checked for position before being finally bolted up. A second, and in some cases a third, ring of segments is added and jointed and bolted up before sinking is actually commenced. The rings of segments are arranged to break joint vertically, which assists in keeping the shaft truly circular.

The joints are made as follows:—The vertical joints are painted with red lead and have four strands of twine laid in them; the horizontal joints with red lead and yarn. These joints, though simple, are found to be very satisfactory except in very water-logged ground, when it is necessary to caulk the joints with rust cement, a mixture of iron-filings, sulphur, and sal ammoniac.

The red lead joints described above are, as a rule, pointed with neat cement on the completion of the shaft.

The first rings having been bolted up as described, excavation is commenced inside the shaft. The ground under the cutting-edge is first removed a few inches at a time, thus allowing the shaft to sink gradually by its own weight until the whole cutting-edge is buried and the top flange of the cutting-edge comes to a bearing on the solid ground and stops the motion of the shaft. The remaining excavation is then removed over

the whole area of the shaft to the depth of the cutting-edge. These operations are continued as long as it is possible to get the shaft to sink.

As the shaft sinks additional rings are bolted on top of it, the top of the top ring being kept about 12 ft. above ground level. At a certain depth (which depends upon the nature of the soil) the weight of the shaft will be insufficient to overcome the skin friction and the motion of the shaft will cease; additional weights are then added, distributed evenly round the circumference of the shaft, and supported on special stages constructed inside it at various levels. It is very important to load the shaft evenly, as otherwise it will get out of plumb, and when once out it is very difficult to correct it.

Should the shaft be found to be out of plumb while being sunk it may be rectified either by adjusting the load or by placing wooden foot-blocks under the side which is lowest so as to stop the movement on that side.

For the purpose of checking the shaft for a perpendicular position it is customary to suspend four plumb-lines, two on each axis of the shaft, at a distance of about 2 in. from the castings, and hanging from top to bottom of the shaft. From these lines measurements are taken at the top and bottom of the shaft, which should agree if the shaft is plumb.

It will occasionally be found that the shaft will be out of shape—that is to say, the diameter measured in one direction is greater than in another direction, and in order to rectify this error strong union screws and chains are fixed across the widest portion of the shaft and tightened up, and, if necessary, strong timber struts are also placed across the narrowest point. It is, however, extremely difficult to rectify the shape of the shaft when once it is wrong.

When the shaft has been sunk as far as possible into the ground the whole of the extra weight added is removed, together with those rings which project above ground-level; the cutting-edge is also taken off after the wooden key has been cut out. The clay is then excavated for a further depth of 4 ft., and another ring of cast-iron segments bolted up to the underside of the bottom ring, the joints being made as before. As each ring is fixed it is carefully grouted in cement or lime under a pressure of about 60 lb. per square inch so as to fill any spaces that may exist between the clay and the iron. These operations are repeated until the shaft has reached the required depth, when an invert of cement concrete, about 3 ft. thick, is constructed as a foundation.

Special castings are built into the shaft as it is constructed to form the necessary openings for communication with the foot-passages leading to the tunnels.

The skin friction varies with the strata. In the case of made ground or loose ballast it is about 1 cwt. per ft. super., but in other strata it may amount to as much as 2½ cwt., and when this latter figure is reached it is impracticable further to increase the load, and underpinning has to be commenced.

The total weight used in one case to sink a 23-ft. shaft was 371 tons.

In some cases water-bearing strata have to be passed through, and it is then usual to excavate inside the shaft by means of a clam-shell grab, as pumping should be avoided whenever possible. The shaft may usually be sunk into the clay or other watertight strata by this means; it is, however, more risky in some ways, it being impossible to ascertain if there is any obstruction to the free passage of the shaft, and this occasionally leads to broken segments and considerable trouble. The following instance will be interesting as an example of the mishaps which may occur in such cases:—

A shaft, 23 ft. in diameter, had to be sunk through the following strata:—Made ground 15 ft. 9 in., mud 7 ft. 6 in., ballast 10 ft. 6 in., into the London clay.

All went well until the shaft was about 6 ft. into the ballast, and as the ground was water-logged, it was being excavated by means of a grab, the load being about 50 tons. At this point the shaft stuck fast for a fortnight, although considerable extra weight was added. At the end of this time the grab brought up a portion of the cast-iron cutting-edge, showing that a fracture had

occurred. No more weight was added, but the shaft was pumped out as quickly as possible, and it was discovered that two of the cutting-edge segments adjoining the hardwood key had been forced inwards by a large boulder, crushing the key and breaking the segments; the segment above the cutting-edge at this point was also cracked.

It order to remove the broken plates it was decided to sink the shaft until it was sealed in the clay. The cutting-edge and bottom ring were therefore heavily timbered to prevent them from collapsing any further, and more weight was added, bringing the total weight up to 371 tons, which was sufficient to drive the shaft 9 ft. into the clay.

An attempt was then made to replace the broken segments, and for this purpose the cracked and damaged ones were dried and smashed out, but before the new plates could be placed in position the clay failed, and there was a bad run of ballast and clay into the shaft, which became flooded. It was therefore decided to sink down outside the shaft where the breakage had occurred and replace the plates from outside. This, though rather a tedious undertaking, was successfully accomplished, and the remainder of the shaft was afterwards completed without further mishap by underpinning, as described above.

Rate of Wages for Night Work.

The question of rates of wages is always an important one, and builders will probably be interested in the decision recently given on the rights of labourers to extra wages when working in a night gang.

This point was settled at the Bow County Court. In this case a labourer sued a leading firm of contractors for balance of wages, claiming that he was entitled to one penny per hour extra beyond his usual day rate for working in a night gang. Both sides were legally represented, and upon it being shown that there was no working-rule agreement between the London Master Builders' Association and the Labourers' Union the judge non-suited the claimant.

Inquiries were made among the leading London firms of builders and a considerable divergence of practice was discovered. It was found that very few firms had recently employed regular night gangs, their experience being chiefly limited to gangs working an occasional night-shift, and in these cases the practice varied materially. The firm in question had, however, employed night gangs on numerous contracts regularly for the last few years, and had paid no extra rate.

It is very desirable that employers should know their position as to the payment of labourers engaged on night gangs, but, to avoid misunderstanding, it would be advisable to let the men know on their engagement what rate of wages they are to be paid.

Foundation Work at the Piccadilly Hotel.

There is a considerable rise in the ground-level across the site from Piccadilly to Regent-street amounting to about 8 ft.; there is also a rise to a smaller extent from east to west, which tended to complicate the question of floor-levels. It was therefore arranged to keep the sub-basement floor-level in Regent-street 8 ft. higher than in Piccadilly. The sub-basements are carried through on the means of these two levels, the basement and mezzanine following them, and the gradual rise round the site is dealt with by means of a series of steps in the ground-floor and estresol levels only; all the floors above this being carried through level.

A great part of the site was previously occupied by the St. James's Hall and Restaurant, and from the information available concerning the construction of these buildings it was anticipated that a very considerable amount of water would be encountered, some authorities stating that an underground stream, similar to that met with in Bayswater during the construction of the Central London Railway, would be found to run across the site in a north and south direction. It was decided by the architects therefore to construct the foundations in the form of a tank, and the external walls were designed as self-supporting retaining-walls.

The retaining-walls vary in height from 32 ft. to 40 ft., and the thickness at the base varies from 10 ft. to 12 ft. They are constructed of cement concrete of six parts

of ballast and brick rubbish to one part of Portland cement. To ensure water-tightness the walls have each an asphalt vertical damp-course placed in the thickness of the wall, about 2 ft. 6 in. from the back, connecting with a horizontal damp-course laid about 18 in. below the sub-basement floor-level.

Immediately possession could be obtained of a portion of the site the contractors commenced to excavate the trench for the retaining-wall on the Regent-street frontage at the point at which it was expected that most water would be encountered, but, although a stratum of ballast was passed through, practically no water was found, that which was there being easily dealt with by a hand-pump.

The concrete walls were constructed in lengths of about 50 ft., and were brought up in layers of 3 ft. The front portion of the wall inside the asphalt damp-course was always constructed first and allowed to be thoroughly set. The asphalt damp-course was then applied to the back of it in two layers, and afterwards the remaining portion of concrete behind the asphalt was put in. The whole of the concrete for the retaining-walls was mixed by mechanical mixers of two types, viz. (1) The revolving-drum type of mixer driven by an electric motor mounted on the same travelling carriage as the mixer itself; this mixer was led by a steam travelling-crane, and travelled alongside of the trench as required; (2) the "gravity" or ladder mixers, which can readily be shifted to any position along the trench as may be necessary.

After the retaining-walls had been allowed sufficient time to become thoroughly set the excavation of the dumping was proceeded with. The strata met with were approximately as follows:—Made ground 10 ft. to 12 ft.; ballast, with veins of sand, 3 ft. to 15 ft.; and below this London clay. The dip in the ballast is very great, and is interesting, as it appears to confirm the theory that a water-course ran across the site at some time.

Considerable difficulty was experienced in removing the foundations of the old St. James's Hall, the main walls of which were carried on extremely massive concrete foundations. It was also found that the arched iron-ribs supporting the roof of the hall were carried down through the walls into the foundation-concrete, being anchored into the concrete by two layers of York stone landings 8 in. thick, in slabs 8 ft. to 10 ft. square. All these old foundations had to be cut away with hammers and wedges, as it was not considered advisable to resort to blasting owing to the close proximity of other buildings and public highways.

The stanchions carrying the superstructure of the hotel, of which there are over 100, are constructed of cast-iron up to ground level; each stanchion is furnished with a massive cast-iron base, which distributes the load which the stanchion carries over a large area. These cast-iron bases are in turn supported by blue-brick bases, which again increase the spread, and are built on concrete foundations 4 ft. thick. The cast-iron bases are not bolted down to the brick and concrete foundations. A space of $1\frac{1}{2}$ in. is left between the bottom of the iron base and the top of the brickwork for adjustment, the bases being in the first instance supported on steel wedges, which are tightened or slackened until the bases are absolutely level; the space is then filled in with liquid-cement grout.

A considerable quantity of underpinning was necessary where the retaining-walls are constructed against adjoining property, and in these cases the walls are built in short lengths in the usual way in stock brickwork in cement.

The low-level sewer in Regent-street is fortunately at a sufficient depth to give a good fall from the farthest corners of the sub-basement, and therefore the whole of the drainage is brought to three connexions on this side of the site.

The work is being carried out for the Piccadilly Hotel, Ltd.; Mr. William Woodward and Mr. Walter Emden are the joint architects; and Messrs. Perry & Co., of Tredgar Works, Bow, and Westminster, are the contractors for the whole of the work.

THE NEW RESERVOIRS AT HONOR OAK.

ON Saturday, the 21st ult., one of the summer visits of the Civil and Mechanical Engineers' Society was paid to the new covered service reservoirs now under construction by the Metropolitan Water Board at Honor Oak. The party, which included Professor Henry Adams (Past-President), the Hon. Secretary (Mr. A. S. E. Ackermann), and a number of members and visitors, was conducted by the Clerk of Works to the Metropolitan Water Board.

Each of the four reservoirs is 412 ft. long by 294 ft. wide by 21 ft. 6 in. deep to water-level, and their collective capacity will be fifty-two million gallons. All the piers and covering arches, the latter with the span of 21 ft. 6 in. from centre to centre of the piers, are being built of bricks made by the Metropolitan Water Board from clay obtained on the site. These bricks, of which some thirteen million are in stock at the present time, are being sold to the contractors (Messrs. T. J. Moran & Co.). The retaining walls are constructed in concrete with a brick-facing on the inner surface. The reservoir floors are partly of concrete and partly of inverted brick arches. Including their banks, the reservoirs cover an area of about 21 acres, and will supply the south-western and south-eastern district of London with water obtained in part from Hampton and in part from a deep well that was sunk at Honor Oak about two years ago. When finished it is estimated that the well will yield six million gallons of water daily. The contract price for the reservoirs is 136,561l., which works out at the satisfactory figure of 52s. 6d. per 1,000 gallons of water stored; but it should be mentioned that before the contract was let part of the excavation had already been performed by the Metropolitan Water Board for the purpose of obtaining clay to be used in the manufacture of bricks. The maximum depth of excavation was 43 ft. at the south-west corner of the site. Three 42-in. mains will supply the reservoirs with water, and two service-mains will be provided for distribution purposes.

The works were commenced in February this year, and it is expected that they will be completed early in 1908.

MASTER BUILDERS' CONFERENCE IN DUBLIN.

The Contract Form.

A GENERAL meeting of the National Federation of Building Trade Employers of Great Britain and Ireland was held on Wednesday, August 1, in the Supper Room, Mansion House, Dublin. Mr. George Macfarlane (Manchester) presided, and there was a large muster of delegates from various parts of the United Kingdom. A deputation of the Belfast Builders' Association (who are not affiliated with the National Federation) attended the Conference on invitation. The deputation comprised Messrs. R. B. Henry, J.P. (Vice-President), J. A. McAnley (Secretary), John Smith, and J. C. White, solicitor.

The Lord Mayor of Dublin, through whose kindness the meeting was held at the Mansion House, attended at the opening of the proceedings, and extended a cordial welcome to the delegates, remarking that in doing so he was sure that he echoed the sentiments of the whole of the citizens of Dublin. Although he was welcoming the master builders, he was sure the gentlemen present were interested also in those who were dependent upon them—namely, the workmen and their wives and families. He trusted that their deliberations would be the means of cementing the friendship which should exist between employers and employed, and that they would be able to devise some scheme whereby lamentable trades disputes and matters of that kind would be avoided in the future. As a working man, he knew the difficulties and troubles that arose where a dispute took place between capital and labour, and, speaking as a working man, he deplored such strikes and lock-outs. He was not there to say who was responsible for such disputes, but they were all agreed that all suffered by such events, and none more than the working men themselves. He stood there as a trade representative, anxious for the amelioration of the class to which he belonged, anxious to

see Capital and Labour working hand in hand, and he certainly would do all in his power at all times to smooth over any difficulties that unfortunately might occur.

The President, on behalf of the delegates, said they heartily appreciated the generous welcome the Lord Mayor had extended to them, and he trusted that their visit to the City of Dublin would be one of mutual benefit.

The Half-yearly Report.

The fifty-seventh half-yearly Report submitted to the Conference stated that, although trade during the half-year had continued depressed, there were some signs of improvement in the demand for builders' work. There had been very few disputes between employers and operatives during the past six months, and none with which the intervention of the executive had been found necessary. Considerable progress had been made in raising the National Reserve Fund, and there was now in hand a sum of 1,658l. 16s. 9d., excluding interest, out of which a sum of 854l. 10s. was to be paid.

The Report was adopted, on the motion of the President, seconded by Alderman Bowen (Birmingham).

Belfast Delegation.

This body was next received, and welcomed by the President.

Mr. R. B. Henry, J.P., in reply, said it gave the members of the Belfast deputation much pleasure to be present. They had been anxious to learn the benefits that would accrue by their joining the Federation. They had experienced many difficulties in Belfast, amongst them being the question of the contract form, and they had watched with interest the successful manner in which the subject had been approached by the Federation across the water. The special form adopted by the Federation seemed to have become universal throughout Great Britain, with the exception of Ireland, and they, as builders, had approached the architects on this matter, and were still working with a view to a satisfactory solution.

Mr. J. C. White (Belfast) congratulated the builders and contractors of England upon having, in conjunction with the Royal Institute of British Architects, achieved a clear, well-defined, and equitable form of building contract. They understood the form was meeting with general acceptance, and already it had come to be recognised in the English Courts of Law as a standard document regulating the relationship between building owners, architects, and contractors. Decisions were forming on it, and if only uniformity were maintained, there would grow round their conditions of contract a body of law that would be of common knowledge and leave little or no room for disputes and litigation. In Ireland, however, the matter was still in a state of uncertainty. Until recently in Ireland no serious efforts were made to procure conditions of contract that would meet with universal sanction. Individual architects used various forms, each, apparently, doing what seemed right in his own eyes. This led to the confusion from which they in England had emerged. Within the past few years attempts had been made in Ireland to arrive at a common understanding, and it might be gratifying to them to learn that the contract which their Federation assisted in forming had met with approval from many architects and from most builders in Ireland. The Royal Institute of Architects in Ireland, having carefully considered and prepared five different sets of conditions of contract, a majority of their members reported in favour of the Federation form, as the basis on which modified conditions of contract should be sanctioned; but the Council of the Irish Institute came to the conclusion that it would be wiser to postpone the adoption of that form until some years of experience had proved its efficiency. The Belfast Builders' Association only differed from that view by stating that the form was sound and equitable, that it had already been under test for over three years, and that, as the law regarding these contracts was the same in both countries, the form of contract should be also the same. They further thought that there was no good reason for delaying its extension here. The Irish builders believed that the extension and general acceptance of that form of contract would be beneficial to

all concerned, and earnestly desired that the Federation would assist in having it adopted.

A number of delegates from several parts of England spoke of the successful manner in which the contract form had been brought into use in their respective districts.

Mr. Henry (Belfast) thanked the Federation for the information given, and said that he himself would be in favour of joining the Federation; but, of course, he would have to report to a meeting of his Association.

Mr. Blake (South Africa) returned thanks for their reception, and said that they were making great progress in South Africa.

Messrs. Knox, President of the Scottish Federation, and McDonald, ex-President of the Scottish Federation, also returned thanks.

Mr. Good (Dublin) said that the builders in Dublin had found the Federation of much assistance in times of trouble. They had recently a strike of considerable dimensions in Dublin in connexion with one of the trades with which they were associated. It was a bitter fight, and they in Dublin came to the conclusion that they should import men to carry on the work. They sent to the Secretary of the Federation, and he put them in touch with the different centres on the other side. They got the greatest assistance, and thousands of men to enable them to carry their end in the dispute. They had been in negotiation with the Institute of Architects in Ireland for many years. They would understand that with an old city like Dublin, old firms of architects had their different forms of contract. The architects had advised them that they should have a uniform contract form for the whole of Ireland, and they formed a committee, and about seven months ago produced a form of contract which was not acceptable to the builders. Then the (Builders) Association bound themselves not to adopt it. If Belfast had done the same, and had not tentatively accepted an objectionable form, it would have strengthened their hands in Dublin.

Alderman Shepherd moved a vote of thanks to the Lord Mayor for having received them and for having accorded the use of the Supper Room for their general meeting. They were much obliged to his lordship, and they all recognised that he occupied his distinguished office with the greatest credit. He had treated them with great consideration, and with great courtesy.

Alderman Jessop (Huddersfield) seconded, and Alderman Dawson (Huddersfield) supported the vote of thanks to the Lord Mayor.

The President put the vote, which was passed with acclamation, and he announced that he would send a letter to the Lord Mayor thanking him for his kindness and courtesy.

A vote of thanks was passed to the President, who, in reply, moved a vote of thanks to the secretaries.

The proceedings of the Conference then concluded.

In the afternoon the delegates attended a garden party in the Zoological Gardens.

THE LONDON COUNTY COUNCIL.

The usual weekly meeting of the London County Council was held on Tuesday in the County Hall, Spring-gardens, S.W., Alderman Spicer, Chairman, presiding.

Loans.—On the recommendation of the Finance Committee it was agreed to lend Greenwich Borough Council £2,400, towards the acquisition of Ranger's House, Blackheath; Hackney Guardians 20,000, for poor law purposes; Hackney Borough Council 2,695*l.*, for street improvement; Kensington Royal Borough Council 32,130*l.*, for housing purposes; Paddington Borough Council 15,000*l.*, for alterations and additions to town hall; and Stoke Newington Borough Council 6,175*l.*, for dust destructor. Sanction was also given to Chelsea Borough Council to the borrowing of 4,560*l.* for paving work.

Acquisition of School Sites.—The following recommendations of the Education Committee were agreed to:—

"(a) That the estimates of expenditure on capital account amounting to 28,500*l.*, submitted by the Finance Committee, in respect of the acquisition of (i) additional land adjoining the site of the Berner-street school (St. George-in-the-East), for the

purpose of providing additional manual training accommodation and centres for laundry and house-wifery work; (ii) the site in Hotham-road (Wandsworth), for the purpose of erecting thereon a public elementary school; and (iii) the site in Stepney, for the purpose of erecting thereon a public elementary school, be approved.

"(b) That expenditure on capital account not exceeding 28,500*l.*, for the purposes referred to in resolution (a), be sanctioned.

"(c) That additional property adjoining the Berner-street site (St. George-in-the-East) and also the sites in Hotham-road (Wandsworth) and in Stepney be acquired for the purposes referred to in resolution (a)."

Schools, etc.—It was agreed:—

"That the estimate of expenditure on capital account of 495*l.*, submitted by the Finance Committee in respect of the enlargement of the Stanley-street school for mentally defective children (Brixton), be approved.

"That the supplemental estimates of expenditure on maintenance account amounting to 5,254*l.*, submitted by the Finance Committee, in respect of the cost of the equipment and maintenance of (i) a secondary school at Cassland-road, Hackney, and (ii) a secondary school at Deansfield-road, Eltham, be approved.

"That the supplemental estimate on maintenance account of 625*l.*, submitted by the Finance Committee, in respect of alterations to the London County Council Fulham Secondary school, be approved.

"That a partition be removed and the floor levelled in order to provide a dining-room at the London County Council Fulham Secondary school (Fulham); that a covered way be provided between the buildings, and certain alterations be effected in the cloakroom, lavatory, etc., and that expenditure not exceeding 475*l.* be sanctioned for the purpose.

"That the estimate of expenditure on capital account of 2,173*l.*, submitted by the Finance Committee, in respect of the work of relaying the drains and executing improvements to the sanitary arrangements at the Benthall-road school (Hackney, N.), be approved.

"That the estimate of expenditure on capital account of 1,681*l.*, submitted by the Finance Committee, in respect of the work of relaying the drains, and effecting improvements to the sanitary arrangements at the Great Wild-street school (Holborn), be approved.

"That the estimate of expenditure on capital account of 274*l.*, submitted by the Finance Committee, in respect of taking out quantities in connexion with the erection of a public elementary school for the accommodation of 110 children on land adjoining the "Southfield" site (Wandsworth), be approved.

"That the estimates of expenditure on capital account amounting to 445*l.*, submitted by the Finance Committee, in respect of taking out quantities in connexion with the proposed enlargements of the following schools, be approved:—(i) Amberwell N. (Olive) (Goldsmith); (ii) Hammersmith, Addison-gardens; (iii) Islington, W.-Hungerford-road; (iv) Newington, W.-Fauce-street; (v) St. Pancras, N.-Ryall-street.

"That the estimate of expenditure on capital account of 8,559*l.*, submitted by the Finance Committee, in respect of a scheme of improvements proposed to be effected at the Dempsey-street school (Stepney), be approved.

"That, subject to the Board of Education approving the finished plans, the tender of W. & B. H. Davey, amounting to 10,194*l.* 12*s.* 7*d.*, for erecting a scheme of improvements at the Dempsey-street school (Stepney), be accepted.

"That the supplemental estimate of expenditure on capital account of 1,000*l.*, submitted by the Finance Committee, in respect of the acquisition of the freehold of the property known as 'The Elms,' belonging to Batson's trustees, in connexion with the Hilldon-road site (Islington), be approved.

"That additional expenditure on capital account not exceeding 4,000*l.*, in respect of the acquisition of the freehold of the property referred to, be sanctioned; that the estimate of 3,703*l.*, the claim of Batson's trustees be referred to the Finance Committee with a view to the payment of the money.

"That the supplemental estimate of expenditure on capital account of 2,500*l.*, submitted by the Finance Committee, in respect of the acquisition of the Lawn-lane site (Kennington), be approved.

"That the valuer and the solicitor do complete the purchase of all interests in the Lawn-lane site (Kennington).

"That the resolutions of August 1, 1905 so far as they relate to the organisation of the Dransfield-road London County Council school (Woolwich), and to the staff to be allocated thereto, be rescinded.

"That the Dransfield-road London County Council elementary school be adapted for the purpose of a temporary secondary school to be known as the London County Council Eltham Secondary school.

"That the work referred to be executed by the contractor for the new buildings as an extra on their original contract for the erection of the school; and that expenditure not exceeding 1,046*l.* be sanctioned therefor.

"That the estimate of expenditure on capital account of 19,540*l.*, submitted by the Finance Committee, in respect of the erection of a public elementary school on the Fountain-road site (Wandsworth) to accommodate 840 children, be approved.

"That, subject to the Board of Education approving the finished plans, the tender of E. A. Vigor & Co., amounting to 16,868*l.*, for erecting a school to accommodate 840 children on the Fountain-road site (Wandsworth), in accordance with the specification as finally amended, be accepted.

"That the estimate of expenditure on capital account of 18,497*l.*, submitted by the Finance Committee, in respect of the erection of a public elementary school on the Lawn-lane site (Kennington), to accommodate 836 children be approved.

"That, subject to the Board of Education approving the finished plans, the tender of J. Garrett & Son, amounting to 18,553*l.*, for erecting a school to accom-

modate 836 children on the Lawn-lane site (Kennington), in accordance with the specification as finally amended, be accepted.

"That the estimate of expenditure on capital account of 20,035*l.*, submitted by the Finance Committee, in respect of the erection of a public elementary school on the Franciscan-road site (Wandsworth), to accommodate 804 children, be approved.

"That, subject to the Board of Education approving the finished plans, the tender of J. & M. Patrick, amounting to 16,717*l.*, for erecting a school to accommodate 804 children on the Franciscan-road site (Wandsworth), in accordance with the specification as finally amended, be accepted.

"That the estimates of expenditure on capital account amounting to 16,700*l.*, submitted by the Finance Committee, in respect of the acquisition of (i) property in Barnsbury-park (Islington, E.), and (ii) property, having an area of about 21,630 sq. ft., in Toller-street (Mile End), for the purpose of erecting thereon public elementary schools for the accommodation of 1,600 and 500 children respectively, be approved.

"That the estimates of expenditure on capital account amounting to 2,004*l.*, submitted by the Finance Committee, in respect of the acquisition of (i) the freeholder's interest in the house, No. 50, Canterbury-road, in connexion with the Canterbury-road school (Deptford), and (ii) additional property adjoining the Hydon and Bristol-street schools (Portsmouth), for purposes in connexion with the rebuilding of the school, be approved."

New County Hall Designs.—The adjourned Report of the Establishment Committee, as reported in our last issue, p. 152, was then considered. The Committee also reported as follows:—

"In continuation of our report on the question of obtaining designs for the new county hall, we desire to add that the Finance Committee are prepared to submit the estimate in respect of the fees for the assessments, and we would be glad to have a further opportunity of considering the question of fees for the assessors, so we only ask the Council at present to approve the estimate in respect of the fees of 200 guineas which it is suggested should be paid to each of the competitors, not exceeding twenty-three, participating in the final stage of the competition. At an early meeting after the receipt of the proposals, or a position to submit the names of eight leading architects who we suggest should be invited to send in designs in the final stage of the competition. Subject to the Council approving the main features of the suggested competition, we propose asking Mr. Norman Shaw, R.A., and Mr. Riley, the Council's architect, to draw up a schedule of requirements and the detailed conditions of the competition. We have had the advantage of conferring with Mr. Norman Shaw on several matters connected with the competition, and we are able to give a preliminary and fairly accurate estimate of the time which should be allowed to carry through the competition. It will take some time to prepare the detailed particulars of the accommodation required by the Council, and the conditions of the competition, and allowing sixteen weeks for the preliminary and seventeen weeks for the final stages of the competition. It is anticipated that suitable dates for receiving the preliminary and final designs would be May 7 and October 3, 1907, respectively. We recommend:—(a) That the estimate of expenditure on capital account of 4,530*l.*, submitted by the Finance Committee, in respect of the fees for not exceeding twenty-three architects who will take part in the final stage of the competition for obtaining designs for the new county hall, be approved. (b) That expenditure on capital account not exceeding 4,830*l.* be sanctioned for the payment of a fee of 200 guineas to each of the competitors taking part in the final stage of the competition for obtaining designs for the new county hall."

The report of the Finance Committee under standing orders was to this effect:—

"The Finance Committee, having considered in its financial bearings the above estimate, submit the same as chargeable to capital (original outlay) account. The proposal of the Establishment Committee to spend a large sum in obtaining a suitable design for the new county hall appears to us to be costly. We appreciate the desire of that Committee that a dignified building suitable for the needs of the Council should be erected, but, looking at the matter from a financial point of view, we venture to hope that it may be possible to attain this object without offering to pay so many fees. No specific provision has been made in the capital estimates of the current financial year to meet this expenditure, although 1,000*l.* is provided for the preparation of plans, but we understand that there is no likelihood of the fees having to be paid before the end of the year. In addition to the expenditure in respect of which this estimate is submitted, further expenditure will be involved in remunerating the assessors selected to adjudicate on the designs sent in."

Sir Melville Beachcroft asked what was the idea to be conveyed to the architects to be invited to compete? Was it that of a blank cheque? Or would economy enter into a consideration of the matter in the preparation and selection of designs? He thought that preference should be given to an economical design. The County Hall should be a building worthy of London—a dignified workshop—but there was a great difference between such a building and an extravagant or ornate one which would be more suitable for a Parliament House. Was it likely that a dignified workshop would be obtained if *carte blanche* were given to competing architects? If the

building they obtained could be made pleasing to the eye and dignified so much the better, and he ventured to propose the addition of the following words:—"It being made clear in the instructions than an important element which will weigh with the Council in accepting the design will be that of economy."

Mr. Anstruther seconded.

Mr. Radford said they were all in favour of economy, but if they voted for those words being added, the competing architects would feel restricted, and would not be likely to do their best, and the Council would not be likely to get such a good design. Every architect knew quite well that one of the merits of a good scheme was that it should not be unduly costly, and that it should be suitable for the purpose.

Sir Thomas Brooke Hitching said that he noticed that the competition was to be open to the architects of all countries, and it seemed absurd that a country that could produce such fine buildings as the Houses of Parliament and others, should feel it incumbent to invite foreign architects to compete. He did not know of any foreign country throwing such competitions open to English architects. He hoped that in the design selected large halls, as against small offices, would be provided for the officials, with raised platforms for the heads of departments at one end. It was necessary that there should be control over the officers in their work.

Mr. Bruce suggested that Sir T. Brooke Hitching should send in his plans with the competing architects.

Mr. Verney, M.P., said the building was to be one of the finest buildings of London, and they should approach the matter in no mean spirit, nor put any undue restrictions upon architects, who should be free to provide London with a building worthy of the great object to which it would be devoted. He would not object to some leading continental architect assisting in deciding which was the best of the designs submitted in the final competition. They wanted a dignified building in good proportion, and not laden with vulgar ornament. It should be well suited to the purpose intended—i.e., that it should house the staff in comfort and health, and with a hall which should have the acoustic properties that the present hall had not. He did not think the competition should be limited to Englishmen or Scotsmen.

Mr. Cleland said that the Committee were absolutely agreed in the matter. On what had been called by some architects the best architectural site in London for the purpose they would not be doing their duty if they erected a mean building; but at the same time they did not intend to put up an over-elaborate one. As to limiting the competition to English architects, they might, on the same principle, limit it to London architects. They hoped the successful design would be by an English architect, but they thought they should throw the competition open to the world, in order to get the best talent, as had been done by foreign countries in similar circumstances, and in that way they hoped to get the best possible designs.

Mr. Whittaker Thomas said that he should have liked to hear more about the instructions to architects. At present they were very much in the dark as to what was intended.

After further discussion, the amendment was put and rejected on a division, twenty-one voting for it and fifty-five against.

Mr. Hunt then moved, and Sir Thomas Brooke Hitching seconded, that the competition be limited to British architects.

On a show of hands the amendment was rejected, and the Committee's recommendation was agreed to.

Tramways.—The following recommendations of the Highways Committee were agreed to:—

(a) That subject to Parliamentary authority being obtained in the present session for the construction of the tramways referred to in this resolution, the estimate of expenditure on capital account of £6,500, submitted by the Finance Committee, be approved in respect of the construction of the underground conduit system of electric traction, of the tramways for which authority is sought in the London County Council (Tramways and Improvements) Bill, 1906, from Westminster Bridge road, via Westminster Bridge and Victoria Embankment, to a point near John Carpenter-street, with connections at Waterloo Bridge with the proposed tramway subway and at St. Pancras with the Battersea and Wandsworth tramways, namely, trackwork, including rails, special work, and alterations to footways, 74,500; cables and cable-ducts, 22,000;—total, £6,500.

(b) That the estimate of expenditure on capital account of 7,875, submitted by the Finance Committee, be approved in respect of the erection of the tramways sub-station at the Holborn.

(c) That, subject to Parliamentary authority being obtained in the present session for the construction of the tramways referred to in the foregoing resolution (a), the estimate of expenditure on capital account of 8,700, submitted by the Finance Committee, be approved in respect of the provision of plant, machinery, switchgear, etc., for the Holborn tramways sub-station.

(d) That application be made to the Board of Trade for its approval under the London County Tramways (Electrical Power) Act, 1903, of the underground conduit system of electric traction and the mode of construction proposed to be adopted for the tramways referred to in the foregoing resolution (a).

(e) That expenditure, on capital account, not exceeding £6,500, 8,700, and 7,875, be sanctioned for (i.) the construction and equipment of the tramways referred to in the foregoing resolution (a), (ii.) the provision of the necessary plant at the Holborn sub-station, and (iii.) the erection of the Holborn sub-station, respectively.

(f) That, subject to the approval of the Board of Trade being obtained to the system of traction and mode of construction proposed to be adopted for the tramways, the offer of the Hadfield Steel Foundry Company, Ltd., to supply for a sum not exceeding £5,500, the special trackwork for the construction of the tramways referred to in the foregoing resolution (a), be accepted; that the solicitor do prepare, and obtain the execution of, a contract to give effect to the arrangements; and that the seal of the Council be affixed to the contract.

(g) That the necessary alterations of the footways and parapet of Westminster Bridge in connection with the construction of the tramways referred to in the foregoing resolution (a), be referred to the Works Committee to execute as a jobbing work.

(h) That the Highways Committee be authorised to make arrangements with the Metropolitan Water Board and the several companies concerned to execute the works in connexion with the removal, lowering, or diversion of mains, pipes, wires, etc., necessary for the construction of the tramways referred to in the foregoing resolution (a); and that the seal of the Council be affixed to any contracts or other documents necessary in connexion with the matter.

(i) That the operation of standing order No. A 23, which requires that all tenders where the estimated expenditure exceeds £500, shall be opened in the Council by the chairman, be suspended so as to enable the subjoined recommendation (j) to be considered.

(j) That the Highways Committee be authorised to arrange for the opening during the summer vacation of any tenders that may be received for the roadwork and platelaying, etc., in connexion with the construction of the tramways referred to in the foregoing resolution (a), and for the acceptance of the tender which appears to be most satisfactory.

(k) That authority be given for portions of the work under the contract referred to in the foregoing resolution (j) to be sub-let (if necessary) to such persons or firms as may be approved by the chief engineer under the contract; that the solicitor do prepare the agreement prescribed by standing order No. A 248 relative to sub-letting.

(l) That the offer of Charles Wall, Ltd., to erect the Holborn tramways sub-station on the schedule of prices submitted by them, based on the bills or quantities prepared for the Midway Park tramways sub-station, be accepted; that the solicitor do prepare and obtain the execution of, a contract to give effect to the arrangements; and that the seal of the Council be affixed to the contract.

(m) That the paving works in connexion with the erection of the Holborn sub-station be executed by the Council's permanent way staff, under the supervision of the chief officer of tramways.

(n) That the wiring and fitting for electric lighting, etc., of the Holborn sub-station be executed by the electrical staff of the tramways department, under the supervision of the chief officer of tramways.

(o) That, subject to the approval of the Board of Trade being obtained to the system of traction and mode of construction proposed to be adopted for the Westminster Bridge and Victoria Embankment tramways, arrangements be made with the undermentioned firms for the extension of their present contracts with the Council, so as to provide for the supply of the additional materials or plant required as shown below, at costs not exceeding the sums mentioned, namely:—

Name of Firm.	Subject of Contract.	Estimated Cost.
Siemens Bros., Dynamo Works, Ltd.,	Motor generators	£
Ferranti, Ltd.,	High and low tension switchgear	5,400
Eckstein, Heep, & Co., Ltd.,	Low-tension switchgear	270
J. Smith (Keighley), Ltd.,	Overhead travelling hand cranes	4,500
Messrs. Reid Bros.,	Laying of cable-ducts	7,500
Bolckow, Vaughan, & Co., Ltd.,	Track rails, etc.,	10,500
Frodingham Iron and Steel Company, Ltd.,	Conductor tee rails	6,500
Steel, Peck, & Tozer, Ltd.,	Slot rails, etc.,	
Western Electric Company,	High-tension cables, etc.,	
W. T. Henley's Telegraph Works Company, Ltd.,	Low-tension cables, etc.,	
Total		£37,670

that the chief engineer, the chief officer, of tramways, and the solicitor do take steps to give effect to these arrangements; and that the seal of the Council be affixed to any necessary documents in connexion therewith.

That the supplemental estimate of expenditure on capital account of £4,500, submitted by the Finance Committee, be approved in addition to the amount of £8,000, included in the estimate of £65,000, approved on December 12, 1905, and to the estimate of £2,000, approved on April 3, 1906,

in respect of cables and cable-ducts for the first section of the Council's northern tramways.

That expenditure on capital account, not exceeding £9,355, 15s. 9d., be sanctioned for the supply of the cables, etc., required in connexion with the electrification of the first section of the Council's northern tramways.

That, subject to the result of the usual inquiries proving satisfactory, the tender of the Western Electric Company, amounting to 35,726l. 19s. 6d., for the supply and laying of the high-tension electric cables, cable troughs, etc., for the first section of the Council's northern tramways, be accepted.

That, subject to the result of the usual inquiries proving satisfactory, the tender of W. T. Henley's Telegraph Works Company, Ltd., amounting to 23,628l. 16s. 3d., for the supply of the low-tension electric cables, feeder pillars, etc., for the first section of the Council's northern tramways, be accepted.

That W. T. Henley's Telegraph Works Company, Ltd., be allowed to sub-let to Messrs. Spagnoli and Co. (or to such other person or firm as may be approved by the engineer under the contract), the manufacture of the feeder pillars required.

Aldwych to Islington Tramways: Track-work, etc.—They also recommended, and it was agreed:—

(a) That the supplemental estimate of expenditure on capital account of 7,000, submitted by the Finance Committee, be approved, in addition to the estimate of 19,000, approved on July 11, 1905, and to the amount of 19,870l., included in the estimate of 59,394l., approved on August 1, 1905, in respect of the trackwork for the tramways in the tramway subway and along Theobald's-road.

(b) That additional expenditure, on capital account, not exceeding 7,350l., be sanctioned for the execution of the trackwork for the tramways in the tramway subway under Aldwych and Kingsway and along Theobald's-road.

Widening of Hampstead-road—Reconstruction of Tramways Terminus.—It was also agreed:—

(a) That application be made to the Board of Trade for its approval, under the London County Tramways (Electrical Power) Act, 1903, of the underground conduit system of electric traction and the mode of reconstruction proposed to be adopted for the tramways along a portion of Hampstead-road.

(b) That the estimate of expenditure on capital account of 6,200l., submitted by the Finance Committee, be approved in respect of the reconstruction, for the underground conduit system of electric traction, of the short length of tramways in Hampstead-road affected by the widening of that thoroughfare.

(c) That expenditure, on capital account, not exceeding 6,200l., be sanctioned for the work referred to in the foregoing resolution (b).

(d) That the roadwork and platelaying, etc., in connexion with the reconstruction of the tramways referred to in the foregoing resolution (b) be done by the Works Committee.

(e) That the Highways Committee be authorised to make arrangements with the Metropolitan Water Board and the several companies concerned to execute the works in connexion with the removal, lowering, or diversion of mains, pipes, wires, etc., necessary for the reconstruction of the tramways referred to in the foregoing resolution (b); and that the seal of the Council be affixed to any contracts or other documents necessary in connexion with the matter.

(f) That, subject to the approval of the Board of Trade being obtained to the system of traction and mode of reconstruction proposed to be adopted for the tramways referred to in the foregoing resolution (b), arrangements be made with the undermentioned firms for the extension of their present contracts with the Council, so as to provide for the supply of the additional rails required as shown below, at a cost not exceeding 380l., namely:—

Name of Firm.	Subject of Contract.
Bolckow, Vaughan, & Co., Ltd.,	Track rails, etc.,
Frodingham Iron and Steel Co., Ltd.,	Conductor tee rails,
Steel, Peck, & Tozer, Ltd.,	Slot rails, etc.,

Installation of Additional Plant at the Elephant and Castle Sub-station.—The same

Name of Firm.	Subject of Contract.	Estimated Cost.
Siemens Bros., Dynamo Works, Ltd.,	Motor generators	£
Ferranti, Ltd.,	High and low tension switchgear	5,400
Eckstein, Heep, & Co., Ltd.,	Low-tension switchgear	270
J. Smith (Keighley), Ltd.,	Overhead travelling hand cranes	4,500
Messrs. Reid Bros.,	Laying of cable-ducts	7,500
Bolckow, Vaughan, & Co., Ltd.,	Track rails, etc.,	10,500
Frodingham Iron and Steel Company, Ltd.,	Conductor tee rails	6,500
Steel, Peck, & Tozer, Ltd.,	Slot rails, etc.,	
Western Electric Company,	High-tension cables, etc.,	
W. T. Henley's Telegraph Works Company, Ltd.,	Low-tension cables, etc.,	
Total		£37,670

Committee recommended, and it was agreed:—

(a) That the estimate of expenditure on capital account of 7,000, submitted by the Finance Committee, be approved, in respect of the erection and equipment at the Elephant and Castle sub-station of the generators now in use at the Longborough Junction temporary electricity generating-station, including the purchase of the necessary motors, switchgear, etc.

(b) That expenditure, on capital account, not exceeding 7,500l., be sanctioned in respect of the items referred to in the foregoing resolution (a); that the Highways Committee be authorised to arrange for the execution of the works, and that the seal of the Council be affixed to any necessary documents in connexion with the matter.

Tar-paving of Playgrounds.—The Education Committee reported as follows:—

The Council, on February 20, 1906, decided to obtain tenders for providing and laying new tar-paving in the playgrounds of Council schools, and also for repairing, retopping, and running tar-paving, etc. We thought it desirable in this case to invite tenders by public advertisement for the execution of the work according to a schedule which comprises eight items, and it was specified that three prices should be quoted, as follows:—(i) For work in the whole county; (ii) for work north of the Thames; and (iii) for work south of the Thames. Twenty firms were supplied with the necessary particulars to enable them to tender. Twelve tenders were received, and were referred to us on May 29, 1906, as follows:—The Asphaltes United, Birmingham; Bradshaw & Co., 52, Queen Victoria-street; Chittenden & Simmons, West Malling, Kent; Constable, Hart, & Co., Ltd., Clarence House, Arthur-street West; Fry Bros., Lion Wharf, Greenwich; A. C. W. Hobman & Co., Cliftonville, South Bermondsey; the North Wales Asphalt Company, Old Colwyn, North Wales; F. G. Sheppard & Co., 12, Wimburn-road, Southend-on-Sea; J. Smart & Son, 53, Victoria-street, Tarnac, 20, Victoria-street, Kiburn; Tarnac, Ltd., 20, Victoria-street (tender not in accordance with specification); and J. Wainwright & Co., Ltd., 173, Maidway, Maid.

As a basis of comparison we made of the whole work in connexion with tar-paving executed during the year 1905, and calculated the cost at the prices submitted by each firm tendering. The result shows that the lowest tenders are those of Messrs. Hobman & Co. and Messrs. Chittenden & Simmons, as under:—(i) For work in the whole county—Messrs. Hobman & Co., 12,195l. 19s. 11d.; (ii) for work north of the Thames—Messrs. Hobman & Co., 4,833l. 18s. 6d.; (iii) for work south of the Thames—Messrs. Chittenden & Simmons, 7,067l. 16s. 11d.

We consider that the best interests of the Council would be served by the acceptance of the tenders of two contractors, viz., that of Messrs. Hobman & Co. for work to the north of the Thames, and that of Messrs. Chittenden & Simmons for work on the south side.

The Committee recommended accordingly, and it was agreed.

Purchase of Art Examples.—The Committee recommended, and it was agreed:—

That plaster casts be purchased and prints framed for use in the Council's evening art centres; that copies of casts in the museum of the Architectural Association be made for use in the Council's schools of art; that a copy of each cast be presented to the Association; and that expenditure not exceeding 101l. 2s. 6d. be sanctioned in connexion therewith.

Tribunal of Appeal: Remuneration of Members.—The Building Act Committee reported as follows:—

We have had under consideration a letter from the Home Office stating that the Tribunal of Appeal has requested the Secretary of State, in the exercise of the power conferred upon him by sect. 179 of the London Building Act, 1894, to fix for a further period the scale of remuneration for the members of the tribunal, and asking for the observations of the Council upon the matter. The scale laid down by the Secretary of State in 1895 and continued in operation from that year until 1905, was for each member, three guineas for the first hour, and two guineas for each subsequent hour of each day's sitting of the tribunal. On March 20, 1906, the Council, on our recommendation, decided to inform the Secretary of State that it was of opinion that the present rate of remuneration was sufficient, and that no adequate reason had been shown why it should be increased, and we see no reason to alter that decision at the present time. We have the whole question of the tribunal under consideration, and propose to report thereon at an early date. We recommend that it be suggested to the Secretary of State for the Home Department that the scale of remuneration for the members of the Tribunal of Appeal laid down in 1895, and extended in operation until the end of the year 1906, should be continued in operation for the year 1906.

This was agreed to.

Tooting Fire Station.—The following recommendations of the Fire Brigade Committee were agreed to:—

That the estimate of 11,620l., submitted by the Finance Committee in respect of the erection of the new Tooting fire station, be approved.

That the estimates of 100l. and 370l., approved in respect of the preliminary expenses in connexion with the erection of the new Tooting fire station, be cancelled.

That expenditure not exceeding 10,500l. be sanctioned for the erection of the new Tooting fire station; that the work be carried out without the intervention of a contractor; and that the drawings, specification, quantities, and estimate be referred to the Works Committee for that purpose.

Greenwich Generating Station and the Royal Observatory.—The Highways Committee reported as follows:—

The Council, on July 3, 1906, authorised us to take the necessary steps in connexion with the appointment of the Committee suggested by the Admiralty to inquire whether the working of the Greenwich electricity generating station will have any injurious effect upon the Royal Observatory, Greenwich. Since then we have given the matter

our most careful consideration, and we have now to report that we have arranged with Sir Benjamin Baker, F.R.S., to act as the Council's representative on the Committee. We have also thought it well that the Council should obtain the assistance of an expert from the astronomical and scientific point of view, and in this connexion we have arranged for Professor C. Boys to act in an advisory capacity to the Council. The representatives appointed by the Admiralty on the Committee are Professor J. A. Ewing, F.R.S., and Lord Rosse.

Name of Estate.	Where Situated.	Name of Buildings.	No. of Persons Provided for.
Jerusalem-square estate.....	Hackney	Valette-buildings	410
Norbury estate	Norbury, Croydon	Eight cottages	68
Roby-street estate	St. Luke, Finsbury	Wenlake-buildings (part)	240
Tottenham-fields estate	Tooting	152 cottages	1,248
Wand-worth-road estate	Lambeth	Lennox-buildings	194
Wand-worth-road estate	Lambeth	Clerc cottages	42
Wendmore-street estate	Upper Holloway	Wessex-buildings (third block)	340

Tramways.—It was agreed:—

That expenditure, on capital account, not exceeding 1,000l. be sanctioned for execution of additional work under the contract with J. Mowlem & Co., Ltd., for the construction of the tramways over Vauxhall Bridge.

Construction of Tramway Subway from the Strand to the Victoria-embankment.—The Highways Committee recommended, and the Council agreed:—

(a) That, subject to Parliamentary authority being obtained in the present session for the purpose, authority be given for notices to treat to be served for the acquisition of the property, in respect of which such notices have already been served under the London County Council (Subways and Tramways) Act, 1902, required for the construction of the tramway subway from the Strand to the Victoria-embankment, authorised by the London County Council (Subways and Tramways) Act, 1902, as proposed to be amended by the London County Council (Tramways and Improvements) Bill, 1905, and the construction of a station in connexion therewith beneath Wellington-street.

(b) That, subject to the necessary additional Parliamentary authority being obtained in the present session, expenditure on capital account, not exceeding 65,000l., be sanctioned for the execution of the tramway subway and station works referred to in the foregoing resolution (a); and that the works be done by the Works Committee as jobbing works upon a schedule of prices.

Supply of Electricity in Bulk.—The Highways Committee reported as follows:—

The Council, on July 17, 1906, authorised us to take such action as is necessary in order that a scheme for the supply of electricity in bulk in London and the surrounding districts may be submitted to the Council after the summer vacation, and sanctioned expenditure of 1,500l. in connexion with the matter. We are giving very careful consideration to the whole question, and have arranged for Mr. H. F. Parrish, Mr. Robert F. Hammond, and Mr. J. F. C. Neill to render expert assistance in preparing the scheme. It will be remembered that the London County Council gentlemen were retained as experts in connexion with the Bill promoted by the Council in the present session of Parliament. We hope to submit our proposals to the Council at an early date after the summer recess.

Testing of Electricity Meters.—They also recommended, and it was agreed:—

That the attention of the Board of Trade be directed to the necessity which, in the opinion of the Council, exists for further legislation to provide that no electricity meter shall be fixed for use unless it shall have been previously officially tested and stamped by the Council; and that the Highways Committee do take any requisite steps to place before the Board all the facts relating to the subject.

Lewisham to Lee Green Tramways; and High-road, Lee, Improvement.—The Joint Highways and Improvements Committees recommended, and it was agreed:—

(a) That expenditure on capital account, not exceeding 23,500l., be sanctioned for the execution of the road work and plate-laying, including the provision of rails, in connexion with the construction of the authorised tramways from Lewisham to Lee Green.

(b) That the working drawings, specification, bills of quantities, and estimates of the cost (24,517l. and 2,220l.) of the construction of the tramway tracks of the authorised tramways from High-street, Lewisham, to Lee Green, and of the street widening, paving, etc., works in High-road, Lee, be approved; and that the Works Committee be authorised to the works being executed by them without the intervention of a contractor.

(c) That arrangements be made with the undermentioned firms for the extension of their contracts with the Council so as to provide for the supply of the rails required for the construction of the Lewisham to Lee Green tramways, at an estimated cost of 4,500l., namely:—

Name of Firm.	Subject of Contract.
Boileau, Vaughan, & Co., Ltd.	Track rails, etc.
Prodingham Iron and Steel Co., Ltd.	Conductor tie rails.
Steel, Peech, & Tozer, Ltd.	Slot rails, etc.

Housing.—The Housing of the Working Classes Committee reported as follows:—

The dwellings comprised and opened during the year contain accommodation for 2,508 persons in three tenements of one room, 106 tenements of two rooms, 169 tenements of three rooms, sixty-three tenements of four rooms, and fifty-six tenements of five rooms, and particulars of the estates and buildings at which such accommodation has been provided are given in the subjoined table:—

Accommodation for 33,847 persons was provided by the Council up to March 31, 1906, the accommodation consisting of 187 cubicles in Park-street House and Carrington House, 1,014 cottages and 5,312 tenements in block dwellings.

The gross rental for the year from all the dwellings was 13,055l., as compared with 120,096l. for 1904-5, while the net rental amounted to 121,533l. 6s. 6d., exclusive of 685l. 16s. 3d. for interest on cash balances. The amount of rents written off as irrecoverable was 169l. 7s. 6d., or only about 13 per cent. (2s. 7d. per 100l.) of the gross rental. The total loss of income due to empties was 12,755l. 13s. 2d., or 8.9 per cent. of the gross rental, as against 11.25 per cent. in the preceding year. The greater part of this loss is attributable to five estates, on which the value of the empty tenements amounted during the year to 5,300l. The value of the caretakers' quarters was 856l. 8s. 6d., or 66 per cent. of the gross rental.

The expenditure on dwellings in occupation was 118,922l. 10s. 6d., or 89.6 per cent. of the gross rental. Of this amount the sum of 64,617l. 6s. 3d. was acquired for interest and sinking fund charges, or 47.6 per cent. of the gross rental. This sum of 47.6 per cent. was transferred to the repairs and renewals fund, although the actual expenditure on repairs amounted to 8,930l. 19s. 4d. only, while the sum of 39,522l. 19s. 11d., or 29.58 per cent., was required for other outgoings, such as central office charges, cost of local supervision, and collection of rent, rates, and taxes, lighting, water, insurance, stores, and incidentals.

The total expenditure on capital account on all the dwellings and estates up to March 31, 1906, amounted to 2,305,431l. 6s., which sum represents the actual payments made up to that date, and does not include liabilities under contracts for buildings in course of erection.

Tottenham Fields Estate, Section B.—The Committee also reported as follows:—

Messrs. F. & H. F. Higgs, the contractors for the erection of cottages on sect. B of the Tottenham Fields Estate, have completed sixteen blocks of cottages, and nine of the remaining fourteen blocks will, it is anticipated, be completed in the course of a few weeks. The contract provides for the retention of a sum of 5,000l., one-half of which is to be paid upon the completion of the work, but the contractors now ask that a portion of the retention money may be paid to them upon the completion of the nine blocks above referred to—that is to say, when twenty-five blocks in all have been finished. Subsequent agreements have been entered into with the contractors in respect of the erection of cottages of different designs from those which formed the subject of the original contract, which formed the subject of the original contract, and the progress of the work has consequently been delayed. In the circumstances we are of opinion that the contractors' request is reasonable, and should be granted, and as we are advised that, if the sum of 2,288l. be released, the Council would still retain sufficient money to meet any claims likely to arise in respect of the remaining five blocks, we accordingly recommend:—(a) That standing order No. 2288 relative to retention monies under contracts, be suspended so far as may be necessary to enable the following recommendation to be considered: (b) That, subject to the architect's certificate, a payment of 2,288l. out of the retention money held under the contract be made upon the completion of twenty-five out of the thirty blocks of cottages on sect. B of the Tottenham Fields Estate, and that it be referred to the Finance Committee to make the payment.

The recommendations were agreed to.

Strand Improvement.—On the recommendation of the Improvements Committee that the Council should confirm its decision that no alteration be made in the present northern line of frontage in the Strand between Wellington-street and the Law Courts, as no suggestion had been made which offered sufficient advantage to justify the great expense involved.

Mr. N. W. Hubbard intimated that Capt. Swinton's scheme for narrowing Aldwych at the eastern end, with the object of widening the Strand, should be considered by the Committee, and the original recommendation was accordingly withdrawn.

Paris in London.—It was decided that the seal of the Council be affixed to the agreement, when ready, for a lease to the syndicate which has been formed for dealing

with the central portion of the crescent site created in connexion with the Holborn to Strand improvement.

Old-street, Shoreditch, Widening.—The Improvements Committee recommended, and it was agreed:—

(a) That the estimate of expenditure on capital account of 5,000*l.*, submitted by the Finance Committee in respect of the widening of Old-street at Nos. 324 to 338, be approved.

(b) That expenditure on capital account not exceeding 5,000*l.* be sanctioned in respect of the widening of Old-street at Nos. 324 to 338; that consent be given under sect. 72 of the Metropolitan Management (Amendment) Act, 1862, to the widening proposed by the Shoreditch Metropolitan Borough Council, in accordance with the plan; and that a contribution be made, on the usual conditions, of the net cost of the acquisition by the borough Council of the property needed for the improvement, provided (i.) that such net cost exceed 5,000*l.*, the Council's contribution shall be limited to 5,000*l.*, and (ii.) that in the execution of the improvement no departure whatever be made from the approved plan, except with the previous consent of the Council.

Hampstead Heath Extension.—The Parks and Open Spaces Committee recommended, and it was agreed:—

"That the supplemental estimate of expenditure on capital account of 10,750*l.*, submitted by the Finance Committee, in respect of the acquisition of eighty acres of land for addition to Hampstead Heath and the payment of costs incidental to the proposed, be approved.

That additional expenditure on capital account not exceeding 10,750*l.* for the purpose referred to in the previous resolution be sanctioned, subject to an undertaking being given by a responsible member of the Hampstead Heath Extension Council to repay the Council such sum, including interest, as may be spent by it in excess of the amount of its promised capital of 8,000*l.*, in completing the purchase of the land.

Springfield Park: Adaptation of Springfield House and other Work.—It was agreed:—

"That additional expenditure on capital account not exceeding 287*l.* for the purposes referred to in resolution be sanctioned; that the tender of Messrs. J. & C. Bowyer, for the execution of the necessary works, be accepted; that the solicitor do prepare, and obtain the execution of, a contract, to give effect to the tender; and that the seal of the Council be affixed to the contract when ready."

Proposed British Empire Exhibition.—The Theatres and Music-halls Committee stated that they had considered drawings, submitted by Mr. E. White, on behalf of Mr. Imre Kiralfy, of certain buildings to be erected in connexion with the British Empire Exhibition, which it is proposed to lay out on a site, about 82 acres in extent, situated on the west side of Wood-lane, Hammersmith. The general scheme of the proposed arrangements has been conditionally approved by the Building Act Committee, and they recommended accordingly, and the Council agreed.

Proposed Concert-hall, Oxford-street.—They also recommended:—

"That Messrs. E. Rantz & Ford be informed that the arrangements shown on the site plan submitted by them with regard to a concert-hall proposed to be erected to front on Oxford-street, between St. Michael's Parish Hall, and in the opinion of the Council, unsatisfactory."

Parish Hall, Bromley-by-Bow.—They also recommended:—

"That Messrs. J. E. K. & J. P. Cutts be informed that, provided the works shown on the five drawings submitted by them with regard to a building to be known as the St. Michael's Parish Hall, and to be erected at Ulm-street, Bromley-by-Bow, be commenced within six months, the Council will be prepared to grant a certificate."

The recommendations were agreed to.

Tivoli Music-hall.—It was agreed:—

"That Mr. T. Ibbelson and Mr. H. Tozer be informed that the Council has no objection, so far as its regulations under sect. 12 of 41 and 42 Vict. cap. 32, are concerned, to the arrangements shown on the two drawings submitted by them with regard to certain alterations proposed to be made at the Tivoli Music Hall Strand."

The Council, having sat over nine hours, adjourned for the summer recess.

THE "GRIPCORD" WINDOW-BLIND CLIP.—Messrs. Herbert Terry & Sons (Rutcliffe) have introduced a new clip for blind-cords. It is made of strong brass wire bent to form two holes for screws, an eye for the cord, and a V-shaped grip for securing the cord. It is simple, effective, and cheap.

IMPROVE SITES AND SOILS AND SUB-SOILS. LONDON.—A pamphlet, price 1*s.*, is published by the Board of Agriculture and Fisheries relating to the soils and sub-soils in London and the suburbs, in particular reference to building sites. The text is illustrated with sections and drawings and a map printed in colours; the nature of the sub-soil is described in the several districts, and matters of water-supply, ground-water and drainage from the sanitary point of view are treated upon.

APPLICATIONS UNDER THE LONDON BUILDING ACT, 1894.

THE London County Council at their meeting on Tuesday dealt with the following applications under the London Building Act, 1894. The names of applicants are given between parentheses:—

Lines of Frontage and Projections.

City of London.—An oriel window at No. 60, Fenchurch-street, City, to abut upon Fenchurch-street and London-street (Mr. J. S. Gibson for Mr. J. Carmichael).—Consent.

Finsbury, Central.—Projecting one-story shops in front of Nos. 38 and 39, Chapel-street, Pentonville (Messrs. T. H. & A. M. Watson for Mr. T. W. Dobson).—Consent.

Fulham.—Porches and projecting eaves to a new wing of the Fulham Waste Lands and Lygon Almshouses, Fulham Palace-road, Fulham (Mr. E. Avern for the Trustees of the Almshouses).—Consent.

Kensington, South.—The retention of an illuminated sign at the "Kensington Arms" public-house, Warwick-road, Kensington (Mr. A. N. Foley).—Consent.

Lewisham.—A projecting one-story shop in front of No. 149, High-street, Lewisham (Mr. L. Jacob for Mr. J. Jacobs).—Consent.

Marylebone, East.—Two porches in front of a proposed block of buildings between Nos. 18 and 20, Cavendish-square, St. Marylebone (Messrs. Gilbert & Constans).—Consent.

Marylebone, East.—A projecting stone balcony on the Welbeck-street frontage of a building abutting upon Wignore-street and Welbeck-street, St. Marylebone (Messrs. Wallace & Gibson for Messrs. Debenham, Ltd.).—Consent.

Marylebone, East.—An addition to No. 3, Ascot-road, St. John's Wood (Mr. W. R. Phillips for Mr. J. M. Swan, R.A.).—Consent.

Rotherhithe.—A deviation from the plan approved for the erection of buildings on the southern side of Lower-road, Rotherhithe, opposite Neptune-street, so far as relates to the retention of a building and the erection of an addition thereto, in advance of the line approved (Messrs. Newman & Newman for the Guardians of the Parish of Bermondsey).—Consent.

St. George, Hanover-square.—A deviation from the plans approved for the retention of an iron and glass shelter in front of the Arlington-street entrance to the Ritz Hotel, Piccadilly, so far as relates to the addition of two hanging lamps to such shelter (Mr. P. Bishop for the Building and Vendor Company, Ltd.).—Consent.

Southwark, West.—A manual training-centre at the Council's Westminster Bridge-road schools, to abut upon Westminster Bridge-road (Mr. T. J. Bailey for the Education Committee of the Council).—Consent.

Strand.—Buildings with projecting shop-fronts, bay-windows and balconies upon the site of Nos. 418 to 421, Strand, to abut upon the Strand and Exchange-court (Messrs. Crickmay & Sons).—Consent.

Strand.—A projecting clock in front of the Lyceum Tavern, No. 354, Strand (Messrs. Brown & Barrow for Messrs. Henley).—Consent.

Wandsworth.—Porches and balconies in front of thirteen houses in Rosendale-road and six houses in Dulkeith-road, Wandsworth (Mr. C. M. Quilter for Mr. S. Admans).—Consent.

Wandsworth. Blocks 26 and 27 on the Tottenham Fields Estate, Tooting, to abut upon Blakenham-road, Coteoford-street, and Cowick-road, and do also consent to a variation in the forecourt boundary of block 27, where such forecourt boundary abuts upon Blakenham-road (Mr. R. Robertson for the Housing of the Working Classes Committee of the Council).—Consent.

Wandsworth.—Five blocks of cottages and shops (section "C") on the southern side of Francis-road, Tottenham (Mr. R. Robertson for the Housing of the Working Classes Committee of the Council).—Consent.

Clapham.—Buildings on the south-eastern side of Clarence-road, Clapham-park, Clapham (Messrs. Donald, Day, & West for Mr. A. G. Taylor).—Refusal.

Width of Way.

Hoxton.—Buildings on the eastern side of Hoxton-street, Hoxton, at less than the prescribed distance from the centres of the roadways of Hoxton-street and Drysdale-street (Mr. G. H. Lovegrove for Messrs. Yapp & Co.).—Refusal.

Width of Way and Lines of Frontage.

Strand.—A projecting oriel with balcony over in front of a proposed building on the site of No. 20, Warwick-street, Strand (Mr. J. N. R. Vining for Messrs. Liberty & Co.).—Consent.

Width of Way and Space at Rear.

Rotherhithe.—Three dwelling-houses to abut upon Claremont-place and Wells-tenements, Rotherhithe, within 20 ft. from the centre of the roadway of Claremont-place, and exceeding in height the width of such street, and with boundary fences at less than the prescribed distance from the centres of the roadways of the said streets

(Messrs. Stock, Page, & Stock for the Gomm Estate and Messrs. Bisley & Sons).—Consent.

Width of Way and Construction.

Limehouse.—The retention of a wood and iron building of a temporary character on the western side of Carr-street, Limehouse, in front of the railway arch No. 640 (Messrs. A. Hopson & Co.).—Consent.

Lines of Frontage and Space at Rear.

Wandsworth.—A house on the north-western side of Chiltern-road, Tooting, to abut upon Buckle-street (Mr. H. Bignold for Mr. F. Hooper).—Consent.

Horton.—An enclosed iron and concrete gangway across King John's-court, Wood's-buildings, Great Eastern-street, Hoxton (Mr. T. H. Smith for Messrs. Brown Brothers).—Refused.

Lines of Frontage and Construction.

Strand.—A crane of the "Cathead" type over the public way at the front of No. 71, Dean-street, Oxford-street (Mr. E. K. Purchase).—Consent.

Formation of Streets.

Bow and Bromley and Hackney, South.—A deviation from the plans approved for the formation or laying out of a new street for carriage traffic to lead from Carpenter's-road to Hornorton-road, Hackney-wick, so far as relates to an alteration in the levels of a portion of such road (Messrs. Deakin & Cameron for the trustees of the late Viscount Eversley and the trustees of the late Major Clayton).—Consent.

Hammersmith.—That an order be sealed (in duplicate) and issued to Mr. H. Mair, sanctioning the formation or laying out of a new street for carriage traffic in continuation eastward of Jeddoad-road, Hammersmith (for the Hammersmith Metropolitan Borough Council).—Consent.

Hammersmith.—That an order be issued to Messrs. Weatherall & Green sanctioning the formation or laying out of a new street for carriage traffic to lead out of the western side of Wilton-road West, Hammersmith, so far as relates to the portion of such street as will be within the boundary of the County of London (for Major Cowper Essex).—Consent.

Holborn.—That the Council in connexion with the street for foot traffic only to lead from Southampton-row, Holborn, to Vernon-place, approved on May 28, do consent on the application of Mr. R. J. Worley, on behalf of the Selected London Properties Company to the erection of buildings abutting upon such new street without requiring the portion of such new street as is to be on the site of Nos. 2 and 3, Vernon-place to be formed and laid out. —Consent.

Woodwick.—That an order be issued to Messrs. D. Watney & Sons sanctioning the formation or laying out of two new streets for carriage traffic on the Page Estate, Eltham, Woolwich, and in connexion therewith the widening of a portion of Well Hall-road (for Mr. C. H. Polhill).—Consent.

Space at Rear.

Finsbury, Central.—A modification of the provisions of sect. 41 so far as relates to the proposed alteration and rebuilding of workshops at the rear of Nos. 20, 22, and 24, Cyrus-street, Clerkenwell (Major C. E. Dudgeon for the Marquess of Northampton).—Consent.

Strand.—A building to be known as the Piccadilly Hotel, to abut upon Piccadilly, Piccadilly-place, Vine-street, Regent-street, and Air-street (Messrs. W. Woodward & W. Emden).—Consent.

Wandsworth.—A modification of the provisions of sect. 41 with regard to open spaces about buildings so far as relates to the proposed erection of a building on the southern side of Marius-road, Tooting, with an irregular open space at the rear (Mr. H. Bignold for Mr. F. Priddis).—Consent.

Deviation from Certified Plan.

Marylebone, East.—A deviation from the plans approved in connexion with the rebuilding of Nos. 116 to 132 (even numbers only), Oxford-street, and Nos. 1 to 5, Wells-street, St. Marylebone, so far as relates to the erection of a first story addition at the rear of No. 122 Oxford-street, and the erection of a gangway to connect the flat roof of such addition with Nos. 68 to 70, Berners-street (Mr. J. Slater for Messrs. Bourne & Hollingsworth).—Consent.

Buildings for the Supply of Electricity.

Greenwich.—A generating station and works on the north-west side of Blackwall-lane, Greenwich (Messrs. Babcock & Wilcox for the South Metropolitan Electric Light and Power Company).—Consent.

Cubical Extent.

Hackney, Central.—The covering in of a portion of the yard at the Motor Bus Garage, Shrubland-road, Hackney (Messrs. P. Borcham & Son for the Motor Bus Company, Ltd.).—Consent.

Hackney, North.—The retention of a building known as the Stamford-hill Brewery, Stamford-terrace, Hackney, such building exceeding in extent 260,000, but not 450,000 cubic ft., and used only for the purposes of the trade of a brewer (Mr. C. G. Smith for Messrs. Mitchell Goodman, Young, & Co., Ltd.).—Consent.

Uniting of Buildings.

St. George, Hanover-square.—That the Council do make no order with regard to the proposed party wall openings at a motor garage, approached from Carrington-street, St. George, Hanover-square (Mr. T. G. Chambers for the Electro-mobile Company, Ltd.).—No order.

Dwelling-houses on Low-Lying Land.

Greenwich.—That a licence be granted under sect. 122 of the Act to Mrs. Colwell for the erection of four dwelling-houses on low-lying land facing Ordnance-road, East Greenwich, in accordance with the plans submitted with the application of Mr. Alfred Roberts on her behalf.—Consent.

Poplar.—That a licence be granted under sect. 127 of the Act to Messrs. Frederick & T. Thorne, for the erection of a dwelling-house and office on low-lying land at Dudgeon's Wharf, Manchester-road, Cubitt-town, in accordance with the plans submitted with their application.—Consent.

The recommendations marked † are contrary to the views of the local authorities.

Illustrations.

ST. PANCRAS CENTRAL LIBRARY.

THE following extracts are taken from the Report accompanying the design by Mr. S. B. Russell and Mr. T. Edwin Cooper, placed first by the Assessor (Mr. John Belcher, A.R.A.): "It was decided that the position of the principal entrance should be at the angle of Prince of Wales-road and Anglers-lane.

By so planning the building the chief architectural interest is focused at the junction of the two streets, and the principal entrance obtains an importance impossible to achieve in any other position.

The plan is arranged in simple lines, the main idea being the economy of working."

REDDISH BATHS.

This block of buildings, which comprises public baths, fire-station, and free library, in Gorton road, Reddish, Stockport, was the subject of a recent open competition, and the Assessor was Mr. A. Brunwell Thomas, of Westminster.

The public baths contain a swimming-bath with pond, 75 ft. by 25 ft., with dressing-boxes along one side, a spectators' gallery at one end, and five slipper-baths, laundry, and boiler-house and necessary adjuncts. The pond of swimming-bath is to be of white glazed bricks with tile bottom; enamelled slate divisions are used between the dressing-boxes and 2½-in. thick white glazed-brick divisions between the slipper-baths. The woodwork generally is to be of pitch-pine; the entrance-hall is to have a terrazzo floor; the interior walls generally to be of buff facing-bricks, with a salt glazed-brick dado. Space is provided in the boiler-house for two boilers, but it is only intended to install one at present.

The fire station contains engine-house, watch-room, two loose-boxes at back of engine-house, provender-room, hay and straw loft, with two sets of married men's quarters over. At the back of the building there is a large, open yard for drying purposes, cleaning engines, etc. The floor of the engine-house is to be of Dutch clinker on concrete, the walls of buff brick with salt-glazed dado. The firemen's dwellings are placed above the engine house, and approached from the drill-yard by an iron staircase and balcony, and are to be carried out in a plain, substantial manner.

The free library contains lending library, with public space, counter, and accommodation for about 10,000 volumes, news-room, magazine-room, children's room, librarian's room, store, etc. The entrance-hall is to

have a mosaic floor; the fittings generally are to be of Cyprus wood. The lending-library counter is to have an oak top, and to be fitted with Chiver's or Graham's indicators; the floors generally to be pitch-pine on concrete.

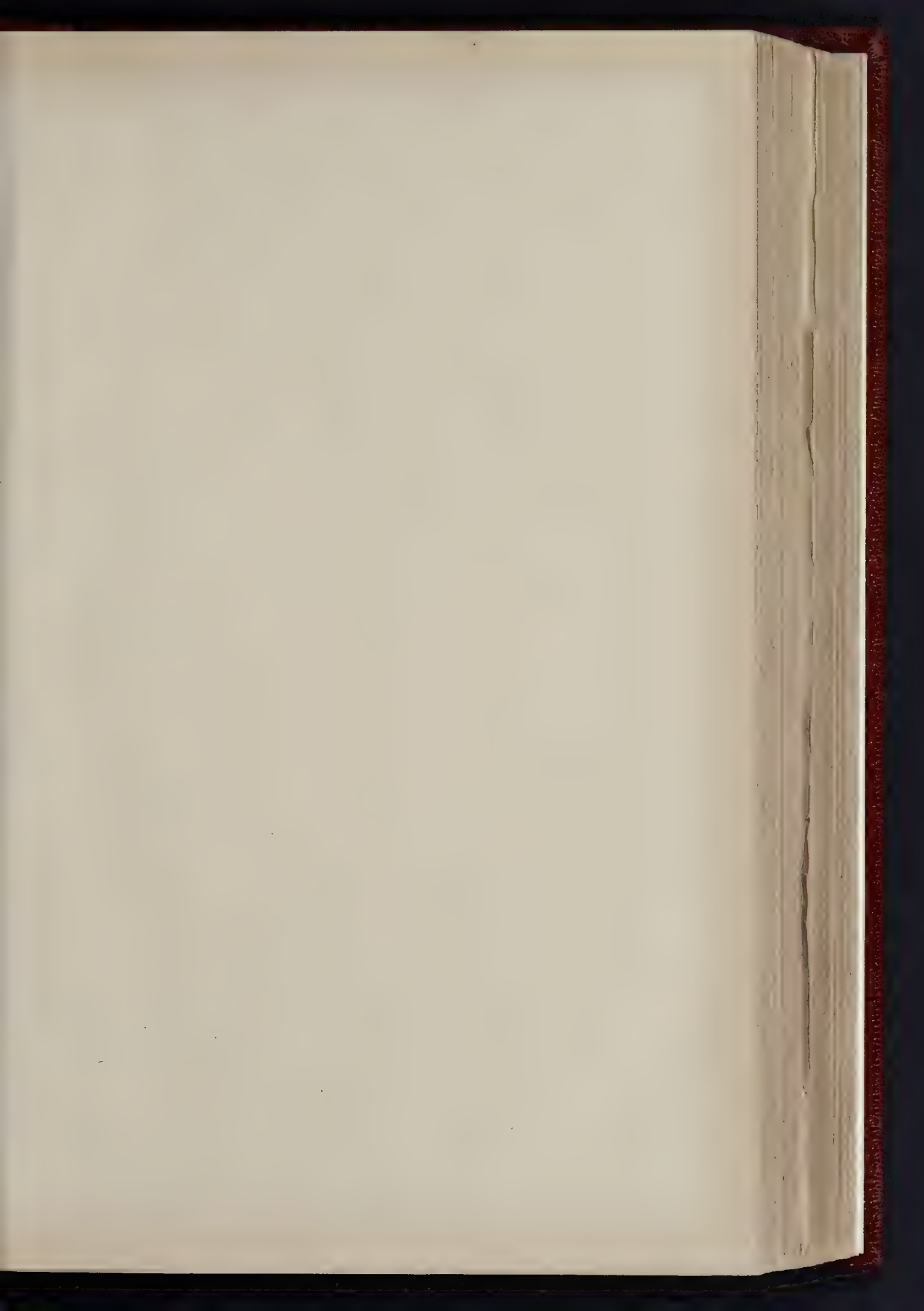
The heating for the whole building to be by hot water, and the lighting by electricity. The work is to be proceeded with immediately. The architects are Messrs. Dixon & Potter, King-street, Manchester. The estimated cost, exclusive of certain items, such as filtering scheme, architects' commission, was 5,050l.

HOUSE AT CHASELLAS, NEAR ST. MORITZ, ENGADINE.

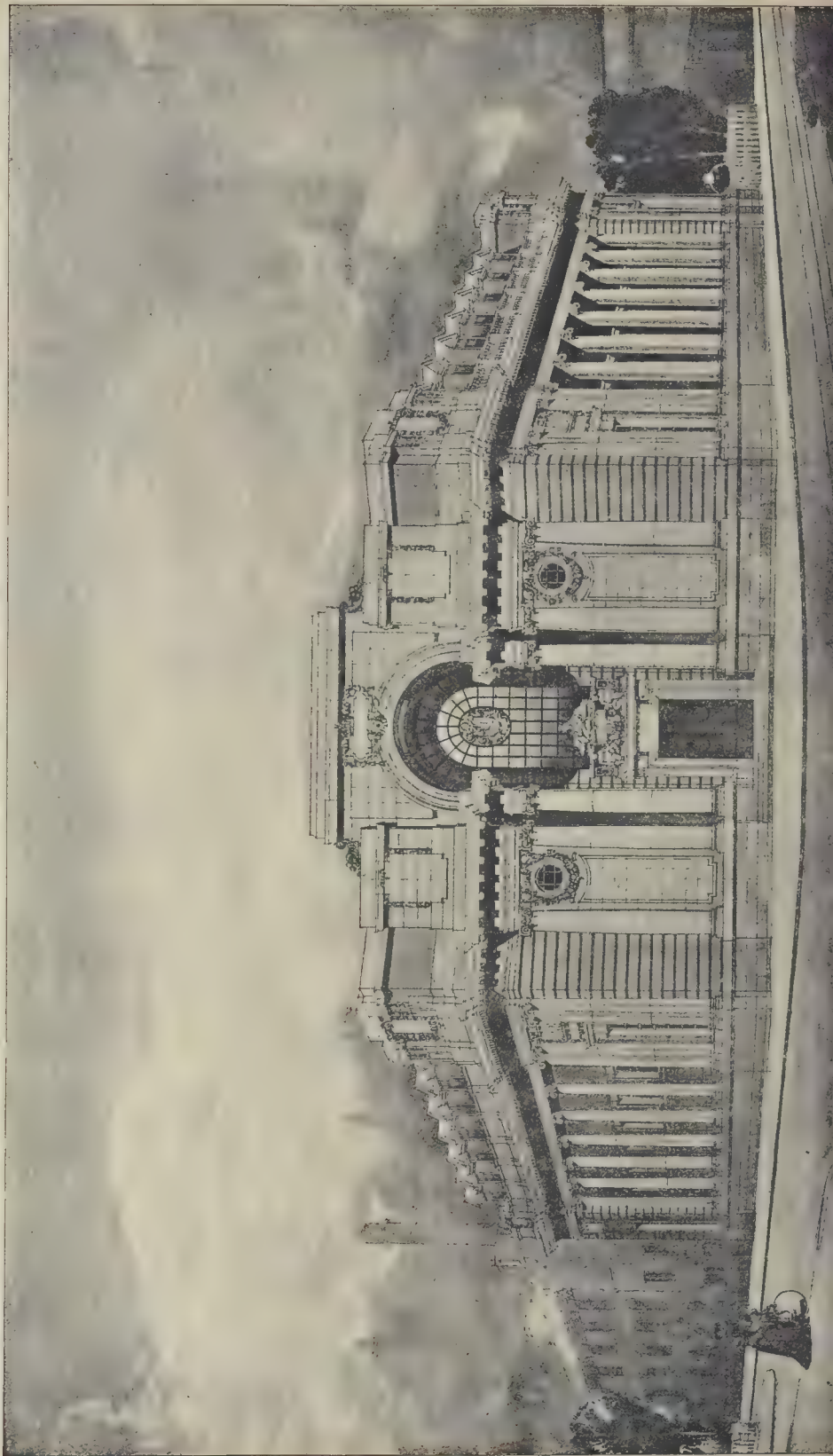
This house is about to be erected in the development of an estate in the neighbourhood of St. Moritz, Switzerland, from the designs of Mr. H. Inigo Triggs. The walls are of local granite, 0.80 m. thick in the lower story and 0.50 m. thick above, rough-cast above the level of the ground floor. All the external walls are lined on the inside with thick planks; these are lined on one side with cork, and an air-space left between planks and stone wall, as the temperature at this height (6,800 ft. above sea-level) frequently falls considerably below zero. The house is heated throughout by hot water, and open fireplaces are also arranged in the principal rooms. The heating and sanitary arrangements have been so arranged that in the basement is the heating chamber and water closet; above are butler's pantry on the ground-floor, and bath-room and water-closet on the first floor. All pipes are placed in a central cupboard, protected from the cold by the flues of the heating chamber and kitchen placed on either side of the cupboard. The servants' accommodation is kept entirely in the basement; on the ground-



Detail of Selected Design for St. Pancras Central Library.



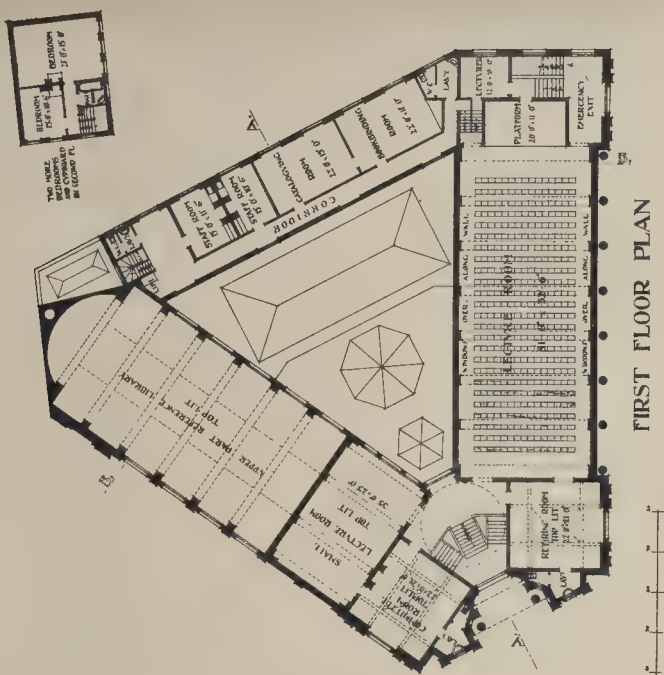
THE BUILDER, AUGUST 4, 1906.



ST · PANCRAS · CENTRAL · LIBRARY



GROUNDFLOOR PLAN

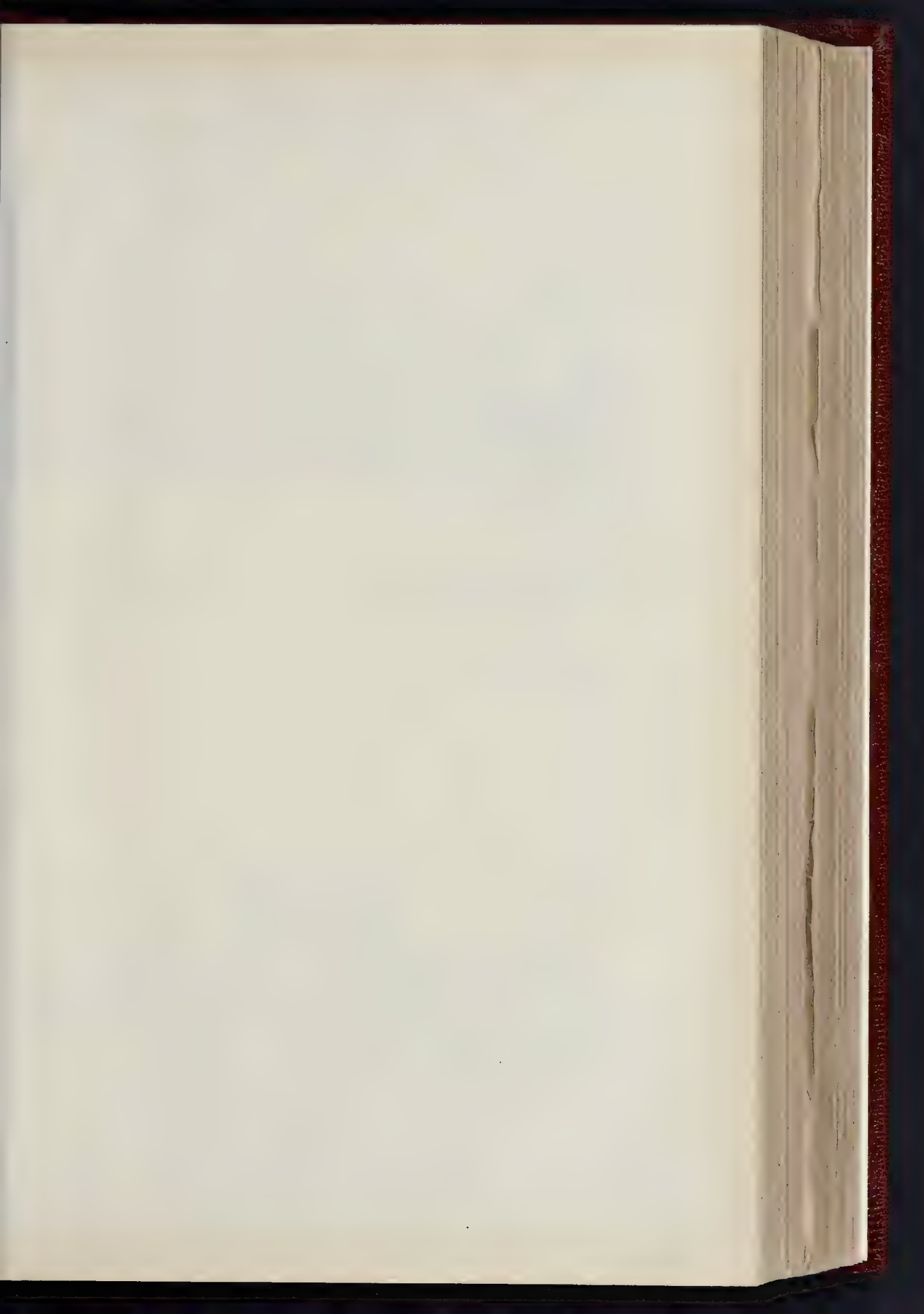


FIRST FLOOR PLAN

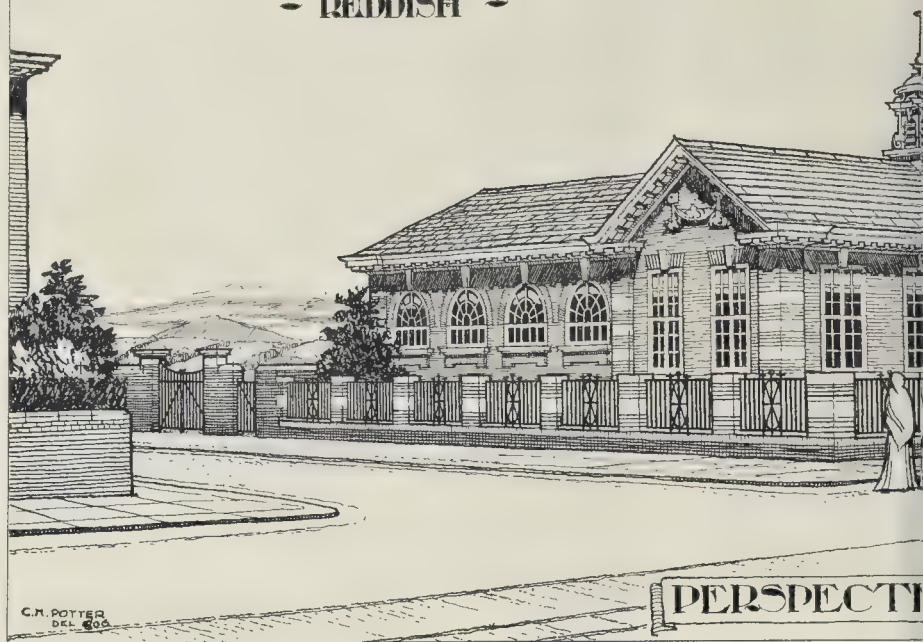
PLOT OF (K_{sp})^{1/2}
VS. 1/T FOR Na₂S₂O₄
AT THE DEPOSITION
OF THE COMPOUND
FOR OTHER VOLTAGES

ANY PHOTO APPLIES TO A 6 EAST WARD NE STREET FOTTER, AND CC

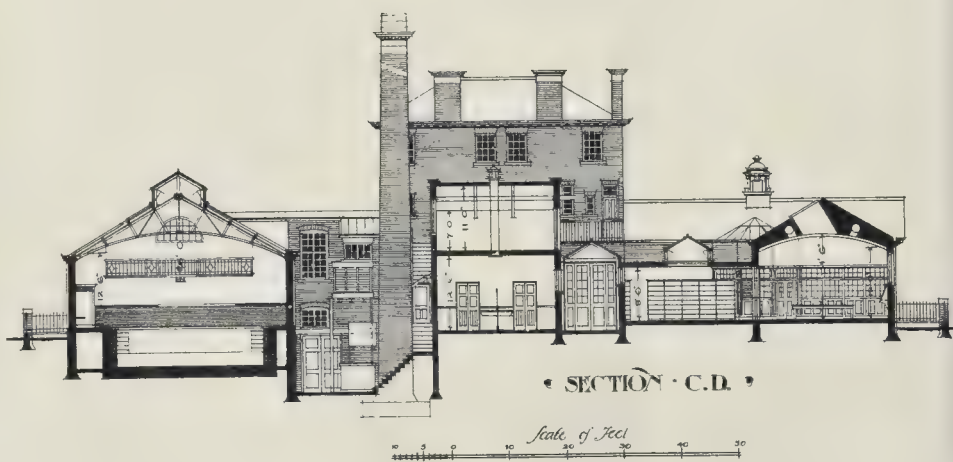
SELECTED DESIGN FOR ST. PANCRAS CENTRAL LIBRARY.—MESSRS S. B RUSSELL & T. EDWIN COOPER F.F.R.I.B.A., ARCHITECTS.

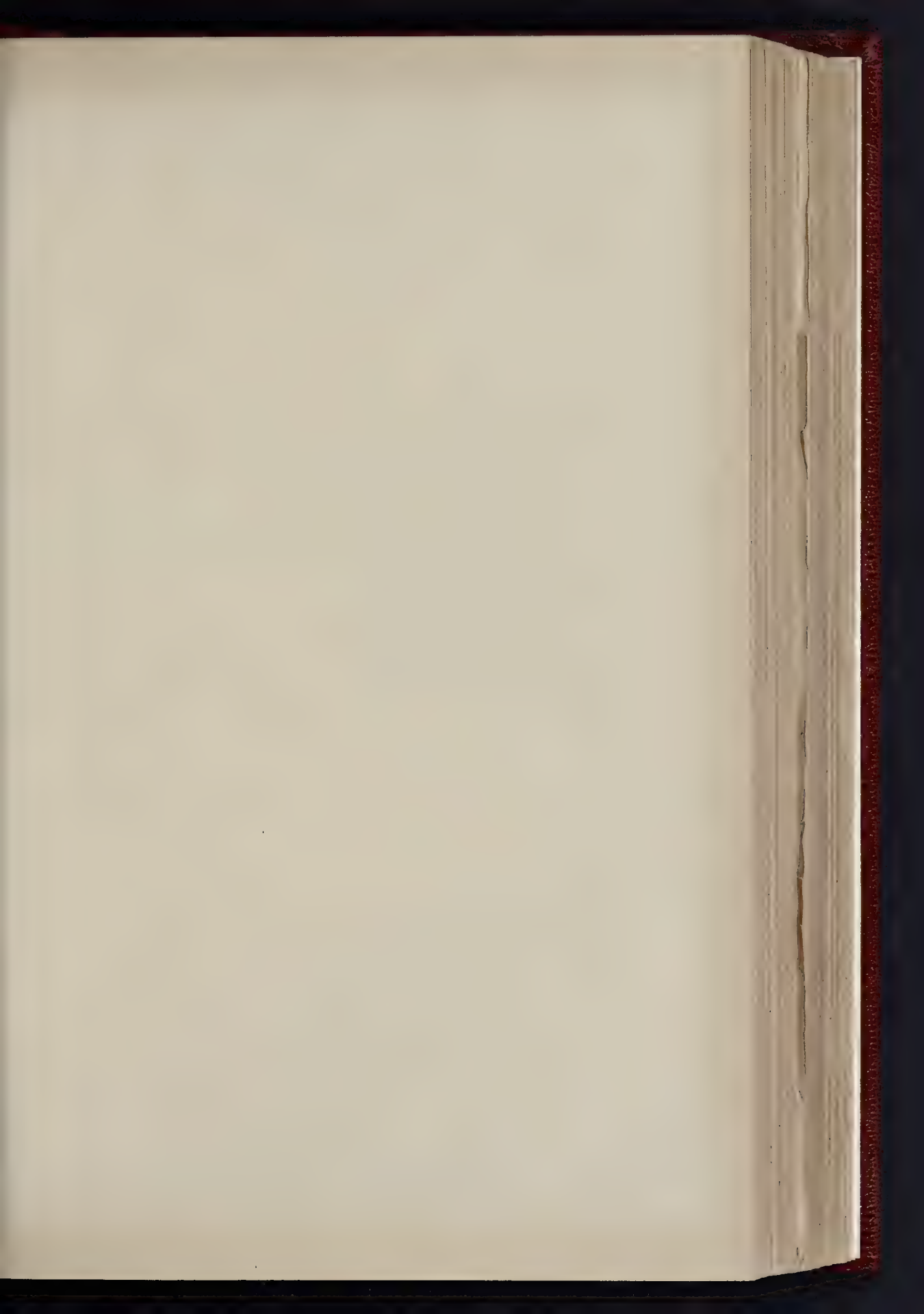


PROPOSED BATHS FREE LIBRARY AND FIRE STATION - REDDISH -

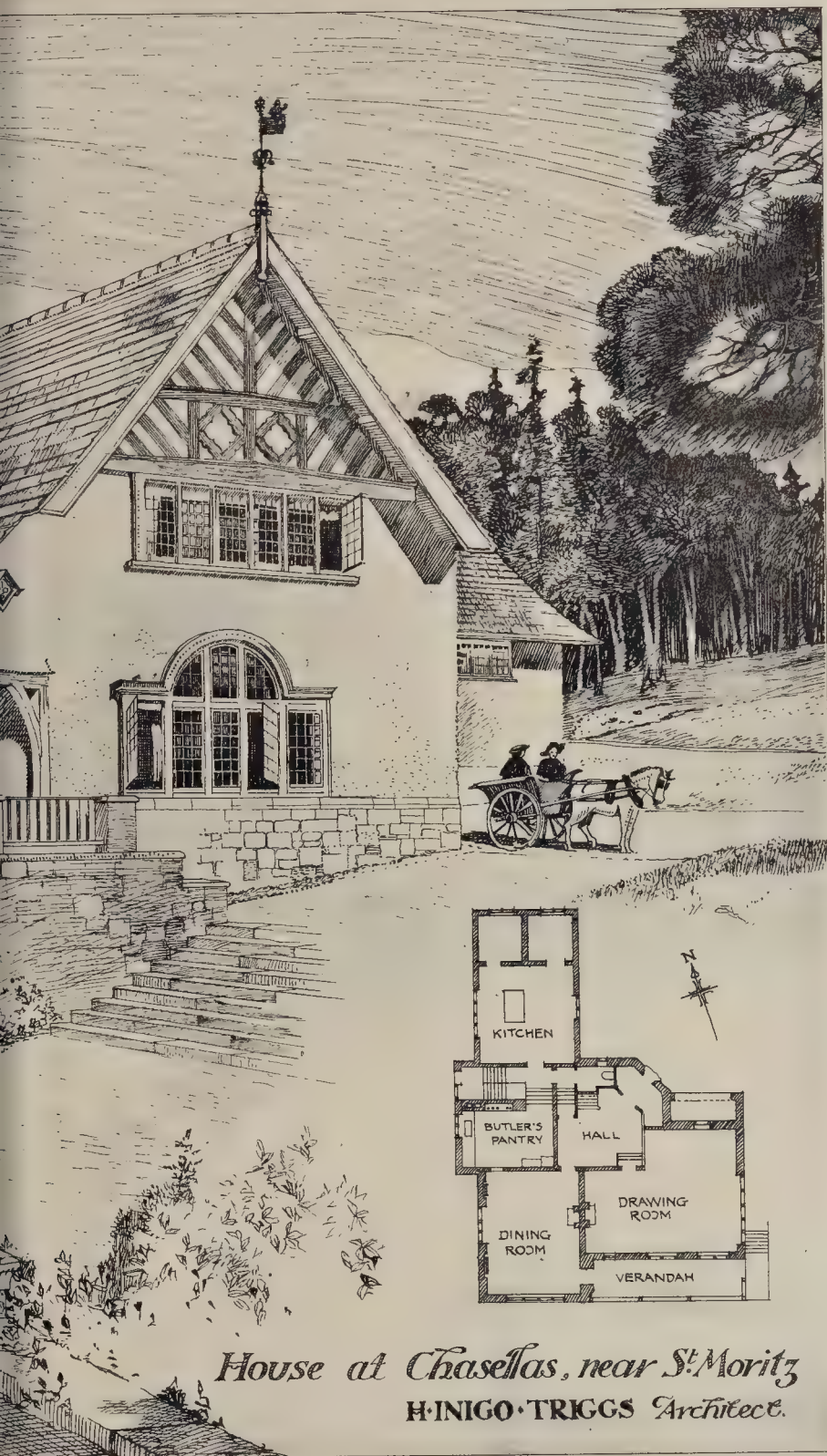


PERSPECTIVE

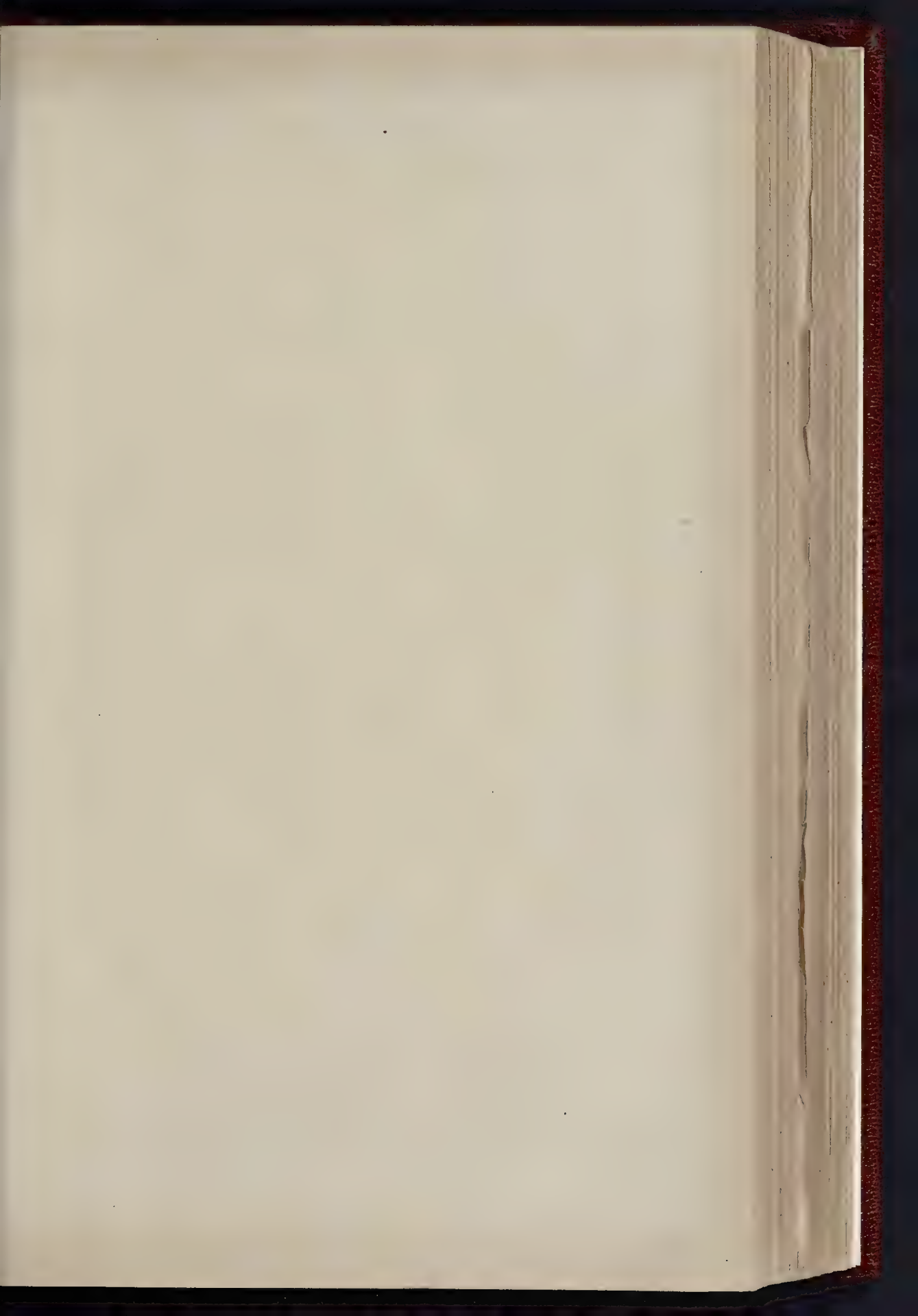








House at Chasellas, near St. Moritz
H. INIGO TRIGGS Architect.





COMPETITION DESIGN FOR THE PEACE PALACE



THE HAGUE.—By MR. STANLEY D. ADSHEAD, F.R.I.B.A.
E. VIEW.

Trade Catalogues.

THE Globe Tank and Hurdle Company, of Wolverhampton, send us a circular describing and illustrating their rotary screen for sand, gravel, lime, and other materials. This is a machine fitted in a strongly made frame and running on four wheels, so that it can readily be moved from place to place. The chief feature of the drum is the construction of the mesh with detachable triangular blades, which, it is claimed, cause a perfect self clearance, and remove all possibility of clogging and corrosion. The Globe screen of the usual rectangular form made by the same firm is fitted with blades of similar type.

Messrs. R. Waygood & Co. send us a pamphlet describing in general terms the principal features of their electric and hydraulic lifts for various purposes. A point very frequently raised by prospective lift users is whether electric or hydraulic power is preferable for passenger and goods lifts. The question is one involving the consideration of various factors which are briefly discussed in the introduction to this pamphlet. Among the advantages of electric lifts such as those here described are the convenience of control by means of car switches, and the facility with which interlocking gear can be connected with the landing gates as a precaution against accidents by reason of the gates being left open, or opened when the lift car is not opposite any of the floors.

Messrs. Waygood & Co. also send us a circular illustrating and describing the lifts which are in use at Folkestone for conveying visitors up and down the cliff. These lifts are worked on the water balance principle with tanks fitted beneath the cars, sufficient water being admitted into the tank under the descending car to raise the load in the ascending car. We learn that the Bournemouth Corporation have now decided to install two similar lifts for the convenience of visitors and residents, but the method of operation will be by electric motors and winding-gear, controlled by an attendant at the upper level. As the Bournemouth and Poole Electricity Supply Company have recently laid power mains in the central part of Bournemouth it is probable that a good many electric lifts of the types for which Messrs. Waygood and other firms are well known will be installed in the town during the next year or two.

The British Steel Piling Company send us a pamphlet describing the Friestedt patent sheet-piling, which is composed of two distinct sections, a 15-in. channel-bar, and an interlocking 15-in. channel-bar, the latter having a Z-bar riveted to the web near each end to form the interlocking device. Special designs are necessary for corner construction, but the general idea is the same as that embodied in the plain interlocking channel-bar. One advantage claimed for this form of piling when used on temporary works is that every alternate section is simply a 15-in. channel-bar, which can be used for structural purposes after having been withdrawn. This system of sheet-piling is quite new in Great Britain, but has been employed on a fairly extensive scale in the United States, chiefly for the construction of cofferdams and diaphragm or core walls to prevent the percolation of water through reservoir dams and retaining walls.

Messrs. Arthur L. Gibson & Co. have sent us illustrations and particulars of the "Kinneer" pressed radiators made by the Kinneer Pressed Radiator Company at Pittsburg, U.S.A. The radiators are of the usual sectional type, but are made of sheet-iron pressed to the required shape and joined together with welded seams; the pipe connections are ingeniously fixed to the sheet-metal, and each radiator is galvanised after manufacture and tested to a pressure of 35 lb. per square inch. The advantages claimed for these radiators are lightness, rapid radiation, and economy of space. For the same amount of radiation it is said that a cast-iron radiator weighs four times as much as the "Kinneer" radiator and occupies twice as much floor-space.

Messrs. W. F. Dennis & Co. have issued a fifth edition of their useful "FREDENIS" illustrated price-list of goods stocked in London, including wire of various kinds,

wire-netting, fencing accessories, tin plates, weldless steel chains, drain ladders, etc.

A pocket catalogue of cast-iron drain-pipes, fittings, and other sanitary goods has been issued by Messrs. John Bolding & Sons. It is fully priced and illustrated, and includes, in addition to cast-iron drains and soil-pipes a number of stoneware traps and channels, manhole covers, rain-water goods, wrought-iron pipes and cisterns, flushing-tanks, etc. The index adds to its value as a handy reference-book.

Messrs. Young & Marten have sent us a pocket catalogue of 152 pages, entitled "No. 7, Leading Lines." It is closely printed, and includes sanitary fittings, drain pipes, glass, joinery, metals, stable-fittings, iron windows, fire-grates, ironmongery, gas-fittings, and plumbers' brasswork, and many other materials and fittings required in the building trade.

From the London Drawing and Tracing Office we have received a catalogue (written by Mr. John B. Thorp) containing a number of illustrations showing models of buildings, etc., made by the firm. It is an interesting little catalogue, and will be useful to architects and surveyors and also to lawyers.

Messrs. John Spencer (Wednesbury) have sent us a copy of the twenty-third edition of their priced catalogue of iron and steel tubes for gas, water, steam, etc., boring tools for wells, steel poles for electric traction and lighting, wrought-iron coils, gas-fittings, steel flanged pipes, etc. There are some useful tables at the end of the catalogue.

The Hopton Stone Firms (Wirksworth) have sent us a descriptive account of the various stones quarried by them. It is entitled "Some British Marbles," and contains four coloured illustrations of the light and dark Hopton wood stone, grey bird's-eye marble, and Derbyshire fossil marble, and also a number of excellent half-tone illustrations of important buildings in which the stones have been used.

Correspondence.

THE FIRST TUSSAUD EXHIBITION.

SIR.—Mr. Tussaud confirms the statement in the *Builder* of July 7, p. 8, *ante*, and tells me that "England" might have been written for "London." He supports—as to the place of exhibition—the tradition mentioned by Mr. Conrad in your number of July 28. After having been shown in London the wax-works were taken to many places in the suburbs and the provinces.

THE WRITER OF THE ARTICLE.

THE RECENT INTERNATIONAL CONGRESS.

SIR, The suggestions in the first article of the current number of the *Builder* with regard to the choice of chairman for sectional meetings of future International Architectural Congresses will, I am sure, be generally approved, and it is to be hoped that they will be noted in the proper quarter and acted upon. If I might venture to make a small additional suggestion it would be that in the future every proposition or amendment upon which voting is to be taken should be translated and read to the members present in all the languages of the Congress before any discussion takes place. If this course had been followed at the meeting at which the subject of the conservation of ancient monuments was discussed much time would have been saved and misunderstanding avoided. At that meeting a proposition, in general terms, was first moved in French and duly carried. A second resolution, referring solely to the United Kingdom, was then proposed in English, and it soon became evident that many of the members present were totally ignorant of its import. At least the very proper request was made that it should be translated into French, but there seemed to be no one officially present capable of doing this, and much time was lost until Mr. Locke, who, as you truly say, "seemed to be everywhere where any one required assistance," appeared upon the scene and put matters straight.

Apparently such a difficulty as this had not been foreseen—at any rate, no arrangements had been made to meet it—and, as it is one likely often to recur, I venture to call attention to it so that suitable means may be devised to overcome it in the future.

Edlington,

BENJAMIN WALKER.

LONDON COUNTY COUNCIL REQUIREMENTS.

SIR,—With reference to the notes with regard to the London County Council requirements under the new 1905 Act which were published in your issue of Saturday last, we should be glad if you

could spare the space in your journal to air what we consider is a hardship upon architects and builders who are endeavouring to meet the Council's requirements under the new Act, viz.:—The fact that no schedule of hardwoods is issued by that body, but they merely state that oak, ash, jessie, or karri, or other hardwoods must be used, and on our asking whether mahogany, birch, walnut, greenheart, etc., would be accepted, we were met with the reply that they might or might not be accepted, but that each case must be judged on its merits and the exact wood to be used must be specified in each application and adhered to in the execution of the work.

"ANTI-MUNICIPAL."

The Student's Column.

ROOFS: STRUCTURALLY CONSIDERED.—III.

10. Slate.

FOR ordinary buildings slate is by far the most generally used of all materials for roof covering.

Slate is an argillaceous sedimentary rock, which subsequent to its deposition as clay, has been subjected to pressure, rendering the formation exceedingly dense and practically obliterating the original planes of stratification, and has also been subjected to shearing action, causing planes of cleavage independent of the original beds.

The value of slate as a roofing material is chiefly due to the facility with which it can be split into thin plates, for if not so divisible its strength and impermeability would not constitute special recommendations.

Good slate is of uniform colour, fine-grained, hard, tough, non-absorbent, and not friable at the edges. It is rough to the touch, and when struck with the knuckles should give a clear metallic ring.

Inferior slate is smooth and greasy to the touch, apt to split when trimmed or holed, or to break under light transverse pressure, emits a clay-like odour when breathed upon, and is liable to premature decay. A coarse and uneven texture suggests the admixture of foreign substances and the probability of undue porosity.

The selection of slate for architecture depends largely upon aesthetic considerations, which are beyond the scope of this series of articles; but from a structural standpoint it is important that the quality of the material should be determined by careful examination and tests.

It is commonly stated that the transverse strength of good Welsh slate is more than double that of York stone, and more than five times that of Portland stone. But no authoritative figures are to be found for the transverse strength of the latter materials, as there are for American and German stones.

Rankine gives the modulus of transverse rupture ($\frac{1}{2}$) for slate at 5,000 lb. per square inch, without defining the quality of slate intended. The modulus in question was determined by testing bars of slate 1 in. square, supported at two points 12 in. apart and loaded in the middle of the span. The value was calculated by the usual formula:—

$$f = \frac{3 W l}{2 b d^2}$$

which, for the dimensions stated, gives

$$f = \frac{3 W \cdot 12}{2 \cdot 1 \times 12} = 18 W.$$

Beyond these data no precise information is available as to the transverse strength of British slate.

So far as the mechanical properties of slate are concerned architects have to depend chiefly upon their individual judgment, supplemented by knowledge of the properties possessed by slate derived from different sources. The values in Table VI. may be of service for general guidance.

Two commonly-applied tests for absorption are stated below:—

(1) A sample of slate is thoroughly dried and weighed, immersed in water, and again weighed at the expiration of twelve hours. If the quantity of water absorbed does not exceed 0.005 per cent. the weight of the slate, the latter may be regarded as satisfactory.

(2) A dry slate is immersed on edge to half its depth in water. At the expiration of twelve hours, if the water absorbed has not

risen more than $\frac{1}{8}$ in. the slate may be regarded as practically non-absorbent.

Roofing-slate of excellent quality is produced in various parts of the United Kingdom, the chief centres of the industry being North Wales, the Lake District, the West of England, the West of Scotland, and the South-West of Ireland.

In addition to the slates produced at the home quarries, considerable quantities are imported from Newfoundland, the United States, France, Germany, and Norway.

according to the quality of the work and the pitch of the roof. It is never advisable to adopt a lap of less than $2\frac{1}{2}$ in. the average in good work being 3 in. For Westmoreland and rag slating the lap should not be less than 3 in.

The gauge of slating (see Fig. 1) is the measurement denoting the width of the exposed part of each course, and is thus determined—

Deduct the lap from the total length of the slate and halve the remainder.

TABLE VI.—PROPERTIES OF SLATE.

Variety.	Size of Specimen.	Crushing Strength.		Tensile Strength. Pounds per Square Inch.	Coefficient of Elasticity (E).	Absorption.		Authority.
		Pounds per Square Inch.	Pounds per Square Inch.			Hours Immersed.	Per Cent.	
Welsh slates (Not stated)	3-in. cubes	733—1,052	1,205	—	275,000—650,000	—	—	Unwin
"	3-in. cubes	—	—	—	—	167—334	0.23	Mallet
"	3-in. cubes	—	—	—	—	125	0.54—0.70	Unwin
"	3-in. cubes	—	—	—	—	24	0.6	Robine
Roofing	1-in. cubes	1,372	—	—	—	—	—	Wilkinson
Glanmore	"	1,374	—	—	—	—	—	"
Killakee	"	753	—	—	—	—	—	"
Valencia	"	658	—	—	—	—	—	"
(Not stated)	"	—	—	9,600—12,880	—	—	—	Rankine

The colour of slate is not of much value as an indication of its structural desirability, and depends chiefly upon the nature and proportion of the iron compounds contained in the rock.

Blue slate derives its colour from ferrous oxide (FeO); purple and red slates are coloured by ferric oxide (Fe₂O₃); green slates contain a smaller proportion of iron and a greater proportion of magnesium compounds; and soft black slate contains ferric disulphide or iron pyrites (FeS₂), together with carbonaceous matter.

In Table VII. we give some notes relative to slates of different colours derived from various sources. The excellent quality of Welsh slate is so well known that we have thought it unnecessary to make remarks upon the different varieties produced in that country.

TABLE VII.—VARIETIES OF ROOFING-SLATE.

Colour.	Source.	Remarks.
Red, or red-purple.	Penrhyn, N. Wales	—
	Dinorwic, N. Wales	—
	Newfoundland	Stouter than Welsh slate.
	Germany	Similar in colour to Welsh red slate.
Green.	Cumberland	Vary from light sea-green to deep olive.
	Westmoreland	Very strong and tough, size and thickness varies, generally stouter than Welsh slate.
	Lancashire	—
	Velineli, N. Wales	Good quality and colour, output limited.
	Precelly, S. Wales	Similar to Lake District slate, colour ranging from dark green to olive and khaki.
	Ireland	Very similar to Lake District slate in quality and colour.
	Newfoundland	Good quality and colour.
	United States	(a) Pale green-grey, durable and colour permanent.
		(b) Sea-green, colour liable to change.
	Germany	Quality not durable, colour fair.
	Norway	Colour rich green.
Grey.	Penrhyn, N. Wales	—
	Dinorwic, N. Wales	—
Grey-blue.	Delahoe, Cornwall	Strong, straight, and clean.
Blue.	Penrhyn, N. Wales	—
	Dinorwic, N. Wales	—
	Festiniog, N. Wales	Also known as Portmadoc slate.
	Bettws-y-coed, N. Wales	Strong, with rough surface.
	France	Quality fair, colour dark blue.
	Germany	Quality inferior.
	Norway	Durable, but roughly made.
Purple.	Bangor, N. Wales	—
	Nantlle Valley, N. Wales	—

Roofing slates are laid so that each course overlaps the next course but one below it, the distance between the two edges being termed the lap, as shown in Fig. 1.

The lap of slating varies from $2\frac{1}{2}$ in. to 4 in.,

Example (1): Find the gauge of slates 36 in., 22 in., and 13 in. long, with a 3-in. lap.

$$36 - 3 = 33, \text{ and } 33 \div 2 = 16\frac{1}{2} \text{ in.}$$

$$22 - 3 = 19, \text{ and } 19 \div 2 = 9\frac{1}{2} \text{ in.}$$

$$13 - 3 = 10, \text{ and } 10 \div 2 = 5 \text{ in.}$$

Slating is measured by the square, which equals 100 superficial feet. The number of slates per square is ascertained as follows:—

Multiply the gauge by the width of the slate and divide the product into 100.

Example (2): Find the number per square of slates with a 3-in. lap and of the following sizes:—36 in. \times 24 in., 22 in. \times 12 in., 13 in. \times 10 in.

Using the gauges calculated in Example (1) we have:

$$100 \div (16\frac{1}{2} \times 24 \div 144) = 38 \text{ per square.}$$

$$100 \div (9\frac{1}{2} \times 12 \div 144) = 126 \text{ "}$$

$$100 \div (5 \times 10 \div 144) = 288 \text{ "}$$

An addition of about 5 per cent. to the number of slates per square is usually allowed to cover waste.

Taking the nearest whole number to each percentage, the results in Example (2) become:

$$38 + 2 = 40 \text{ per square.}$$

$$126 + 6 = 132 \text{ "}$$

$$288 + 14 = 302 \text{ "}$$

In Table VIII. the dimensions, gauge, and number per square are given for various sizes of roofing-slates, the gauge being calculated for a 3-in. lap.

TABLE VIII.—MEASUREMENT OF ROOFING-SLATES.

Designation.	Nominal Size.		Gauge with 3-in. lap.	Weight.	Number per Square.	
	Length.	Width.			Net.	With 5% for Waste.
	In.	In.		Cwt.		
Queens	36	24	163	5.38	37	40
Imperials	30	24	134	5.33	45	47
Empresses	26	16	111	5.40	81	85
Empresses (small)	26	15	114	5.25	84	88
Princesses	24	14	104	5.31	98	103
Duchesses	24	12	104	5.27	115	121
Duchesses (small)	22	12	94	5.29	127	133
Marchionesses	22	11	94	5.17	138	145
Marchionesses	20	10	84	4.96	170	179
Countesses	18	10	74	5.20	192	202
Viscountesses (wide)	14	12	58	5.14	214	225
Viscountesses	14	12	58	5.45	218	229
Viscountesses	16	10	65	5.06	222	233
Headers	16	9	65	5.15	247	259
Ladies (wide)	14	10	65	5.23	251	264
Ladies (broad)	14	10	65	5.46	262	275
Dames	16	8	63	5.20	277	291
Headers	13	10	5	5.42	288	302
Plantations	14	8	53	5.47	328	344
Small Headers	12	8	45	5.46	374	383
Ladies (small)	12	7	45	5.84	410	420
Ladies (narrow)	12	7	45	5.14	411	432
Doubles (wide)	12	8	45	6.44	515	541
Doubles	12	6	44	6.24	533	560
Singles	11	5	4	6.80	653	688
Doubles (small)	11	5	31	7.15	680	720
Fractions	10	6	31	6.58	824	865
Units	10	5	31			
Odds	10	5	31			

The average weight of a square foot of slate 1 in. thick is as follows:—

Welsh	15 lb.
Westmoreland and Cumberland	14.5 lb.
Devonshire and Cornish	13 lb.

Welsh slates of what is known as "First Quality" are usually from $\frac{3}{8}$ to $\frac{1}{2}$ in. thick. "Second Quality" Welsh slates are from $\frac{1}{4}$ to $\frac{3}{8}$ in. thick.

Slates from the Lake District are usually thicker than Welsh slates and weigh about 50 per cent. more.

In timber roofs slates are fixed by nails upon battens laid across the rafters, or upon boarding similar to that used for zinc, lead, or copper sheets.

In steel roofs they are fixed by copper wire to angle-bar purlins bolted to the rafter backs of the principals, or nailed upon timber battens screwed to the purlins.

Slate battens for timber roofs vary in section from $1\frac{1}{4}$ in. to 3 in. wide by from $\frac{1}{2}$ in. to 1 in. thick, and are spaced to suit the size and gauge of the slates, as illustrated in Fig. 1.

The size of the angle-bar purlins in steel roofs should be about $1\frac{1}{2}$ in. by $1\frac{1}{2}$ in. by $\frac{1}{2}$ in. when the principals are from 8 ft. to 10 ft. apart. Timber battens for steel roofs are usually square in section, their dimensions being governed by the size of the angle-bar purlins.

Copper, copper composition, zinc, galvanised iron, and black iron nails, with circular flat heads and sharp-pointed shanks, are employed for fixing slates; copper nails are very durable, but rather too soft. Composition nails made of an alloy consisting of seven parts copper to four parts zinc are hard and durable. Zinc nails are soft, and will not last for more than about twenty years; and the life of iron nails is considerably less, even if galvanised. Black iron nails are never advisable, but if used should be heated and dipped in boiled linseed oil.

The following are suitable lengths for slating nails:—

- 14 in. Odds to Doubles.
- 14 in. Ladies to Viscountesses.
- 14 in. Countesses to Marchionesses.
- 14 in. Duchesses to Imperials.

For regular-sized slating the nails should not be so stout as to prevent the heads from being finished flush with the surface.

For Westmoreland and rag slating stout nails are recommended in the lengths of $1\frac{1}{2}$ in., $1\frac{3}{4}$ in., and 2 in., according to the size and thickness of the slates.

Except in sheds and other buildings where ample ventilation through the roof is advantageous, slates should be laid upon boarding not less than 1 in. thick, covered with sheathing-felt or other suitable material, as a precaution against the penetration of wind, rain, and snow, and for the purpose of equalising temperature variations inside the building.

The adoption of a boarded covering is also of value in reducing the risk of damage in

times of high wind. The reason for this is that a strong gust of wind is usually followed by a considerable reduction of atmospheric pressure outside the roof. Consequently the pressure of air below the roof is exerted in a

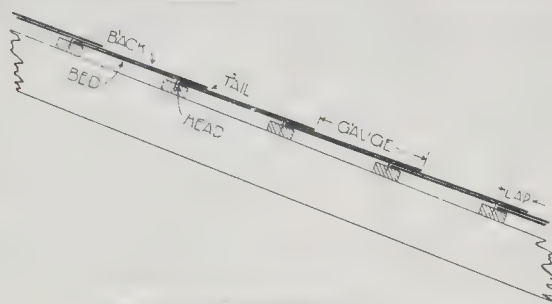


Illustration to Students' Column Fig 1

direction which the slates are least able to resist. When the rafters are covered with boarding and felt the slates are obviously far less liable to damage from this cause.

With the view of preventing rain from being blown through the joints, slates should not be laid at an inclination of less than 25 deg with the horizontal.

The general rule governing the width of slates is the smaller the pitch the wider the slate and the greater the pitch the narrower the slate

COURT OF COMMON COUNCIL.

A MEETING of the Court of Common Council was held at the Guildhall on Thursday last week, the Lord Mayor presiding.

Widening of King Edward-street.—The Improvements and Finance Committee reporting on the proposed widening of King Edward-street, submitted the award of Mr. S. Walker in respect of the ground needed for widening the public way thereat, amount, 5,000*l.*, and stated that they have instructed the Comptroller to complete the purchase accordingly.

Repainting of Artisans' Dwellings.—The same Committee submitted for acceptance a tender of Messrs. Vigor & Co. for repainting and repairs to the artisans' dwellings in Stoney-lane, Houndsditch, for the sum of 1,165*l.* The Court agreed.

Offices of the Public Health Department.—The Committee also recommended that the annual cleaning and repairs necessary to the various offices of the Public Health Department be carried out at an estimated cost of 300*l.*, including furniture, blinds, and reflectors for the new addition to the engineer's offices. This was agreed to.

Reconstruction of a Sewer.—The Streets Committee recommended, and it was agreed, that the sewer beneath Barbican should be reconstructed at a cost of 3,000*l.*

Appointment of Clerk of Works.—Mr. Harold Clarke was appointed to act temporarily as clerk of works to supervise new paving works, etc.

Paving Works.—On the recommendation of the Streets Committee it was agreed to accept the tenders of Messrs. Mowlem & Co. for masons' and paviors' works for three years from Michaelmas, subject to the Corporation reserving the right to terminate the contracts at the end of the first or second year, and also a tender of the French Asphalt Company, Ltd., for relaying the carriage-way pavement of Cornhill with asphalt for the sum of 14,991*l.* 8*s.*, the work to be carried on day and night.

Water Mains on Blackfriars Bridge.—Mr. Deputy Alder submitted a report from the Bridge House Estates Committee recommending that an agreement be entered into with the Metropolitan Water Board, in accordance with the terms granted to them by the House of Lords Committee, to carry their mains across the widened bridge; and that the agreement be sealed when prepared, and that the Bill, on its receiving the Royal assent, be referred to this Committee to carry into execution. The Court approved.

The Egyptian Hall, Mansion House.—The General Purposes Committee were authorised to expend a sum not exceeding 200*l.* in the cleansing of the Egyptian Hall, Mansion House.

Repainting of Leadenhall Market.—The Billingsgate and Leadenhall Markets Committee recommended the acceptance of the tender of J. Kirkaldy & Son, Ltd., of Gayford-street, E., for repainting the interior of the shops in Leadenhall Market and approaches at the sum of 1,010*l.*; and for authority to engage a clerk of works. The Court agreed.

New Buildings at the Central Market.—The Coal and Corn Finance Committee brought up a report on the subject of the covering in of the space over the railway facing Charterhouse-street, comprising an area of about 14,000*sq.* ft., super between the fish, fruit, and vegetable section of

the Central General Market and the premises in the occupation of the London Central Markets Cold Storage Company, Ltd.; and the erection thereon of buildings for market and other purposes at a total estimated cost of 16,225*l.* The Committee recommended that the necessary funds should be provided out of the City's cash. This was agreed to.

Proposed Public Slaughterhouses.—The Cattle Markets Committee presented a report recommending the abolition of private slaughterhouses at the Metropolitan Cattle Market, and the construction of public slaughterhouses thereat divided into separate chambers for cattle and sheep, and with a general chamber for pigs, at a estimated cost of not exceeding 40,000*l.* The report was adopted, and referred back for execution.

Alterations at the Central General Market.—It was agreed, on the recommendation of the Central Markets Committee, to accept the tender of Messrs. Johnson & Co., Ltd., of Wandsworth, at 59*l.*, for works of alteration in connexion with premises in the Central General Market, formerly used by the market constables.

Sanitary Works at Billingsgate Market.—The Billingsgate and Leadenhall Markets Committee were authorised for authority to expend a sum of not exceeding 350*l.* in sanitary works at Billingsgate Market and buildings.

OPERATIVE PLUMBERS' ASSOCIATION.

At the meeting of the United Operative Plumbers' Association of Great Britain and Ireland, held at King's College on the 31st ult., there was a large attendance, including representatives of the building trade and various public bodies. Sir Albert K. Rolit, who presided, supported by the general secretaries of the trade unions of stonemasons, plasterers, carpenters and joiners, and others, expressed on behalf of the Governors and Council of King's College their warm appreciation of the services rendered to the educational work of the college by the Plumbers' Company and the Carpenters' Company. He referred to the great impulse given to the cause of technical education generally by the Guilds of London.

The Master of the Plumbers' Company (Mr. W. D. Carbe) presented, on behalf of the Operatives' Association, two grants of 100*l.* each, one to a member incapacitated from following his trade, and the other to the widow of a deceased member. He said that the Association was not, as some might suppose, merely a body concerned in regulating the wages and working rules of the body of Operative Plumbers of the United Kingdom, but it was a great self-supporting society, which administered a wide scheme of practical benevolence, that it also encouraged thrift, and had provided a system by which men could make provision for their declining years, and moreover it represented a great educational force by which the rising generation of craftsmen were being better qualified to fulfil their important duties to the community. The Plumbers' Company had co-operated with the Association, numbering some 12,000 members, at about 200 centres, in promoting the plumbing classes and examinations for plumbers that are now carried on in the chief cities and towns of the Kingdom. And he referred particularly to the practical co-operation set up between the plumbers and the public health and water authorities in regard to the regulations affecting the health of the community and the greater economy in the distribution and use of water for domestic and other purposes. In a brief address upon "Craftsmanship" the Master referred to the perfection of the work of the Middle Ages and later period, and dwelt upon the hereditary character of the training of craftsmen and the reverence for accumulated experience.

Mr. Randall, on behalf of the Association, expressed their appreciation of the aid rendered by the Plumbers' Company to maintain the principle of apprenticeship as the basis of training for

the craftsmen, and called attention to the influence often exercised by the spirit of commercialism overruling the spirit of craftsmanship by looking to the output of work rather than the quality and finish of the product. He said the Association looked to the growth of co-operation between the professional and official representatives of the public and the workmen in seeing that the standards of work were not reduced below those creditable to the craftsmen and safe to the community.

Mr. F. Barter, on behalf of the London Management Committee of Operative Plumbers, cited the statistics of the Association as evidence of their being largely a benevolent society; the total expenditure upon trade disputes being only about one-fourth of the total expenditure of the Association.

Mr. Gregory, of the stonemasons' union, said that 100 of the principal unions from a total expenditure of sixteen millions had expended only 14 per cent. on disputes, 22 per cent. on the unemployed, and 41 per cent. on sick, accident, and other benefits, and he claimed that in the year 1904 the returns showed that some 30,000 persons had been saved from applying for relief from the rates by the support rendered to them by the unions.

A short address, with illustrations to "Egyptian Craftsmanship" was delivered by Mr. C. T. Curry.

The laboratories of bacteriology and public health were visited under the direction of Dr. Taylor, who showed the growth of organisms in water polluted by sewage. The engineering and other departments and laboratories of the college and the exhibition of the Egyptian Exploration Fund were thrown open during the evening, as well as the laboratories for advanced instruction for plumbers, and the chief objects of interest were explained.

LONDON BUILDING ACT: TRIBUNAL OF APPEAL.

On Wednesday last at the Surveyors' Institution, Great George-street, Westminster, a meeting of this Tribunal was held. Mr. A. A. Hudson presided, and he was assisted by Mr. J. W. Penfold and Mr. E. A. Gruning.

The first business was the decision of the Tribunal in the appeal of the Metropolitan Railway Company and others against the certificate of the Superintending Architect as to the general line of buildings on the south-east side of Euston-road, Marylebone, between Southampton-street and Bolsover-street, and the north-west portion of the building site, and also the western side of Cleveland-street between Euston-road and Buckingham-street, which was heard on July 15.

The Tribunal decided to vary the line of the Superintending Architect as shown on the certificate, both on the south-east side of Euston-road between Tottenham Court-road and Bolsover-street and also on the western portion of Euston-road, as indicated in the plan presented on appeal.

The result of the judgment was to grant the appeal.

A lengthy legal argument took place on the application of the appellants for costs.

Mr. Avory maintained that as a matter of law the Tribunal had no power to order costs against the London County Council. The Council, he said, was in no sense a party to the case—they simply appeared there to assist the Tribunal and uphold the decision of the Superintending Architect, who was a judicial officer against whose decision the London County Council had no appeal. The London County Council could not be aggrieved in the matter, and therefore they were not parties to the appeal in the sense that they could be made liable for costs.

Mr. Macmorran pointed out that in a case heard by the Tribunal some years ago an appellant was given ten guineas costs against the London County Council, and he submitted that the Council by appearing to support the Superintending Architect were parties to the appeal, as the Superintending Architect was the respondent in the case. If Mr. Avory was right in his contention the Tribunal had acted wrongly when they had made appellants pay the costs of the London County Council, as they had done more than once.

The Chairman said they had decided to give costs against the London County Council in respect to both the appellants, but they would be very pleased to state a case if Mr. Avory wished it. The only question was as to the amount.

Mr. Macmorran said that the costs of the Metropolitan Railway had amounted to 80*l.*

Mr. Wakeley said that the costs of his clients were 70*l.*

After consulting with his colleagues, the Chairman said they would award the Metropolitan Railway 60*l.* and Mr. Wakeley 50*l.*

Mr. Avory said he should certainly take the case to the High Court. A case might arise in which there would be fifty appellants, each of them with a bill of costs for 80*l.*

The appeal of Mr. Thomas Skinner and Messrs. Lilley & Skinner, Ltd., under sect. 25 of the

London Building Act, 1894, against the certificate of the Superintending Architect of Metropolitan Buildings, dated June 21, 1906, defining the general line of buildings on the north side of Pentonville-road, between Southampton-street and North-street, was then proceeded with. Mr. Macmorran, K.C., Mr. Bethune, and Mr. Glen represented the appellants, and Mr. Horace Avory, K.C., appeared for the London County Council.

Mr. Macmorran, for the appellants, said that the Superintending Architect had fixed a building-line practically drawn right across and through, so as to exclude the existing one-story buildings which lay between the line and Pentonville-road. The appellants' buildings consisted of the block between Winchester-street and Southampton-street, and the Superintending Architect, in determining the line, had absolutely ignored the existing one-story buildings which existed along the whole front, not only of the appellants' premises, but of the premises on each side.

His submission was that, in so acting, the Superintending Architect was wrong both in principle and in fact. The Superintending Architect could not lay down a line where it would be convenient to have it—the line was there and all that the architect had to do was to ascertain where it was.

Mr. Avory said of course he admitted that the Superintending Architect could not make the line in their, but he entirely disputed the proposition that he was bound to take the line of one-story shops.

Mr. Macmorran replied that there was no reason why the frontage of one-story shops should not be the line of frontage of a street. He admitted that a certificate had already been given in respect to numbers 180 and 182, Pentonville-road, but in these cases the certificates were given on the application of the owners for the specific buildings, and it did not affect anybody else.

Mr. Arthur Sykes, architect, examined by Mr. Bethune, said that he had known Pentonville-road for twenty-five years. The one-story shops in question were substantial buildings, and most of them had been erected many years. It seemed to him to be absurd to fix the general building-line behind those shops.

Mr. A. R. Stenning, architect, gave similar evidence.

Mr. Avory, for the London County Council, said that as far as they had been able to trace the history of these one-story shops, some of them were erected with the consent of the old Board of Works, that they should not be raised at any time, and, as regarded those for which they could not trace any consent, it was clear that they were originally unlawfully erected. The line of buildings at 180 and 182, Pentonville-road was the line of buildings as defined by the Superintending Architect in his certificate, and he submitted that that was evidence that in 1898 that was the general line of those two buildings. The Act meant that the general line of building was the line of the main buildings and not the front door of excrecences of this kind. It was a very important question of principle that the Council was asked to consider, and he asked them to say that such erections as these ought not to control the general line of building.

The Tribunal reserved its decision.

General Building News.

ROMAN CATHOLIC CHURCH, MILLFIELD, SUNDERLAND.—The foundation-stone of St. Joseph's new Catholic Church, King's-road, Millfield, was recently laid by Bishop Collins, of Newcastle. The church is to be built entirely of concrete moulded blocks. The total cost of the work is estimated at 3,000*l*. The church will have a nave, side aisles, with circular chapels and a sanctuary, and with sacristies connected with the present presbytery by a corridor, the whole being planned by the rector, the Rev. J. Rogers. The introduction of concrete blockwork is due to Mr. Thomas Axtell, engineer, of Ryhope, who is also responsible for the designs, and the main part of the contract is being carried out by Mr. J. L. Durne, of Sunderland.

MISSION CHURCH, BOROUGH GREEN, KENT.—On the 24th ult. the Bishop of Rochester consecrated the new church, erected at Borough Green. The plans were prepared by Messrs. Monckton & Gillespie, Walbrook, E.C., and Messrs. Allcorn & Son, of Plaxton. The new church is of brick and tiled roof and spire. Seating accommodation has been provided for about 250, and the total cost, exclusive of site, is estimated at 1,850*l*.

BAPTIST CHURCH, HERTFORD.—The memorial-stone of the above new church was laid on Thursday, the 26th ult. The church, which has been designed by Messrs. George Baines & Son, London, is being erected at a cost of 2,251*l*, the contract having been let to Messrs. F. Wood & Co., of Luton. It will accommodate about 471 persons in a mixed congregation. The building is designed in late Gothic, freely treated. Vestries and offices

are included in the scheme, also certain alterations to the existing school.

BAPTIST CHURCH AND SUNDAY SCHOOL, DROITWICH.—A new Baptist church and Sunday school have been erected at Droitwich. Mr. Francis B. Andrews, of Birmingham, was the architect of the work.

WESLEYAN METHODIST SCHOOL-CHAPEL, SOUTH BENWELL.—Foundation-stones of a new Wesleyan school-chapel—which forms part of a scheme proposed to be carried out by the members of the Paradise Society—were laid at South Benwell on the 28th ult. The work at present undertaken is estimated to cost 2,000*l*. Messrs. E. and A. Story, of Benwell, are the contractors, and the plans have been prepared by Mr. F. Marshall Dryden, architect, of Newcastle. The buildings comprise two halls, vestry, with sliding partition, cloak-room, kitchen, etc. The large hall will be 57 ft. by 33 ft., will run east and west, and have its entrance from Atkinson-road.

TECHNICAL SCHOOL, WATERFORD.—The building of the new Central Technical Institute at Waterford was commenced on April 26, 1905. The area covered is 87 ft. deep, with a frontage of 70 ft. The plans submitted by Mr. J. J. Fleming, a local architect, were adopted by the local Technical Committee. The contract was entrusted to Mr. Patrick Costen. Mr. Robert Costello, Waterford, is the contractor for the heating, and has also carried out the plumbing and sanitary arrangements. Mr. Wm. Keating was clerk of works, and Mr. McReddy acted as foreman for the contractor, Mr. John Foley being shop foreman.

BATHS, TORRINO.—The ceremony of laying the foundation-stone of the new Tooting baths for the Wandsworth Borough Council took place on Saturday, the 28th ult. The architect is Mr. Henry Drury, and the Consulting Engineer, Mr. E. R. Dolby, M.Inst.C.E., and the cost of the scheme will be about 6,250*l*. The accommodation consists of eight first-class spray and twelve second-class spray baths for men and eight second-class slipper baths for women.

CLASSROOMS, GRAY'S INN.—After a luncheon given by the Treasurer and Masters of the Bench on July 21 to several of the judges and other representatives of the legal profession were opened the new classrooms for students belonging to the four Inns of Court and common-rooms for members of the Honourable Society of Gray's Inn, which have been built after designs prepared by Mr. C. W. Reeves.

SWIMMING BATHS, NORTHFLEET.—New swimming baths have been erected at Northfleet. They measure 80 ft. by 30 ft., while the depth graduates from 3 ft. to 8 ft. Mr. Taylor, engineer, prepared the plans.

ADDITIONS TO THE SEAMEN'S INSTITUTE, SOUTHAMPTON.—An addition is to be made to the Southampton Mission to Seamen's Institute in the Royal Crescent, near the Docks, in the shape of new coffee-rooms. The new building will consist of an addition on the eastern side of the existing Institute, and its total length from front to back will be about 70 ft. odd. The exterior will be of brick, black pointed to match the adjoining building, and with stone dressings. Mr. A. F. Gutteridge was the architect; Messrs. Dyer & Sons being the builders.

MUNICIPAL BUILDINGS, BROMLEY.—On the 28th ult. the foundation-stone of the new municipal buildings in Tready-road, Bromley, was laid. The design for the building was obtained by means of an open competition for architects having offices within twenty miles of the Borough, and Mr. J. S. Gibson was, on the nomination of the President of the Royal Institute of British Architects, appointed Assessor. Forty-three sets of plans were received, and the Assessor awarded first place to Mr. R. Frank Atkinson, of London, Mr. Samuel A. Stanger, of the firm of Messrs. C. Stanger & Son, of London, was appointed quantity surveyor. Forty-four tenders were received, and the Corporation accepted the tender of Mr. F. G. Minter, of Putney, for the sum of 18,793*l*.

GYMNASIUM, NEWBURY.—A gymnasium has been built in connexion with the Newbury Grammar School. The structure is of wood and iron on concrete foundations, and the main room is 40 ft. by 25 ft. and 22 ft. high. The interior is lined with felt and matchboarded, with a boarded floor fixed to cots throughout. It is stained and varnished throughout. It was designed by Mr. S. J. Lee Vincent, Borough Surveyor, and was carried out by Messrs. James Edwards & Son, of Inkpen.

PROPOSED WORKMEN'S DWELLINGS, HORNSEY.—Mr. R. H. Bicknell, M.Inst.C.E., conducted a Local Government Board inquiry at the Hornsey Municipal Offices, Southwood-lane, on the 24th ult., in an application by the Hornsey Borough Council for sanction to borrow 5,700*l*. for the purchase of land for additional workmen's dwellings. Mr. E. J. Lovegrove (Borough Surveyor), in giving evidence, stated that it is intended to lay out a main road, 45 ft. in width, with branch roads 40 ft. wide, and as far as the scheme has at present been formulated there will be a provision for approximately 120 self-contained cottages.

THEATRE IMPROVEMENTS, SHEFFIELD.—Improvements have recently been carried out at the Theatre Royal, Sheffield; Messrs. Hall & Fenton were the architects, and Messrs. Longden & Sons, Ltd., the contractors for the work.

FIRE-STATION, HERNE HILL, LONDON.—On February 8, 1898, the London County Council approved a scheme for further increasing the means of protection from fire in London. This scheme included the provision of a permanent fire-station at Herne Hill. For the site of the station, the Council acquired, under compulsory powers, a piece of vacant ground between Herne Hill and Milkwood-road, at a cost of 2,353*l*. 8s. 8d., and the erection of the station was commenced by the Works Committee in June, 1905. The architect's estimate of the cost of the building was 7,775*l*. The architect is Mr. W. E. Riley, from whose designs and under whose direction the building has been constructed. The administrative portions of the building are situated on the ground floor, the chief apartment being the appliance-room, with run-out into Herne Hill. This room is about 31 ft. wide and 37 ft. 6 in. deep. The walls are lined with white glazed bricks, and the floor is paved with adamantine clinkers, having panels of blue bricks to assist the horses to start. The watch-room adjoins the appliance-room, and is 9 ft. 6 in. wide and 13 ft. 10 in. deep. It has an inspection window overlooking the separate entrance passage, which leads from the front to the staircase and to the yard. The separate entrance and the staircase are lined with white glazed bricks. Adjoining the separate entrance passage are the laundry, with hot closet and stoker, the coke-store, and the battery cupboard.

At the rear of the appliance-room there is a back door to the yard, a stable containing four stalls, and a fodder-store. A workshop and the necessary wood coal, general, and oil stores are arranged in the yard, which is paved with ironstone tile paving, and to which there is a run-in from Milkwood-road. The hose hoist is on the external wall of the staircase, and the windows in this wall are arranged so as to be useful for hook ladder drill. The recreation-room is placed on the first floor over the appliance-room. It is entered from the flat at the back, and is large enough to accommodate a full-sized billiard table. The domestic portion of the station is situated on the upper floors, accommodation being provided for the station officer and seven married men. In addition to the recreation-room on the first floor, there are the station officer's quarters, which contain four rooms, a scullery, and a water-closet, and one other set of quarters with two rooms and scullery and water-closet, and a bath-room for the two sets of quarters. On each of the second and third floors there are three sets of quarters, each containing three rooms, a scullery, and water-closet, and there is a common bath-room on each of these floors. Sliding poles are provided from all floors, and are reached from the staircase landings. The elevations are faced with stone and red bricks.

FIRE-STATION, BRIXTON, LONDON.—On November 12, 1901, the London County Council decided to erect a new fire-station in substitution for the station in Fendale-road, Brixton. The Council acquired under compulsory powers a piece of vacant ground at the junction of Station-road and Gresham-road, at a cost of 1,547*l*. 1s. 4d., and the work of erecting the station was commenced by the Works Committee in June, 1905. The architect's estimate of the cost of the building was 13,250*l*. The architect is Mr. W. E. Riley, from whose designs and under whose directions the station has been constructed. The administrative portions of the building are situated on the ground floor, the chief apartment being the appliance-room, with run-out into Gresham-road. This room is about 30 ft. wide and 40 ft. deep; the walls are lined with white glazed bricks, and the floor paved with ironstone paving, having panels of blue bricks to assist the horses to start. The watch-room adjoins the appliance-room, and is 13 ft. 6 in. wide and 13 ft. 3 in. deep. It has an inspection window overlooking a passage from the separate entrance which leads to the staircase and also to the yard. This passage, as well as the staircase, is lined with white glazed bricks. A small waiting-room opens from the separate entrance passage, and adjoining is the recreation-room, large enough to hold a full-sized billiard-table. At the rear of the appliance-room there is a back door to the yard, and a stable containing four stalls and a fodder-store. The laundry, with hot closet and stoker, are behind the stable. A long ladder shed, with a run-out into Station-road, has been built at the rear of the site. A workshop and the necessary wood, coal, and coke, general, and oil stores, are arranged in the yard, which is paved with ironstone paving, and to which there is a run-in from the Station-road. The hose hoist is on the external staircase wall, and the windows in this wall are so arranged as to be useful for hook ladder drill. The domestic portion of the station is situated on the upper floors: the station officer and six single men being accommodated on the first floor, and nine married men over. The station officer's quarters contain four rooms, a scullery, bathroom, and water-closet, and the single men have a common

mess-room, scullery, lavatory, and bath-room, and each man has a separate sleeping cubicle, about 6 ft. by 9 ft. 6 in. On each of the second, third, and fourth floors there are three sets of quarters, each containing three rooms, a scullery, and water-closet, and there is a common bath-room on each of these floors. Sliding poles are provided from all floors. The elevators are faced with stone and red bricks.

Appointments.

NATIONAL GALLERY.—The trusteeship rendered vacant by the demise of Sir Chas. Tennant, Bart., has been filled by the appointment of Sir T. D. Gibson Carmichael, Bart.

ROYAL VICTORIAN ORDER.—Mr. Alfred Young Nutt, M.V.O. (Fifth Class), of His Majesty's Office of Works, Windsor Castle, has been raised as member of the Fourth Class of the Order.

LEGION OF HONOUR.—The President of the French Republic has conferred a Chevaliership upon Mr. Walker, of Lille, a builder.

Sanitary and Engineering News.

SEWERAGE, ETC., WORKS, SKEGNESS.—The new bacterial purification and sewerage works at Skegness, Lincolnshire, were opened on the 20th ult. The new works were rendered necessary by the rapid growth of the place, and the collapse of the existing method of purification, which was that of intermittent land filtration. The rapid development of a new estate at Seacroft, totally unprovided with means of drainage, rendered an extension of the sewerage system vitally necessary, and the inadequacy of the existing pumping plant in connexion with the old system of sewers to provide against wet seasons and the smallness of the pumping main forced the Authority to provide a further pumping installation and a larger pumping main. A new engine-room, 40 ft. by 23 ft., has been erected at the pumping-station, and a set of three-throw plunger pumps, capable of lifting 25,000 gals. hourly and driven by an oil engine of 104 brake h.p., has been installed, also a duplicate air-compressing plant, each set capable of compressing 69 cubic ft. of free air per minute for lifting the sewage of the Seacroft and other low-lying areas. Space is rendered for further extension of the pumping plant when the necessity arises. A new 16-in. pumping main has also been provided. The new sewerage system at Seacroft has been laid quite watertight, every length being tested with water before being covered over. The subsoil was gravel and running sand abundantly charged with water, and iron pipes were laid for about half the length, and Hassall's double-lined pipes the remainder. The sewers all gravitate to a central position. An ejector chamber is built at this point, the bottom of floor being 23 ft. below the surface and two 50-gallon ejectors are installed with space for a third. The ejectors are coupled-up with the pumping-station by three-quarters of a mile of 3-in. air main and eject through a 6-in. rising main direct to the disposal works. In winter the subsoil water rises to within 2 ft. of the surface, and although the whole chamber is under water it is quite watertight. Part of the exhaust air from ejectors passes into the sewer, which produces a constant current to the lamp column ventilators, and thus effectually ventilates them. At the disposal works the two pumping mains discharge into a small grit chamber in which the heavy mineral matter is intercepted, and thence flows through a 15-in. pipe into a circular separating or dormund tank, 22 ft. 6 in. in diameter, the inlet being submerged 11 ft. under the surface and entering in a downward direction in the centre. Above the inlet level the tank is cylindrical, and below the bottom is in the shape of an inverted cone. The heavy matter containing the solids in suspension settles to the bottom and is continuously withdrawn at a depth of 19 ft. through a dipping pipe and is conveyed into a liquefying or septic tank for further treatment. The clarified liquid flows slowly upward and is quietly taken off just below the surface through numerous outlets around the circumference and also two pipes from the centre, and is run into an adjoining intermittent valve chamber. About 20 per cent. of the total flow is taken off at the bottom and the remainder from the top. The clarified liquid passing upwards is in this tank about one hour, and then flows almost directly to the bacterial filters, thus being treated while in a fresh state. The settled sewage flows direct into the liquefying tank, where it remains about twenty-four hours. This tank is rectangular in shape and uncovered; the size is 53 ft. by 20 ft. and an average depth of 8 ft., containing about 53,300 gals. The inlet and outlet are submerged, thus maintaining a quiet surface to encourage the formation of scum; the outlet from this tank is also connected into the intermittent valve chamber, thus commingling with the clarified liquid from the separating tank. This tank is provided with mud outlet

at bottom, and another outlet at two-thirds its depth for the abstraction of the clearer liquid when requisite. A 12-in. Coleman mercurial balanced valve is fixed in the intermittent valve chamber, and is adjusted to obtain a rest period for the bacterial filters about three times hourly, which amounts to about 25 per cent. of the whole time the pumps are at work, thus greatly facilitating the aeration of the filters. There are two circular percolating bacterial filters, each 90 ft. in diameter and 6 ft. deep, filled with destructor clinker, having all fine material taken out. These filters are fitted with an arrangement for forced aeration at the bottom, the floor drains being all connected together and the outlet trapped. The upper end of the drain is connected to an aluminium flap valve, which allows the ingress of air but prevents any egress. The filtered water is ponded back to the extent of about 6 in. in a twenty-four hours' residence time in the tanks would require a tankage about five times as great as the method adopted, and, besides producing an objectionable odour, renders the effluent less susceptible to the beneficial action of the aerobic bacteria in the filter. As a finishing-off process, two of the old half-acre plots are used as an earthen reservoir, and the effluent is then passed direct into the water-course, in which it has to travel of 3¼ miles before reaching the sea beyond Gibraltar Point, or about 4½ miles from the pier. The two tanks have been in action for about nine months and the filters about half this period. The winter population is about 3,300, and the summer population 10,000, and the maximum day-trippers about 20,000. The whole works have cost nearly 11,000*l.*, of which 2,688*l.* has been expended at the disposal works. The pumping and air-compressing plant was supplied by the Campbell Gas Engine Company, Ltd., of Harrogate; the ejectors (Coombs' patent) by Messrs. D. Adamson & Co., of Dukinfield; iron pipes by the Stanton Iron Company, and the general work was executed by Mr. J. S. Dawson, of Blackpool, with Mr. W. H. Hill as clerk of works. The consulting engineers were Messrs. Elliott & Brown, of Nottingham, under whose supervision the whole works were carried out.

Foreign.

GERMANY.—In the competition for a new School of Commerce to be erected in Vienna, the first prize of 1,500*k.* was awarded to Messrs. Deininger & Deininger. The Baden authorities object to the restoration of Heidelberg Castle, and wish the ruins to be made suitably high up. The Lower Austrian Central Society of Builders has decided to oppose the proposed extension to all workmen of the Insurance Tax against accidents, in order to protect the trade from this grievous burden. Exhibitions are being held in Nuremberg and Dresden, which illustrate the advance in the last decade of German decorative art. In the new Building Regulations for Dresden the town authorities pay particular attention to the æsthetic side of the architectural development of the Saxon capital, and furnish suitable means for attaining satisfactory results. For example, the regulations require that in streets which are, or will become, important thoroughfares, or which are in good quarters, a higher standard of architectonic merit obtain in the buildings than in less favoured neighbourhoods; that mere repetitions of any design be avoided; that buildings which are visible on all sides be treated architecturally on all their elevations. Further, it is resolved that restorations of buildings which would disfigure the town are inadmissible. Perhaps the most important clause, which it would be well to copy, refers to the preservation of monuments, certain buildings and streets are protected from the character of art, and no alteration is to be allowed in them without the express permission of a committee of experts in matters artistic. Moreover, it is provided that when new buildings are to be erected in a protected neighbourhood, their design is to be of such a nature as to harmonise with and in no way to detract from the character of the older work. Several events have lately shown the wisdom of these measures and the benefit to be derived therefrom. Some of the regulations dealing with practical matters are equally efficacious. They prescribe that no room occupied as a dwelling is to be more than 30 metres distant from a staircase; that wooden stairs are to be allowed in buildings only two stories in height, and that all stairs are to have a minimum width of 4 ft. 6 in. in buildings over one

story in height. From August 11 to September 2 an Industrial Exhibition will be held in Solothurn. The Meran-Mals railway was opened on July 1st. It is about 60 kilometres in length, rises 696 metres in its course, and cost 16,000,000 francs to construct. In a Berlin school twenty girls fainted. On examination it was discovered that the heated air had been poisoned with gas through a back-current, in the flue, of the products of combustion. Last November the new Courts of Justice in Rudolstadt were completed from the designs of Herr Holtmeyer, at a cost of 320,000 marks, or seventeen marks per cubic metre. The irregularity of the site suggested a pleasing picturesque grouping of the buildings. The external and internal frescoes are the work of Herr Maennchen, of Berlin.

SWITZERLAND.—The sculptor, Paul Amlehn, of Sursee, has won the competition for the decoration of the facade of the new Art and History Museum at Geneva. Premiums were awarded to the other competitors, MM. Sicard, of Paris, Moulet, of Freiburg, and Gasq, of Paris. On June 29, at the age of sixty-two, died August Waldner, the founder and publisher of the *Schweizerische Bauzeitung*.

PORT SUDAN.—Mr. F. Imbault will superintend the construction of the rolling-lift bridge which will provide for ordinary traffic as well as for two lines of railway, with a span of 184 ft., the waterway being 400 ft. broad. The Cleveland Bridge and Engineering Company, of Darlington, are contractors.

CEMENT TRADE IN THE UNITED STATES.—Sir Percy Sanderson, British Consul-General for the district of New York, reports that the value of the imports of cement into New York, which had fallen from 75,000, in 1903 to 24,000, in 1904, show a further reduction to 19,000, in 1905. The total importations into the United States have fallen off much in the same way during the three years in question, namely, from 605,000, in 1903 to 277,000, in 1904, and to 220,000, in 1905. The largest supplies come from Germany and Belgium, but these are diminishing year by year, as the production of the United States increases. The total production of hydraulic cement in the United States in 1905 is estimated at about 34,000,000 barrels of 380 lb. net, of which 1,026,502 barrels were exported, the value being given at about 278,000*l.* Of the foreign cement imported upwards of 8,000*l.* worth was re-exported in 1905, leaving the balance of imports about 212,000*l.* in value.

BRITISH CEMENT AT LOURENÇO MARQUES.—The imports of cement to Lourenço Marques in 1905 amounted to 5,352 tons, valued at 13,045*l.*, the United Kingdom contributing 1,015 tons at 2,629*l.*, and Germany 3,685 tons at 9,044*l.*, the remainder coming from Belgium and Sweden. H.M. Consul, Major Baldwin, in his annual report, remarks that "a pleasing feature of the figures for 1905 is the reappearance of British cement. Large quantities of German cement are still imported, but British cement has clearly established a firm hold on the affections of the Transvaal importer, and it is to be hoped that every encouragement will in future be given to enable this hold to be maintained. In quality British cement is undoubtedly superior to the German article. It has, however, been possible to place it lately on the market at a slightly cheaper price, and it is to be hoped that the present time to so fine a point that the most infinitesimal margin of profit is sufficient to weigh the scales in favour of an inferior article where the superiority of its opponent is not overwhelmingly marked. British cement is now used by all Transvaal Government departments, as well as by a large number of the mines."

Miscellaneous.

PROFESSIONAL AND BUSINESS ANNOUNCEMENTS.—Mr. H. Cayley, architect (Bank Chambers, Rothwell, Kettering), has taken into partnership Mr. C. D. Rochester, formerly chief assistant to Messrs. Salomons & Steindl, of Manchester.

The Ruberoid Company, Ltd., Knightrider-street, Queen Victoria-street, E.C., has been formed to take over the business of the Ruberoid Department of Messrs. Robert W. Blackwell & Co., Ltd. Mr. Edgar R. James, late joint managing director of Messrs. Robert W. Blackwell & Co., Ltd., and a managing director of the company, is **KING'S COLLEGE, LONDON.**—The following is the list of prize-winners for 1905-6: *Building Construction*—Henry Cook, silver medal; Henry A. French, bronze medal; Thos. M. Bricknell, 3*l.* in books; John F. Odell, 2*l.* in books. *Constructional Drawing*—H. A. French, silver medal; Alfred Fenswood, 3*l.* in books; Chas. Coxall and F. J. Jones, 1*l.* in books each. *Quantities*—F. J. Jones, first (prize-winner last year); W. J. Dyer, 3*l.* in books; Chas. Coxall, 2*l.* in books; Thos. M. Bricknell, 1*l.* in books. *Architectural History*—First division, L. E. Williams, 2*l.* in books; A. J. Lee, 1*l.* in books. *Study*—W. J. Burton, certificate of distinction (disqualified for the prize as he obtained it last year); C. W. Fairweather, 1*l.* in books; W. F. Foster, 1*l.* in books. Sir George Faudel Phillips

bronze medal for sanitary building construction : Thos M. Bricknell.

TWO WEST-END PROPERTIES.—On Wednesday, July 26, the premises of the Whitehall Club, Nos. 47, Pall Mall, and 8, W., were sold at the Mart for 60,000l. The site occupying 4,025 ft. superficial at the corner, south, of Derby-street. After a formal bid of 165,000l. on behalf of the vendors the vacant site at the corner, east, of Piccadilly and St. James's-street, covering an area of 5,312 ft., was withdrawn from sale.

STATUE OF LORD TREDEGAR.—The equestrian statue to be erected at Cardiff in honour of Lord Tredegar will be sculptured by Mr. W. Goscombe John.

PRESENTATIONS TO SIR WILLIAM PERKIN.—On July 26 the Chemical Society celebrated at the Royal Institution the "jubilee" anniversary of the coal-tar colour industry by presenting to their Past-President, Sir William Perkin, his portrait painted by Mr. A. S. Cope, A.R.A.; a marble bust of the discoverer of the dye-stuff mauve, to be sculptured by Mr. F. W. Pomeroy, A.R.A., will be placed in the library of the Society; the portrait will eventually become the property of the nation. The Chemical Society has also applied to the Perkin Research Fund, under the administration of the Chemical Society. The proceedings were further signalled by the presentation to Sir William Perkin of the Lavoisier medal by Professor A. Haller, together with an address from the Société Chimique de Paris, as a tribute to his successful labours in the field of chemistry and its application to modern industries. The Court of Leeds University have resolved to confer the degree of D.Sc. upon Professor Haller and Sir W. Perkin.

HAINAULT FOREST AND OPEN SPACES.—On Saturday, July 21, Lord Carrington, President of the Board of Agriculture and Fisheries, dedicated some 800 acres of Hainault Forest to the public use and enjoyment, as an open space under the care and maintenance of the London County Council. The area forms about one-fifth of the eastern portion of the ancient Forest of Essex, whereof the western portion—the 5,530 acres of Epping Forest—was committed to the conservation of the Corporation of London in pursuance of Sir H. Selwin Ibbetson's Act of 1878. Barking Abbey surrendered the greater part of the Hainault manors to King Henry VIII., who retained Hainault in his own hands for the pleasures of the chase. It was disforested in fifty-five years ago when the Commissioners of Woods cleared for cultivation the 1,920 acres which were at that time reserved to the Crown. Amongst the 100,000 trees cut down was the famous Fairlop Oak, near Barking-side. To the labours of Mr. Edward North Buxton and his coadjutors the Commons Preservation Society are due the recent recovery and preservation of the 300 acres of Lambourn Forest and some adjoining forest lands, together with the re-transfer to the public by the Woods Commissioners of 500 acres of the cultivated lands. The latter area of arable land has been recently turfed and planted, within fenced enclosures, with young trees—comprising hornbeam, oak, beech, hawthorn, and bramble—and gorse-bushes have been set on the slopes which incline to the valley of the river Roothing. Towards the acquisition of Hainault Forest three years ago the London County Council contributed 10,000l.; amongst liberal subscribers to the balance of 12,000l. were Mr. Buxton and members of his family. In respect of the Grove Hall Asylum estate in Fairfield-road, Bow, E., a property covering nearly 12 acres, of which we announced on July 28 the sale for 22,300l., we may mention that proposals are made to preserve the land as a public park or recreation ground. The enclosed grounds are well timbered, and would afford an open space in a densely populated and manufacturing district where one is much needed.

—On August 9 the Speaker will open Gowbarrow Fell and the Airs Glen and Force to the public.

G. F. WATTS' STATUE OF "PHYSICAL ENERGY."—For this equestrian group a site has been chosen in Hyde Park, near the eastern end of the Serpentine.

WHITEFIELD TAVERNACLE, FINSBURY.—The committee are about to dispose of their property in Finsbury in view of a proposed removal to Muswell Hill. The present building was erected one hundred and fifty years ago instead of a temporary place of worship built by Whitefield, in 1741, in Moorfields.

WINGFIELD'S MULTIPLE BRICK.—Mr. S. W. Wingfield has obtained a patent for a series of bricks specially adapted for the construction of inspection-chambers, cesspools, and wells, but also suitable for hollow walls, etc. The "bricks" are in shape a modification of the plaster slabs used in the construction of fire-resisting partitions, a groove is formed around the beds and joints, and is filled with cement grout after the slabs have been placed in position. The fixing is facilitated and additional rigidity given by a number of projections or studs fitting into corresponding recesses. Rounded angle bricks can be had, with angles of 90 deg., 120 deg., and 135 deg., so that rectangular, hexagonal, and octagonal chambers can be built. The bricks are ingeniously designed, and will probably be used if they can be put on the market at a moderate price.

A NEW DAMP-COURSE.—The Fireproof Company now supply their "Dovetail Corrugated Steel Sheeting" in widths suitable for damp-courses. The sheets are 4 ft. long with 3 in. lap joints, and are laid on a bed of cement mortar and pressed down so that the mortar fills the lower corrugations; the corrugations on the upper surface are filled with similar mortar on which the brickwork is built. There can be no doubt that the damp-course is strong, flexible, and impervious to moisture, and the only objection that can be raised is that the material may corrode. In these days of reinforced concrete the objection loses much of its weight, as experience has shown that steel embedded in cement is very durable. For use as a damp-course, however, the metal might be dipped in some damp-proof solution, such as Angus Smith's, without adding much to the cost.

CONDITION OF WINCHESTER CATHEDRAL.—Further discoveries have been made of the unsatisfactory condition of the fabric of Winchester Cathedral. Immediately after one of the services last week a loud crash was heard in the building, and soon after it was discovered that the pointing of a joint in one of the ribs of the vaulted ceiling over the south aisle of the nave had fallen. The debris was composed of slate, brick, and oyster-shells, which had been used as packing by the original builders. The immediate cause of the fall is believed to have been the concussion occasioned by the work of relaying the roof with lead, but examination showed that a serious weakness existed. The outer walls have been torn away from the vaulting, which has caused serious fractures in the spandrels of the roof. This points to either a settlement of the building or the thrust of the vaulting forcing the outerwall outwards. The outer wall is 4 in. out of the perpendicular to the height of 15 ft. Temporary measures have been taken to meet the situation pending the reception of a report on the state of the south aisle by the Dean and Chapter. It is anticipated that the south wall will have to be underpinned and the whole of the pockets of the wall rebuilt. It is estimated that the cost of this work will be about 5,000l. The work at the east end is progressing favourably. The Dean and Chapter have their hands full in the present state of affairs. With the appeal for 30,000l. at present made, and the west front in a very decayed condition, this fresh trouble has caused much concern. —*Morning Post.*

GLADSTONE MEMORIAL AT HAWARDEN.—On the 28th ult., in the parish church at Hawarden, the Bishop of St. Asaph unveiled the Gladstone memorial, consisting of recumbent effigies in white Carrara marble of Mr. and Mrs. W. E. Gladstone. The donor of the monument, as well as of the side chapel, which was built expressly to contain it, is Mr. Henry Neville Gladstone, of Burton, son of the late Statesman. The memorial, which was designed by Sir William Richmond, R.A., shows the figures of Mr. and Mrs. Gladstone lying in the Boat of Life, which, with winged prows, is represented as ploughing its way through the Sea of Life. An owl is introduced as typical of the wisdom of the great statesman, and a cross emblematic of Sacrifice rests on the head of Wisdom. The hands of the figures rests on the cross; a figure of the Saviour is typical of Peace; at the four ends of the cross are the emblems of the four Evangelists, and an angel with outstretched arms supports the cushion on which rest the heads of the figures. In the niches at the corner of the memorial are the figures of Dante, Homer, Aristotle, and King David. The central panel bears an inscription as does the panel on the north side.

THE LONDON BUILDING ACT.—A public meeting was held recently at the Islington Town Hall to protest against sects. 10 and 12 of the London Building Acts Amendment Act, and their application to existing projecting shops. The Mayor of Islington, Alderman H. Mills, presided, supported by Mr. Wiles, M.P., who moved a resolution of protest similar to that adopted at the St. Pancras meeting. Councillor Piper, Chairman of the Islington Branch Association for the Amendment of the Projecting Shop Clauses, seconded, and the resolution being supported by Mr. Giles, secretary of the Metropolitan Grocers' Trade Association; Mr. B. E. Evans, vice-chairman of the Drapers' Chamber of Trade; and Councillors Saint, Crole-Rees, and Bryan, and Mr. John Williams. Mr. King moved a resolution appointing a deputation to wait on the London County Council Building Act Committee, Mr. Fred Harris, hon. secretary of the Islington branch, seconded. Mr. H. D. Widdicombe, chairman of the St. Pancras Branch Association, having also addressed the meeting, a vote of thanks to the Mayor concluded the meeting. It was mentioned that 600 signatures had been obtained to a petition against the provisions of the Act, and that no less than 1,000 shops were affected in Islington alone.

REBUILDING OF THE HOUSE OF COMMONS ON THE 30th ult., Mr. B. S. Straus asked the Secretary to the Treasury whether he was aware that His Majesty's Commissioners of Woods and Forests in their design for the rebuilding of Regent street had proposed the reduction of space above the ground floor to the extent of 2,638 ft.; and whether he could see his way to prevent any

diminution of the existing area in this thoroughfare. Mr. McKenna (Monmouth, N.)—I am informed that no complete design has been settled for the rebuilding of Regent-street other than the Quadrant, but, as the houses in the whole street will be rebuilt in the near future by degrees, either singly or a few at a time, a general building-line for the whole street has been agreed between the Commissioner of Woods and the London County Council. I believe a reduction of 3,400 ft. in the area at present occupied is contemplated, but as the upper stories of many of the houses will be built further out than at present, I understand that there will be no loss in cubic contents, and it is not expected that the Land Revenue will be adversely affected. On the other hand, the street will be widened.

NATIONAL GALLERY OF ART.—In the House of Commons on Tuesday Mr. P. W. Wilson asked the First Commissioner of Works whether it was proposed to utilise the space behind the National Gallery of Art at Millbank for the purpose of building a new Stationery Office or other Government office; and, seeing that such building, if erected, would render it impossible to make additions to the Art Gallery, which has become overcrowded with pictures, whether he would consider the advisability of reserving this ground for the extension of the gallery. Mr. Harcourt.—The reply to the first paragraph is in the affirmative; in accordance with a scheme sanctioned by my predecessor, it was proposed to build the Stationery Office upon the vacant land behind the National Gallery of Art at Millbank. The extensions originally contemplated when the site was offered by the Government to Sir Henry Tate in 1893 have already been made. I will make inquiry as to the future needs of the Gallery, and will reconsider the matter before next year's Estimates are framed. I may mention that some space is still reserved for the purpose of the Gallery.

NEW KILN, WARNHAM BRICKWORKS.—At the Warnham brickworks recently, Mrs. Waddy, wife of the Chairman of the Sussex Brick and Estates Company, Ltd., started a fourth kiln. These brickworks have a capacity of turning out 600,000 bricks per week, and the works employ 120 men. The new kiln cost 2,000l. In its construction between 400,000 and 500,000 bricks were used, and it is capable of burning 150,000 bricks per week.

Legal.

CITY ANCIENT LIGHT CASE.

THE case of Ellis v. the National Bank came before Mr. Justice Swinfen Eady in the Chancery Division on the 27th ult., on a motion by the plaintiff for an interlocutory injunction restraining, until the trial of the action or further order, the defendants from erecting on the land adjoining or in the neighbourhood of the houses of the plaintiff, Sir J. Whittaker Ellis, Nos. 18 and 19, Old Broad-street, E.C., any building or structure which would interfere with the plaintiff's ancient lights. It appeared that the defendants are rebuilding their premises and had already given an undertaking not to exceed the height of the buildings which formerly stood on the site without giving the plaintiff three weeks' notice. It was said that such height would be reached in about two months' time.

In the result it was arranged that his lordship should make no order on the motion and that the costs should be reserved, the defendants giving an undertaking not to build above the height of the old building before October 24 (the day the courts resume business after the Long Vacation), nor above a certain height without giving three weeks' notice. It was also arranged that pleadings should be delivered notwithstanding the Long Vacation.

Order accordingly.

RIGHT TO LIGHT CASE.

THE case of Ankersson v. Connelly came before Mr. Justice Warrington in the Chancery Division on the 26th ult., an action by the plaintiff for a declaration that the defendant was not entitled to any easement over his land for light.

It appeared that the defendant some years ago bought three old houses in the King's Cross-road, being Nos. 172, 174, and 176. He bought the houses with the view of pulling them down and putting up new buildings on the site. Defendant pulled down the old buildings and put up new ones, and in so doing made alterations the effect of which prevented the plaintiff, who was an adjoining owner, erecting buildings on his own premises without creating a legal interference with the ancient lights of the defendant, whereas before the defendant's alterations he could have done so. He accordingly commenced the present action for the declaration before stated.

At the conclusion of the arguments of counsel his lordship, in giving judgment, said that since the decision of the House of Lords in the Colls case the burden now cast upon the person whose land was subject to an easement of light was that

he was prevented from erecting on the land any building in such a situation and of such a height and dimensions as would be interfering with the light passing through an ancient aperture belonging to a house of the owner of the easement substantially render that house substantially uncomfortable. What the defendant had done in the present case was to increase materially the burden of the person subject to the easement. He had made it impossible for him without legally interfering with the plaintiff's light to put up a building such as he could formerly have put up without any such interference. It was impossible to say what the plaintiff could do on his land which would not be a nuisance to so much of the old light as still passed through the old apertures under the existing altered circumstances. Looking at the existing altered circumstances it was impossible to say how much the defendant could build without infringing the obligation to which he was properly subject. That impossibility had been created by the defendant's own act, and he could not, therefore, successfully maintain an action to enforce his claim to light. That being so, whether the defendant's act had technically destroyed his right to light or whether it had only made it impossible for him to enforce it by action, the result was the same—that he had no right which he could enforce and therefore no right to light at all. He therefore held that the plaintiff was entitled to the declaration claimed.

Mr. Geo. Wallace appeared for the plaintiff; and Mr. Cave, K.C., and Mr. Henry Fellows for the defendant.

THE ACTION AGAINST THE ST. PANCAS BOROUGH COUNCIL.

In the Chancery Division on the 30th ult. Mr. Justice Neville, in giving judgment in the case of *Westlake v. the St. Pancras Borough Council*. (The case was reported in last week's issue of the *Builder*.)

In this case the plaintiffs, the owners and tenants of the houses in College-street, St. Pancras, sought to restrain the defendants from carrying on certain works of theirs adjacent to the property of the plaintiffs in such a way as to create a nuisance. The nuisance alleged was first a nuisance caused by vibration set up by the engines used by the defendants in their electricity supply works in St. Pancras; the second ground of complaint arising in connexion with the dust destructor works that the defendants had on the same site as their electric generating station. The nuisance alleged with regard to this was the scattering around of grit or dust which, it was said, covered the plaintiffs' premises in a certain direction of the wind, thus interfering with the health of the occupants of the premises and preventing them from carrying on their respective businesses as beneficially as formerly. Plaintiffs also complained of a nuisance by smell caused by the burning of the refuse and the "damping down" of clinkers. The defence was a general denial of the plaintiffs' allegations.

Mr. Justice Neville, in giving judgment, said that as far as the nuisance from the dust destructor was concerned, it was important to observe that the dust destructor began to be worked in the year 1894 and had been continuously at work ever since, and from that date until December 13, 1905, the date of the issue of the writ in the action, the plaintiffs had taken no active steps to stop the nuisance alleged to arise from the fumes, smell, and dust, although some complaints had no doubt been made from time to time. He quite agreed that lapse of time before action brought in the case of a legal nuisance would not prevent the right to an injunction if the nuisance alleged was proved to exist, but in such cases the court must take into consideration the fact that since 1894 the plaintiffs had "sat down," so to speak, under the nuisance alleged to arise from the dust destructor. In his opinion the plaintiffs' evidence on this point was vague, inaccurate, and somewhat exaggerated, and he held that they had failed to prove any nuisance from the dust destructor. But there remained the question of the vibration alleged to be caused by the defendants' electric generating plant. It was common ground that some periodic vibrations had existed since 1903. He thought the evidence on both sides showed that No. 3 engine did lead to vibration and that a legal nuisance did exist at the date of the writ. It was true that the defendants had discontinued the use of that engine since February, 1906, and had stated by their counsel that that engine would not be used again. But the nuisance existed at the date of the writ he thought the plaintiffs were entitled to an injunction restraining the defendants from working No. 3 engine or any other engine so as to cause a nuisance to the plaintiffs. That entitled the plaintiffs to the costs of the action, except so far as they had been increased by their claim for an injunction in respect of the dust destructor, and there would be a set off of those costs against the costs of the action, and the defendants would pay the balance of the costs.

Mr. Jenkins, K.C., and Mr. Beaumont appeared for the plaintiffs; and Mr. Hughes, K.C., and Mr. A. J. Walter and Mr. A. B. Morten for the defendants.

STREET WIDENING FOR TRAMWAY PURPOSES.

Judgment was given on the 28th ult. in a Divisional Court of King's Bench, composed of Justices Darling and Phillimore, in the case of the *King v. Mountford ex parte the London United Tramways (1901), Ltd.*, on arguments on a rule nisi for a writ of *certiorari* obtained by the company to quash the verdict of a sheriff's jury awarding to Mr. A. H. Mountford compensation for the purchase of certain land and for damage in respect of injurious affection of the remainder of his premises. The rule was moved for on the ground of excess of jurisdiction.

It appeared that Mr. Mountford was a dentist, carrying on his practice in Eden-street, Kingston-on-Thames, in a house which for a great many years had been associated with a dentist's practice, he holding the house under a lease a portion of the term of which was unexpired. The company, under its statutory powers, gave Mr. Mountford notice to treat for a strip of land which formed part of the forecourt of the house, the strip being about 10 ft. wide by 170 ft. long, and included a portion of the garden and a portion of the stable. The object of doing that was to widen the street so that a double line of tramways might be introduced into that particular street. Mr. Mountford based his claim for compensation in the following way:—He claimed compensation for the value of the land taken and also for depreciation in value of the remainder of the premises by reason of the alteration of the character of the neighbourhood. The land taken was not used for the purposes of the tramway, but merely for the purposes of widening the street, and no part of it was included in that part of the street, which the tramway company were compelled to maintain. The jury awarded 360*l.* in respect of the land taken and 400*l.* in respect of the injurious affection of the remainder of the premises, including Mr. Mountford's lost goodwill. The company's contention was that Mr. Mountford was not entitled to get compensation in regard to the tramcars passing up and down the street, as he could not get compensation for that for which there had been no Act authorising the running of the tramcars he would have had no greater cause of action to any greater degree than any other member of the public.

Mr. Justice Darling, in the course of his judgment, said that Mr. Mountford had been paid 360*l.* for the taking of his land, and in that sum was included damages for the diminished value of the land left to him and also further damages for the use of that taken owing to the passing over it near Mr. Mountford's house of the public and the ordinary traffic of the street. More than that he could not satisfy himself that he was entitled to claim. Mr. Mountford suffered by the taking away of his piece of land and had been compensated therefor. He suffered further by reason of the public user of that piece of land as a portion of the street into which it had been thrown, and for that he had also received full compensation. He suffered with every other dweller in Eden-street from the running of the trams along a public highway, but his house had been brought near to the road than it was before his land was taken. He thought the rule should be made absolute.

Mr. Justice Phillimore concurred, and the rule was accordingly made absolute with costs.

As the claimant intimated his desire for a fresh inquiry the whole of the verdict was quashed.

Mr. Eldon Bankes, G.C., and Mr. J. Gordon appeared for Mr. Mountford in showing cause against the rule; and Mr. Roskill, K.C., and Mr. Courthorpe-Munroe for the Tramway Company in support of the rule.

ACTION AGAINST BUILDERS AND CONTRACTORS.

The case of *Mouchel v. W. Cubitt & Co.* came before the Court of Appeal, consisting of Lord Justices Vaughan Williams, Romer, and Cosens-Hardy, last week, on the defendants' appeal from the order of Mr. Justice Swinfen Eady, in the Chancery Division. (The case was reported in the *Builder* of July 7 last.)

In this case the plaintiff, the English agent for the Hennebique system of reinforced building, applied for an interlocutory injunction restraining, until the trial or further order, the defendants from carrying out or contracting to carry out, without the written consent of the plaintiff, any ferro-concrete or other similar work which might be in competition with that system. The alleged breach of covenant contained in a licence to use the system "within the town of London," granted them by the plaintiff on March 2, 1903. Disputes having arisen between the parties with regard to the licence, defendants in March last wrote to the plaintiff formally repudiating the restriction insisted upon, and so as to raise the question at law, stating that they intended to use under a contract for building in Chiswell-street, E.C., reinforced concrete work which competed with, but did not infringe, the Hennebique patents. Plaintiff subsequently commenced the present action, and in the result Mr. Justice Swinfen Eady granted in the interim an injunction, such as to restrain the plaintiff giving the usual undertaking in damages. From this decision the defendants now appealed.

Mr. Astbury, K.C., and Mr. Percy Wheeler appeared for the appellants, and Mr. Eve, K.C., and Mr. F. Newbolt for the respondent.

At the conclusion of the arguments the appeal was dismissed.

POINT UNDER THE WORKMEN'S COMPENSATION ACT.

The case of *Neale v. the Electric and Ordnance Accessories Co., Ltd.*, came before the Court of Appeal, composed of the Master of the Rolls and Lords Justices Moulton and Farwell, last week, on the application of the plaintiff for a new trial or judgment in an action tried before Mr. Justice Ridley and a special jury at Birmingham.

In this case the plaintiff, a boy of about fifteen years of age, brought the action through his next friend to recover damages from the defendants, his employers, for personal injuries caused by the alleged negligence of the defendants, or, in the alternative, by a breach on their part of their statutory duty under the Factory and Workshop Act, 1901, to keep certain machinery properly fenced. At the trial three questions were left to the jury, all of which were answered against the plaintiff and in favour of the defendants, and judgment was entered in accordance with the verdict for the defendants. After judgment had been entered plaintiff's counsel applied to the learned judge to assess compensation to the plaintiff to be paid by the defendants under sect. 1, subsect. 4 of the Workmen's Compensation Act, 1897, and the learned judge made an award in favour of the plaintiff under the Act for 3*s.* 6*d.* a week, and gave a certificate to that effect.

After the case had been opened by Mr. McCardie for the appellant, Mr. Acland, K.C., on behalf of the respondents, took the preliminary objection that the application could not be heard. He contended that as the plaintiff had exercised the option conferred on him by sect. 1, subsect. 2 (b) of the Workmen's Compensation Act, and having obtained an award of statutory compensation under subsect. 4, he was estopped from proceeding further with his common law remedy.

Mr. McCardie, on behalf of the plaintiff, contended that he was not, in the circumstances, estopped from proceeding with the action.

In the result their lordships upheld the preliminary objection, holding that, as the plaintiff had exercised his option to have compensation assessed under the Act of 1897, and having got the award which was apparently unimpeachable and properly made, he was barred from prosecuting the action, and the appeal was accordingly dismissed with costs.

Patents of the Week.

APPLICATIONS PUBLISHED.*

13,418 of 1905.—H. C. WEBB and A. A. WEBB: Domestic Fire-Grates.

This invention relates to domestic fire-grates of the kind in which on one or both sides of the fire there is a grate-front portion similar to the sham side of an ordinary kitchen open fire or range, there being usually a sham side and an oven side. The grate front portion on the sham side is built with a horizontally sliding panel, which, when not in use, forms the front surface of the sham side, and which, when in use, takes up a position entirely or partially covering in the vertical front of the fire so as to form a draw-plate or fire-screen.

The said panel forms a part of the grate-front, and is therefore suitably shaped to conform to the general appearance of the grate, it being distinct from a sliding shutter, which does not at one time form an exterior portion of the said grate. The said panel slides within or upon top and bottom grooves or bearings on the sham side front, and may be fitted with suitable anti-friction devices. There may also be provided, if desired, means for securing the said panel in its out-of-use position.

17,390 of 1905.—R. MAX: Air-Heating Chambers for Stoves and Furnaces.

This invention relates to an air-heating chamber for stoves, furnaces, and the like, and consists of pipes with internal radial webs, each of said pipes extending the full height or length of the fireplace, a bottom chamber or chambers upon which said pipes are mounted, a top chamber or chambers, mounted upon the upper end of said pipes, and a removable front wall for each of said top chambers, said top and bottom chambers being open to the atmosphere.

7,131 of 1906.—HELLIWELL & CO., LTD., and F. W. BAYNES: Ventilator.

This invention relates to a ventilator, and is characterised by a series of curved or bent shutters or sheets of metal, or the like, so constructed and arranged that the upper limb or curve of one of such shutters overlaps and partially embraces the lower limb or curve of the shutter immediately

* All these applications are in the stage in which opposition to the grant of Patents upon them can be made.

PATENTS.—Continued on page 192.

List of Competitions, Contracts, etc.

For some Contracts still open, but not included in this List, see previous issues. Those with an asterisk (*) are advertised in this Number: Competitions, —; Contracts, iv. vi. viii. x.; Public Appointments, xvii.; Auction Sales, xxvi.

Certain conditions, beyond those given in the following information, are imposed in some cases, such as: the advertisers do not bind themselves to accept the lowest or any tender; that a fair wages clause shall be observed; that no allowance will be made for tenders; and that deposits are returned on receipt of a bona-fide tender unless stated to the contrary.

Contracts.

BUILDING.

AUGUST 6.—Ashby.—House, etc.—The erection of house and shop and dwelling-house at Ashby (Screeds). Plans and particulars may be seen, and Mr. J. W. Wais, auctioneer, Central Auction Room, Seething, on or before August 6.

AUGUST 6.—Garth.—House.—Manager's house at Garth, Macclesfield, for Messrs. Elder's Navigation Company Ltd. Plans and specification may be seen at the office of Mr. Thomas Gibb, architect, Post-office Chambers, Port Talbot, from whom bill of quantities may be obtained on deposit. Sealed tenders, endorsed "Tender for Garth House," to be sent to Mr. W. S. Wardlaw, Plevna, Macclesfield, on or before August 6.

AUGUST 7.—Abersoch.—A villa at Abersoch, on the Plas Llynwedd Estate. Plans and specification to be seen at Aberllyn, Abersoch. Tenders, sealed and endorsed, to be sent to Mr. Ellis F. White, architect and surveyor, 27, Bangor-street, Carnarvon, by August 7.

AUGUST 7.—Holyhead.—Chapel House.—Additions and alterations to the C.M. Chapel, Llanochter, Holyhead. Plans and specifications may be inspected at the Chapel House, Llanochter. Tenders, sealed and endorsed "Llanochter Chapel," to be delivered to Mr. R. Owen, 4, Brighton-terrace, Holyhead, on or before August 7. Mr. J. Owen, F.R.I.B.A., architect, Exchange Chambers, Holyhead.

AUGUST 7.—Huddersfield.—Shed.—The erection of a shed at Grove Mills, Leeds-road. Plans may be seen, and bills of quantities obtained, at office of Mr. J. Berry, architect, surveyor, and valuer, 3, Market-place, Huddersfield. Tenders, free of charge, to be sent not later than August 7.

AUGUST 8.—Coleraine.—ALTERATIONS, ETC., TO COURT HOUSE.—Landowners' Proposal Committee invite, on or before 4 o'clock p.m., on August 8, tenders for the undermentioned work, viz.: To alter, repair, and make additions to the Coleraine Court House. Not to exceed £2,800. Plans and specifications may be seen at County Surveyor's Office, County Court House. Full particulars of conditions of tendering and forms of tender may be had from Mr. Thompson B. Adams, Secretary to County Council, County Court House, Londonderry.

AUGUST 8.—Darlington.—Clergy House.—For new clergy house, Parish of St. Hilda's, Darlington. Notices to the architects, Messrs. Kitching & Lee, 14, High-street, Darlington, on or before August 8, stating trades required. Quantities will be supplied.

AUGUST 8.—Kingussie.—LAVATORIES, ETC.—The mason, carpenter, plumber, slater, plasterer, painter, and glazier works of lavatories, shelters, and dykes to be erected at Kingussie School. Plans and specifications to be seen with Mr. Alex. Cattanach, architect, Kingussie, and offers to be tendered with Mr. L. McIntosh, Clerk School Board, Kingussie, on or before August 8.

AUGUST 8.—Darrington St. Clement.—House.—A dwelling-house at Hay Green, Terrington St. Clement, for the Old Stager Lodge of Oddfellows, Lynn. Drawings, specifications, and conditions may be seen, and further particulars obtained, at the office of Mr. H. P. Tison, architect, 16 Railway-road, Lynn. Sealed tenders to be delivered to architect not later than noon, August 8, endorsed "Tender for House, Terrington St. Clement."

AUGUST 10.—Cwm.—HOUSE AND SURGERY.—A house and surgery at Cwm for the Ebbw Vale Doctor's Fund Committee. Plans and specification may be seen, and further particulars obtained, at the office of Mr. Hy. Walters, architect, Beauport, Mon. Sealed tenders, endorsed "Tenders for House and Surgery," are to be in the hands of the Secretary, Mr. T. J. Rees, 27, Alexandra-street, Ebbw Vale, on or before August 10.

AUGUST 10.—Dalechroy, Avie.—ELECTRICAL POWER HOUSE, ETC.—The mason, carpenter, slater, plumber, and glazier works of electrical power house, motor house, and men servants' house, to be erected at Dalechroy, Avie, Strathpey, for Mr. F. M. Farnham. Plans and specifications may be seen with Messrs. A. Macdonald & Sons, architects, or Mr. James Gilbert, Seaford Estates Office, Grafton-road-Sney, and tenders to be lodged with the architect not later than August 10.

AUGUST 10.—Illogan.—Houses.—For the erection of four houses at Illogan. Plans and specifications for the same may be seen at the residence of Mr. Emden, 28 West-end, Redruth, to whom sealed tenders, endorsed "Tenders for Houses," may be sent on or before August 10. Mr. Leonard Winn, architect and surveyor, Redruth and Truro.

AUGUST 11.—Camborne.—RESIDENCE.—Residence at Basset, near Camborne, for Mr. John Whitworth, according to plans and specification, which may be seen by appointment at the offices of Mr. Sampson Hill, architect, Green-lane, Redruth, from whom all tenders, endorsed "Tenders for Residence," may be obtained. Sealed tenders are to be sent to the proprietor, Lloyd's Bank, Camborne, on or before August 11.

AUGUST 11.—Clayton West.—EMERGING SCHOOL HOUSE.—The West Riding Education Committee in-

vide tenders for the work in connexion with enlarging the head teacher's house at Kaye's Provided School, Clayton West, near Huddersfield. Plans may be seen, and bills of quantities obtained, on application to office of Mr. J. Vickers-Edwards, County Architect, County Hall, Wakefield. Sealed tenders, properly endorsed, to be sent to the architect not later than 10.30 on the morning of August 11.

AUGUST 11.—Whitburn.—House.—Marsden Industrial and Provident Society, Ltd., invite tenders for the erection of a new house to be built at Whitburn on a site adjoining their Whitburn branch store. Plans may be inspected, and bills of quantities obtained, on application to the Secretary at the Marsden Stores, Marsden. Sealed tenders, endorsed "Whitburn House," must be delivered at the Marsden Stores not later than August 11, addressed to the Secretary of the Marsden Industrial and Provident Society, Ltd., Marsden.

AUGUST 13.—Pontytllyn.—Houses.—Two houses at Farm-road, Pontytllyn, for Messrs. Lewis & Morgan Pontytllyn. Plans and specification may be seen at office of Mr. P. Vivian Jones, F.R.S.I., architect and surveyor, 4, Cardiff-street, Cardiff. Sealed tenders to be sent on or before August 13.

AUGUST 14.—Cookstown.—House, etc.—A dwelling-house and out offices to be built at Cookstown, Tullagh, co. Dublin. Drawings, etc., and bills of quantities to be delivered to the architects' office. Tenders to be delivered to Messrs. Doolin, Butler, & Donnelly, architects, Dawson Chambers, Dublin, on or before August 14.

AUGUST 15.—Bishop's Stortford.—CARBONATED GAS BUILDINGS.—Tenders invited by the Bishop's Stortford and District Gas Company for the above. Drawings and specification can be obtained from Mr. J. W. Fortess, Gasworks, Bishop's Stortford, on payment of 11s. 6d. Sealed tenders, marked "Tender for Carbonated Water Gas Buildings," to be addressed to the Chairman of the Gas Company, 16, Water-lane, Bishop's Stortford, and delivered by August 15.

AUGUST 17.—St. Austell.—SCHOOLS.—The Cornwall Education Committee invite tenders for erecting new secondary schools at St. Austell, according to plans and specifications prepared by Mr. B. C. Ainsworth, Architect to the Committee, Biddick-court, St. Austell, at whose office the plans may be seen and all information obtained. Sealed tenders to be sent to Mr. F. B. Paine, Secretary, Education Office, Truro, on or before August 17.

AUGUST 17.—Seacombe.—SWIMMING BATH.—The Waterworks Committee invite tenders for the erection of public swimming baths at the Gunner Gap, Seacombe. Drawings and specifications may be seen on application to Mr. W. H. Travers, Engineer and Surveyor, Public Offices, Eglington, Seacombe. Bills of quantities will be supplied on payment of a sum of 3s. Tenders, enclosed in official envelopes, to be forwarded per post so as to reach Mr. H. W. Cook, Clerk and Sealer, Public Offices, Eglington, Cheshire, not later than August 17.

AUGUST 18.—Barry.—PUBLIC OFFICES.—Barry T.D.C. invite tenders for the erection of public offices in Hollow-road, Barry, in accordance with designs prepared by Messrs. Hutchinson & Payne, architects, 29, John-street, London W.C. Plans and specifications may be seen, and forms of tender and bills of quantities obtained, at the office of the architects or of the Surveyor to the Council, 120, Hollow-road, Barry, on payment of a deposit of 5s. Sealed tenders, endorsed "Public Offices," to be delivered to Mr. T. B. Tordoff, Clerk, Council Offices, Barry, Glam., by August 18.

AUGUST 18.—Belfast.—EXTENSION OF PREMISES.—Tenders are invited for building extensions to the premises of Messrs. R. Watson & Co., of Belfast, Ltd., Donegal-street, according to the plans, specification, and conditions of contract, to be seen in office of Mr. William J. Fennell, M.R.I.A., architect, 2, Wellington-place, Belfast. Bills of quantities can be obtained from Messrs. McCarthy & Brookes, surveyors, Scottish Provident Buildings. Tenders to be sent to architect on or before August 18.

AUGUST 18.—Halifax.—ADDITIONS TO CLUB.—For the masons carpenters and joiners, plumbers and glaziers, plasterers and slaters, heating engineers, ventilation engineers, and painters work in the erection of additions to Booth Town Liberal Club, Halifax. Plans and specifications will lay for inspection, and quantities may be obtained from Messrs. C. A. F. Horstall & Son, architects, Lord street Chambers, Halifax, from August 13 to August 18, on which last-named date sealed tenders must be delivered not later than 12 o'clock on August 18.

AUGUST 20.—Wimbledon.—CART SHED.—Wimbledon Corporation invite tenders for the supply, delivery, and erection complete, at the Depot, Queen's-road, Wimbledon, of a cart shed, about 165 ft. long by 30 ft. span, with open sides, and consisting of galvanised corrugated iron roofing, steel roof trusses, and rolled-steel stanchions. Detailed plans and specification may be inspected, and forms of tender obtained, on application to the Borough Engineer and Surveyor, Town Hall, Wimbledon. Quantities of materials to be delivered at the Town Hall on or before noon on August 20.

AUGUST 25.—Greenwich.—NEW SORTING OFFICE.—The Committee of H.M. Works and Public Buildings invite tenders for erection of new sorting office at Greenwich. Drawing, specification,

conditions, and form of contract may be seen on application to Mr. J. Wager, H.M. Office of Works, Storey's-gate S.W. Bills of quantities and forms of tender are obtainable on deposit of 11s. 6d. Tenders, addressed to the Secretary, as above, and endorsed "Tender for Greenwich Sorting Office," to be delivered before 12 o'clock noon on August 24.

★ SEPTEMBER 5.—Manchester.—ADDITIONS TO SCHOOL.—Tenders are invited for alterations and additions to the Abbott-street Municipal School, Rochdale-road, Manchester. Plans may be seen, and copy of bill of quantities, etc., obtained, on or after September 4, at the Education Offices, Deansgate, Manchester, on deposit of 2s. 2d. Tenders to be delivered not later than September 5.

★ SEPTEMBER 5.—Manchester.—SCHOOL.—Tenders are invited for the erection of a municipal school in Dumet-street, Blackley, Manchester. Plans may be seen, and bills of quantities, etc., obtained, on or after September 1, on deposit of 2s. 2d., at the Education Offices, Deansgate, Manchester. Tenders to be delivered not later than September 5.

ENGINEERING, IRON, AND STEEL.

AUGUST 6.—Manchester.—ELECTRIC TRAM CARS.—Manchester Corporation Tramways Committee invite tenders for the supply of the following:—(a) Electric tram-car bodies; (b) electrical equipment for cars; (c) tram-car trucks. Specifications and forms of tender may be obtained on application to Mr. J. M. McKillop, General Manager, Tramways Department, 55, Piccadilly, Manchester. Tenders are to be addressed to the Chairman of the Tramways Committee, 55, Piccadilly, Manchester, and must be received not later than 3 p.m. on August 6.

AUGUST 6.—Seaton Snook.—BRANCH RAILWAY.—North-Eastern Railway Directors invite tenders for the construction of a branch line, about 1 mile 50 chains long, from the company's Stockton and Hartlepool Railway to Seaton Snook. The line will commence about three quarter mile south of Seaton Carew Station. Plans may be seen, and specification, detailed list of quantities, and form of tender obtained, on personal application at the offices of Mr. W. J. Cudworth, the company's engineer, at York. Sealed tenders, endorsed "Tender for Seaton Snook Branch," to be sent to the Secretary, at York, but later than noon on August 6.

AUGUST 6.—Strabane.—RAILS.—Strabane and Letterkenny Railway Directors invite tenders for 220 tons of flat-bottomed steel railway rails, weighing 60 lb. per yard, and delivered free at the railway station at Strabane, and at the railway station, Letterkenny, or the Port Quay, Letterkenny, in such proportions as may be arranged. Delivery of one-half to be completed at Strabane before November 15, 1906, and of the remainder as may be directed as to place on or before December 31, 1906, under penalty of 2s. per ton per week for late delivery. Tenders to be sent in to Mr. James Barton, Engineer to the Strabane and Letterkenny Railway Company, on or before August 6, to his office, Exchange, Dundalk.

AUGUST 7.—Dublin.—STEEL WORK.—Dublin Corporation Waterworks Committee invite tenders (in writing) from properly qualified persons for the supply of 432 ft. of 16-in. and 216 ft. of 9-in. steel plate main. Specifications and forms of tender can be had at the office of Mr. Spencer Haritz, City Engineer, City Hall, Dublin, on all lawful days between the hours of 10 a.m. and 4 p.m. Tenders to be sealed and endorsed "Tender for Steel Pipes," and addressed to the Chairman, Waterworks Committee, City Hall, Dublin, and sent in not later than 10 a.m. on August 7.

AUGUST 9.—Bolton.—BOILERS.—Bolton Electricity Committee invite tenders for the supply and erection of two Lancashire boilers. Specification and form of tender may be had on application to Mr. Arthur A. Day, A.M.I.E.E., M.I.E.E., Borough Electrical Engineer, Spa-road, Bolton. Tenders, endorsed "Tender for Boilers," to be delivered not later than 12 o'clock noon, August 9, addressed to the Chairman of the Electricity Committee, Town Clerk's Office, Town Hall, Bolton.

AUGUST 11.—Shotton Colliery.—COKE OVEN PLANT.—Coal storage bunkers, boiler, steamings, and coke ovens at Shotton Colliery in accordance with plans and specification to be seen at the colliery office. Tenders for the work in accordance therewith may be sent in up to August 11, addressed to the Horden Collieries, Ltd., Castle Eden, R.S.O., and marked "Tender for Coke Oven Plant."

AUGUST 11.—South Shields.—PERMANENT WAY.—South Shields Tramways Committee invite tenders for the constructional work and paving thereto for the carrying out of the permanent way and track, including steel rails points, crossings, and other auxiliary work for the Boldon-lane and Hudson-street extension of the South Shields Corporation Tramways, 3 furlongs 1-20 chains double line, equal to about 6 furlongs 2-40 chains single track. Copies of the specification and conditions, including conditions and form of tender, and also forms of contract, can be obtained, and the general and detail drawings seen, at the office of Mr. S. F. Burgess, M.I.C.E., Borough Engineer and Surveyor, Chapter-row. Tenders, on forms supplied, sealed and endorsed "Tender for Tramways Permanent Way, Boldon-lane Extension," must be delivered to Mr. J. Moore Hayton, Town Clerk, at his office, 11, South Shields, on or before 12 noon on August 11.

AUGUST 11.—Stockport.—WATER-TUBE BOILER.—

tations of the work can be seen, and a form tender with quantities and any further information obtained, from the Surveyor to the Committee, Town Hall, West Didsbury. Tenders to be endorsed "Tenders for Street Works," and to be addressed to the Chairman of the Withington Committee, Town Hall, West Didsbury, not later than noon on August 7. **AUGUST 8.—Chiswick.—SEWERS.—The U.D.C.**

Chiswick invite tenders for the construction of 500 yds. of concrete tube or stoneware pipe sewer laid surface-water drain in a new road near Burlington-lane, Chiswick. Form of tender and copy of the specification on application to Mr. John Barclay, Surveyor of the Council, at the Town Hall, Chiswick, between the hours of 9 a.m. and 1 p.m. Tenders are to be made in sealed covers, endorsed "Tender for Sewers," together with a schedule of prices, to Mr. Ernest F. Collins, Clerk of the Council, Town Hall, Chiswick, W., not later than 5 o'clock on August 5.

August 8.—**Edinburgh.**—Sewers.—Edinburgh Magistrates and Council invite offers for the construction of a new 12-in. diameter fireproof pipe sewer in Colinton-road, 34 yds. or thereby in length, all to conform to plans, specification, and schedule of measurement prepared by the Burgh Engineer, from whom schedules of measurement and all particulars may be obtained. Sealed offers, endorsed "Tender for Colinton-road Sewer," must be lodged with Mr. Thomas Hunter, W.S., Town Clerk, City Chambers, Edinburgh, before 10 a.m. on August 8.

August 8.—**Loanhead.**—Water Supply.—The Town Council invite tenders for providing and laying about 24 miles of 6-in. cast-iron piping, with valves, etc. Drawings may be seen at the office of Mr. G. Somerville Carrara, C.E., 1, Erskine-place, Edinburgh, from whom a copy of the specification, schedule, and form of tender may be obtained on payment of 11. Tenders to be sent to Mr. A. Perry Francis, Town Clerk, Loanhead, on or before August 8, specially marked "Tender for Water Supply."

August 8.—**North Berwick.**—Drainage Works.—Cutting tracks, providing, laying, and jointing 22 yds. 12-in. fireproof and 322 yds. 12-in. cast-iron outfall and storm overflow, with manholes, etc., at the East Links, North Berwick. Plans and sections of work proposed can be seen with Mr. A. Cruickshank, estate surveyor, North Berwick, from whom schedules can be obtained on a payment of 10s. Tenders to be lodged with Messrs. Rods, Murray, & Jamieson, W.S., 66, Queen-street, Edinburgh, on or before August 8.

August 9.—**London.**—Roads.—Bandon R.D.C. on August 13, at 2 o'clock p.m., will consider tenders for the maintenance of six roads and the execution of six new works. Tenders to be lodged with Mr. Maxine, Clerk of District Council, Council Room, Workhouse, up to 4 o'clock p.m. on August 9. Specifications for the several roads and works, together with conditions of contract, are deposited at the Council Room, Workhouse, for inspection of contractors. Prescribed tenders must be had on application at office of Clerk.

August 10.—**Hale.**—Making-up.—Hale U.D.C. invite tenders for the making-up of Ollerbarrow-road, Hale, under two separate contracts. Plans and specifications can be seen, and bills of quantities and forms of tender can be obtained, on the payment of a deposit of 11. 1s., at the office of the Council's Surveyor, Mr. F. E. Boaz. Tenders and priced bills of quantities are to be received by Mr. J. G. Whyatt, Clerk to the Council, Council Offices Ashley-road, Hale, Cheshire, not later than noon on August 10, in accordance with the specifications and envelopes which will be supplied.

★ August 10.—**Hornsey.**—Sewerage, etc.—Tenders are invited for sewerage, levelling, paving, metalling, kerbing, channelling, and making good Avenue-mews, Briston- Grove, and Warner-road (first section), Hornsey. Forms of tender, etc., can be obtained from the Borough Engineer and Surveyor, Municipal Offices, Highgate, between 10 and 12 o'clock on any morning. Tenders, sealed and endorsed with quantities duly completed, to be delivered in the Town Clerk's Office, 99, Southwood-lane, Highgate, N., by 4 p.m. on August 10.

August 13.—**Cowpen.**—Asphalting.—The Rural Board for the township of Cowpen invite tenders for the asphaltting, etc., of part of the carriage drive and cross walk within the grounds of the cemetery at Cowpen, near Blyth. Plans and specifications may be seen on application to Mr. A. C. Fawcett, Clerk, Cowpen Rural Board, Blyth. Tenders, sealed and endorsed "Tenders for Asphaltting," are to be received not later than August 13.

August 13.—**Kerridge.**—Sewerage.—Bollington U.D.C. invite tenders for the construction of the sewerage of Kerridge. The works comprise about 1,853 yds. of 7-in. and 8-in. stoneware pipe sewers, together with manholes, lampholes, and other appurtenant works. Plans may be seen, and quantities and form of tender may be obtained, at the office of the Engineer, Mr. W. H. Radford, C.E., Albion-chambers, King-street, Nottingham, on deposit of 2s. 2s. A copy of the plans may also be seen at the office of Mr. S. Knight, Clerk, Council Offices, Bollington. Sealed and endorsed tenders to be sent in

to Mr. Samuel Knight, Clerk to the Council, Council Offices, Bollington, near Macclesfield, on or before August 13.

August 14.—**Hampton.**—Street Works.—Hampton U.D.C. invite tenders for the making-up and paving of Warfield-road, Hampton. Plans and sections may be seen, and copies of the specification, bills of quantities, and forms of tender obtained, from Mr. Sidney H. Chambers, Surveyor to the Council, Public Offices, Hampton, Middlesex, on payment of 2s. 2s. as a deposit. Sealed tenders, endorsed "Tender for Private Street Works," to be delivered to the Clerk, Public Offices, Hampton, Middlesex, not later than 5 p.m. on August 14.

August 15.—**Hunslet.**—Drainage.—Hunslet R.D.C. invite tenders for the following contracts:—Contract No. 1.—The construction of about 535 lin. yds. of 9-in. fireproof pipe sewers and 40 lin. yds. of 9-in. cast-iron pipes on brick piers, together with manholes, lampholes, storm overflow chamber, settling tank, continuous filter, sludge filter, effluent drain, etc., in the hamlet of Colton, near Leeds. Drawings and specifications may be seen and quantities and form of tender obtained, at the office of Messrs. Marriott, Son, & Shaw, civil engineers, Church-street Chambers, Dewsbury, on payment of 11. 1s. Contract No. 2.—The construction of about 200 lin. yds. of 9-in. fireproof pipe sewers, with manholes, etc., at Whitkirk, near Leeds. The drawings and specifications for this contract may be seen, and quantities and form of tender obtained, at the office of Mr. W. B. Pinder, Clerk to the Council, Glasshouse-street, Hunslet, Leeds. Sealed tenders, endorsed "Tender for Drainage," to be delivered to the Clerk not later than 12 noon on August 15.

August 15.—**Inverkeithing.**—Pipe Sewer.—The Town Council invite offers for laying about 200 yds. of 9-in. metal sewer pipe at Inverkeithing Bay to west of Paper Mill. Plans and sections may be seen in the hands of Mr. James C. Sim, architect, Inverkeithing, from whom schedules can be obtained. Offers to be lodged with Mr. John B. Monies, Town Clerk, Inverkeithing, not later than August 15.

August 16.—**Smallthorpe.**—Street Works.—The Smallthorpe U.D.C. invite tenders for sewerage, levelling, paving, channelling, and making good Good Thomas-street, at Packmoor, in accordance with a plan and specification which have been prepared by Mr. John William Deane, the Surveyor to the Council. The plan and specification may be inspected at the offices of the U.D.C. on any day, Saturdays excepted, between the hours of 10 a.m. and 4 p.m. Tenders, in writing, sealed and endorsed "Street Works," etc., must be addressed to Mr. George Phillips, Clerk to the Council, Smallthorpe, and delivered at the Council Offices not later than 5 o'clock p.m. on August 16.

August 21.—**Caversham.**—Sewage Works.—Caversham U.D.C. invite tenders for the alterations to existing works, and the erection of additional septic tanks and continuous filters in connexion with their Sewage Disposal Works. General conditions, specifications, bills of quantities, and forms of tender may be obtained, and drawings inspected, at the surveyor's office, 11, Bridge-street, Caversham, upon receipt of a deposit of 21. 2s. Sealed tenders, endorsed "Caversham Sewage Disposal Works—Contract No. 2," must be delivered to Mr. Alfred J. Smith, Engineer and Surveyor, Council Offices, 21, Bridge-street, Caversham, not later than August 21.

August 22.—**Watford.**—Making-up.—Watford U.D.C. invite tenders for making-up the following roads:—Sawley-road, Pl. III. (257 yds. in length); Mildred-avenue, (590 yds. in length). Plans, sections, and specifications may be seen and forms of tender obtained, on application to Mr. D. Waterhouse, surveyor, Tenders, duly sealed and endorsed "Tender for Private Street Works," to reach Mr. H. Morten Turner, Clerk to the Council, Council Offices, 14, High-street, Watford, not later than 12 o'clock noon on August 22.

August 22.—**Watford.**—Sewerage.—Watford U.D.C. invite tenders for the construction of about 570 lin. yds. of 9 in. stoneware pipe sewers and 630 lin. yds. of 6 in. stoneware pipe sewers, together with manholes, lampholes, and other appurtenant works. Persons desirous of contracting for the work may see the drawings, form of contract, specifications, etc., at the Offices of the Council, 14, High-street, Watford, between the hours of 9.30 a.m. and 1 p.m. A copy of the schedule of works (quantities) and a form of tender can be obtained at the office of the Council. Sealed tenders, addressed to Mr. H. Morten Turner, Clerk to the Council, Council Offices, Watford, and endorsed "Tender for Sewerage," must be delivered under cover not later than August 22.

August 25.—**Kirkcaldy.**—Sewerage and Sewage Disposal.—The Kirkcaldy R.D.C. invite tenders for the providing and laying of about 1,018 lin. yds. of 6-in. sewers, together with the necessary manholes, flushing manholes, settling tank, and laying-

out filtration area, and other works in connexion therewith, at Kirkcaldy, in the County of York. The drawings, specification, etc., may be seen at the office of Mr. Wm. Richardson, Clerk to the Council, at Stokesley, E.S.O., Yorkshire, from 10 a.m. to 4 p.m. each day, except Wednesdays. Copies of specification, quantities, and form of tender may be obtained from the engineers (Messrs. Fairbank & Son, C.E., Lendal Chambers, York) on deposit of 21. 2s. Sealed tenders, endorsed "Tender for Kirkcaldy Sewerage, Contract A," must reach the Clerk on or before 10 a.m. on August 25.

August 31.—**Walthamstow.**—Permanent Way.—Walthamstow U.D.C. invite tenders for alterations and additions to the permanent way (light railways). Persons desirous of submitting tenders may obtain drawings, conditions of contract, specification, and form of tender from Mr. G. W. Hoiles, A.M.I.C.E., Town Hall, Walthamstow, on payment of 51. as a deposit. The form of tender and schedule must be properly and fully filled in, and enclosed with the specification, in a sealed envelope, marked on the outside "Tender for Alterations and Additions to Permanent Way," and delivered to Mr. C. Sydney Watson, Clerk, Town Hall, Walthamstow, not later than August 31.

September 5.—**Brighton.**—Kerb and Channel.—Brighton Corporation invite tenders for the supply of dressed granite kerb and channel as under:—5,000 ft. run 12 in. by 6 in. granite flat kerb; 2,000 ft. run 6 in. by 10 in. granite edge kerb; 7,000 ft. run 12 in. by 6 in. granite flat channel. The specification and form of tender may be obtained on application at the offices of the Borough Surveyor, at the Town Hall, Brighton. Sealed tenders, addressed to Mr. Hugo Talbot, Town Clerk, Town Hall, Brighton, and endorsed "Tender for Granite Kerb," must be left at his office at the Town Hall before 10 o'clock a.m. on September 6.

September 24.—**Jassy, Roumania.**—Water Supply and Sewerage.—The Municipal Authority invite tenders for the water supply and sewerage of the City of Jassy, Roumania. The estimated cost is, for water supply, 8,547,400 fr. 19c. and for sewerage, 1,887,607 fr. 20c. The works will be let in one contract only, but the contractor may tender to be submitted for each work showing the percentage over or under schedule prices. A guarantee of 4 per cent. of the total value must be deposited with the tenders, and an additional 2 per cent. on the signing of the contract. Plans and specifications may be seen, and all further information obtained, at the Chief Engineer's Office, Town Hall, Jassy. Tenders to be delivered on or before September 24. Mr. George Lascar, Mayor, Mr. A. S. Savul, Chief Engineer.

STONE, MATERIALS, AND STORES.

August 3.—**Egypt.**—Flints.—Tenders are required by the Egyptian War Department for 336 doz. Flints. Tender forms may be obtained from Lieut.-Col. J. H. Western, Queen Anne's Chambers, Westminster, and are returnable to him by August 3.

August 8.—**Clacton.**—Flints.—Clacton U.D.C. invite tenders for the supply of 1,700 yds. of Keish flints, delivered in barges alongside Clacton Beach. Endorsed tenders, with samples, to be sent to Mr. Geo. T. Lewis, Clerk to the Council, Town Hall, Clacton-on-Sea, not later than noon on August 8. Specification and further particulars may be obtained upon application to Mr. A. R. Robinson, Surveyor to the Council, Town Hall, Clacton-on-Sea.

August 9.—**London.**—Paints, Metals.—Bengal and North-Western Railway Company Directors invite tenders for the supply and delivery of (a) paints, (b) metals, per specification to be seen at the company's offices. Tenders, addressed to Mr. Alexander Izat, Managing Director, 237, Gresham House, Old Broad-street, London, E.C., and marked "Tenders for Paints" or as the case may be, are to be lodged not later than noon on August 9. For each specification a fee of 10s. will be charged, which cannot, under any circumstances, be returned.

August 11.—**Alton.**—Basalt.—Alton U.D.C. invite tenders for the supply of 630 tons of Welsh (Gest) granite, 2-in. gauge, 45 tons of Welsh granite sliftings, to be delivered at Alton Station (L. and N.W.K.) in quantities of 35 tons per day. Delivery to commence on October 20 next. Tenders to be sent to Mr. W. Brady Trimmer, Clerk to the Council, Alton, on or before August 11, marked "Tenders for Basalt."

August 14.—**Heywood.**—Lime, Tubes, etc.—Heywood Gas Committee invite tenders for the supply of lime, tubes and fittings, sulphuric acid, and also for the purchase of surplus tar. Specification and form of tender may be obtained from Mr. W. Whatmough, the Gas Manager. Sealed and endorsed tenders to be sent to Mr. Geo. G. Boucher, Town Clerk, Municipal Buildings, Heywood, not later than August 14.

Public Appointments.

Nature of Appointment.	By whom Advertised.	Salary.	Applications to be in
INSPECTOR OF BUILDINGS	Beckenham U.D.C.	130l. per annum rising to 160l.	Aug. 16
CLERK OF WORKS	Denbighshire County Council	31. 3s. per week	Aug. 18
CLERK OF WORKS	Conventry Education Com.	22. 10s. per week	Aug. 25

Auction Sales.

Nature and Place of Sale.	By whom Offered.	Date of Sale.
*STO K, ETC. OF BUILDERS' MERCHANT.—2, Dudley-road, Southall, Mid'-sex	H. W. Smith	Aug. 14
*DEALS, BATTENS, ETC.—Great Hall, Winchester House, Old Broad-street, E.C.	Churchill & Sims	Aug. 15
*STOCK AND PLANT OF BUILDER, ETC.—34-35, Alpha-road, Surbiton-lim, Surrey	H. W. Smith	Aug. 16

PATENTS.—Continued from page 188.

above it, the shutters being alternatively fixed and movable, with means for simultaneously rocking the movable shutters upon their pivots in such manner as to close, open, or partially open such movable shutters in relation to the fixed shutter.

7,966 of 1906.—A. G. LEIGH: *Flushing Apparatus*. This invention relates to an apparatus for flushing water-closets, urinals, sewers, and the like, and consists of a closed cistern or vessel, a water inlet to said cistern having a non-return valve, the quantity of flushing liquid admitted to the cistern being regulated by the air compressed within the cistern, such compressed air serving to more forcibly eject the flush from the cistern, and self-closing means for discharging the contents of the cistern, such apparatus being used with or without a water regulating inlet valve and with or without a siphon seal.

8,854 of 1906.—S. R. PARKES: *Axle for Window Sash Pulleys*.

This invention relates to an axle for window sash pulleys, and consists essentially in the employment in combination of a cast-iron axle pulley having trunnions, a sheet metal front plate, and side plates, said front plate being secured to the side plates by brackets and rivets, and said side plates curving the pulley by its trunnion.

19,832 of 1905.—A. BROWN and H. C. PRUCE: *Casement Stays*.

This invention relates to a two-part and separable casement stay, and consists of a compound bar jointed at one end to a window or casement and adapted to come between, and be engaged, by a pair of laterally separated studs or projections mounted upon a swivelling plate attached to the casement frame and fitted into gaps or notches formed in the opposite edges of said bar, which latter is adapted to be lifted clear of the studs and entirely removed from the fixture on the casement frame.

19,884 of 1905.—T. W. RIDLEY: *Slag Bricks*.

This invention relates to bricks which are cast in moulds carried by endless chains. Each mould is composed of a five-sided box open at the top, and is made in two parts hinged together. One part is connected to the chains, and comprises the bottom, one end, and one side, whilst the other part comprises the other end and the other side, the latter being hinged to the bottom. When the mould is upright the two parts are held together by a hooked catch pivoted to one part and engaging with the other, but when the mould is reversed, on forcing the end pulley, the catch disengages by its own weight, and thus allows the two parts to separate and discharge the brick. When the mould is righted the parts come together, and the catch engages again automatically, so that the mould is ready for another brick to be cast in it.

25,645 of 1905.—H. McKENZIE and W. TIVEN-DALE: *Locks*.

This invention relates to a lock having grooved cylinders fitted on spindles which pass through the door and have pointers at the outside thereof arranged to work in conjunction with disks the arrangement being such that when the cylinders are turned to certain positions they allow the bolt to work, but when not turned to these positions they prevent it working, each cylinder being secured to its spindle by means of a pinching screw, so that the positions of the cylinders can be altered relatively with the spindles and the combination varied.

14,295 of 1905.—R. A. CUMMINGS: *Concrete Columns and the like*.

This invention relates to columns, piles, or the like, consisting of a series of metallic members extending vertically through the columns and a series of metallic bands running transversely through the columns, the whole being enveloped and embedded in concrete or the like, and is characterised by the fact that said bands have their ends united to form a continuous band and have one extreme end bent outwardly to form a spacing member for contacting with the centring or casing.

9,165 of 1906.—J. J. COX: *Cement Block Moulding Machine*.

This invention relates to a block moulding machine, and consists of a stationary moulding table, a fixed delivery platform, a mould-box having a fixed body wall with top and bottom openings and shiftable bodily from the table to the platform and vice versa, temporary closures to said openings, said mould-box being arranged to move over and pass the delivery platform to discharge the moulded article thereon.

SOME RECENT SALES OF PROPERTY: ESTATE EXCHANGE REPORT.

July 14.—By H. & R. L. COBS (at Colchester). Manningtree, Essex.—Station-rd., freehold building land, etc., 9 a. 2 r. 1 p. £1,120
By C. M. STANFORD (at Colchester). Wormingford, Essex.—Long's Farm, 73 a. 1 r. 3 p. 420

July 17.—By H. & R. L. COBS (at Ashford). Brookland, etc., Kent.—A freehold holding, 74 a. 1 r. 3 p. 2,714

Willborough, Kent.—Enclosure of land, 11 a. 2 r. 35 p. f. 360

Ashford, etc., Kent.—Freehold farmhouse and 22 a. 1 r. 6 p. 2,000

July 17 and 18.—By GIDDY & GIDDY (at Swindon). Wootton Bassett, Wilts.—The Meux Estates (part portion), area 4,326 acres, f. in numerous lots 123,015

July 19.—By WELLES & SON (at Brighton). Reenfield, Sussex.—"The Flough Plots," 1 a. f. y. r. 132 240

"Towen Mead," 8 a. 1 r. 27 p. f. 400

"Backset Town Farm," 164 a. 1 r. 23 p. f. 4,250

By C. R. MORRIS, SONS, & PRARD (at Amnester). Musbury, Devon.—"New House Farm," 212 a. 0 r. 33 p. f. 8,000

House, Blacksmith's shop, etc., area 0 a. 3 r. 6 p. f. 290

"Seller's Wood," 13 a. 2 r. 37 p. f. 720

July 20.—By DYER, SON & HILTON (at Lee Green). Lee.—19 to 25 (odd), Leam-ham-rd., f. c. 1432 2,000

35 and 37, Turner-rd., u.t. 60 yrs., g.r. 71, e.t. 701. 475

By J. HANFORD & SON (at Exeter). Coleridge, etc., Devon.—The Earl of Portsmouth's estates, comprising farms, lands, houses, etc., 3,352 a. 1 r. 35 p. f. (in numerous lots), ex timber 39,741

By H. F. RUSSELL & SON (at Leominster). Kinsland, etc., Hereford.—Enclosures of land, 38 a. 3 r. 17 p. f. 1,416

July 21.—By DWYLL & SONS (at Cambridge). Dry Drayton, Cambs.—"Proctor's Farm Estate," 148 a. 2 r. 35 p. f. and c. (in lots) 1,680

By PROTHIER & MORRIS (on the estate). Leytonstone, Essex.—56 plots of land, let on building lease for 99 yrs., at per annum Church-rd., 20 shop plots, let on building lease for 99 yrs., at per annum 271

By PERCIVAL & THORPE (at Northampton). Walgrave, Northants.—"Walgrave Lodge Farm," 120 a. 2 r. 25 p. f. 2,100

Old, Northants.—"Bales Barn Farm," 61 a. 3 r. 39 p. f. 1,040

"York's Close," 49 a. 1 r. 11 p. f. 1,020

A freehold cottage and 6 a. 3 r. 18 p. f. 500

Two cottages, yard, and 4 a. 2 r. 11 p. f. 130

By GREEN & SON (at Hammarham). Shepherd's Bush, 354 Goldhawk-rd., u.t. 58 yrs., g.r. 167. 850

Battersea, 46, Francis-st. (s.), u.t. 44½ yrs., g.r. 54. 450

By MCGILLY, BOOKE, & CO. Hyde Park—2, Devonport-st., u.t. 28½ yrs., g.r. 81, y.r. 116½ 800

77, Oxford-ter., u.t. 28½ yrs., g.r. 16½, y.r. 140½ 800

By NORRIS, HADLEY, & CO. Kentish Town, 18, Gill-st., u.t. 56 yrs., g.r. 82, y.r. 390 355

108, Queen's-ore, (s.), u.t. 43½ yrs., g.r. 68, y.r. 384 350

32 and 34, Carleton-rd., u.t. 44 yrs., g.r. 14½, y.r. 722 500

Long Acre, Nos. 89 and 90 (s.), u.t. 11½ yrs., g.r. 30½, y.r. 280½ 1,605

Long Acre, No. 87 (s.), u.t. 11½ yrs., g.r. 11½, y.r. 120½ 160

Battersea, 6, Bennerley-rd., u.t. 62 yrs., g.r. 61, y.r. 284 280

Barnes, 97, 100, and 101, Weymouth-rd., u.t. 60 and 63 yrs., g.r. 154, w.r. 921. 600

Kingston, Surrey, 21, Canbury Park-rd., u.t. 58½ yrs., g.r. 61, y.r. 300 170

Brentford, 10A, Hanger-rd. (wrenching yard), u.t. 61 yrs., g.r. 74, y.r. 461 345

Chiswick, 30, 32, and 36, Stonehill-rd., u.t. 67 yrs., g.r. 11½, w.r. 354. 610

Mortlake, 1 to 4, Orchard-cottages, u.t. 80 yrs., g.r. 61, w.r. 701. 450

Barnes, 113 and 115, Archway-st. (s.), f. w.r. 411. 320

41, 43, and 45, Railway-st., w.r. 582. 460

6, The Ter., and 1 and 2, Wentworth-row, f. y.r. 621. 690

Chiswick, Bolton-rd., "Holly Lodge" and "Westlands," f. c. 170½ 2,000

Kilburn, 36 and 40, Glengall-rd., f. c. 84½ 995

By A. SAVILE & SONS. Ilford, Barley-la., freehold building land, 41 a. 2 r. 2 p. 5,075

Grove-rd., freehold building land, 3 a. 2 r. 15 p. 725

Little Heath, freehold building land, 16 a. 0 r. 4 p. 2,550

"Little Heath Farm," 26 a. 1 r. 1 p. f. p. 2,400

"Padmal-gr." and "Hannault House" Farms, 73 a. 3 r. 25 p. f. 4,350

Billet-rd., freehold building land, 9 a. 3 r. 25 p. 110

By JOHN BULLY. Holloway, 4, Beacon-hill, u.t. 36 yrs., g.r. 81. 305

81. 305

By WEATHERALL & GREEN. Edmonton, 9, The Parade (s.), u.t. 72 yrs., g.r. 61, y.r. 504 560

Paddington, Harrow-rd., f. g.r. 36½, reversion in 39 yrs. 1,120

By G. GODFREY, SON, & CO. (at Winchester House). Belgrave, Euston-pl., f. g.r. 45½, reversion in 22½ yrs. 19,000

Lyall-st., f. g.r. 17½, reversion in 22½ yrs. 7,200

Chesham-st., f. g.r. 18½, reversion in 22½ yrs. 9,750

Chesham-pl., f. g.r. 130½, reversion in 22½ yrs. 26,600

Font-st., f. g.r. 47½, reversion in 22½ yrs. 9,015

By ED. RUSHTON, SON, & KENTON (at Preston). Eddle, Lancs.—"Whans Farm," 49 a. 1 r. 39 p. f. 11,900

Forton, Lancs.—"Allotment Field," 3 a. 1 r. 31 p. f. 230

Two freehold cottages and 1 a. 0 r. 3 p. f. 190

By E. G. BOTHERELL (at Preston). Catterall, Lancs.—"The Catterall Hall Estate," 283 a. 3 r. 9 p. f. 15,000

July 24.—By F. DOD & CO. Holloway, 569, Holloway-rd. (s.), f. y.r. 632. 1,250

Clapton, 73 and 75, Clifden-rd., f. w.r. 85½, w.r. 85½, y.r. 521. 90

"Ivydene," f. y.r. 521. 56

Tottenham, 7 and 9, Sherborough-rd., f. w.r. 361. 48

80, Pack-st., u.t. 42 yrs., g.r. 21. 34

Homerton, 61 and 63, Digby-rd., u.t. 24 yrs., g.r. 61. 26

Leytonstone, Montague-rd., f. g.r. 191. 56, reversion in 70 yrs. 43

By HAMPTON & SONS. Wimbledon, 39, High-st., f. p. 2,520

Chislehurst, Yester-rd., "Camden Wood," and 11 a. 0 r. 7 p. f. p. 9,100

By LANGSTON & CO. Bermondsey, 7, Maze-pond, f. y.r. 26½ 41

By MARK LILL & SON. Bow, Fairfield-rd., "Grove Hall" building estate, 11 a. 3 r. 0 p. f. p. 22,300

By EVERETT OWEN. Broadbeury, 74, Fordwynch-rd., u.t. 82 yrs., g.r. 107, y.r. 661. 61

Hampstead, 71, Messina-av., f. y.r. 471. 105 50

By FRED. WARMAN. Blackthorn, 221, No. 53 (s.), u.t. 83 yrs., g.r. 25½, y.r. 125½ 1,200

Stoke Newington, 51, Evering-rd., u.t. 67½ yrs., g.r. 71, e.t. 481. 40

Wood Green, 10, Napier Villa, u.t. 61 yrs., g.r. 54, y.r. 281. 21

By G. GODFREY, SON, & CO. (at Winchester House). Belgrave, Chesham-st., f. g.r. 54½, reversion in 22½ yrs. 34,800

Lowndes-st., f. g.r. 172½, reversion in 22½ yrs. 25,700

Lowndes-st., etc., f. g.r. 50½, reversion in 22½ yrs. 11,900

By N. EASTON & SON (at Hull). Elsternwick, Yorks.—"Elsternwick Road Farm," 40 acres, f. 1,500

A freehold enclosure, 15 acres. 2,2

Burswick, Yorks.—"Wranglands Farm," 40 acres, f. 1,4

By H. J. BROMLEY (at Croydon). Thornton Heath, Whitshire-rd., etc., five plots of freehold building land 8,900

By G. T. BAINBRIDGE (at Darlington). Middleton St. George, Durham.—"High Scrogs Farm," 49 a. 1 r. 3 p. f. 2,000

High Coniscliffe, Durham.—"The West Farm," 271 a. 2 r. 2 p. f. 8,1

July 25.—By DYER, SON, & HILTON. Wimbledon, 174 and 176, Effra-rd., f. w.r. 801. 4

Blackheath, 46, Granville-pk., u.t. 29 yrs., g.r. 12½, y.r. 651. 1

By FIELD & SONS. Rotherhithe, 16, Rotherhithe New-rd., u.t. 41 yrs., g.r. 34. 155, w.r. 334. 100

Deptford, 7, Colwick-est., u.t. 59½ yrs., g.r. 34, w.r. 281. 1

By HERRING, SON, & DAW. Stepney, Louisa-st., l.g.r. 27½, u.t. 49 yrs., g.r. 51. 280

By HUMBERT & FLINT. Piner, Middlesex.—"Pinner Estate," 28 a. 1 r. 5 p. f. 8,600

By MAY & PHILPOT. Streatham, 20, Bournvale-rd., u.t. 75 yrs., g.r. 81. 106, e.t. 454. 1

46, Glengall-rd., u.t. 76 yrs., g.r. 17½, e.t. 701. 1

By D. SMITH, SON, & OAKLEY. Leweston, etc., Dorset.—"The Leweston Estate," 1,052 a. 0 r. 35 p. f. 35,400

By A. W. TAYLOR & CO. Wimbledon, 58, Wimbledon Park-rd., u.t. 62 yrs., g.r. 81. 36, p. f. 60,000

By G. TROLLOPE & SONS. Westminster.—Parliament-st., "The Whitehall Club," area 4,025 ft. 60,000

By R. TIDY & SON. Regent's Park—Upper Gloucester-pl., l.g.r. 141. 145, u.t. 14 yrs., g.r. 111. 1

Marlybone, Carlisle-st., l.g.r. 32½, u.t. 15 yrs., g.r. 48. 60

Notting Hill—Rolland Park-av., etc., l.g.r. 306, u.t. 16 yrs., g.r. 101. 306

City-road, Haverstock-st., l.g.r. 304, u.t. 18 yrs., g.r. 181. 121

Caledonian-rd., Copenhagen-rd., l.g.r. 121, u.t. 35 yrs., g.r. 11. 121

Islington, Denmark-rd., l.g.r. 24½, u.t. 41 yrs., g.r. 41. 24½

Whitechapel, 67, High-st. (s.), u.t. 61 yrs., g.r. 171, y.r. 751. 171

Teddington, 16, Spencer-rd., u.t. 97 yrs., g.r. 81. 106, p. 80,000

By DICKINSON, BIGGALL, & CO. (at Louth). Legby, Lincs.—"Collow Grange Farm," 271 a. 3 r. 20 p. f. y. 2701. 4

By JAMES ELEY (at Boston). Shirbrook, Lincs.—Closes of pasture, 15 a. 2 r. 38 p. f. 1

Butterwick, Lincs.—"Willoughby Hills Farm," 57 a. 1 r. 29 p. f. 2

Closes of land, f. 1 a. 0 r. 2 p. 2

Fishkiff, Lincs.—Three closes of land, 42 a. 2 r. 15 p. f. 1

Fritchville, Lincs.—Freehold farmhouse, and 10 a. 0 r. 9 p. 1

WOOD (continued).			
JOINERS' WOOD (continued).		At per standard.	
Dry Walnut, American, per ft.	£ s. d.	£ s. d.	
super, sea inch	0 10 0	0 1 0	
Task, per load	17 0 0	22 0 0	
American Whitewood Planks, per ft. cube	0 4 0	0 5 0	
Prepared Flooring, etc.—			
1 in. by 7 in. yellow, planed and shot	0 13 6	0 17 6	
1 in. by 7 in. yellow, planed and matched	0 14 0	0 18 0	
1½ in. by 7 in. yellow, planed and matched	0 16 0	0 1 0	
1 in. by 7 in. white, planed and shot	0 12 0	0 14 6	
1 in. by 7 in. white, planed and matched	0 12 6	0 15 0	
1½ in. by 7 in. white, planed and matched	0 15 0	0 16 6	
¾ in. by 7 in. yellow, matched and beaded or V-jointed brds.	0 11 0	0 13 6	
1 in. by 7 in. "	0 14 0	0 18 0	
¾ in. by 7 in. white "	0 10 0	0 11 6	
1 in. by 7 in. "	0 12 6	0 15 0	
6 in. at Gd. to 9d. per square less than 7 in.			

JOISTS, GIRDEES, &c.			
In London, or delivered		Railway Vans, per ton	
Bolled Steel Joists, ordinary sections	£ s. d.	£ s. d.	
Compound Girdees, ordinary sections	9 0 0	10 0 0	
Steel Compound Stanchions	12 0 0	13 0 0	
Angles, Tees, and Channels, ordinary sections	9 0 0	10 0 0	
Pitch Plates	9 0 0	10 0 0	
Cast Iron Columns and Stanchions including ordinary patterns	7 10 0	8 10 0	

METALS.			
Per ton, in London.		£ s. d.	
Iron—		8 0 0	8 10 0
Common Bars		8 0 0	8 10 0
Staffordshire Crown Bars, good merchant quality		9 10 0	9 0 0
Staffordshire "Marked Bars"		10 10 0	9 0 0
Mild Steel Bars		8 15 0	9 0 0
Hoop Iron, basic price		9 5 0	9 10 0
"Galvanised		17 0 0	
("And upwards, according to size and gauge.")			
Sheet Iron Black—			
Ordinary sizes to 20 g.		9 10 0	
" 24 g.		10 10 0	
" 26 g.		12 0 0	
Sheet Iron, Galvanised, flat, ordinary quality—			
Ordinary sizes, 6 ft. by 2 ft. to 3 ft. to 20 g.		14 0 0	
Ordinary sizes to 22 g. and 24 g.		15 0 0	
Ordinary sizes to 26 g.		15 0 0	
Sheet Iron, Galvanised, flat, best quality—			
Ordinary sizes to 20 g.		17 0 0	
" 22 g. and 24 g.		17 10 0	
" 26 g.		19 0 0	
Galvanised Corrugated Sheets—			
Ordinary sizes 6 ft. to 8 ft. 20 g.		14 0 0	
" 22 g.		15 0 0	
" 26 g.		15 10 0	
Best Soft Steel Sheets, 6 ft. by 2 ft. to 3 ft. by 20 g. and thicker		11 10 0	
Best Soft Steel Sheets, 22 g. and 24 g.		12 10 0	
" 26 g.		14 15 0	
Cut Nails, 3 in. to 6 in.		9 10 0	9 15 0
(Under 3 in., usual trade extras.)			

LEAD, &c.			
Per ton, in London.		£ s. d.	
LEAD—Sheet, English, Sib. and up.		19 7 6	
Pipe in coils		19 7 6	
Soil pipe		22 7 6	
Compo pipe		23 7 6	
Zinc—Sheet—			
Vuille Montagne	ton	33 0 0	
Silesian	ton	32 15 0	
COPPER—			
Strong Sheet	per lb.	0 1 1	
Thin	"	0 1 2	
Copper nails	"	0 1 0	
BRASS—			
Strong Sheet	"	0 1 0	
Thin	"	0 1 1	
TR—English Ingots	"	0 1 0	
SOLDER—Plumbers'	"	0 0 8 ½	
Timmen's	"	0 0 10 ½	
Blowpipe	"	0 0 11 ½	

ENGLISH SHEET GLASS IN CRATES OF STOCK SIZES.			
per ft. delivered.		£ s. d.	
15 oz. thirds	24d.		
" fourths	19d.		
21 oz. thirds	24d.		
" fourths	24d.		
26 oz. thirds	24d.		
" fourths	24d.		
32 oz. thirds	24d.		
" fourths	24d.		
Fluted Sheet, 18 oz.	24d.		
" 21 oz.	24d.		

ENGLISH ROLLED PLATE IN CRATES OF STOCK SIZES.			
per ft. delivered.		£ s. d.	
Hartley's	24d.		
" "	24d.		
Figured and Oxford Bolled	3d.		
"Oceanic" Glass, white	3d.		
Do. "tinted"	3d.		

OILS, &c.			
per gallon		£ s. d.	
Raw Linseed Oil in pipes		0 1 10	
" " in barrels		0 1 11	
" " in drums		0 2 1	
Boiled " in pipes		0 2 1	
" " in barrels		0 2 1	
" " in drums		0 2 3	
Turpentine in barrels		0 3 8	
" " in drums		0 3 10	
Genuine Ground English White Lead	per ton	22 10 0	
Red Lead, Dry		21 10 0	
Best Linseed Oil Putty	per cwt.	0 7 0	
Stockholm Tar	per barrel	1 12 0	

VARNISHES, &c.			
Per gallon.		£ s. d.	
Fine Pale Oak Varnish		0 8 0	
Pale Copal Oak		0 10 6	
Superfine Pale Elastic Oak		0 12 6	
Fine Extra Hard Church Oak		0 10 0	
Superfine Hard-drying Oak, for seats of Churches		0 14 0	
Fine Elastic Carriage		0 12 6	
Superfine Pale Elastic Carriage		0 16 0	
Fine Pale Maple		0 16 0	
Finest Pale Durable Copal		0 18 0	
Extra Pale French Oil		1 1 0	
Eggshell Flattening Varnish		0 18 0	
White Copal Enamel		1 4 0	
Extra Pale Paper		0 12 0	
Best Japan Gold Size		0 10 0	
Best Japan Black		0 18 0	
Oak and Mahogany Stain		0 9 0	
Brunswick Black		0 8 6	
Berlin Black		0 16 0	
Knottling		0 10 0	
French and Brush Polish		0 10 0	

TO CORRESPONDENTS.

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TENDERS.

Communications for insertion under this heading should be addressed to "The Editors" and must reach us not later than 10 a.m. on Thursday. [N.B.—We cannot publish Tenders unless authenticated either by the architect or the building-owner; and we cannot publish announcements of Tenders accepted unless the amount of the Tender is stated, nor any list in which the lowest Tender is under 100£, unless in some exceptional cases, and for special reasons.]

Denotes accepted. Denotes provisionally accepted.

ABERTYSSWAG.—For erecting new Baptist chapel, for the Building Committee. Mr. J. Davies, architect, 11, The Green, Abertyswag. £1,800 0 T. Matthews, 11, The Green, Abertyswag. £1,800 0 H. Rowlands, 1, 1331 6 Pengam, £1,800 0 Williams & Sons, 1, 1790 0

AMBLE.—For street improvements, High-street and Percy-street, for the Rural District Council. Mr. W. Gibson, Surveyor, 94, Queen-street, Amble. Quantities by Surveyor.—
R. Cane & Son, 4503 1 R. C. Brown, 4339
A. Douglas, 461 R. C. Brown, 405
[All of Amble. Surveyor's estimate, £440.]

ATERCLIFFE (Sheffield).—For erecting a new sorting-office, for the Commissioners of H.M. Works and Public Buildings.—
J. E. Green, £2,900 18 H. Boot & Son, £1,450 0
J. Fidler, Ltd., 1,640 0 T. Gray & Sons, 1,410 0
W. & A. Forns, 1,680 0 Ark. Son, & Co., 1,345 0
J. B. Longden & Co., 1,475 0 J. Greenwood, 1,342 0
Son, Ltd., 1,475 0

BANDON.—For laying additional water mains, for the Rural District Council. Mr. G. A. Armstrong C.E., Ardara, Bandon.—
J. Shine, 2519 J. McCarthy, Cork-road, Bandon, 2428

BOURNEMOUTH.—For the erection of a church in connection with the "Craven" Estate, Craven Park, Bournemouth. Mr. H. A. Whitburn, architect, 22, Surrey-street, London, and Woking. Quantities by Messrs. Carew & Finn, surveyors, 22, Surrey-street, London.—
T. Brown & Son, £10,800 0 J. Jones & Seward, £9,687 0
Miller & Sons, 10,315 0 R. Ashley & Co., 9,653 0
George & Hard, 10,263 0 McWilliam & Son, 9,329 10
H. G. Jones, 9,886 0 Jenkins & Son, 9,824 0
Jones & Son, 9,886 0 H. Kneock, 8,905 0
Harris & Son, 9,800 0

BROUGHTON-IN-FURNESS.—For erecting three cottages for the Co-operative Society. Mr. J. Bell, architect, of Coniston, R.S.O., Lancs.—
J. Coward, jun., Saw Mills, Coniston, B.S.O., Lancs., £1,277 6

DARTFORD.—For making-up private streets, for the Urban District Council. Mr. T. E. Tiffin, Surveyor, Council Offices, Dartford.—
Parsons & Parsons, Hford, £1,623 12 6

CAMBRIDGE.—For block of tenements, Corona-road, Victoria-road, New Chesterton, Cambridge, for the Corona Building Association. Quantities by the architect, Messrs. Cayley & Rochester, Bank-chambers, Rothwell, Kettering.—

	Price for Alternative A.	Price for Alternative B.	Deduct for Value of Gravel
Redding & Son	£ s. d.	£ s. d.	£ s. d.
Kerridge & Shaw	727 0 0	710 0 0	10 0 0
Scals & Robins	701 16 0	707 10 0	44 3 6
Scals & Robins	700 0 0	690 0 0	0 0 0
P. Barnard	655 10 0	648 0 0	10 0 0
J. Briggall	850 13 0	848 0 0	50 10 0
Oak Building Co.	649 0 0	842 0 0	10 0 0
J. R. Bennett & Son	681 12 3	636 10 1	23 1 0
H. E. Ambrose	605 0 0	590 0 0	21 18 0
G. J. Newman, Abbey Villa, Newmarket-road, Cambridge	590 0 0	578 0 0	10 0 0

Accepted subject to certain adjustments.

DONISTHORPE.—For laying a stoneware pipe sewer in the Ashby-road, for the Ashby-de-la-Zouch Rural District Council. Mr. S. Turner, surveyor, Packington, Ashby-de-la-Zouch.—
W. Moss, £201 11 E. Clarke, Wood-ville, £180

EPSON.—For new Council school, for 950 children, for the Surrey Education Committee. Messrs. Jarvis & Richards, Architects, 36, Victoria-street, Westminster S.W.—
J. B. Potter, £12,190 0 H. Kent, £10,686
Roll & Taylor, 11,800 0 Crowley Bros., 10,488
Jones & Son, 11,500 0 Williams & Co., 10,294 1
Wood & Son, 11,244 0 Taylor, 10,294 1
G. Kemp, 10,898 0 Martin, Wells, 10,290
Mitchell Bros., 10,849 0 & Co., 10,290
Wakelam Bros., 10,779 0 Hawkins & Co., 10,011

GREAT DUNHAM.—For enlargement of school, for the Norfolk Education Committee. Quantities by Surveyor to the Education Committee.—
Brummitt & Co., Sutton-bridge, £2375 16

HELLFIELD.—For 290 lineal yards of 9-in. and 80 lineal yards of 6-in. internal diameter-glazed earthenware pipes, for the Settle Rural District Council. Mr. T. A. Foxcroft, Surveyor, Town Hall, Settle. Quantities by Surveyor.—
L. Reaps, Long Preston, R.S.O., £144 10 3

HEREFORD.—For the erection of new sacristy and vestry at Belmont Cathedral, for the Right Rev. John G. Fowler, D.D. Mr. E. G. Davies, architect, 7, Bridge-street, Hereford.—

	Section 1.	Section 2.
R. Taylor	£475	£170
R. L. Friend	419	179
Bovars & Co.	400	151

(All of Hereford.)

HEREFORD.—For the erection of a rectory at Bydon for the Rev. T. M. Newbery. Mr. E. G. Davies, architect, 7, Bridge-street, Hereford, and at Mostmouth, W. C. Bolt, £1,300 0 C. Cooke, £1,130 0
W. L. Cadwal, R. L. Friend, 1,100 0
W. L. Cadwal, 1,296 10 W. Powell, 1,059 1
Barker & Son, 1,262 19 W. W. Willis, 1,030 0
Griffiths & J. H. Davies, 1,030 0
Mantle, 1,161 0 Loomister, 959 19

HEYWOOD.—For alterations to library in Longdon-street, for the Finance Committee. Mr. J. Ainsworth, Settle, Borough Engineer, Heywood.—
Blaikley & Wild, Heywood, £468

HULL.—For the erection of a tank shed, etc., Oxford-street, for Messrs. Walker & Co., Ltd., Mr. Metcalf, Lenham, architect, 21, Bond-street, Savile-street, Hull.—
C. C. Construction.
H. T. Arnold, £251 0 G. P. Bilton, £216 11
H. J. Kirkwood, 241 7 6 H. Hunt, 216 0
A. Lison, 238 9 J. Simpson, 212 0
J. T. Levitt, 234 8 T. M. Lenham, 209 15
G. Boulton, 221 0 W. Turner, 98 0
G. W. Richardson, 223 14 9 Northumber, 207 17
T. S. Kettlewell, 219 17 0 land-avenue, 207 17

KETTERING.—For house for Mr. J. Dines, Harrington-road, Rothwell, Kettering. Quantities by the architect, Messrs. Cayley & Rochester, Bank-chambers, Rothwell, Kettering.—

Haycock & Sharman, R. Read, Rothwell, £285 14 6 well, £297 0

LEEK (Staffordshire).—For laying down concrete foot and foundations for new engines and generator, etc., electricity generating station, for the Urban District Council. Mr. W. E. Becham, Surveyor, Town Hall, Leek. Quantities by the Surveyor, Town Hall, Leek.—
Banker Bros., £188 10 0 J. Heath & Sons, £113 12 6
S. Salt, 121 0 0 W. Turner, 98 0
[All of Leek. Surveyor's estimate, £110 6 8.]

LINCOLN.—For pulling down and rebuilding a warehouse in St. Swin's-square, for Messrs. W. K. Mort & Sons, Ltd. Messrs. Scorer & Gamble, architects, Bank-street, Lincoln. Quantities by architects.—
A. & R. Horton, £1,241 13 6 H. S. & W. Close, £1,019 10
Wright & Son, 1,075 0 F. Scarborough, 1,042 17
Farnhope, 1,075 0 T. Laidson & Co., 1,075 0
Haires Bros., 1,057 0 Son, 1,011 0
[All of Lincoln.]

LONDON.—For electric light installation, Lee-green station, for the London County Council.—
Hooper, Neary, & Co., £230 0 R. Dawson, Ltd., £173 0
J. D. Davies & Son, J. O. Grant & Co., 165 1
L. J. Davies, 214 0 Coleby & Co., 157 1
Barlow & Young, 196 0 Durell & Co., 58 5
W. Johnson, 183 0 F. A. Chubb & Co., 134 1
Oliver, Clark, & Co., 176 0 street, E. C. 4, 134 1

Price for each indicator.				Prices for clips, with screws and bolts, etc.			
Small size.		Large size.		Small size.		Large size.	
With hand.	Without hand.	With hand.	Without hand.	For columns up to 5-in. diameter.	For columns over 5-in. diameter.	For columns up to 5-in. diameter.	For columns over 5-in. diameter.
s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.
0 9	0 7½	1 19	1 7	0 5	0 7½	0 7½	0 9
1 1	0 11	2 4	2 4	0 4	0 7	0 7	0 9
1 1	0 11	2 4	2 4	0 10	0 11	1 2	1 2
2 0	1 19	4 0	3 6	(included in the prices for the indicators.)			
1 3	1 10	3 6	2 9	1 2	1 6	1 9	2 6
2 0	1 10	2 6	2 4	1 3	1 6	1 3	1 6

PRESTON.—For erecting a secondary school for girls, Moor Park-avenue, for the Corporation. Messrs. Woolfall & Eccles, architects, of Liverpool. Quantities by Mr. James London, Liverpool:—
T. Croft & Son, Ltd., Victoria-street, Preston £9,381

PURFLEET.—For alterations at Purfleet Council School, for the Essex Education Committee (Orsett Advisory Sub-Committee). Mr. Christopher M. Shiner, A.R.I.B.A., Architect, 6-8, Crutched-frars, E.C., and Grays. Quantities by Mr. Hoyland:—
S. E. Moss .. £2,250 0 0
Patman & Fotheringham 2,303 0 0
J. Brown .. 2,075 0 0
T. Bruty .. 2,041 0 0
Sheffield Bros. 1,948 0 0
Dobson .. 1,922 11 4
H. J. Carter .. 1,915 0 0
C. Wall & Co., Ltd. 1,911 0 0
£ Recommended for acceptance.

SOUTHGATE.—For the work and materials required in the construction of the permanent way (for electric traction), bridge work, road widenings, etc., for Contract No. 17, Railway No. 1 (Order 1903), a line of double track (with crossovers, contingent work, etc.) to be laid along Green-lanes, in the districts of Wood Green and Southgate, in the county of Middlesex, to a length of 8 miles 0 furlongs 4 chains, or thereabouts, for the Middlesex County Council. Mr. H. T. Wakelam, County Engineer, Middlesex Guildhall, Westminster, S.W.:—

Brush Electrical Engineering Co.	£134,892 15 0
R. W. Blackwell & Co.	74,078 17 1
Muirhead & Co.	77,434 2 10
T. Turner ..	76,741 11 8
G. Law ..	74,045 5 10
J. A. Ewart ..	72,123 2 0
W. Underwood & Co.	70,470 9 5
W. Griffiths & Co.	69,810 10 10
British Electric Equipment Co.	69,155 2 0
G. Wimpey & Co.	68,458 0 0
J. Mowlem & Co.	68,300 0 0
Zadig & Co.	67,889 18 2
T. Adams ..	67,094 7 10
C. Ford ..	65,910 2 2
Dick, Kerr, & Co.	65,010 2 2
W. Dobson ..	63,314 11 2

STOKE-UPON-TRENT.—For making-up back passages, for the Corporation. Mr. A. Burton, Borough Surveyor, Town Hall, Stoke:—
P. Barker .. 1145 0 0
W. Bullock .. 135 5 11
W. Williams .. 130 15 0
Horobin & Son 130 4 0
S. Underwood .. 129 8 0
T. Torrance .. 129 8 0
W. P. Taylor .. 127 6 10
A. Bullock, Stoke-on-Trent* .. 123 10 2

TWICKENHAM.—For electric lighting and supply of electrical machinery, etc., at pumping station, etc., The Mereway, for the Urban District Council. Mr. W. Fairley, consulting engineer, 59, Victoria-street, Westminster. Quantities by Mr. F. W. Pearce, Surveyor to Council, Town Hall, Twickenham:—
H. J. Godfrey, 138, High-road, Balham* £545 12
[Sixteen other firms tendered.]

WALSALL.—For building a sub-station to The Ditch, for the Corporation. Mr. A. Wylie, electrical engineer, Walsall:—
Jones & Evans, Pool-street* .. £94

WATFORD.—For erecting new infirmity laundry and phthisis wards at the Workhouse, for the Guardians. Mr. C. P. Ayres, architect, Buryale, Watford:—
Chifford & Gough .. £11,555 0 0
W. Holt & Sons .. 11,450 0 0
W. H. Lascelles & Co., Ltd. .. 11,190 0 0
W. King .. 11,150 0 0
W. H. Hyde .. 10,995 0 0
J. Honour & Son .. 10,876 0 0
L. F. Blay .. 10,850 0 0
Miskin & Sons .. 10,800 0 0
G. Wiggs .. 10,622 0 0
Hawkins & Co. .. 10,584 13 2
Myall & Ison .. 10,530 0 0
W. Lawrence, jun. .. 10,494 0 0
G. & J. Waterman .. 10,467 0 0
C. Brightman .. 10,300 0 0
H. Brown .. 10,191 0 0
Webster & Cannon .. 10,145 0 0
Oak Building Co., Ltd. .. 10,050 0 0
Murray & Son .. 10,012 0 0
Clark Bros., Watford* .. 9,889 0 0

WAKEFIELD.—For erecting three houses in Marsland-terrace, for Mr. J. H. Mitchell, of Wakefield. Mr. J. Day, architect and surveyor, Central-buildings, Marygate, Wakefield. Quantities by architect:—
Builders: Flower Bros., Wakefield* .. £357 12 5
Slaters: Pickles Bros., Leeds* .. 39 10 0
Plasterers: T. E. Senior, Wakefield* .. 35 0 0
Carpenters and Joiners: J. Loyd, Wakefield* .. 162 15 0
Plumber, etc.: H. Gillett, Wakefield* .. 49 7 8
Painters: Baines & Taylor, Wakefield* .. 12 5 0

WEST THURROCK.—For alterations at West Thurrock Council Schools, for Essex Education Committee (Orsett Advisory Sub-Committee). Mr. Christopher M. Shiner, A.R.I.B.A., 6, 7, and 8, Crutched-frars, E.C. Quantities by Mr. G. Silvester:—

Patman & Fotheringham ..	£2,170	461
T. Bruty ..	2,147	442
I. Brown ..	2,117	348
Hammond & Son ..	2,091	427
Sheffield Bros. ..	2,071	678
F. & E. Davey, Ltd. ..	2,049	471
C. Wall & Co., Ltd. ..	2,014	471
H. J. Carter ..	1,956	353
W. Potter ..	1,918	359
G. Brown, Grays, Essex* ..	1,903	379

WILLESDEN.—For road making and paving works, Lushington-road and Drayton-road, Barleaden, and Lyford-road, Wilsden Green, for the District Council. Mr. O. Claude Robson, Engineer to the Council, Public Offices, Dyne-road, Kilburn, N.W.:—

	Lyford road.	Drayton-road.	Lushington-road.
Neave & Son ..	£93	£204	£770
H. Boyer, Paddington ..	655*	299	671
T. Adams ..	800	258	675
F. G. Brummell, Willesden ..	770	182*	570*
P. Fowles ..	629	195	650

VOUGHAL.—For the erection of nine houses for the accommodation of the working classes on Cork Hill, for the Urban District Council. Mr. E. Green, C.E., Kilkenny, Co. Cork:—
J. Regarty .. £1,080 0 0
P. Kennedy .. 1,073 17 6
M. Murray & Son .. 1,000 0 0
J. Callaghan, Voughal* .. £988 17 6

W. H. Lascelles & Co.

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ILLUSTRATIONS.

Gonville and Caius College, Trinity College	From Loggan's "Cantabrigia Illustrata."
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New Villa in China.....	Messrs. Smedley, Denham, & Rose, Architects.
Wesleyan Sunday Schools, Sevenoaks.....	Messrs. Potter & Harvey, Architects.
Own Country Cottage.....	Mr. H. Dare Bryan, F.R.I.B.A., Architect.

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Old Illustrations at Cambridge.



HE present is a time of change, so far as the University, and therefore the town, of Cambridge, is concerned. The last thirty years have witnessed many

important additions to college architecture. Besides its new court, a fine and perhaps not over-appreciated work of the younger Gilbert Scott, Pembroke is adding yet another court on the site of the master's garden, a court which will solve the question of inter-communication between the two ends of the college. Caius has a new court facing the entrance-gate in Trinity-street. The whole aspect of Downing-street has been completely altered by the erection of three or four important laboratories and science lecture-rooms. These, indeed, are but a few of the many changes which have been taking place. In consideration of these architectural developments, if for no other reason, the appearance of a book which deals with Cambridge as it was towards the end of the XVIIth century must in itself be of great interest, and when Mr. J. W. Clark's name appears on the title-page as editor one may expect a volume of more than ordinary importance.

reproduction of David Loggan's famous book of views, first published in 1690, which has always been regarded as one of the most accurate guides for its day. Let us say at the outset that the book should be equally acceptable to antiquarian and architect. It must only be matter for wonder that so long a time has elapsed before a new edition of Loggan's book has been given to the public.

In his introduction Mr. Clark enumerates the few facts which are known of the artist's life, and explains the plan upon which Loggan worked. Probably few more conscientious draughtsmen than David Loggan ever lived, and in the plates which Messrs. Vaus & Crampton have so successfully reproduced in half-tone, one has the opportunity of examining a remarkable combination of picturesqueness and accuracy. The fidelity of these drawings, says the author, "can be realised by anyone who will take the trouble to study even a single plate minutely. . . . His [Loggan's] extraordinary accuracy as a recorder of architectural facts cannot be appreciated as it deserves unless some college be thoroughly examined with his picture of it in one's hand. It will then be discovered that he has omitted nothing." In cases, moreover, where additions have been made and subsequently removed, several features which figure in Loggan's views have been discovered exactly as they were drawn. It would, indeed, be difficult to over-estimate the importance of these plates. They show us the colleges as they were in the closing decades of the XVIIth century.

From a general survey of Loggan's work one may obtain a very fair idea of the collegiate system. The various founders of the colleges, says Mr. Clark, "were evidently copying a large dwelling-house of the period, such as some of them were very possibly living in at the moment." The colleges themselves are all "more or less quadrangular in design," and the official buildings, such as the chapel, hall, combination-room, and library, are ranged round a court, one side of which faces a thoroughfare. Loggan's drawings, taken as most of them are from a bird's-eye view, more particularly enable one to note the varying methods adopted by the architects of succeeding ages.

The first four plates are given over the original title-page, dedication, preface, and index of views. Loggan's preface, which is given both in its original Latin form and in English, is interesting inasmuch as he is at pains therein to describe the methods adopted in the case of such a stupendous work. "To pay repeated visits to the University," says he, "and when there to submit everything to the closest examination of the mind, as well as of the eye; to observe the limitations imposed by optics as well as by geometry; to examine, from some distant point, the roofs of all the buildings. . . . all the objects which the subtle art of architecture brought under my notice in the different materials which it employs; to draw them first on paper, then to engrave them properly on copper, and lastly to print them skillfully—are tasks which few know how to

His present work* is in the form of a
* "Cantabrigia Illustrata." By David Loggan. A series of views of the University and colleges. Edited, with a life of Loggan, an introduction, and historical and descriptive notes, by J. W. Clark, M.A., Hon. Litt. D., F.S.A. Cambridge: Macmillan & Bowes, 1905.

perform, and I must confess I learnt from experience." It was Loggan's aim to show as many as possible of the buildings which went to make up the college he was drawing, and in consequence most of his views exhibit perhaps more of the roofs than one would care to see, though his drawings are of such excellence as to remove speedily enough any prejudice that might have been aroused on that ground. There is a subtle grandeur in every one of his plates.

Of the thirty engravings four are views of King's College. The famous chapel founded by Henry VI., who left such definite instructions with regard to its construction in his will, is shown from three points of view, and each of the plates is a masterpiece in its way. This is especially the case in the engraving of the interior, the mass of detail being portrayed in a truly marvellous manner. In connexion with this plate "there is a legend," says the author, "that Loggan lost his eyesight as a result of the minute work which he bestowed upon it." Fortunately there is no evidence in confirmation of this story. It is known that Loggan worked extremely slowly, and that on occasions he allowed one or more of his assistants to help him with the actual drawing; but the great mass of the work was his own, and it occupied ten years of his life. After the views of King's Chapel, the colleges are shown in the order of their foundations. Pembroke is drawn with its new chapel, one of Wren's two important works in Cambridge, and the mass of buildings in the first court, which now no longer exist. Pembroke is probably the college which has changed the most in the last two hundred years. Its old chapel has been turned into a library, Wren's chapel has been lengthened, whilst new courts have arisen on all sides. Loggan's view, showing part of Trumpington-road, is particularly interesting.

The plate of Trinity Hall is hardly so good as the others, but its fidelity could not be doubted. The engraving of Gonville and Caius gives one an idea of a "small mediæval college before it had suffered alteration." In the centre of the foreground is the famous Gate of Honour, now made more beautiful by long ages, and to the right is seen the tree-lined avenue with the two Gates of Humility and Virtue. "The gateways," says Mr. Clark in his note, "are the earliest specimens in Cambridge of the Renaissance in stonework. They are designed with great architectural skill, and with that singular attention to symbolism which characterised the reign of Elizabeth." It is of interest to note that in this plate Loggan has been caught "tripping," for in the foreground figure a cart and horses traversing a road, which could not have been in existence at the time.

In all probability King's College and that at Eton were designed by the same person. The stone used for both foundations, as Mr. Clark has remarked in another book, was quarried "at their joint expense, and then divided between them." One is glad, therefore, to see that Loggan includes a view of Eton. He bestows two plates on St. John's College, the first of which, taken from the front, may be said to be one of the most successful of the series. The three

courts, one behind the other, are shown in quaint perspective. The two gates at the entrance to the second and third courts—the latter designed by the Ralph Symonds who afterwards worked on the Great Court of Trinity—are drawn with their four-angle turrets and wealth of ornamentation. The artist shares in the common admiration of that most wonderful of all colleges, Trinity. Three of his plates are given to this college, one a bird's-eye view of the whole, another of Neville's court, one of the most beautiful in Cambridge, and containing the library, which must be considered one of Wren's most successful works, and a third of the Bishop's Hostel, "which has preserved its original features with but little alteration," in spite of several additions in its near neighbourhood. Mr. Clark calls attention to the irregularity of the Great Court, but adds that "notwithstanding these peculiarities, perhaps in consequence of them, the whole has a singularly picturesque and harmonious effect." We should be inclined to think that the great size of the court would prevent the eye from noting any irregularities save, indeed, the variety of design in chapel, hall, master's lodge, and college rooms. The fountain is not in the centre of the court, but it appears to be so. As Mr. Clark says, there is harmony, and Loggan has obtained this quality in his illustration.

In addition to these views there are included plates of the town, the map of Cambridge executed by John Hammond, and a fine portrait of the Duke of Somerset, who was Chancellor of the University from 1689 to 1748. Mr. Clark is to be congratulated on a successful attempt to bring Loggan's work before a larger public. The "Cantabrigia Illustrata" comes as a fitting addition to the author's previous labours in the architectural history of the town and University. The book cannot fail to please those who are ready to appreciate fine, delicate, and accurate work of an age when the engraver's art was greatly neglected. We should welcome a similar reproduction of Loggan's companion work—first published in 1675—on the sister University.

ON SOME THAMES BRIDGES.

By E. S. ROSCOE.



NE is constantly prone to forget that what we call general history is only the result of, in many instances, local incidents; so that if one is acquainted with the local history of this or that place we probably realise more vividly history in its larger aspects. Passing down the Thames on a summer day one notes with pleasure the extending length of Abingdon Bridge, losing itself as it were in the Culham meadows, and the agreeable outlines of Henley Bridge, which so many of us have known from boyhood. One may not recollect, however, that these and other bridges are not only local landmarks, but that they mark and exemplify also incidents in the social history of this country. Godstow, Oxford, Abingdon, Culham, Clifton Hampden, Wallingford, Henley, Maidenhead, and Richmond—how many memories of different ages they recall of

old ferries across a river now placid and now rippling over gravelly banks, once the haunt of the salmon and the trout; of the enterprise of the country-side, sick of detention in winter floods, resulting in structures illustrative of growing national prosperity, which while primarily utilitarian, were always picturesque! In this iron age we span the Thames, even at its choicest parts, even by Windsor itself, with bridges which, however useful, have no harmonies of colour, and are antagonistic to their surroundings.

The two choicest of the Upper Thames bridges are those of Abingdon and Henley, which illustrate the efforts and the art of two widely different ages, the XVth and the XVIIIth centuries. Each bridge has its own special attractions, each is typical of its time, of the history of each we know something definite. The narrow roadway, the small arches, the sturdy pointed piers of Abingdon Bridge tell us of a time when construction was not easy, when the river ran down its course with impetuosity, when the creation of such a structure was a very notable deed. In the hall of the ancient almshouses which are so delightful a feature of Abingdon one may see depicted the building of the bridge in 1416, of stone presented by Sir Peter Besil, of Besileigh, a place which lay on the high ground between Oxford and Abingdon. One thousand marks towards the cost of the bridge were supplied by Geoffrey Barber, a rich burgher of Abingdon, who stands in the foreground of the picture counting out the money to be paid to the workmen, who, in the background, are toiling at their labour, which the benefactors and the great men of the place are supervising. It was a pious and a useful work:—

"Another blessed besines is briges to make," as the old verses preserved in the same old buildings say, telling us, too, how the aforesaid Sir Peter gave the materials for the sake of his father's soul and his friends; and how the women came to the river-side to watch the work, and how everyone rejoiced at the comfort of crossing the river dryshod. It was a memorable event this when

"King Henry the Fifth in the fifth year of his reign,
At Burford and Culliam did bridges built."

In those days, too, there were no highway boards and district councils, and the Guild of St. Helen, a religious foundation, was entrusted with the care of these bridges, and of the adjacent roads, exemplifying once again the fact that the architects and engineers of the age, the builders of bridges as well as of cathedrals, were ecclesiastics.

Thus in Abingdon Bridge we see an example of the energy of the age, and we may even realise the difficulties of life on the Thames side when for long periods in the winter the crossing of the river was very difficult, and often very dangerous.

Godstow Bridge and Folly Bridge at Oxford have some of the same interest as Abingdon and Culham Bridges; but only a small part of Godstow Bridge is mediæval. Folly Bridge has lost its ancient characteristics, being now only of three arches built in 1825 and 1827;

was in days gone by a roadway over a series of forty arches, and was well named "Grand Pont." It was more than bridge over the Isis; it was really a causeway over a space of marsh and muddy shallows, ranging in depth of water according to the season. Tradition hangs still about the place. Roger Bacon lived in the Gatehouse, and stories exist of him; in another the abbot of Abingdon took toll.

In the small modern bridge, not so rightly, we can see nothing of these old days, and it remains in most of our memories the background to Salter's flat, with its boats and its cheery occupants.

Most people who know the Upper Thames recollect the picturesque bit of river-scenery at Clifton Hampden, a few miles below Abingdon, the warm-coloured and pleasant brick bridge being a marked feature in the landscape. This shows that a bridge to harmonise with English scenery need not necessarily be mediæval or even of the XVIIIth century, for Clifton Hampden belongs to the Early Victorian period, having been built about 1840, primarily at the instigation of the present Lord Aldenham.

If, however, we want to find a bridge to compare with Abingdon in interest, unquestionably we must go lower down the river to Henley. Many who are not lovers of the Thames have seen this delightful memorial of the XVIIIth century. There were evidently warm local discussions on the subject of a new bridge in the autumn of 1781, in which year an Act of Parliament had been passed to authorise the new structure in place of the old bridge, which, being unsafe, was finally swept away by an abnormal flood in 1774; for Horace Walpole writes, in September 16, to General Conway, the owner of Park Place, referring to something he had told him of a meeting at Henley:—"You have temper and patience enough to hear with fools and false talk." Evidently Conway's wishes prevailed, for not only was a beginning made with the bridge, of which one William Hayward was the designer (though he died before the work was begun), but by 1784 it was nearing completion, and Walpole tells us in one of his letters that "Mrs. Damer herself is modelling two masks for the keystones of the new bridge." Mrs. Damer was the accomplished daughter of Conway. In 1785 casts of these heads were exhibited at the Royal Academy, and by the autumn of that year the bridge was nearly completed; again we hear of it from Walpole. "We saw," he writes in August, "the new bridge at Henley, which is completed on one side, and is most beautiful, the bend of the arch was regulated by General Conway himself, in three centres, and for grace does not veil the bonnet to the Porte del Tremblé at Florence." Walpole visited Conway so often that his letters form a kind of diary of the progress of the bridge, for next year he again writes: "I have seen the delight of my eyes, the new bridge at Henley." Walpole is too often regarded as a shallow and fanciful dilettante; but, on the contrary, beneath some mannerisms and affectation lay a keen intellect and a true taste. He concludes the same letter by saying that this

bridge "traverses a river a thousand times more beautiful" than the Tiber. After such a bit of enthusiasm Walpole cannot be accused of want of appreciation of a peculiarly charming but thoroughly quiet bit of English scenery, and in his appreciation of it he shows how modern in intellectual taste he is compared to many of his contemporaries.

As we pass under the agreeable grey arches of Henley Bridge, or shelter, it may be, beneath them from sun or rain, we ought to recall the scenes of which these extracts remind us, and the various characters, by no means unimportant in the society of the XVIIIth century, who were interested in its building. Maidenhead Bridge, built in 1772, is of the same type and construction as Henley, but it has not attached to it the personal interest which belongs to the other, though we can hardly say with a certain Mr. Powys that:—

"Our English rivers claim superior praise
From Damer's sculpture and from Denham's lays."

Something might be told of Wallingford, a famous mediæval structure, of which now next to nothing is left, for it was badly damaged by the Parliamentary forces at the siege of Wallingford in 1646, and in 1809 the three centre arches were entirely rebuilt. Shillingford, too, ought not to be forgotten, for it brings up pleasant memories of summer evenings, of holiday trips down the river, but we must pass on to Richmond, which, as is fitting, has a bridge built in the XVIIIth century, for the place is crowded with memories of that age, of the Duke of Queensberry ("Old Q."), whose agreeable villa was by the river's side, of the Castle Inn with its gay company, and its landlady, Mrs. Forty, who was the cause of Sheridan's celebrated toast at the Regent's dinner-table, "Fair, fat, and Forty." We are reminded, too, of the French Enigmes, of Madame de Boufflers, and the other brilliant persons who passed part of their exile not without pleasure on the river, of the fashionable Richmond of which Walpole once wrote that it "is in the first request this summer."

It is a little strange that it was not until 1774 that a commencement was made with the new bridge, resulting in its completion in 1777. For centuries Richmond Ferry had been one of the most frequented of river crossings; perhaps it was for that very reason that a bridge was so long in coming, for the owner of the ferry had a valuable vested interest. The bridge was designed by two now little-known architects, Paine and Couse, and cost 26,000*l.* If without striking features, it is yet dignified and pleasant in design, and was happily described by a contemporary bard who wrote of it with more truth than style:—

"No useless glaring ornaments offend."

Placed as it is in so agreeable and even striking a situation, Richmond Bridge tends to increase the charm of a delightful piece of Thames scenery, and for its erection we may offer thanks to our sensible XVIIIth century forefathers.

THE INCORPORATED INSTITUTE OF BRITISH DECORATORS have awarded their gold medal to Sir William Richmond, R.A., in recognition of his having carried out in St. Paul's Cathedral the most important work of coloured decoration executed in this country in modern times.

THE TRADES DISPUTES BILL.

THE proceedings on the Committee stage of the Trades Disputes Bill were such a foregone conclusion that the principal interest in the debate centres in the acrobatic feats performed by certain members of the Government in the performance of their great *volte face*. The Chancellor of the Exchequer sought to justify his change of opinion by saying that he could not be content unless the employers and workmen's unions were placed on equality, and that the new clause accomplished this; moreover, he endeavoured to give himself courage in the adoption of the new policy, that trade unions can do no wrong, by expressing his opinion that trade unions could now be trusted not to wish to do wrong. Was ever legislation based on such reasoning? If an improvement is apparent in the morals and manners of the nation, is that a reason for repealing all laws? Clause 4 of the Bill, subject to the Attorney-General giving the matter further consideration as to whether it cannot still be flavoured a little more to the liking of the Labour members, now stands thus: "An action against a trade union, whether of workmen or masters, or against any members thereof (or officials thereof), on behalf of themselves and all other members of the trade union for the recovery of damages in respect of any tortious act alleged to have been committed by or on behalf of the trade union, shall not be entertained by any Court, provided that nothing in this section shall affect the liability of the trustees of such unions to be sued in the events provided for by the Trades Union Act, 1871, sect. 9."

This section referred to enables trade unions to protect or defend their rights in respect of the real and personal property of the unions. How is equality secured in any real sense between employers and workmen by this clause which the Government has itself described as a piece of undesirable class legislation? If an employer is not a member of a union, apparently his property can be destroyed by the trade union and he be left without any pecuniary remedy. The good sense of the nation and of the working classes in particular is not likely to leave a measure drawn in such terms long on the Statute Book, even if it ever attains that position. The argument that for thirty years the trade unions were not supposed to have their funds made liable for their wrongful acts does not apply to deliberate legislation creating an immunity from responsibility for their actions. The result of such legislation is likely to encourage trade disputes, to encourage co-operation of trade trusts, and to sow strife between the bodies so created.

Clause 3 was also amended to the effect that an act done in furtherance of a trade dispute shall not be actionable if it enables a person to break a contract, in addition to the words relating to interference with trade; the only amendments receiving any consideration being those of Labour members. The history of the Trades Disputes Bill is, so far, unique, but is the policy of irresponsibility it introduces likely long to remain limited to trade unions?

NOTES.

Labour
Disputes.

THE Board of Trade Report on strikes and lockouts has just been published, and the figures given in its pages still show a fairly satisfactory condition in the relations of employers and labour, though not quite so good as last year, but that year, as we pointed out in our issue for August 12, 1905, was a record year. The number of disputes was about the same as in 1904, but the number of working days lost exceeded that of the previous year. The working days lost amounted to $2\frac{1}{2}$ million days, but the average number of days lost in the five years 1900 to 1904 exceeded this figure by some 400,000 days, and in the previous five years, 1895-1899, the number of working days lost averaged two-thirds more than in the year under review. This diminution in strikes and lockouts we attribute largely to the responsibility placed on the union funds of late years, and we earnestly trust that the promised legislation will not have the effect of again disturbing the better relations existing between capital and labour. One unsatisfactory feature disclosed in this last report was that the number of disputes arising out of refusals of union men to work with non-union men showed an increase. One-fifth of the total number of people affected by trades disputes appear to have been thrown out of work owing to controversies arising out of trade union principles.

An article in a French contemporary by M. Albert Sartioux, chief engineer to the Chemin de Fer du Nord, gives voice to the undoubtedly strong feeling entertained by our neighbours concerning the desirability of the Channel Tunnel as an encouragement to trade and industry and to the development of those friendly relations which conduce to the peace of the world. Some statistics given by M. Sartioux come rather as a surprise. For example, he shows that while 1,200,000 Englishmen annually visit the Continent, more than 3,500,000 passengers travel from Paris alone to Northern Germany and Belgium, or about three times the number conveyed from the whole of England to the Continent. These figures appear to dispose of the theory that Frenchmen do not travel abroad so much as Englishmen, and the suggestion is that the sea journey frightens our neighbours away from this country. We are inclined to think that the question of language has more to do with the comparatively small number of French visitors to Great Britain than the dread of an hour's trip on the sea. If, however, it can be shown that the tunnel would encourage the interchange of traffic between the two countries, that would be a powerful argument in its favour. But we are not yet in a position to indorse the opinion expressed by M. Sartioux that "there is no longer any possible doubt as to the technical success of the undertaking." We understand that Sir Douglas Fox is now preparing plans of the undertaking for the British promoters, but until it has been absolutely proved that no

geological faults exist along the proposed line of communication, it cannot be asserted positively that the scheme is practicable.

Metropolitan
Water Supply.

REFERRING to the great benefits conferred on the world by bacteriology, the President of the British Association remarked in the course of his address that by its aid London, using its natural "but inevitably contaminated sources of water supply, has enjoyed a long immunity from waterborne epidemics." This is quite true, yet while monthly reports show that the water as supplied to the metropolis is reasonably pure, it would be more satisfactory if the raw material, so to speak, could be derived from uncontaminated sources like those possessed by Manchester, Liverpool, Birmingham, Glasgow, and other great cities. The recent refusal of a Parliamentary Committee to sanction the proposals of the Yarmouth and Lowestoft water companies to abstract further supplies from the River Bure has been used by Sir Alexander Hinnie as the text for "a note of warning on the present condition of our London water supply." Of course we all know that its sources are contaminated, but it is not correct to suggest that the water supply itself is unfitted for modern requirements. Sir Alexander was identified with the Welsh water supply scheme of the London County Council, and no doubt believes that a similar project should be undertaken by the Metropolitan Water Board. At present, however much we may sympathise with the idea in the abstract, there does not seem to be a state of urgency such as would justify the sacrifice of existing waterworks, and the enormous expenditure involved in the acquisition of gathering grounds, the formation of storage reservoirs in Wales, and the construction of aqueducts from that country to London.

The
Inquest.

THE inquest opened last week on the body of a gasfitter employed by the Gas Light & Coke Company serves the purpose of directing attention once more to the risks which are needlessly incurred by some men who have to deal with the repair of defective gas pipes and fittings. In this particular case an escape of gas was noticed in the stables of a firm of cartage contractors in Holborn, and was reported by the horse foreman to the gas company, who sent three men to attend to the matter. It has not yet been stated what steps were actually taken in the way of repairs, as one man was killed by the explosion and the other two were so seriously injured that, if they ultimately recover, they will not be able to give evidence for at least two months. The point is made clear, however, that the gas was not shut off while the piping was being repaired, and the result was an explosion which wrecked the building, killed one workman, injured the two other workmen, and also injured the wife and child of the yard foreman. It is really extraordinary that gasfitters are still to be found who are unaware or heedless of the fact that coal gas and air form a highly explosive mixture. How it

comes about that men thus ignorant and reckless are employed by important gas companies is a matter that quite passes comprehension.

Workmen's
Compensation.

THE case of Neale v. The Electric and Ordnance Accessories Company, Ltd., reported in our issue of last week draws attention to another of the cases of hardship which may arise under the Workmen's Compensation Act. The plaintiff was an infant, a boy of fifteen suing by his next friend, and the action was brought against the defendants, his employers, in respect of personal injuries sustained by the boy, as was alleged, in consequence of the defendants having neglected to fence their machinery in accordance with the provisions of the Factory and Workshop Act, 1901. The action however failed, and the jury returned a verdict for the defendants. The plaintiff's counsel then applied to the judge for compensation under the Workmen's Compensation Act, acting under the provisions of sect. 1, subsect. 4, which gives the plaintiff the opportunity of still obtaining compensation after it has been determined in the action that the employer is not liable in damages as apart from compensation. The judge then made an award in the plaintiff's favour for 3s. 6d. a week. Subsequently an application was made to the Court of Appeal for a new trial of the action, but the plaintiff was held to be debarred from obtaining this, since by asking for compensation at the original trial he had exerted the option given to him by sect. 1, subsect. 2 (b) of the Workmen's Compensation Act, and therefore could no longer proceed for damages independently of that Act. The hardship involved by this decision is that since the courts have held in the case of Edwards v. Godfrey that the application for compensation under sect. 2, subsect. 4 must be made immediately the action for damages is dismissed, this involves the workman then and there exerting his option under the Act. In a recent case three new trials were granted in one action, and at the third application a Divisional Court was strongly of opinion that there was evidence of negligence, and that the action for damages had twice been wrongly decided. We consider that the Legislature can hardly have contemplated the effect subsect. 2 (b) would have on subsect. 4, and as no change has so far been made in these sections by the new Bill on this point, we think the attention of the Legislature should at once be drawn to a very real hardship.

THE paper contributed by Mr. Clement Reid to the Geographical Section of the British Association covers the chief points to be considered in connexion with the subject of coast erosion, and brings into prominence the necessity for studying the history of our coastline for at least a thousand years back. When the question is examined in conjunction with the deposition of the material eroded from cliffs, it is found that erosion has been by no means a continuous process. The rapid accumulation of material in certain parts of the east and

south coasts of England indicates that attacks by the sea first became marked at a definite date, before which the physical conditions were very different from those now existing. Some 3,000 or 4,000 years ago the sea level was probably about 60 ft. lower in relation to the land than it is to-day, and instead of being cut into cliffs as they now are in many parts along the south coast, the Downs were formerly separated from the sea by a wide plain, of which portions still remain. Mr. Reid suggests that the rise of the sea level may have been completed about 3,500 years ago, and that whatever was its exact date that consummation forms the natural starting-point of present investigations. At first rapid the progress of erosion was presently arrested by the collection of *débris*, in the form of sand and shingle, which are our most efficient safeguards against further inroads. The continued removal of beach material by private and public landowners, and its interception on a large scale by landowners and municipal authorities, constitute serious menaces to the owners of adjacent lands, and show the necessity for a central authority to whom all proposals for dealing with beach material and all coast protection schemes should be referred.

It is seldom that a case in regard to the right to air comes before the Court, but this happened at the recent assizes at Swansea, and Mr. Justice Jelf has just delivered a judgment on this subject. In so doing he has taken occasion, rightly enough, to emphasise the fact that the right to light and air are separate. In the present case he held that there had been such an interference with the air coming to the plaintiff's premises as to justify him in awarding 200*l.* damages. The obstructing walls made the plaintiff's back yard "like a box with the lid off." The weak part of the judgment is the admission that there was doubt "if physically less air than formerly entered the plaintiff's windows"; in other words the obstructions made the atmosphere more "stuffy." But if there is no current of air through a window, obviously less fresh air enters a room, so that we are inclined to think that this admission of the judge was hardly in accordance with his previous finding that there had been a stoppage of the air. The real test is whether an obstruction has caused a legal nuisance, and it is on this broad ground alone that this question can be settled as a matter of fact.

Motor-Cars v. Trains. Nor only the long-suffering shareholder, but also the man in the street, has been looking out for the remarks of the railway chairmen on this subject at the half-yearly meetings. "We motorists," says the writer of "Motor Notes" in a daily contemporary, "have often warned the railway companies of the approaching severe competition they must suffer from the car." Very considerate this, but savouring of supererogation. The severity of the competition is being recognised and acknowledged—though without undue pessimism—at most of the half-yearly meetings. The concrete

case mentioned by the chairman of the London and South-Western, however, illustrates the position very forcibly, and emphasises the serious aspect of the subject for lines depending chiefly upon passenger traffic for their prosperity. It appears that during the four days of Ascot week no fewer than 2,012 cars were counted there—most of them having conveyed "first-class fares" in varying numbers—undoubtedly representing an appreciable loss of income to the railway company. The chairman of the Great Eastern, in more general terms, spoke of the reality and severity of the tram and car competition; but almost side by side with his remarks appeared a paragraph suggestive of an occasional set-off. A car belonging to a well-known actress came to grief near an out-of-the-way Great Eastern station, and it cost the lady 32*l.* for a special train to convey her and her friends to their destination.

Damages for Compulsory Purchase. The case of *The King v. Mountford; ex parte The London United Tramways (1901), Ltd.*, raised a question of some importance to dwellers in cities. The tramway company had Parliamentary powers to lay tramways down certain streets in Kingston, but by their Act they were compelled to widen certain portions of the roadway before opening the lines for traffic. The company, for the purpose of the street widening, had acquired a portion of certain premises held on lease by Mr. Mountford, a dentist, but no part of the tramway was laid on any part of the land acquired from him. In proceedings for compensation under sect. 3 of the Lands Clauses Consolidation Act, 1845, the jury had awarded 360*l.* in respect of the land taken, and 400*l.* for injurious affection of the premises retained by Mr. Mountford, including loss of goodwill in his business. An application was made to the Court to quash this latter finding of the jury, and the application was successful. The Court appear to have held that the first sum included the injurious affection of the land left, including damages for the passage of the ordinary traffic nearer to his house, and that any further inconvenience was only suffered in common with the other inhabitants of the street; but the Court also were of opinion that had any portion of the land taken been used by the tramway company for the purposes of the undertaking, then the second head of damages would have been recoverable. The Court intimated some doubt in giving their decision, and the question involved is one of considerable difficulty. The principle governing these cases is that where an owner has lost his right to veto an undertaking by reason of the exercise of compulsory powers the compensation should be such as a willing seller might have been expected to stipulate for; but the difficulty in administering it satisfactorily would appear to be that one owner who had sold a foot or two of land might be placed in a far more advantageous position than his neighbours. All the same, since both the private Act of the company and the Lands Clauses Consolidation Act contemplate an owner being compensated for severance, it may be a question whether

any limitation can be placed on these provisions, by a consideration such as the above, and the distinction between the two uses the land was put to, seems unsatisfactory.

We read that by reason of the dangerous condition of the roof the Abbey church is closed for repairs. Thorney, first known as Ankeridge, was established on the elevated Drift and Lower Green Sand by the Morris and Fish Fens in the north-western parts of the Isle of Ely for some anchorites by Saxulph, first Abbot of Medehamstede (Peterborough), aided by Wulfhere, lord of Mercia, and brother of Peadha, the reputed founder of the latter monastery. After having been pillaged and burned by the Danes Thorney was, together with Ely, refounded by Æthelwold, Bishop of Winchester, and dedicated to St. Mary the Virgin, A.D. 972, for Benedictines whose abbots attained to high eminence and sat in Parliament. King John granted the patronage of Thorney to Eustace, Bishop of Ely, and his successors. In 26 Henry VIII. the revenues were computed to be 508*l.* 12*s.* 5*d.* per annum, *teste* Speed; Dugdale says they amounted to 411*l.* 12*s.* 11*d.* Edward VI. bestowed most of that property, with the site, upon John, first Earl of Bedford. The Russells continued the monks' labours, ennobled by William of Malmesbury, of draining and cultivating their low-lying lands; the enterprise is commemorated by the "Great Bedford Level" in the construction of which Cornelius Vermuyden played a part. The church had been rebuilt in 1128; in 1638 the nave was converted into the parish church. Some reparation of the fabric in 1652 is attributed to Inigo Jones. Blome enlarged the church about sixty-five years ago for the Duke of Bedford, in whose honour the tenantry, largely descended from Walloon and French *émigrés*, subscribed for a fine organ. The district around had been held by the Iceni, whose chief town was at Norwich. The Britons maintained their stand there until the Gyrwas from Engle-land dispossessed them in the middle of the VIth century. In the neighbouring fens Hereward the Wake and Morkere, Earl of Northumbria, made their last resistance against William the Conqueror.

THE QUEEN VICTORIA NURSING INSTITUTE, READING.—This institute, which was opened recently, consists of two houses in Abbot's-walk, which have been converted into one, affording accommodation for ten bedrooms. The work has been carried out by Messrs. Collier & Catley, and Messrs. Boyd & Murley (painting), under the supervision of Mr. W. Ravenscroft, F.S.A., of Reading.

LIQUID AIR.—The establishment opened at Battersea last week by Major Baden-Powell is said to be the first plant in any country where liquid air has been produced at so low a price that it can be used freely in industrial work. We may point out, however, that at Los Angeles, in America, liquid air and oxygen are being produced on a commercial scale, and that in Germany liquid air is sold at a price which permits it to be used as a substitute for ice. No chemicals are necessary in the process of production, and it is stated that the liquid will be supplied at the small cost of 5*s.* per gallon. Those interested in the industry expect that the product will be used for many purposes, including the operation of prime movers. If it could be applied successfully to motor vehicles instead of the familiar but odorous petrol, the public would have much reason for gratitude.

THE ROYAL ARCHEOLOGICAL
INSTITUTE AT WORCESTER.

(Continued from page 171.)

Friday, July 27.

This day was devoted to an examination of certain architectural antiquities in Worcester itself. The party assembled at 10 o'clock at St. Wolstan's Hospital, more generally known as the Commandery, which was inspected under the guidance of Mr. Littlebury. The chief feature of the building is the fine timber hall of the XVth century, with open roof, and considerable remains of its original quarry glazing, with quaint figures of birds. A visit was next paid to the cathedral church, where Mr. Hope pointed out the various changes described by him on the preceding evening. After luncheon the monastic buildings were inspected. Mr. Hope having first explained in the chapter-house the general disposition of them, as illustrated by the Parliamentary Survey of 1649, at which date all were still standing. From the minute descriptions of the various prebendal houses given in the survey, it was possible to lay down the exact limits and relative positions of the important western block, which contained the monks' dorter and the infirmary, with the vice-dorter between. The inspection of the buildings concluded with a visit to the ancient bishop's palace, now the deanery, where the members were hospitably entertained by the Dean of Worcester and Mrs. Forrest. Though outwardly of no great interest, marked as it is by a XVIIIth century front, the building is one deserving of careful examination, and contains an elaborate series of vaulted undercrofts of the XIIIth and XIVth centuries, below the great hall, chapel, etc., which indicate the original disposition of the chambers over them.

At the evening meeting Mr. J. W. Willis Bund read a paper, illustrated by plans and lantern slides, on "The Evolution of Worcester," from the earliest times down to its condition as a walled town in the Norman period. He also called attention to the danger threatening the few remaining old timber houses in the city, owing to their insatiable condition, which empowered the Corporation, under certain circumstances, to compel first their closing and then their demolition.

Saturday, July 28.

This day was devoted to visits to Ledbury and Malvern. Leaving Worcester at 9.35 a.m. the party reached Ledbury at 10.30 and proceeded to the parish church, the chief features of which were lucidly pointed out by the Rev. Prebendary Maddison Green. The church was originally a cruciform structure of early XIIIth century work, but, owing apparently to the fall of the tower, was largely rebuilt about 1170, and extended eastwards and westwards to its present length. The aisles have been enlarged, the north in the XIIIth century and the south in the XIVth century, and temp. Edward II. a fine and large chapel, richly decorated with bell-tower, was built out north of the chancel. A two-storied vestry and porch were also added about the same time. The tower is a detached structure, c. 1200, to the north of the church, with a later upper story and modern stone spire. A visit was next paid to the Hospital of St. Katharine. This was founded in 1232 by Hugh Foliot, Bishop of Hereford, for a master, and divers poor brethren and sisters, but refounded by Queen Elizabeth in 1580. Most of the present buildings are modern, but the chapel is of the time of the first foundation, and had the hall in line with it to the west. The latter has been subdivided, and much altered, but the chapel retains a fine open roof of the XIVth century, when some of the windows were enlarged, and a good deal of rich flooring, with the tiles disposed in their original patterns.

After luncheon carriages were in readiness to convey the party to Little Malvern priory church, which was described by Mr. C. R. Peers. The priory was a cell of Worcester, founded in 1171, and the church of that date was apparently a cruciform structure with a north aisle only to the nave. The existing remains belong to a reconstruction in the XIVth century, and include the central tower and presbytery, which form the present parish church, with north and south tran-

septs and chapels east of them, all now in ruins. The east end was altered by Bishop Alcock before his translation to Ely in 1486, and in the east window, which contains his arms, are the kneeling figures of Arthur, Prince of Wales, his mother, Queen Elizabeth of York, and his consort, the Lady Katharine of Aragon. The figure of King Henry VII. has been destroyed. The date of this glass, which is by the same hand as some of the later glass at Great Malvern, must belong to the period between the marriage of Prince Arthur, in November, 1501, and his death in the April following. The nave of the church has been destroyed, as well as two sides of the claustral buildings, but the western range, much altered, exists as a modern residence.

The journey was next resumed to Great Malvern, where the priory church was described by the vicar, the Rev. Canon Pelly. After inspecting the fine series of wall tiles and the rich collection of old stained glass the party returned by train to Worcester.

Monday, July 30.

Visits were paid to Evesham and Pershore, the party numbering about a hundred. On arrival at Evesham a halt was first made at the town hall, where the mayor received the members and exhibited the maces, plate, and charters. The site of the Benedictine abbey was next inspected under the guidance of Mr. C. R. Peers, who referred to the excavations carried out by Mr. Rudge early in the XIXth century, which had brought to light the plan and crypt of this great church. Of this only a fragment of the north transept remains above ground. The abbey buildings have also totally disappeared, with the exception of the richly-decorated arch from the cloister into the ten-sided chapter-house and some minor buildings near the great gate. Abbot Lichfield's fine bell-tower, which served also as a gatehouse between the cemeteries of the layfolk and the monks, is still perfect, and there are some interesting remains of the Norman gatehouse through which the outer cemetery was reached from the town. Within this cemetery are two parish churches, both of them in use. The most noteworthy feature in each is a small chantry chapel of the XIVth century, with rich fan vaulting.

Carriages being in readiness, the members of the Institute then drove to Pershore. After luncheon a visit was paid to this abbey church, which was described by Mr. C. R. Peers. The building to which the present remains belong was begun about 1100, but only the south transept and crossing remain. The north transept and the nave, which must have resembled that of Tewkesbury, were destroyed at the suppression of the abbey, and the eastern limb rebuilt in the XIIIth century. This latter work is not, however, all of one date. The eastern chapels, including the destroyed lady chapel, were begun to the east of the Norman presbytery about 1210; the presbytery itself was rebuilt after a fire in 1223, and its vault, together with the upper part of the tower was added after another fire in 1238. Mr. Peers pointed out that for some reason, probably structural, the tower had never been carried up to its intended height, and many of its details were still left in block only. There are traces of a large early XIVth century chapel eastward of the south transept. The whole of the claustral buildings have been swept away. Before leaving the church the President of the Institute called upon M. Eugène Lefevre-Pontalis, President of the Société Française d'Archéologie, who, with several of his countrymen, had honoured the meeting by their presence.

M. Eugène Lefevre-Pontalis, speaking in French, first thanked the President and members of the Institute for their cordial reception of himself and his confrères. M. Louis Serbat, the Secretary of his Society, He then commented in the most interesting manner on the similarity between the architecture of England and Normandy in the first half of the XIIIth century, the same preference for delicate and refined mouldings, the same complicated plans of pillars, the same clearstory passages, and the same forms in the windows, instancing the choir of St. Étienne of Caen, the cathedral churches of Lisieux and Coutances, etc. In speaking of the same preference for complicated mouldings, he noticed the early appearance of the

fillet on shafts and rolls of arch mouldings, which has been attributed by certain French archaeologists to the XIVth century. In the last quarter of the XIIIth century the architecture of England began to separate itself from that of Normandy, especially in the vaults. English architecture continued its preference for complicated forms by the free introduction of tiercerons and liernes, and then by the introduction of curves of contraflexure in window tracery, which anticipated the introduction of the Flamboyant style of France. At the same time he confessed to a preference for the XIVth century Gothic of the continent, as illustrated by the magnificent church of St. Ouen at Rouen. He considered the choir of Pershore to be of fine style, comprising delicacy of detail with impression of stability. He finished a very interesting address by inviting the members of the Institute to take part in the Congress of his Society at Avallon and Auxerre next year, and with the hope that English and French archaeologists would continue the *entente cordiale archéologique* by the comparative study of the architecture of the two countries. He also alluded to the *entente cordiale* of former times between his predecessors, M. de Caumont, M. Ferdinand de Lesteyrie, etc., and Sir Augustus W. Franks, Mr. J. H. Parker, and others.

The party were after received to tea by Mr. and Mrs. Pearce in their interesting house of the Adam period, and subsequently returned by train to Worcester.

In the evening the members of the Institute were present at a conversation at the Shire Hall, by invitation of Mr. J. W. Willis Bund, Chairman of the Worcestershire County Council, who showed his guests an interesting series of lantern slides illustrative of the various types of churches, ancient houses, bridges, and other architectural antiquities characteristic of the county.

Tuesday, July 31.

This was the concluding day of the meeting. Leaving Worcester at 9.25, the party journeyed by special rail-motor to Taddington, and thence in carriages to Stanway. Here the manor-house, a good example of Elizabethan work with forecourt and gatehouse, was first inspected. A visit was next paid to the parish church. This consisted originally of a simple chancel and nave of the XIIIth century, but later windows have been inserted and a tower added at the west end. The journey was next continued to Hayles, where the party were received by Mr. Hugh Andrews, the owner of the site of the abbey, and the remains of the church, etc., examined, under the guidance of Mr. Harold Brakspear. The abbey was one of Cistercian monks, founded in 1245 by Richard, King of the Romans, with a church of similar type to that of Abbey Dore. Between 1271 and 1277 the church was enlarged eastwards for the enshrining of the famous relic of the Holy Blood, by building out an apsidal chapel for the shrine, with an enriching ambulatory and external chevet of five polygonal chapels. Only a fragment of the south wall of the nave remains above ground, but the foundations were excavated a few years ago by the Bristol and Gloucestershire Archaeological Society, and the complete plan recovered. Some fragments are left of a late Tudor rebuilding of the cloister alleys, but the rest of the buildings still await investigation with pick and spade. In an adjacent museum are preserved a large number of fragments of splendid tombs, architectural remains, and paving tiles found during the excavations. Some remarks on the Holy Blood of Hayles were contributed by Mr. St. Clair Baddeley and Mr. Micklethwaite. After an inspection of the parish church, an interesting building with some lately-discovered early wall paintings, the journey was continued to Wincombe. After luncheon a visit was paid to the parish church of Wincombe, where the vicar, the Rev. Dr. Taylor, displayed the interesting church plate and registers and some fragments and tiles from the destroyed Benedictine abbey. The last item on the programme was Sudeley Castle, where the members of the Institute were received by the present owner, Col. Dent Brocklehurst and his family. The first building on the site was apparently a Norman castle, but this was replaced by Lord Sudeley, temp. Henry VI., by a fortified house, of

which there remain the ruins of the great hall and other fragments. The building was considerably enlarged, *temp.* Edward VI., by Admiral Lord Seymour, whose work forms the present castle. Every facility was afforded of inspecting the many art treasures contained in the house, and, after being hospitably entertained at tea, the party returned by special rail-motor to Worcester.

The meeting which was thus concluded was a most successful one in every way, the number of members' tickets considerably exceeding 100, and the excellent arrangements planned by Mr. Harold Brakspear, the Secretary of the meeting, and Mr. William Pearce, the local secretary, worked without a single hitch from first to last. The weather, moreover, was all that could be desired; not a single excursion being marred by rain. It was decided that next year's meeting should be held at Colchester.

OLD SURREY CHURCHES.

THE first thing that strikes one as a prevailing feature in the village churches—if one excepts a few noteworthy structures such as Ewell, Walton, Headley, Worplesdon, West Molesey, Frensham, Peperharrow, and Puttenham—is the picturesque steeple, in most cases a small turret with spirelet, and both generally covered with "shingles." One or two elegant towers with spires occur, such as Chaldon, Newnham, Elstead, Abinger, Ash, Byfleet, particular charm attaching to the first named on account of the compactness of the church and the almost studied harmony of the irregular roofing. Some of the churches are long, and practically all of them are low, without clearstory or triforium. Many show Norman work; even Little Bookham having arches of considerable span from column to column resting on Norman capitals, as if it was the intention of the builders to add aisles when the size of the congregation justified such a step. But in this particular instance, the aisle used to be there, as part of the capitals and columns and arches show on the outside, and Perpendicular windows inserted in the bricking up. The windows of the Surrey churches show a wonderful variety—from the seven lancets at the east end of Ockham Church, near Ripley, to the cathedral-like a superb east window at Oxted, near Limpsfield.

Stoke d'Abernethy and Carshalton have both been practically ruined by modern rebuilding, the most serious disfigurement being at Carshalton, from the architectural and picturesque standpoint, the almost Queen Anne Gothic flaring red brick and yellow stone nave and aisles being extravagantly out of proportion to, and keeping with, the old stone chancel.

Of Godalming Church it must be said with regret that the restorations that took part there resulted in the removal of beautiful tracery, in the west front particularly, and the insertion of totally different patterns of a more formal and less free design, and—what is perhaps worse—the alteration of one of the Norman arches supporting the tower into the pointed shape. The east window of Little Bookham is a terrible affair, as are also its north aisle windows.

Of the fine, almost town-like, specimens in the east and south of the county are Oxted, Godstone, and Horley, without excepting even Brockham and Mersham. Of the less well-known churches, but very interesting and charmingly situated, particular attention is called to Merton, originally built by the monks of the abbey near by; Pyrford, near Byfleet and Newark Abbey; Wisley, one mile south of Byfleet Church; Thames Ditton, with its squat tower, mainly of wood, surmounted by a tiny and thin spire—quite a stripling, in fact; Banstead, with interesting interior, and chantry and screen arches, and fine, but modern, decorative mural painting; Leigh; Shere, with three narrow slits in the upper stage of the lower and handsome broach spire; East Clandon, singularly fascinating in ensemble from either end, amid charming surroundings; West Horsley, one of the best churches between London and Guildford, and possessing an old wooden west porch; Old Malden, about fifteen minutes' walk from Worcester Park Station—turn up by the Plough Inn; Witley; Compton, with its singular chancel of two different heights, the lower arch being surmounted by a window

visible under the chancel arch proper; Sandstead, near Croydon; Chessington, containing unique timber columns and arches separating nave from south aisle; Esher old church, Mickleham, Buckland, Fetcham, Chipstead, and Limpsfield.

A very few have small transepts, such as Thorpe, Oxted, Chipstead, Ewhurst, Dunsfold, Puttenham, Nutfield, Witley, Ashted—a very long north one—Godstone, Brockham, Shere, Bletchingley—these two being gableless. Godalming and Leatherhead and Kingston are the town churches with transepts.

Wanborough, between Guildford and Farnham, on the north side of the Hog's Back, has no steeple at all, only a small roof projecting from the west front, and sheltering a diminutive bell. A singular, and not very pleasing, arrangement occurs at Frimley, where a pediment is arranged over the aisle fronts and leaning to against the sides of the west tower of the XVth century, of which period the aisle west windows also are.

Amongst town churches Leatherhead is a majestic example, with its bold tower standing "four square" to the winds. It, too, has transepts, but the church, being rather closely surrounded by houses on one side, and trees in the churchyard on the other, a general view is difficult to obtain that would satisfy the eye of the architect and antiquary. Kingston tower upper stage is of brick—a comparatively modern one, with a poor parapet, though the whole church is of fine proportions and detail. If the brick were replaced by stone, and with a good parapet and corner pinnacles, the church would be rendered worthy to rank with many of the town churches throughout the land. Godalming we have dealt with *ante*.

Farnham has superb windows, especially at the east end, while the interior, with its interesting west end and fine roof, is striking. Nor should the choice St. Mary's Church, Guildford, be omitted from mention, both as regards exterior and interior, which would repay very careful study. The chantry, too, on the south side of that nightmare hard by—the awful St. Nicholas' Church—must not be passed over, as it is of the Perpendicular period.

Louvers occur at Leatherhead—where those on the south side are irregularly placed, the lower one being very large—Compton, Mickleham, Banstead, Esher Old Church, a curious example, Tandridge, with tracery in their gables, West Horsley, and Chessington, to the south side of the nave, hidden from outside view by the south aisle roof.

Several churches of the county have not been alluded to by name in this article, as they have the different features referred to in those above cited.

With so many admirable examples, so to speak, to hand, cannot the county architects be induced to design their modern churches more in harmony with the unpretentious, dignified, quiet, and unassuming religious edifices of a bygone day, which are the pride of the county and the delight of the antiquary?

Few counties can boast of such architectural and picturesque wealth in the matter of village churches as can the county of Surrey, which holds its head very high, and affords a vast amount of profitable and pleasant study for those who love ecclesiastical art for its own sweet sake.

JOHN A. RANDOLPH.

THE ROYAL SANITARY INSTITUTE.—At an examination in Sanitary Science as applied to Buildings and Public Works, held in Norwich on July 27 and 28, three candidates presented themselves. The following two candidates were awarded certificates—Archer, William Henry, (Cromer), Hutley, Edward (Colchester). At an examination for inspectors of Nuisances, held in Norwich on July 27 and 28, thirty-one candidates presented themselves. The following eleven candidates were certified, as regards their sanitary knowledge, competent to discharge the duties of inspector of nuisances under the Public Health Act, 1875—Bannerman, D. B. (Manor Park), Blower, R. T. (Norwich), Gannham, G. E. (Norwich), Cobb, W. (Catesham Valley), Cox, C. L. (Gosport), Emett, J. P. (Canonbury), Hodgson, Helen S. C. (Pontefract), Lloyd, W. T. (Weybridge), Maylor, S. J. (South Norwood), Mitchell, Mary C. (Crowthorne), Rouse, F. J. (Chislehurst).

THE INSTITUTE OF SANITARY ENGINEERS:

MEETING IN MANCHESTER.

THE annual summer meeting of the Institute of Sanitary Engineers was held in Manchester on Friday, Saturday, and Sunday, July 6, 7, and 8, Sir William Mather M.Inst.C.E., presiding.

In his address of welcome, Sir William said the Institute of Sanitary Engineers represented a branch of the engineering profession which, taking it all in all, was, he thought, the most beneficial of all the branches of the engineering profession. There were the civil engineer, the hydraulic engineer, the electrical engineer, the mechanical engineer, but the sanitary engineer seemed to differ from all these branches inasmuch as he laboured in a field in which, more or less, all branches were interested, but which had to do almost solely and alone with the well being of the people in the highest sense of the word. To be occupied in projecting and carrying out schemes for the purpose of improving the health, the comfort, and the means of life in large communities was a noble work, entirely apart from the remuneration that it brought. In fact, one might say that the sanitary engineer had to work without many of those incentives and rewards which attached to other branches of the profession. He was occupied in dealing with elements in life which were not generally regarded as delightful to look upon or to contemplate; it was a branch of engineering which did not offer many attractions to those who desired to win praise from their fellow-men or to erect monuments to themselves by the work of their hands.

England, as they knew, enjoyed the reputation—or did enjoy the reputation some years ago—of being the most advanced nation in the world in sanitary science, and in its application. He remembered that some twenty years ago an eminent German scientist, Dr. Virchow, who came to England to report on the general tone of our institutions—sanitary, educational, municipal, and otherwise—reported on his return that England was 100 years behind Germany in education, but 100 years ahead of Germany in sanitation. He thought that figure of speech represented very much the difference between Germany and England. He remembered Berlin when it was a city ugly and offensive in many respects, with no drainage system except that which was exposed to the street, with a vile atmosphere, bad water, and bad lighting. But after twenty years Berlin was now the pride of the German Empire. That great transformation had been brought about because education had advanced and performed its perfect work in relation to applied science, to the advantage of the inhabitants of a great city. The sanitary engineer, the civil and mechanical engineer, and the chemist could provide several essential conditions of life without which our boasted civilisation was all veneer and vanity. Every river and stream in the land might be pure, every town and city clear of smoke and noxious vapours, mills and manufactories wholesome and healthy, and the housing of the people, even the most humble, sanitary and cheerful, with fresh air and open spaces adorned with grass and shrubs, common to all who inhabit the towns, together with good water and efficient drainage. All these science and experience could accomplish. The architect, added to these men of science, would contribute the artistic feature to all necessary structures.

Human communities were structures depending on their foundations, like other physical structures, being well laid and strong. It was a frequent complaint on the part of our municipalities, when they were charged with neglect of the housing problem, that the expenditure of public money in this direction was not encouraged because such a vast number of people did not appreciate better conditions of life; and the greatest impediment in this country to the better housing of the people was not the want of will on the part of our municipalities nor the want of money—it was the difficulty of maintaining the inhabitants of the poorer classes in a fit condition for human comfort owing to the habits and want of cleanliness of the people themselves.

Professor E. G. Coker, M.A., President of

the Institute, proposed a vote of thanks to Sir William Mather, which was seconded by Dr. J. B. Wilkinson, M.O.H. (Oldham), and carried with acclamation.

Strength Properties of Brickwork.

The following paper was then discussed—i.e., "The Strength Properties of Brickwork as Determined by Experiment," by Mr. W. C. Popplewell, M.Sc. The author said—

The object of this paper is, in the first place, to describe the manner in which experiments on the strength of brickwork are carried out in the materials testing laboratory of the Manchester School of Technology; to indicate the kinds of results which are to be expected from these; and, lastly, to quote several of the more important of the data which have been obtained here and elsewhere.

Testing Machine and Measuring Apparatus.

The machine used for making tests of brickwork and similar materials is a 900-ton hydraulic press, having a 20-in. ram. In this machine the pressure of the water above the ram is shown on a pressure gauge. In order to allow for the effect of the friction of the cup leather, the weight of the ram and its attachments, and the upward pull of the side pistons which are used to lift the ram, a direct calibration has been made by which the load on the specimen can be calculated directly from the pressure, with a very fair degree of accuracy. The formula made use of is $W \text{ (tons)} = (p \text{ (lb.)} - 34) 0.139$.

This formula has been obtained by means of a steel spring piece which had first been loaded in the Wicketest testing machine. In this way the load in tons on the specimen can be obtained directly from the pressure in pounds per square inch.

The compressions corresponding to the loads are obtained by means of a Martens mirror apparatus. In this instrument changes of length of the specimen which is being loaded cause the rotation of a mirror, and the reflection of a graduated scale in this mirror, as seen through a telescope, is caused to appear to move across a fixed line in the diaphragm of the telescope. The difference in the position of this line on the scale is a measure of the change of length between two points a fixed distance apart. In the experiments here referred to two mirrors were used, placed on opposite faces of the pier, so as to indicate any inequality in the stress. The readings were taken on a length of 20 cm. on the face of the brickwork, and readings could be read directly to 1-10,000th of an inch, and by estimation to 1-50,000th.

Kinds of Tests Carried Out.

The experiments which have been made include tests of piers of brickwork, tests of the bricks of which the piers were built, and tests of the mortar used.

All the piers tested have had a square section, 18 in. by 18 in., giving a sectional area of $2\frac{1}{4}$ sq. ft. Those tested up to the present have been 36 in. high, but three which have recently been built are 48 in.

The building of the piers has in all cases been carried out by working bricklayers. Some have been built in place on the lower platform of the machine, while others have been built on stiff squares of timber and moved into the machine when ready for testing. In all cases the top and bottom surfaces of the piers have been set either in neat Portland cement or in plaster of Paris, in order to distribute the load uniformly. This is an important point, and seriously affects the results of the experiments.

The various piers tested up to now include the following:—

One of common local wire-cut bricks	with lime mortar.
One of common local wire-cut bricks	with Portland cement mortar.
One of Accrington shire	with black mortar.
One of blue Staffordshire	with Portland cement mortar.
Six of blue brindle Staffordshire	with 2 black lime mortar.
	2 Portland cement mortar.
	2 blue lime mortar.
	1 Portland cement 1 to 1.
	1 " " 2 to 1.
	1 " " 3 to 1.
	1 " " 4 to 1.
	1 " " 5 to 1.
Five of Accrington	

At first no special plan was adopted so as to systematise these tests, but now, for any set of piers built and tested, the idea of obtaining information on specific points is kept in mind. To the above must be added

three piers recently built but not yet tested. These are:—One of blue Staffordshire, with Portland cement mortar 1 to 1; one of second Accrington, with Portland cement mortar 1 to 1; one of second Accrington inside, and faced with blue Staffordshire with Portland cement, with mortar 1 to 1. In the case of these last, the height is 4 ft. instead of 3 ft. Thus, in all there are eighteen piers, fifteen of which have been tested.

The result of the first fifteen tests have been already published and discussed in a paper published in the *Proceedings of the Institution of Civil Engineers*, CLXI.

Results Obtained.

Relation of Stress and Strain.—The measurements taken with the Martens apparatus make it possible to express a relation between the stress and mean strain at any period of the loading.

This relation is conveniently expressed by a plotted stress-strain curve, which is similar to the curve obtained on the first loading of any material having the nature of soft stone or mortar or concrete, in which portions of a harder substance are set in a matrix of a different substance, which is generally soft in nature.

This diagram may be divided into three portions:—

(a) There is a curved portion with the concave part upwards. This indicates a diminution of strain as the loading progresses, which may be caused by the spaces between the particles which form the substance being closed up.

(b) The second part of the diagram is straight, thus pointing to an elastic condition of the substance. This elasticity is not quite perfect, as there is generally found a little permanent set on the removal of the load. It is further found, when the specimen has been loaded and reloaded once or twice, that the permanent set is almost completely eliminated. From the readings taken during this part of the loading it is possible to calculate a value of Young's modulus (E). For the best kinds of brickwork (E) has been found to have an average value of about 125,000 tons per square foot, or 1,940,000 lb. per square inch. This may be taken to mean that for the application of a stress of 1 ton on each square foot a wall or column of brickwork will be shortened 1-125,000th of its height. For example, in the case of brickwork 100 ft. high, loaded 12½ tons in each square foot, there would be a shortening, apart from its own weight, of 1-100th of a foot, or about 1 in.

(c) At the end of the straight portion the line again becomes curved in the opposite direction from that of the first part. This indicates a growing increase of compression, and marks the end of the elastic condition.

Effect of Successive Applications of the Load.—If a loading is carried just beyond where it has been called the proportional limit, the load removed, and then again applied, it is found that the measurements taken during the second loading plot on a straight line up to where the previous loading stopped. It would seem that the effect of the first loading is to press the particles permanently nearer together. The result is very like what is found to take place in similar experiments on some of the metals.

Cracking and Crushing Stresses.—In compressive tests of brickwork it is usual, apart from the elastic measurements, to observe and note the stress at which the first crack is seen or heard, and call this the "cracking stress." The next and the last point reached in the loading is the "crushing stress," which is the maximum stress supported by the brickwork, and at which the material is completely broken up.

That final failure takes place by sliding on planes which are inclined to the axis is shown by the fact that the pier finally breaks up into what are, roughly, two pyramids, just in the same way as is seen in the case of stone, cement, and concrete.

The Effect of Mortar on the Strength of Brickwork.—The five piers whose results will now be given were prepared and tested with the idea of finding out to what extent the strength of the brickwork is dependent upon the strength of the mortar. Five piers were built, one kind of brick being used throughout. These were Accrington (Huncoat plastic), with panels on both faces.

On testing three of these bricks for crushing strength it was found that they crushed an average value of 388 tons per square foot. These bricks were tested whole, and were bedded in plaster of Paris when set on their proper bed. Cement mortar was used throughout, the proportions of sand to cement being different for each of the five piers. These proportions were, respectively, 1 to 1, 2 to 1, 3 to 1, 4 to 1, and 5 to 1. The mixing of the mortar and the building of the piers was carried out, as in the previous tests, by a working bricklayer. The tests were carried out as described above, the Martens mirrors being used, and each column was loaded about seven times. The first loading was taken up to 16½ tons per square foot, and each successive loading was about 13½ tons per square foot higher, elastic readings being taken throughout. It is worth noticing that in spite of the great care taken to distribute the stress uniformly on the top faces of the piers, the observations showed there was always a greater intensity of stress on one face than on the one opposite; this excess was found to vary from 10 to 34 per cent. The chief results are given in the following table:—

TABLE I.—RESULTS OF TESTS OF FIVE BRICKWORK PIERS, 1½ FT. SQUARE AND 3 FT. HIGH, MADE OF ACCRINGTON BRICKS AND PORTLAND CEMENT MORTAR. TESTED ABOUT SIX WEEKS AFTER BUILDING.

Mortar used:	Prop. limit last time of loading.	First crack.	Crushing.	Ratio—Strength of brick.	Strength of mortar.	
					At seven weeks.	At twenty weeks.
Sand.						
Cement.						
					Tons per square foot.	
1-1	85	97	125	3-1	79	68
2-1	80	91	159	2-4	32	51
3-1	78	79	125	3-1	27	28
4-1	72	69	114	3-3	20	24
5-1	72	69	125	3-1	16	18

If the terminology used in the case of iron and steel be employed here, the point where this last curve begins may very well be called a "limit of proportionality" (P. limit). What is happening in the material after this point is passed is not very clear, but it may be thought probable that the particles, which, up to this point, have retained nearly the same relative positions, are being pushed further out of their places and a sliding movement is beginning to take place. It is very likely that this movement takes place first in the mortar, and when this begins to move and fail, the even distribution of the stress on the bricks themselves must be changed, with the result that these begin to crack, and a general movement begins to take place throughout the brickwork.

The mortar was tested in the form of cubes of 4-in. side.

An inspection of these results shows the crushing strength of the mortar to diminish as the proportion of sand increases; also, the strength increased with age. These results are both what one would expect them to be. It will be noticed that only the crushing strength of the mortar is given, as it is found that in tests of this kind the cube collapses very soon after the first crack is seen.

In the case of the brickwork itself, the data obtained are, first, the proportional limit as found from the last set of readings taken in the case of each pier. These agree fairly well with the order of merit of the mortars, though there is far less difference than in the case of the mortars themselves.

In the next column are the stresses at which the first crack was detected. The author thinks this the most reliable criterion of the strength of brickwork, because it marks the point where the stress is beginning to cause internal movement of the material. The same order is maintained, though an exception is to be seen in the case of the 4 to 1 pier. This is probably due to a want of alertness on the part of the observer, whose duty it was to look out for the first crack. The "crushing stresses" in the third column do not appear to follow any particular kind of order, except that the aggregate of the first two is greater than that of the last two. This crushing or collapsing load is always found to be uncertain, and where several piers which are supposed to be precisely similar are tested there may be found to be considerable difference in the final loads, although the cracking points are near together.

It may be well here to quote some of the results of previous experiments in the testing laboratory of the Manchester School of Technology, and already published. These piers were all $1\frac{1}{2}$ ft. by $1\frac{1}{2}$ ft. by 3 ft. high. The stresses are given in the same units as in the last table.

cubes are approximately in the order: 500, 200, 160, 120, 100, while the brickwork strengths are as 140, 139, 110, —, 100.

It is quite possible that the mortar had been tested in thin flat slabs instead of cubes the results would more nearly accord with the brickwork.

Working Loads on Brickwork.

There is not a great deal of information published regarding the safe loads that can be applied to brickwork, but from what can be ascertained, the following loads, expressed in tons on the square foot, are often used.

Brick.	Mortar.	Workman-ship.	Safe stress Tons per square foot.
Ordinary Best red	Lime Cement (2-1)	Average Good Best	5 8 10

A case is quoted of a chimney in Glasgow, where the stress is 9 tons per square foot in still weather, and as much as 15 on the lee side in a gale of wind. In the light of the results quoted here it would appear that

TABLE II.

Brick.	Mortar.	Age, Weeks.	Cracking.	Crushing.	Ratio— Brick. Brickwork.	Mortar Crushing.
Common wire-cut.....	Sand and lime	4	35	53	5-1	—
Common wire-cut.....	3 1 Portland cement	39	64	84	3-1-1	—
Accrington.....	Black lime	4	78	96	2-6-1	—
Blue Staffordshire.....	3 1 Portland cement	39	69	98	3-6-1	—
Brindle.....	Black lime	12	100	125	2-2-1	31-8
Brindle.....	Black lime	26	110	135	2-6-1	31-8
Brindle.....	3-1 Portland cement	12	132	163	2-9-1	10-6
Brindle.....	3 1 Portland cement	26	90	161	3-1	10 0
Brindle.....	Less lime	12	38	110	4-0-1	Very poor
Brindle.....	Less lime	26	41	102	4-7-1	Soft and crumbly

To these may be added a few results recently selected from those published by the Royal Institute of British Architects:—

TABLE III.—STRENGTH OF BRICKWORK.
R.I.B.A. EXPERIMENTS.

Brick.	Mortar.	Work- man-ship.	Crushing strength, Tons per sq. ft.
Blue Staffordshire	Lime	Average	74
" "	"	Good	114
" "	Portland cement	Average	77
" "	"	Good	119

In the second table it will be seen that there is a set of piers of Staffordshire blue brindle bricks, which were made in pairs, having different mortars. The second of each pair was twice as old as the first. If the cracking stress be taken as the criterion of strength, it will be seen that there is not a very great deal of difference between the strength of the lime mortar piers and the cement mortar piers, except that the cement mortar fell away in strength, while the lime mortar improved with age. Whether this increase of strength would have been maintained if the second piers had been kept longer it is impossible to say.

The difference between the first four and the last two is, however, very marked. This last pier, built with Has-lime mortar, was evidently very bad. It is probable that the mortar was used too long after mixing, when it had become partially set. There was no hardening of this mortar, which could be easily crushed between the fingers, and the effect is seen in the strength of the brickwork which is lamentably weak as compared with the first four piers of this set. This may be taken as one example of the influence of the mortar on the strength of the brickwork. The other may be taken from the results of the series given on Table I., already referred to. The five mortars used in this set have a gradually increasing ratio of sand to cement, and the results of the tests of the mortars show a corresponding decrease of strength with the increased amount of sand. The brickwork strengths also show a decrease, but not so marked. The strength of the mortar

the loads usually applied to brickwork are amply safe in most cases. In forming an estimate of the probable strength of any particular kind of brickwork, it is not sufficient to be guided by the names of the materials alone, but to have an intimate knowledge of their quality and the manner in which they are used.

The experiments in the Municipal School of Technology, of which the results have been quoted, were made in connexion with the teaching work of the school and the greater number of the observations taken by the students. It would have been impossible to carry out these somewhat costly experiments if it had not been for the apparatus and material provided by the Education Committee of the Corporation of Manchester, to whom the author wishes to take this opportunity of acknowledging his indebtedness and offering his sincere thanks.

Mr. F. W. Mason (Fellow) then read a paper on "Refuse Destructors."

Mr. J. Ashton, F.C.S. (Fellow), also contributed a paper, on "Sewage Purification Works, and the Health of the Community."

Fire Requirements of the London County Council.

"The Fire Requirements of the London County Council, with Some Notes on Fire-resisting Construction" was the title of a paper by Mr. Percival M. Fraser (Fellow). Towards the end of his paper he said:

My experience of the London County Council is that they do not consider each case on a distinct basis, but attempt to apply stereotyped requirements without sufficient regard to the effect it will have on the business carried on in the building. Thus the provision of a new staircase is repeatedly insisted upon, regardless of the fact that it may open up communication between work-people of different sexes; again, in the case of patent and secret manufactures, facilities are afforded to undesirable persons to gain access.

External iron staircases are a continual source of thefts and other annoyances. Exit doors next the street must be set back in lobbies in order that the doors may clear the

pavement. These recesses are put to improper uses in poor neighbourhoods, such as factories and common lodging houses generally occupy. The facilities for roof escape and the increased number of exits in the latter class of buildings necessitate the employment of a large staff for supervision, and cause serious trouble to the police, as they form a ready means of escape for the large number of criminals who use these premises.

There are many appeals against what the building owners consider unreasonable requirements, but the Council's requirements have generally been upheld by the legal decisions.

The main principles employed by the Council in formulating requirements appear to be as follows:—

1. Separate and distinct means of escape from every room, with direct access to the open air, should be provided. This can be effected in several ways, such as by two staircases or by a staircase and access to the roof, or access to adjoining buildings by means of doorways, balconies, bridges, etc. The alternative means of escape should be as far apart as possible.
2. The buildings should be divided up, both vertically and horizontally, into as many fire risks as possible, by means of walls, partitions, and floors, with self-closing doors, etc.
3. Well-holes acting as flues must be inclosed.
4. All means of escape must be protected with materials sufficiently fire-resisting to withstand fire for thirty minutes.
5. Means of escape must be of ample dimensions, and otherwise constructed to avoid accidents in time of panic, even though from a false alarm.
6. Endeavour should be made to keep back smoke as well as flame.
7. The most direct routes should be taken to the open air.
8. All "dead ends" should be avoided.

The following schedule of fire-resisting materials is set forth in the London Building Act:—

- Good stock bricks
- Granite or stone.
- Iron, steel, or copper.
- Slates and tiles.
- Terra-cotta.
- Flagstones under certain conditions.
- Concrete formed of cement or lime and broken bricks, tiles, stone, ballast, pumice-stone, coke breeze.
- Reinforced concrete.
- For doors and similar fittings, oak, teak, jarrah or other hard woods, 12 in. full, in solid bedded frames. The same for stairs, internal and external, with plaster soffits.
- Beams and posts of hard woods with 1 in. of plaster, or metal lathing, or, when in combination with iron, 2 in. of plaster.
- For floors, concrete and iron 5 in. thick.
- For ceilings of projecting shops, 5 in. of concrete pugging.
- Inclosures and partitions of 3 in. incombustible material.
- Glazing in wire-weave glass $\frac{1}{2}$ in. in thickness, or electro-glazed glass in squares of 20 in.

It should be noticed that the provision of stone steps and iron doors is often required by the Council. Both of these are quickly destroyed by the action of fire and water, and should be eliminated from the Act.

Fire-Resisting Construction.

The common expression "fireproof" is hardly a correct term, as no building materials are proof against fire, and are still less so when built into a structure, by reason of the joints and the different expansions of various materials under heat, when used in combination.

A material which will stand a great heat may immediately be destroyed when drenched suddenly with water, such as will certainly happen in any ordinary conflagration. A material cannot therefore be considered of value as a fire resistant until it has—to use an old expression—passed through fire and water.

The following *précis* of the effects of the great Cripple-gate Fire in London in 1897 is instructive:—Ordinary stock bricks almost uninjured, perforated bricks broken to pieces, stone destroyed, iron girders twisted and curled up, wooden beams charred, but otherwise practically uninjured, match-boarding burnt to tinder. Allowance for expansion must be considered. Concrete and iron expand in the same ratio, but terra-cotta and iron do not.

It is well to remember that although the first cost of fire-resisting construction is large, the insurance rates and rent roll are both favourably affected thereby. Architects should not take upon themselves the responsibility of specifying a material which has not been tested.

Elaborate tests have been carried out by

the British Fire Prevention Committee with all the ordinary forms of construction and most of the well-known patents. They divide the test into three classes:—(1) Temporary protection, which implies resistance to fire for three-quarters of an hour; (2) partial protection for one and a half hours; (3) full protection two and a half hours.

Materials with regard to their Fire-Resisting Qualities.

Well-burnt clay bricks are the most reliable building material. Lime mortar is to be preferred to cement. Fireclay is, of course, best, but is not so strong.

Terra-cotta in its porous form is highly satisfactory. There are several other descriptions of terra-cotta which are all more or less useless as a fire-resisting material.

Plaster made with plaster of Paris is a tolerable heat resistant, as it stands drenching at a white heat; it is improved by the addition of asbestos or pumice-stone.

Concrete in slabs of which the aggregate is pumice-stone is classed with the "full resistance" materials. Reinforced concrete is an excellent fire resister, providing the reinforcement is 2 in. from the surface.

The following compositions of concrete are given as being highly serviceable. The effects of severe tests with fire and water are also briefly given. The following proportions are mixed with one part of ferrocrete cement, the sand being sharp pit sand:—

1. Slag 3, sand 2.—Slight cracks and deflection.
2. Broken granite 3, sand 2.—Ditto
3. Broken granite 3, sand 2. Ditto, and washed off slightly.
4. Burnt ballast 5.—Washed off badly.
5. Coke breeze 5.—Washed off slightly.
6. Furnace clinkers 3, sand 2.—Slight cracks and deflection.
7. River ballast 3, sand 2.—This is wholly bad.

Sandstones are better than limestones and granites, but all are unreliable. Iron and steel unprotected are unfit for use for constructional purposes. Iron expands about 14 in. in 10 ft. under prolonged heat. Silicate cotton, slag wool, or asbestos are useful materials, as they are quite incombustible, and may be procured in slabs and sheets, or in the form of cloth. Timber in bulk is perhaps as good a fire resister as can be obtained, as after it is once charred it burns very slowly, and retains its strength when suddenly drenched. Its life is greatly increased by being coated with plaster or tin. The so-called fireproof paints are of very little practical value. The possibility of ignition of timber may be decreased by the use of tungstate of soda, silicate of soda and limewash, and asbestos paint. These, however, merely resist ignition, and cannot be considered to resist fire. Treated woods become hygroscopic and brittle, they also discolour and are hard to work.

Floors are of many descriptions. Arched floors are strong, but heavy and expensive. Various forms of hollow tubes and slabs of terra-cotta and asbestos, etc. These are all cheap, light, and serviceable. Concrete reinforced steel rods makes an excellent floor.

Pavings may be of cement, asphalt, metallic paving, wood blocks, and wood boards laid directly on to the concrete; these should be tarred on the underside.

Cork carpet on concrete makes a very good floor.

A tongued wood floor of ordinary construction with plastered ceiling will stand an ordinary conflagration for about an hour.

Flats are constructed similarly to floors, but are lighter and are best asphalted; vulcanite and wood cement are also largely used.

Partitions.

Ordinary lath-and-plaster partitions, when the intervening spaces are filled in with slag wool, are rendered fire-resisting and sound-proof.

Other light partitions are formed in concrete, brick on edge, terra-cotta, asbestos, and other slabs, uraltite, expanded metal and plaster, or fine coke-breeze concrete, all of which may be fixed on a steel or wood framework.

An air space in the thickness of a partition is a great advantage.

Continuous sheets of metal when used for reinforcement are bad, as they tend to buckle under heat.

Staircases.

Balk timber is the best material for steps. Other steps are constructed of reinforced or

ordinary concrete, stone, and built-up hardwood.

Doors.

Iron doors, as stated before, are required by the Council, but unless secured all round the edges are practically useless. Sliding doors are best, as they can be held on at least three sides.

Armoured sliding doors are perhaps the best for use in party walls between large buildings. These are made up with wood and uraltite, or sheet tin, and can be arranged by means of inclined runners so that when a certain temperature is reached the door fastenings give way and the door is allowed to close automatically by gravitation. The author had used this description of door as made by Messrs. Mather & Platt, and always found them to be serviceable for general use.

Glazing.

This has already been described under "Factory Buildings." Opinions differ as to whether roof glazing over staircases, well-holes, etc., should be fire-resisting, or whether it should be constructed so as to break in case of fire and carry away smoke and flames. This is a bad principle, as every time a staircase door is opened huge volumes of smoke are drawn in and thus render the staircase impassable. The use of shutters is not advisable.

Miscellaneous.

Simple precautions against the spread of fire should be employed in every class of building, such as floor pugging and treating woodwork with solutions, and the use of steel roofs and concrete stairs with wood casing.

Automatic sprinklers, which act at a temperature of 150 deg. to 200 deg., are useful for checking a fire in its infancy, but are open to objection. Automatic fire alarms are useful, but require constant attention.

A note on housing of the working classes was contributed by Mr. A. Alban H. Scott (Fellow).

In the afternoon the members visited the works of Messrs. Mather & Platt.

From the Salford Ironworks the party proceeded by special cars to the Salford Sewage Works, where they were received by the Mayor (Mr. Alderman Frankenburg). The engineer (Mr. J. Corbett) conducted the members, and explained the treatment, which is by chemical precipitation and bacteria beds.

Dinner.

In the evening the members were the guests at dinner at the Midland Hotel of Sir William Mather, who presided. The company included the Lord Mayor of Manchester (Mr. J. H. Thewlis), the Mayor of Salford (Mr. Alderman Frankenburg), the President of the Institute (Professor Coker), Professor Delepine, Principal Reynolds (Manchester School of Technology), Principal Knowles (Salford Technological School), Dr. Niven (Medical Officer of Health), Dr. Carter Bell, Mr. Councillor Huddart, Dr. E. Hopkinson, Mr. A. Willett, Dr. A. Schwartz (School of Technology), Mr. F. Scott, Mr. Alderman Wilson, Dr. Skinner, Dr. Wilkinson (Oldham), Mr. G. W. Chilvers (Chairman of Council), Mr. N. W. Hoskins (Hon. Secretary), and others.

In responding to the toast of the Lord Mayor and Corporation of Manchester and the Mayor and Corporation of Salford, Mr. Alderman Frankenburg (Mayor of Salford) said the death-rate of Salford had been reduced from 27 to 17 per thousand—a saving of something like 2,500 lives per year. The death-rate of Salford was less than that of Brighton. The Corporation intended to make Salford a health resort, and he asked their friends present from the South of England instead of going to Brighton to come to Salford.

The Lord Mayor of Manchester, who proposed "The Institute of Sanitary Engineers," spoke of the important work which the sanitary engineer performed in relation to the health and well-being of the community. The toast was responded to by Mr. G. W. Chilvers, who briefly referred to the recent progress of the Institute in connexion with its students' classes and examinations, which tend to advance the status of the sanitary engineer.

Professor E. G. Coker proposed the health of Sir William Mather, who, in responding, expressed "amiable indignation" at this

innovation in the programme, and wished the Institute every success.

The toast of the "Victoria University" was afterwards proposed to by Professor Coker, and responded to by Professor A. Sheridan Delepine. Mr. N. W. Hoskins proposed the "Manchester and Salford Institutes of Technology," and complimented Manchester on having such a well-equipped school for the training of the sanitary engineer. The toast was responded to by Principal Reynolds, Manchester, and Principal Knowles, Salford.

Mr. T. B. Simmons, Vice-Chairman of Council, proposed the toast "The Invited Guests: The Sanitary Committees, Engineers, and Medical Officers of Health for Manchester and Salford," and Dr. James Niven, Medical Officer of Health for Manchester, and Mr. Councillor Huddart, Chairman of the Salford Health Committee, responded.

On Saturday the members were shown through the Manchester School of Technology by Mr. J. H. Reynolds, director of higher education; later, they visited the University by invitation of the Vice-Chancellor, and Professor Delepine made arrangements for an inspection of the bacteriological laboratories. In the afternoon a journey to the Delamere Sanatorium was undertaken, under the guidance of Dr. Wilkinson.

On Sunday the members attended morning service at Manchester Cathedral, and in the afternoon they drove to Barton Bridge to inspect the aqueduct.

CARVED BENCH ENDS:

EAST BUDLEIGH CHURCH, DEVON.

ORNAMENTAL bench ends, either in the form of carved panels or terminating with finials of poppy heads, are very characteristic of churches in the West of England, and particularly numerous in Devon. It is difficult to ascertain when this custom was first introduced, but it is likely to have been partially used at an early period, although the greater number of specimens that exist are of the Perpendicular style. East Budleigh possesses some sixty or seventy examples, all highly ornate, boldly carved, and showing very clearly that the old craftsmen had great inventing capacities combined with high technical ability. The wood used is oak, and although some panels exhibit less skill in treatment than others, they all breathe of that vivacious delight in the work itself, so universal before the days of machinery. The pews at East Budleigh exhibit the arms of local families, and among them those of Sir Walter Raleigh and his father, who were intimately associated with the place, the former being born at Hays Barton, some few miles away. It has been suggested that much of this and other carving in Devon was done by sailors who sailed under Raleigh, Grenville, Drake, etc., who, on their safe return from the long voyages, erected these humble offerings to the House of God. A detailed study of the subjects depicted tends to confirm this view, for we find such objects as ships, dragons, fish, seaweed, and plants of tropical growth, carved with such faithfulness that the originals must, one would think, have been familiar to the carvers. Be this as it may, the old carved bench ends in our village churches give a delightful decorative aspect to the buildings in which they are placed, as well as forming most interesting and valuable links with the past, and often the only remaining memorials of men whose deeds have gone to the making of empire, but who are now forgotten and unknown.

MASONIC TEMPLE, LINLITHGOW.—The memorial-stone of a new Masonic temple being erected by the members of the Honourable Lodge of Linlithgow, Ancient Brethren (No. 17), was laid a short time ago. Mr. W. M. Scott is the architect of the work, which is expected to cost about 1,000l.

PROPOSED ENLARGEMENT OF THE EDINBURGH COURT OF SESSION.—Plans are being prepared by the Board of Works for the proposed enlargement of the Outer House, or Court of Session. The general scheme of enlargement embraces, it is understood, the setting back of the building southwards, on the open space next the Cowgate, and the enlargement of the five courts of the Outer House, the provision of waiting and retiring rooms for witnesses, rooms for officials, and better accommodation for restaurant purposes. These plans are purely tentative, and the adoption of them or others will depend on the attitude of the representatives of the Government towards them.



Ralegh Pew (Arms Defaced).



Arms of St. Clare.



Arms of Ralegh.

Carved Bench Ends, East Budleigh Church, Devon. Drawn by Mr. Sidney Heath.

Illustrations.

COLLEGES, CAMBRIDGE.

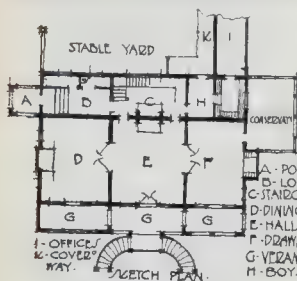
THESE illustrations are from old prints published in Loggan's "Cantabrigia Illustrata," and they are referred to in our leading article this week.

MANSSION FLATS, 25 & 26, BERKELEY-SQUARE, W.

THE accompanying illustration shows a detailed elevation of this building, which has been designed to create the impression of a large town-house. These flats are nearing completion, and with the block at 12, Hyde Park-place, by the same architect, form an important addition to the rebuilding of this part of London, as an endeavour has been made in the direction of a distinct advance on the usual architectural treatment employed for London flats and houses. The front elevation is five stories high, and is composed of a main projecting centre flanked by two short wings; the windows on the front portion are grouped into three bays, connected at the top story by a continuous railing. The whole building is surmounted by a rich console cornice and balustrade. The materials employed for the elevations are brown Portland stone with wrought-iron railings. The contractors are Messrs. Mark Patrick & Son, and the work has been carried out from the designs and under the superintendence of Mr. Frank T. Verity.

HOUSE IN CHINA.

The house which is to be erected on the outskirts of Shanghai for Mr. L. Dabelstein is built of local bricks and Shanghai stone. The roof is constructed of Oregon pine, and covered with a green glazed patent locked tile, made by a German firm at Tsing tan. These tiles stand the severe rain remarkably well, and give at the same time a pleasing splash of colour to the building quite in tone with its setting. They are worth about 10*l.* per thousand at the works. The internal joinery and panelling to the main rooms is in teak, that of the staircase and



House, China. Plan.

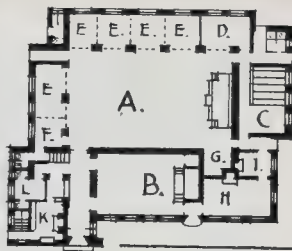
hall being elaborately carved by native craftsmen. The floors are in Japan oak and Singapore red wood, with tiles to the offices.

A great problem in designing for Shanghai is to keep the house cool in summer and dry in winter. The best way to meet the difficulty appears to be to provide inclosed verandas, with casements to the "weather" sides, and keep those open which are on the more sheltered elevations.

There are extensive stables to the rear of the building, where the servants' quarters, stores, etc., are placed. Each bedroom is provided with its own bath and dressing rooms. Wong-Fah-Kee, of Shanghai, is the contractor, and the architects are Messrs. Smedley, Denham, and Rose.

NEW WESLEYAN HALL, SEVENOAKS.

The building illustrated is in course of erection at Sevenoaks, Kent, and is intended for institutional, Sunday-school, and other purposes in connexion with the Wesleyan



LIST OF ROOMS.

A.	MAIN HALL.	34'6" x 54'9"
B.	LECTURE ROOM.	20' x 30'6"
C.	INFANTS ROOM.	16' x 21'6"
D.	ADULTS ROOM.	10'3" x 16'0"
E.	CLASS ROOMS.	10'3" x 11'3"
F.	SECRETARIES.	10'3" x 11'3"
G.	ORGAN SPACE.	8'6" x 8'9"
H.	CLUB ROOM.	12'0" x 22'6"
I.	CLUB ROOM.	9'0" x 11'0"
J.	KITCHEN.	10' x 12'
L.	LADIES ROOM.	7'6" x 9'6"

Wesleyan Hall, Sevenoaks. Plan.

Church. The walls externally are built of Kentish rag stone, with tracery and window dressings in Monks Park. The roof is slated. Internally, the main hall has an open timber roof, stained of a dark, old oak tint. Sliding divisions are placed between all classrooms, affording the opportunity of opening up the whole hall. The windows are glazed with lead light glazing.

The accommodation includes large central hall, with numerous classrooms, guildhall, two social club-rooms, caretaker's residence, etc.

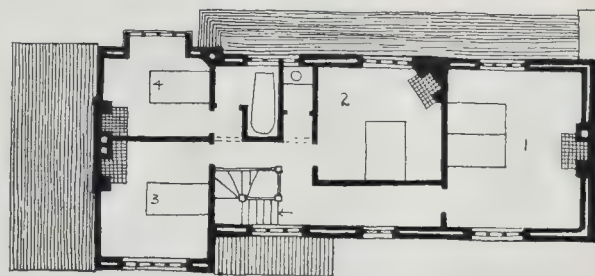
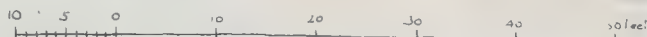
The heating and ventilation will be upon the low-pressure system. The cost of the buildings is about 5,600*l.* The builders are Messrs. Wiltshire & Son, of Sevenoaks, and the architects Messrs. Potter & Harvey, of London and Sevenoaks.

COUNTRY COTTAGE.

This little house is to be built with a rough stone base, and from thence upward with brick hollow walls rough cast on the outside. The set-off at sill level forming a shelf all round the house. Up to this point the walls

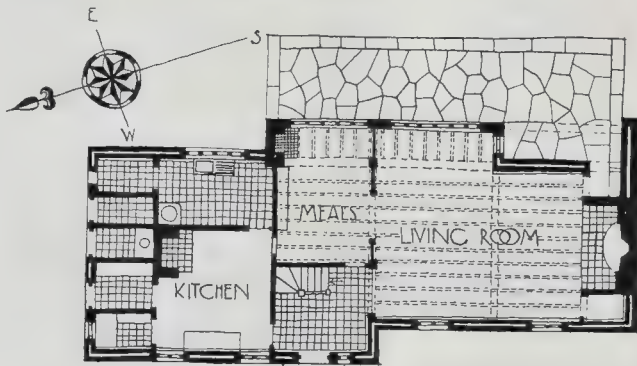
will be finished with a simple oak dado, and the screen partition and folding-doors are also in oak. The first floor is of 4-in. cement concrete, supported on the visible small joists whitened underneath, and the floors laid with Euboeolith, the idea being to avoid as far as possible all hollow spaces for dust or vermin. The walls will be plastered and white limed, and the doors are oak ledged doors, thus obviating the necessity for periodical painting and paperhanging. The roof will be covered with hand-made tiles, and the windows are in oak with lead latticed panes and iron casements. The estimated cost is 750*l.*

DWELLINGS FOR THE POOR, NEWCASTLE.—A meeting of the sub-committee of the Housing of the Poor Committee of Newcastle Corporation was held on the 30th ult., under the presidency of Ald. Newton. A report was drawn up for presentation to a full meeting of the Committee, recommending the City Council to erect seventy-three one-room tenements, with complete equipments, on a site adjoining South Byker playground. The dwellings will be erected especially for the accommodation of aged people, married couples without families, and single women.



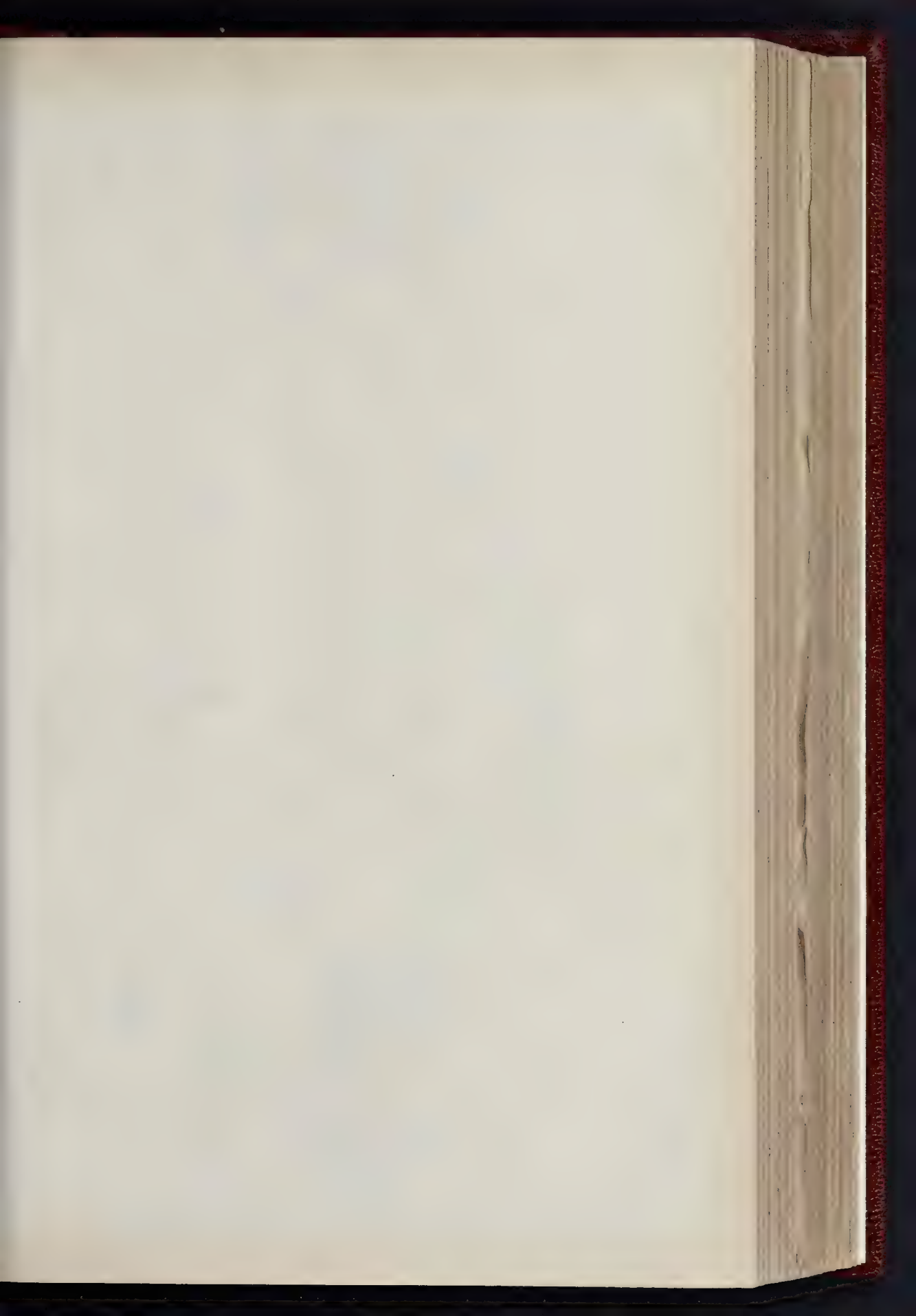
FIRST FLOOR PLAN

Country Cottage. Plan.

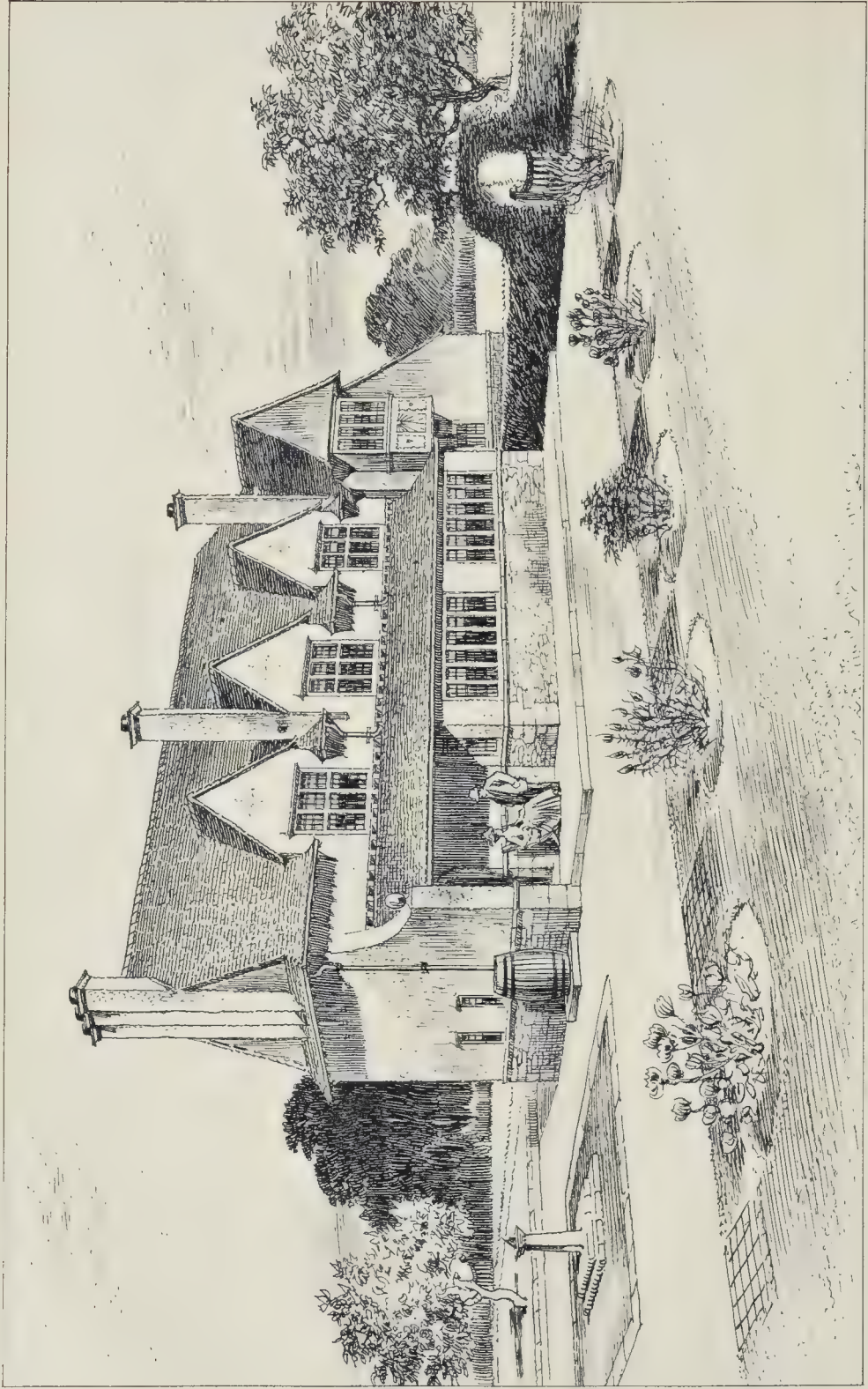


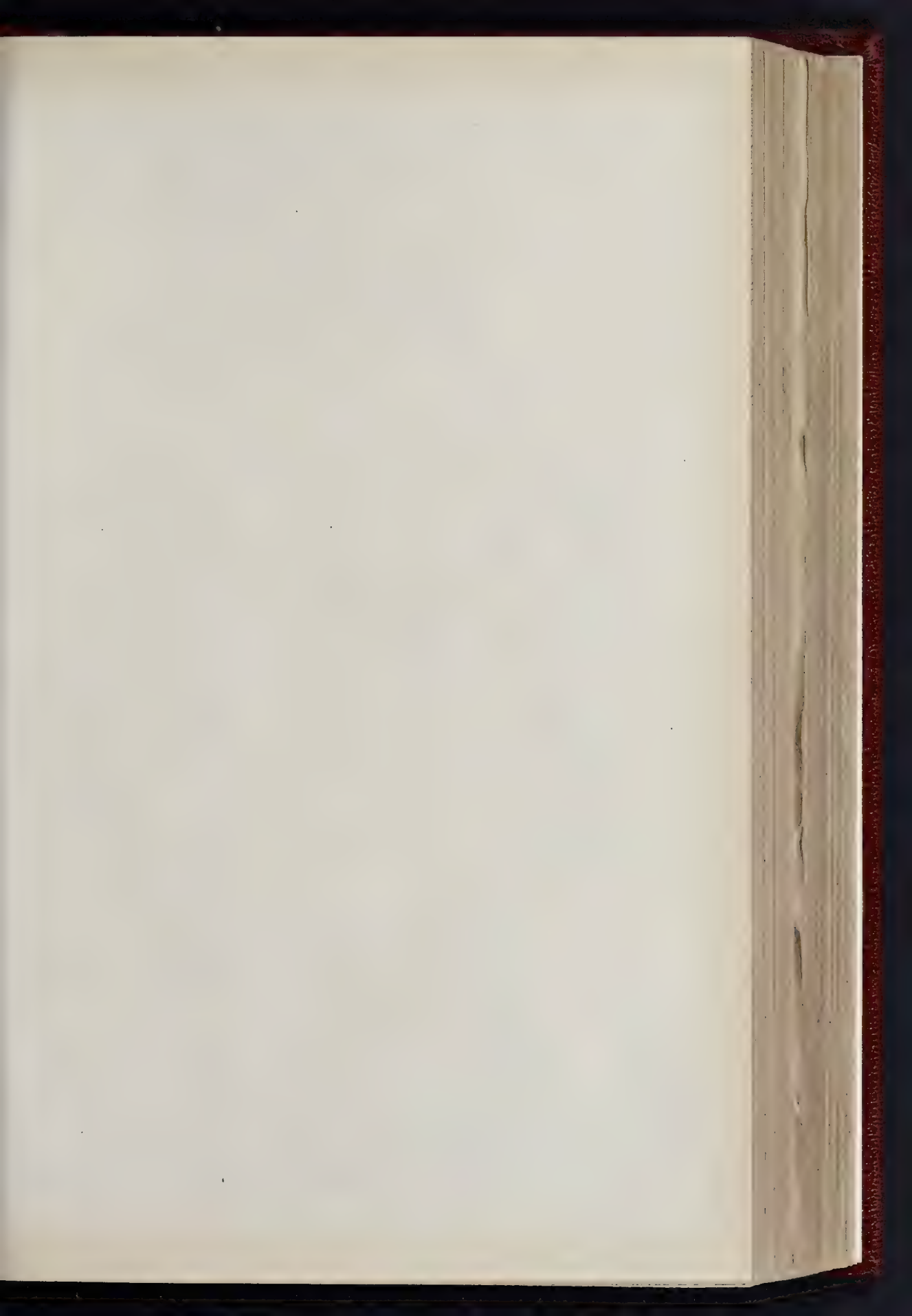
GROUND PLAN

Country Cottage: Plan.

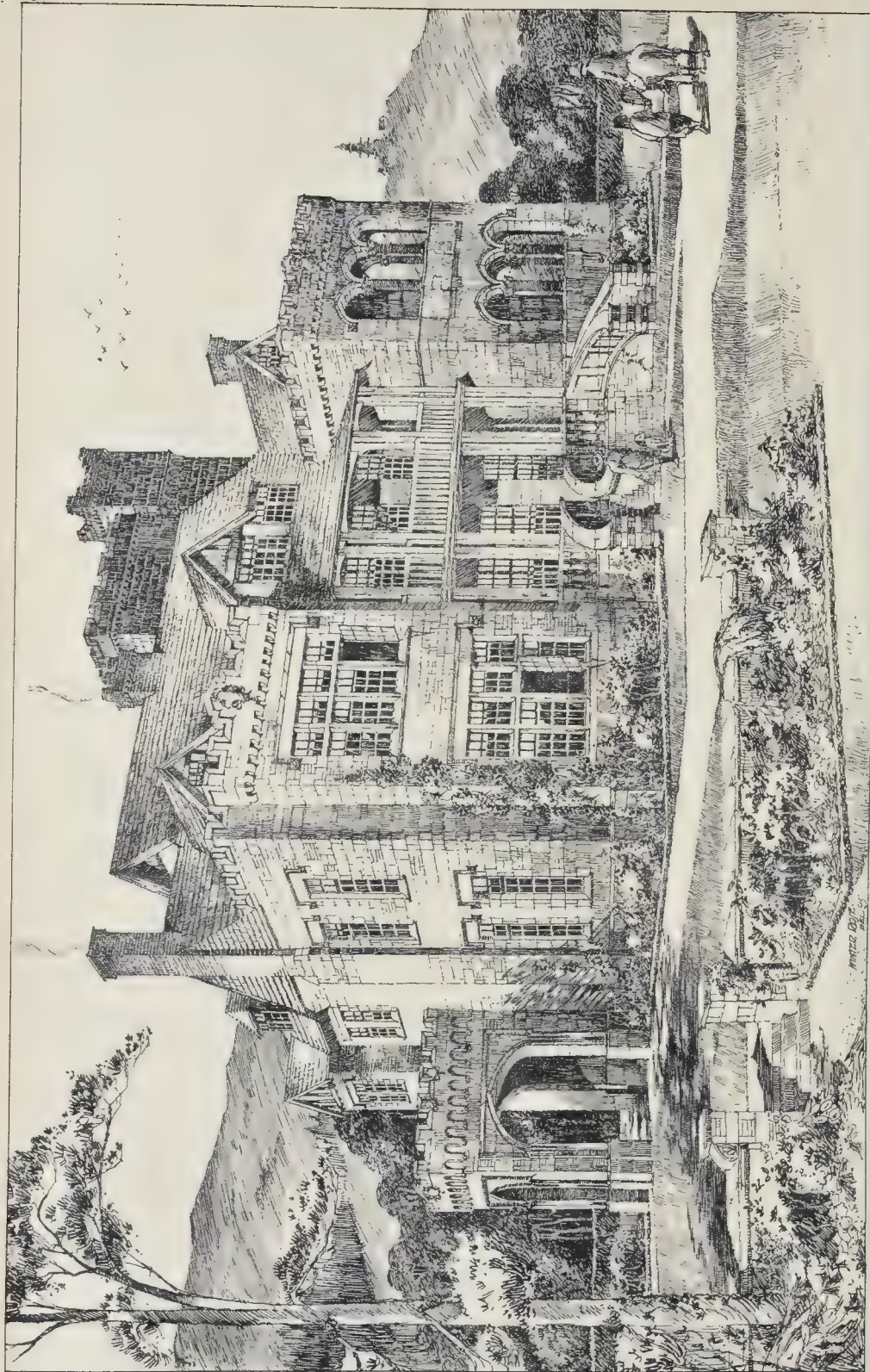


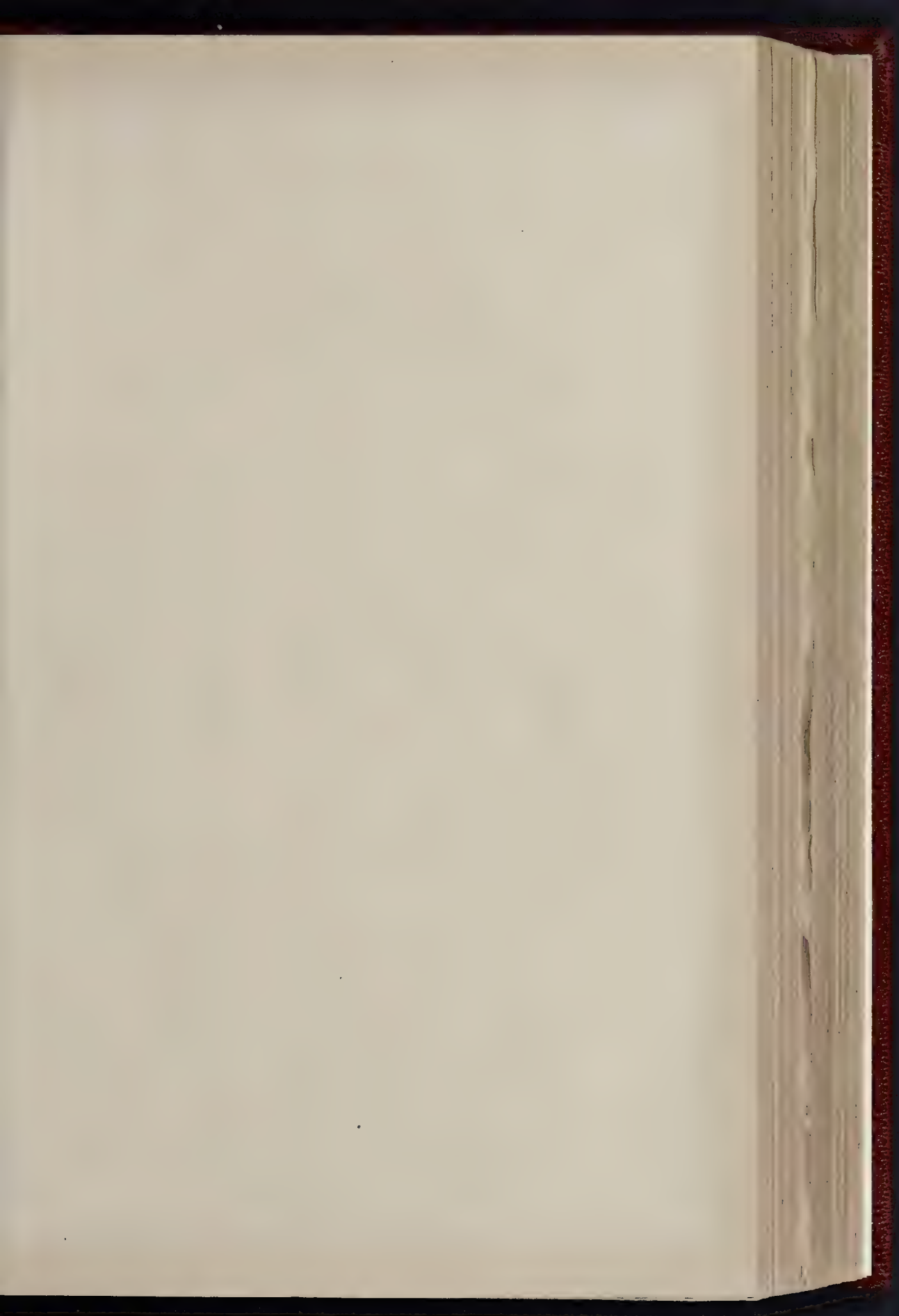
THE BUILDER, AUGUST 11, 1906

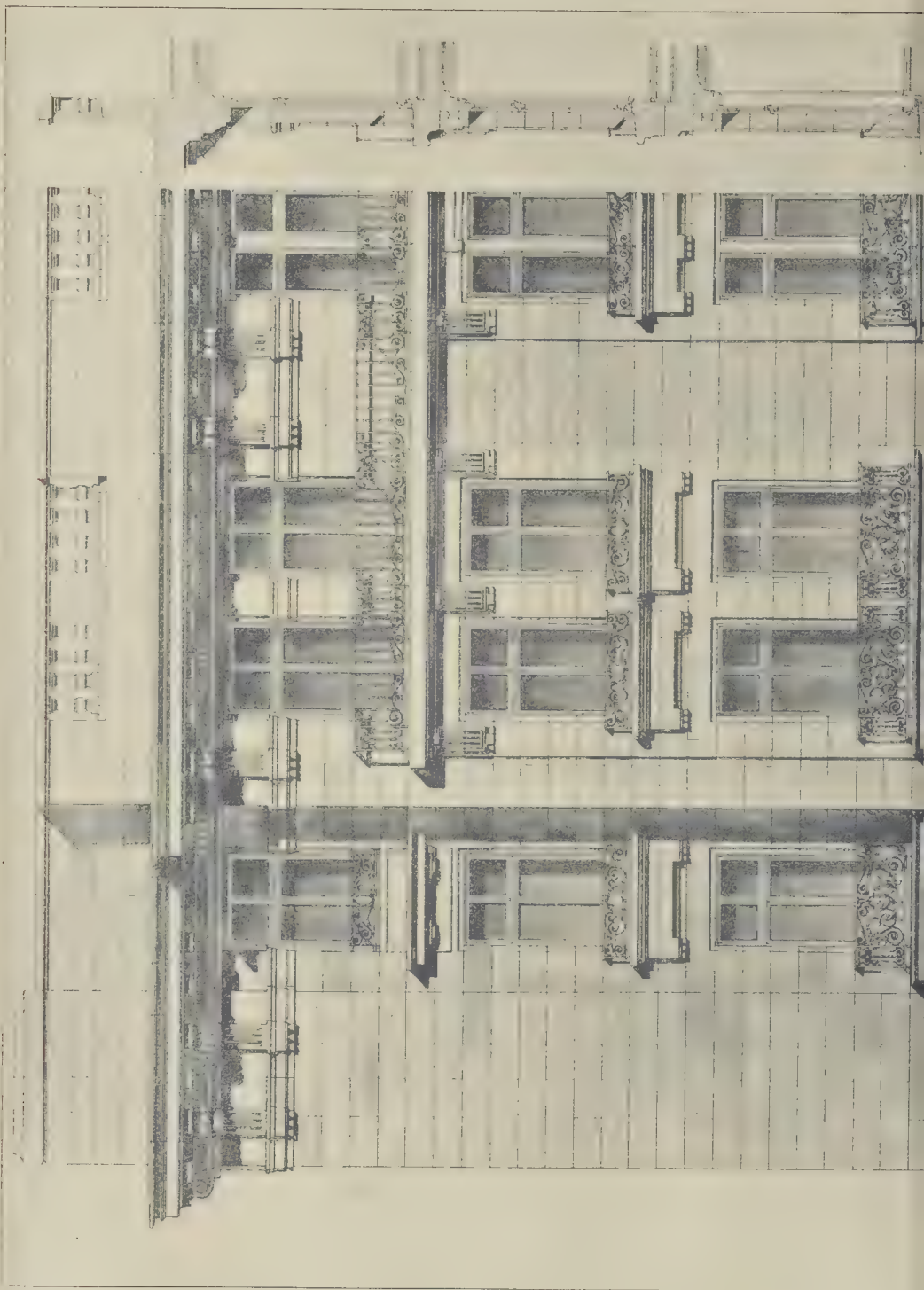


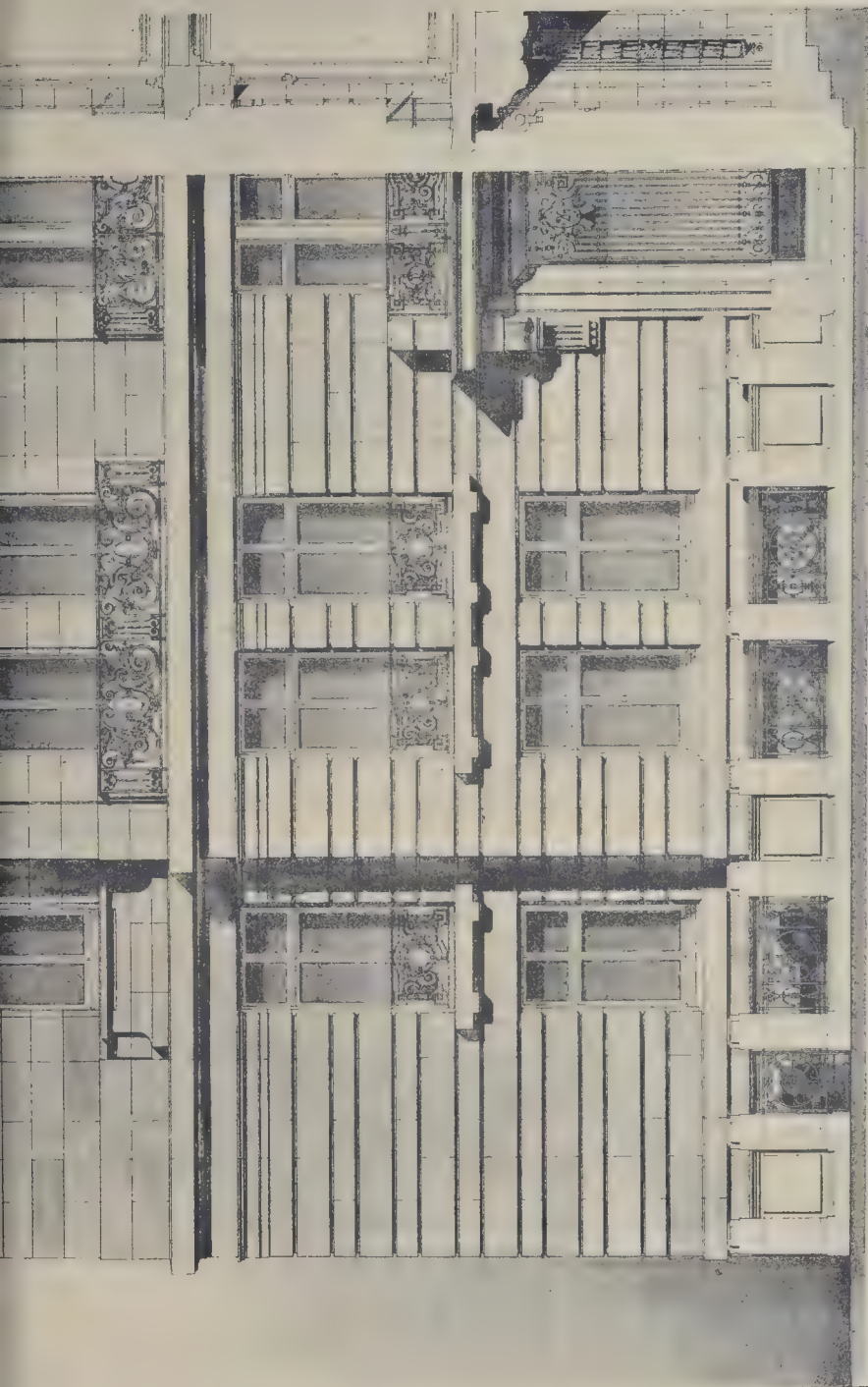


THE BUILDER, AUGUST 11, 1906



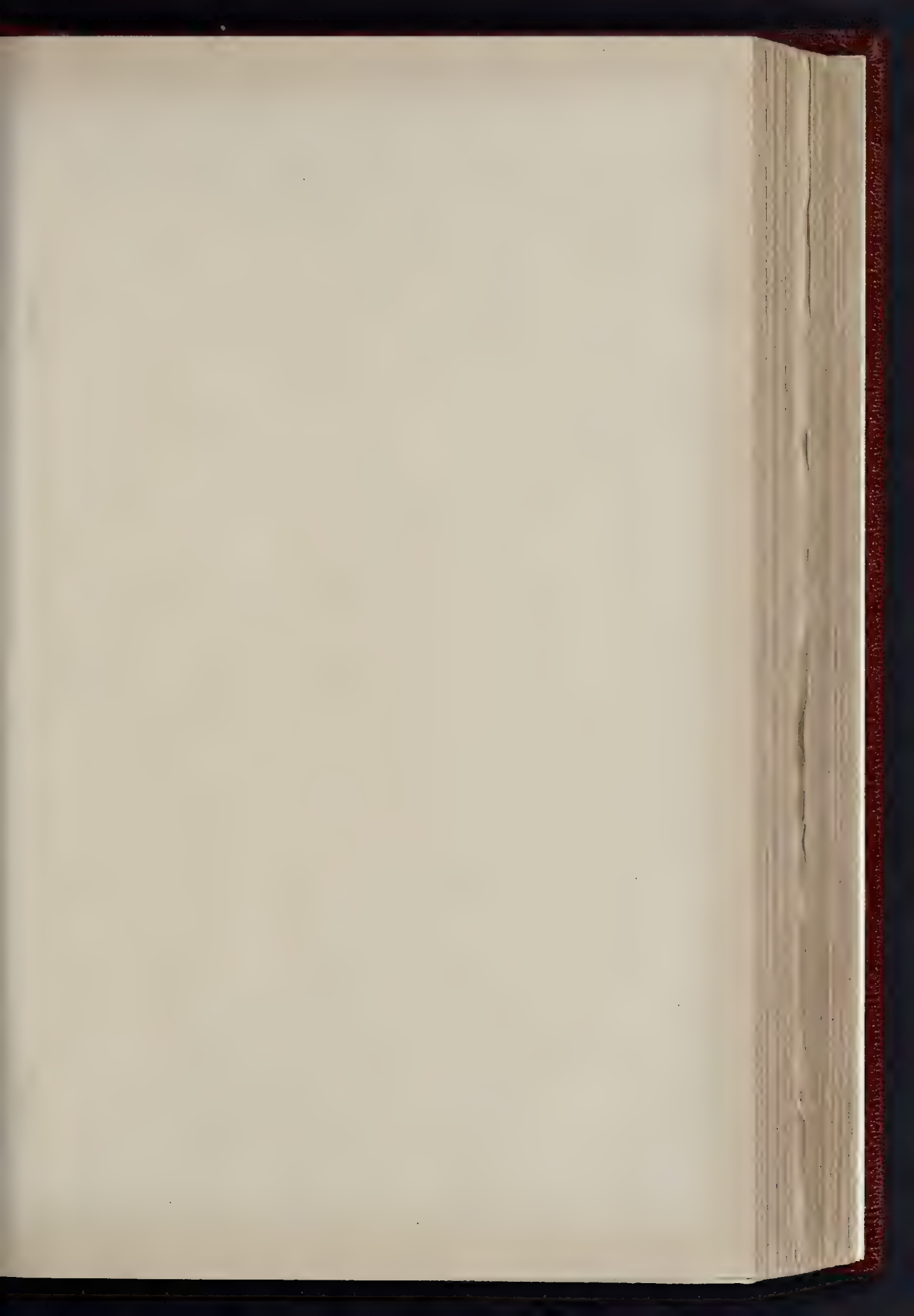






25 & 26 BERKELEY SQUARE MANSION FLATS DETAIL OF FRONT ELEVATION BY FRANK T. V. G. 1906 ARCHITECT

Frank T. V. G. 1906
Berkeley 1906

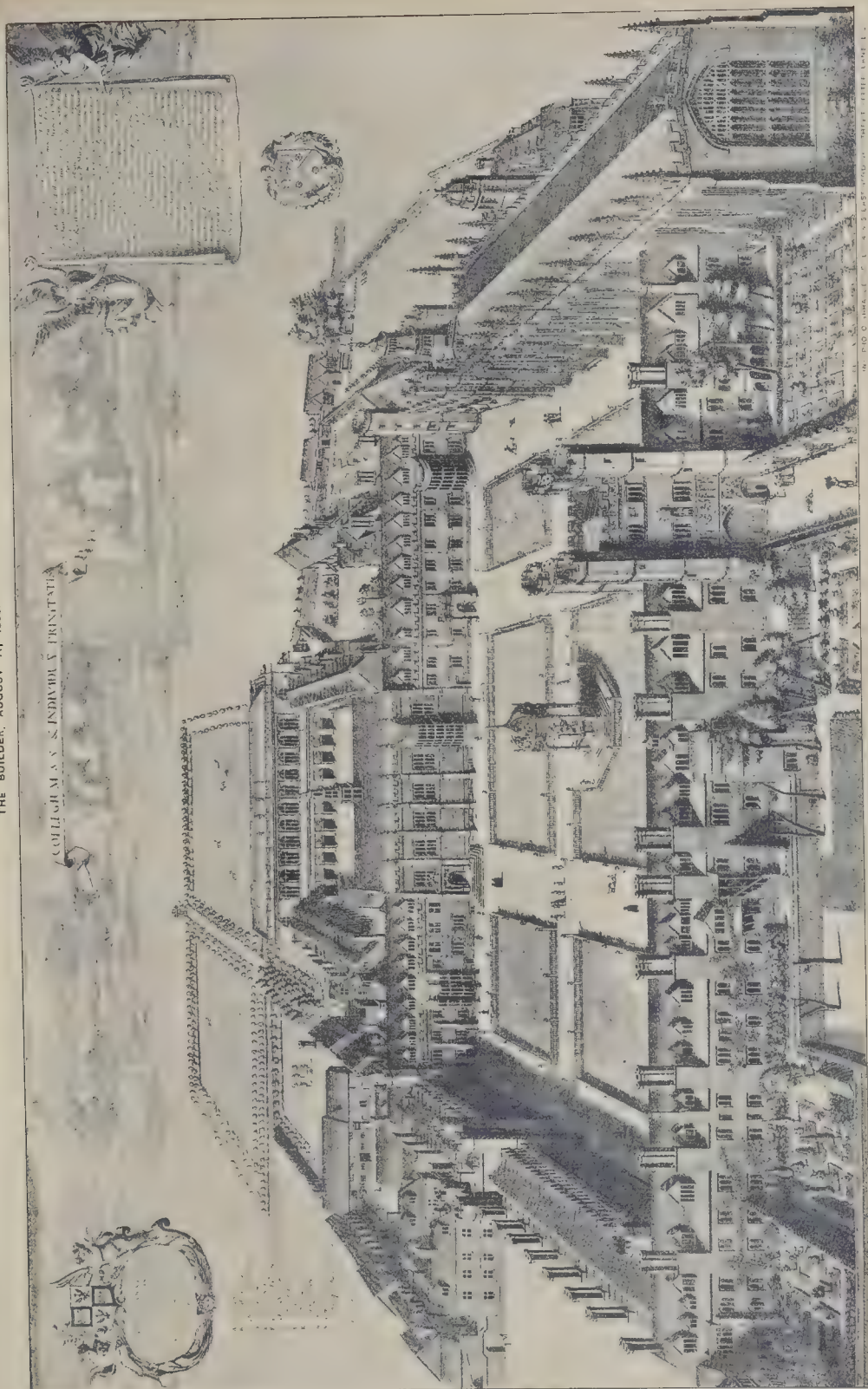


THE BUILDER AUGUST 11, 1906

Chrysomelidae



COLLEGIUM SANCTI TRINITATIS

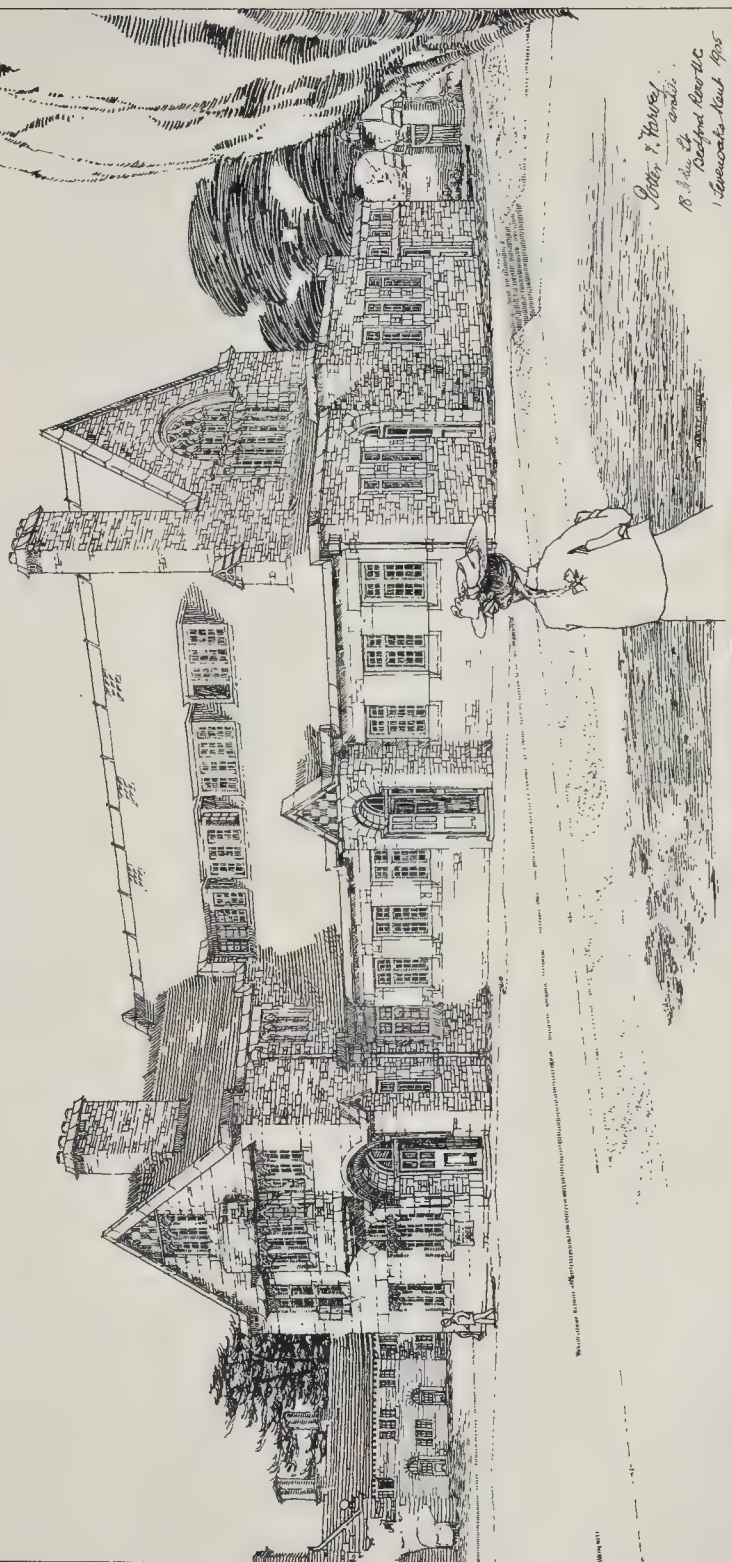


TRINITY COLLEGE.—(FROM LOGGAN'S "CANTABRIGIA ILLUSTRATA".)

WESLEYAN SUNDAY SCHOOLS

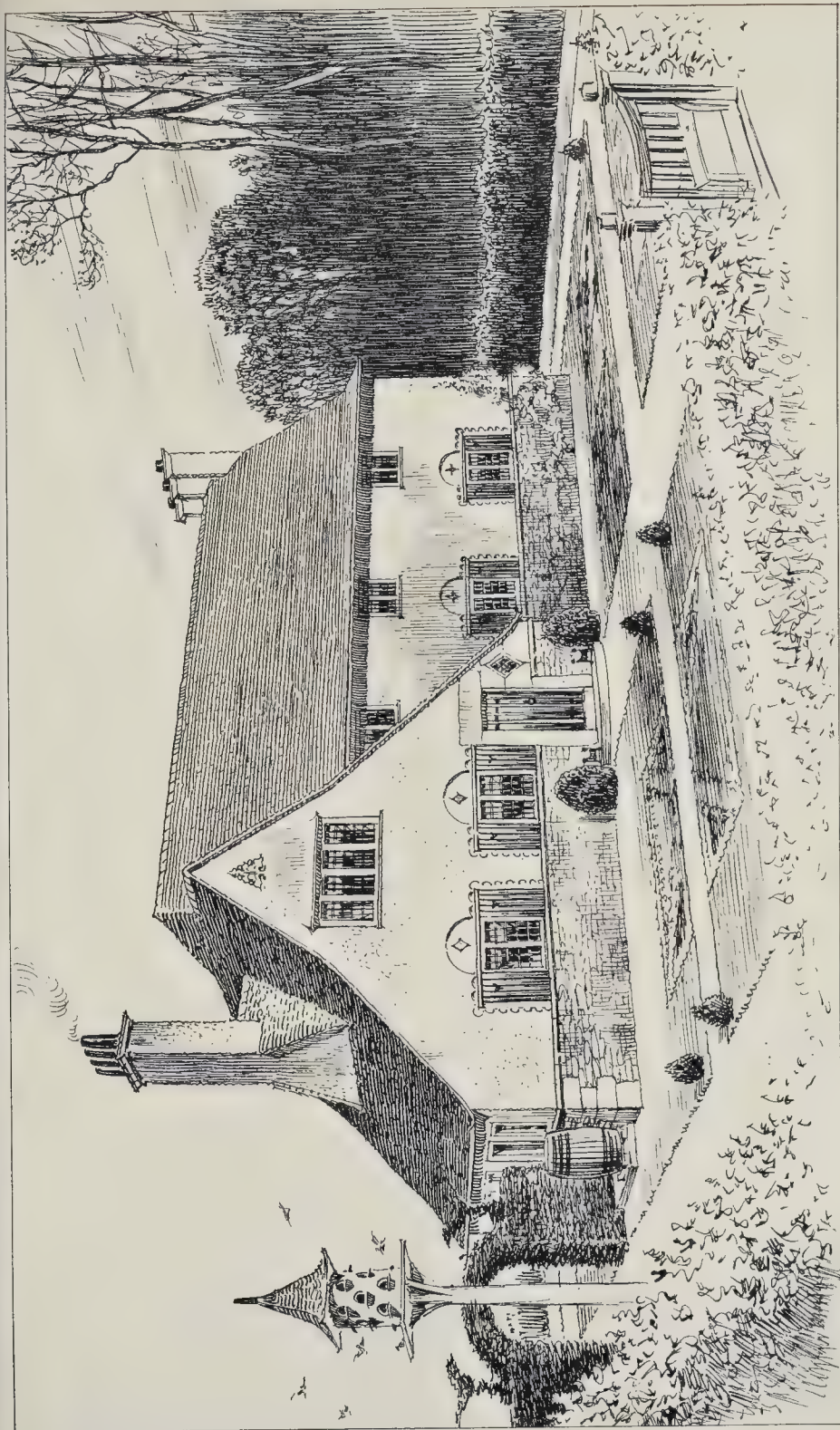
1905

SEVENOAKS KENT



J. H. H. & H. H. H.
18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100

W. H. H. & H. H. H. 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100



PHOTOGRAPH BY MR. H. DARE BRYAN, F.R.I.B.A., ARCHITECT

OWN COUNTRY COTTAGE. FRONT TO HIGHWAY - MR H DARE BRYAN, F.R.I.B.A., ARCHITECT

MASTER BUILDERS' CONFERENCE IN DUBLIN.

THE BANQUET.

On Wednesday evening last week a banquet was given in the Gresham Hotel, Dublin, by the Dublin Master Builders' Association to the President, Council, and members of the National Federation. There was a very large attendance. In the unavoidable absence, through illness, of the President (Mr. Jas. Beckett), the chair was taken by Mr. R. Denne Bolton (Vice-President). On his right sat Mr. G. McFarlane (President of the National Federation), and on his left the Lord Mayor of Dublin. The company included Sir Antony MacDonnell (Under-Secretary for Ireland), Sir Horace Plunkett (Vice-President of the Department of Agriculture and Technical Instruction), the Hon. the Recorder of Dublin, Sir Chas. Cameron, Sir Maurice Dockrell, Sir Thos. Drew, Sir Wm. Smyly, Messrs. M. Goodbody, W. A. Linton, R. Bullen, Alderman Jessop, J.P., J. L. Doves, C. H. Barnsley, James Kiennan, Alderman Bowers, J.P., W. Nicholson, W. Shepherd, W. Mitchell, Joseph Bell, J.P., H. McLaughlin, P. Knox, W. Sapcote, Spencer Henty, C.E., P. Rhodes, J. Good, M. Good, LL.D., W. Beckett, M. A. Partridge, etc.

After dinner the usual loyal toasts were drunk and suitably honoured.

The Chairman proposed the toast of "The National Federation." It might, he said, surprise some people to learn that the building trade occupied the next position to the agricultural industry of the country. The wages paid last year represented close on thirteen millions, while even in Ireland, with its great breweries and distilleries, not even one of these great industries were "in it" with the building trade. In conclusion, he expressed the regret of all present at the unfortunate absence of Mr. Beckett, the President of the Dublin Master Builders' Association.

The toast was cordially drunk. Mr. McFarlane, President of the National Federation, responded. The members of the Federation were combined, he said, in order that they might be able to withstand those who would deal unwise with them, and also to assist one another. The Federation always desired to be conciliatory where disputes arose, and during the last year had assisted in the establishment of various boards of arbitration which would, they thought, do a great deal to remove the trouble caused by strikes during the last half-century. The workmen on those boards had met the masters, however, in an equitable manner. There was indeed, a desire on both sides to deal righteously with each other, and especially was there a desire on the part of the workmen not to demand too much. There were at present two Bills before Parliament, which would greatly affect the builders—the Workmen's Compensation Amendment Bill and the Trades Disputes Bill—but whatever happened to these measures they would meet their obligations manfully, and if they stuck together they would be able to hold their own.

The Chairman next proposed the toast of "The City and Trade of Dublin." He said their Corporation were often sneered at, but it should be remembered that in recent years they had been engaged in two huge works—the main drainage and the electric lighting works. The city tramway system was amongst the best in the world. He was sorry to say that the building trade was not improving, but they trusted that business in this respect would expand in the near future.

The Lord Mayor of Dublin, in reply, regretted the deplorable condition of trade and commerce in Ireland. The country had not been treated as it should be by the Government under which they lived, especially in the matter of army contracts. He was sure that while their Federation had been formed to protect the employer they would also admit the right of the workmen to organise themselves for an equally laudable purpose. It was those who were outside the trade societies that generally caused all the trouble that arose between the masters and the men.

Sir Horace Plunkett also responded. He trusted the friendly relations between employers and workmen would progress in a manner that would give general satisfaction,

and he also trusted that a powerful association like theirs would do all it could to assist the Department of Agriculture and Technical Instruction. The trades unions had assisted them in all possible ways, and he trusted their association would also render all the aid it could in helping to develop the resources of the country. If the Association would assist them in building up city life on its physical side, so as to deal with the social problems of the concentration of population, etc., they would be giving help which was urgently needed.

Sir Maurice Dockrell also responded. He said that one of the greatest factors which militated against the extension of trade in Ireland was the disinclination of the middle classes to embark in trade. Irish youths were put into overcrowded professions, while in other countries business affairs engaged the entire attention of young men. This was an unfortunate state of affairs, and the sooner it was remedied the better it would be for the country.

Sir Antony MacDonnell (Under-Secretary for Ireland) replied to the toast of "Our Guests." He said the buildings with which the members of the Association were acquainted had at least good foundations, but in the building in which a person like himself was employed you could get no foundation whatever. If they asked him what progress had been made in the last three years in building upon that foundation he was afraid he could only point to one or two great features in which there had been progress. He ventured on the last occasion on which he had the honour of partaking of their hospitality to convey a message and to express a warning. The message was one of hope, and it had been fulfilled in the great Act of 1903, which, so far as it had worked, had brought peace and happiness to a multitude of homes; but the warning which he had ventured to express on that occasion had been entirely neglected. Whether that warning had been necessary, or is necessary, the future would tell more certainly than he could. But his own feeling was that the country would suffer from the neglect which was paid to that warning. He came before them that night after three years of work, some of which had brought great satisfaction and some of which had brought regret, and he came before them, as he came three years before, with a message of hope. He was no more entitled to tell them that night the grounds on which the hope was based than he was able to tell them three years ago the grounds upon which his hope was then based; but his firm belief was that the coming year, 1907, would see the fruition of many of those hopes which the best Irishmen had for many years entertained. It might not be the fruition of everything which Irishmen had hoped for, but it would be, he believed, the fruition of so much that Irishmen, if they were true to themselves, would make the fountain and the source from which the whole of their hopes might be fulfilled.

Mr. W. Mitchell (President of the Royal Institute of Architects) and Sir Chas. Cameron also responded. The proceedings terminated at a late hour.

Correspondence.

STREET NOISE ABATEMENT.—PETITION TO THE HOME SECRETARY:

MOTOR-OMNIBUSES AND TRACTION-ENGINES.

SIR,—The petition to the Home Secretary requesting far more stringent regulations and restrictions concerning motor-omnibuses and traction-engines in the streets of the Metropolis has been well started, and bids fair to be one of the most influential petitions of modern times. The names of the principal signatories having been forwarded to the Home Secretary, I have pleasure in herewith enclosing a copy of the same. It is proposed to keep the petition open until the commencement of the Autumn Session.

THOS. BOWDEN GREEN,
Hon. Sec. Petition Committee,
2, Harrington-gardens,
South Kensington, S.W.

* * A long list of signatories accompanies this letter. The petition is as follows:—

"TO THE RIGHT HONOURABLE THE HOME SECRETARY OF HIS MAJESTY'S GOVERNMENT.

Whereas a very large number of property owners, householders, and other inhabitants of

the City and County of London suffer considerable annoyance and inconvenience on account of the noise, smell, dust, vibration, etc., caused by motor-omnibuses and heavy traction engines, unsuitable for crowded or residential districts.

We the undersigned hereby respectfully request the Home Secretary to issue—and cause to be put in force—such regulations and restrictions as may be deemed necessary for the abatement of the above-mentioned nuisances, which are seriously depreciating the value of property and causing a considerable amount of discomfort and injury to health."—Ed.

MOTOR-CARS AND DUST.

SIR,—In your last issue it is observed that there does not appear to be anything that can be done in the construction of motor-cars which would mitigate the horrible dust nuisance. Is not such view erroneous? A correspondent in one of the London dailies recently pointed out that something can be done in that direction, namely, the body of the car can be raised a good foot higher from the ground, and the wheels can be constructed as discs instead of with spokes. Such changes in construction would probably considerably lessen the nuisance.

Newark. DRIVEN OFF THE ROADS.

THE PREVENTION OF DUST ON MACADAMISED ROADS.

SIR,—One hears of calcium chloride for this purpose, but why not the whole means of preventing stone from crumbling to dust? I mean first applying silicate of potash or silicate of soda. The road should be thoroughly well made and in good condition before attempting such an experiment. J. K.

LONDON COUNTY COUNCIL LIST OF CONTRACTORS.

SIR,—I notice in your issue of the 28th ultimo you publish a resolution of the London County Council stating that my name be entered upon the list of persons and firms from whom the Council will not in future accept tenders.

I tendered for repairs to schools under schedule for two districts and afterwards ascertained that the Council kept a staff of their own to do part of these repairs, and as I was to be under the same supervision as their own men, it seemed quite clear that the work could be sorted out. This was not stated in the conditions, which were, therefore, misleading, and I think I was quite within my right in refusing to sign a contract in these circumstances. I wrote the Council to this effect (and enclose you a copy of my letter), but I received no reply from them whatever and heard nothing more of the matter until I saw the resolution in the *Builder*.

The manner in which the resolution is set out is detrimental to me unless some further explanation is given, and I trust, therefore, you will see your way to insert this letter in your next issue.

H. KENT.

* * The recommendations were printed in the *Builder* as they appeared in the Agenda paper of the London County Council.—Ed.

BOOKS RECEIVED.

MODERN BUILDINGS: THEIR PLANNING, CONSTRUCTION, AND EQUIPMENT. Vol. III. Illustrated. Edited by G. A. T. Middleton, (London: The Caxton Publishing Company, Surrey-street, W.C.)

STRUCTURAL STEELWORK: being Tables, Data, and Formulae for the Use of Engineers, Architects, and Contractors. (London: Edward Wood & Co., Ltd., Engineers, Manchester; and 88, Cannon-street, E.C. 5s.)

The Student's Column.

ROOFS: STRUCTURALLY CONSIDERED.—IV.

11.—Tile.

ROOFING tiles are made from clay prepared and burned in a manner generally similar to that followed in brick manufacture. But as tiles are much thinner than bricks they require a specially tough quality of clay free from stones and prepared with great care.

Tiles for roofing purposes are produced in numerous shapes, and, in addition to the ordinary patterns, several patented tiles are made for which the manufacturers claim special advantages. They are obtainable in red, brown, blue, and "Broseley" colours, the latter ranging through an almost infinite variety of shades from deep reddish brown to blue, and exhibiting the characteristic "bloom" which distinguishes Broseley tiles.

All tiles suffer more or less in quality from the unavoidable difficulty that, if well-burned, they are apt to become warped, and if under-burned they are porous and liable to premature decay.

Tiles showing indications of partial vitrification are the most enduring, as well as the least absorbent.

Good roofing tiles are dense, tough, reasonably non-absorbent, of uniform colour, and good shape, free from stones, giving a clear ring when struck, and showing a clean fracture and fine grain when broken. They rapidly acquire a weather coating which prevents the absorption of water by filling the surface pores of the material.

Inferior tiles are generally of a bright red or earthy red; they absorb water freely, and do not weather readily.

The form of tiles is a matter that should receive attention, for unless roofing tiles are of good shape the courses will not lie close one upon another.

Pantiles are used chiefly for sheds and inferior classes of building, as it is difficult to lay them so as to guard against the penetration of water, snow, and wind.

They partially overlap at the sides, but not sufficiently to make a watertight joint, and, in consequence, are usually bedded in hair mortar and pointed inside, and sometimes outside also. Each tile is moulded with a small projection termed a *nib* or *stubb*, about 1 in. wide by $\frac{3}{4}$ in. thick, at the middle of the back of the upper end, for the purpose of hanging the tile to the lath or batten.

Pantiles usually measure 13 $\frac{1}{2}$ in. long by 9 $\frac{1}{2}$ in. wide by $\frac{1}{2}$ in. thick, and weigh about 5 $\frac{1}{2}$ lb. each.

They are laid with a lap of 1 $\frac{1}{2}$ in., 2 $\frac{1}{2}$ in., or 3 $\frac{1}{2}$ in., corresponding to the gauge, or "weather," as it is alternatively termed, of 10 in., 11 in., and 12 in.

As the lap is measured directly from course to course, the gauge is found by deducting the lap from the length of the tile. Allowing for the side lap the effective width of a pantile is 8 in.

The number and approximate weight of dry pantiles per square are given in Table IX. As these tiles absorb a considerable amount of water, and retain it for a long time, a margin of 10 per cent. should be added to the net weight per square of tiling.

TABLE IX.—NUMBER AND WEIGHT OF PANTILES PER SQUARE OF 100 SUPERFICIAL FEET.

Gauge.	Number of Tiles	Approximate Weight.
10 in.	180	84 cwt.
11 ..	164	7 $\frac{1}{2}$..
12 ..	150	7 ..

Pantiles are laid on fir laths 1 $\frac{1}{4}$ in. to 2 in. wide by $\frac{3}{4}$ in. to 1 in. thick, or on oak laths 1 $\frac{1}{4}$ in. wide by $\frac{1}{2}$ in. thick, supplied in bundles of twelve laths, each 10 ft. long.

The roof slope for pantiles ought not to be less than 25 deg. from the horizontal.

Foster's Lock-wing Tiles represent an improved type of pantile design, and it is claimed by the makers that these tiles can be fixed by unskilled labour, requiring neither bedding nor pointing, and that, owing to the special form of the side joint, the tiles cannot be blown off, as the lock becomes tighter as air pressure from beneath increases. Fig. 2 is a diagram illustrating the wing-lock adopted in this form of tile.

Double Roll Tiles (Fig. 3) may be described as double pantiles having two main curves, in addition to the lip by which the side joints are made. They are provided with three projecting nibs at the back.

Corrugated Tiles (Fig. 4) are also generally similar to pantiles, but have three or four flutes.

Angular Tiles (Fig. 5) are simply corrugated tiles with angular flutes.

Italian Corrugated Tiles, also termed *Roman tiles*, are made by various firms in patterns which differ somewhat, but may be generally described as having flat surfaces alternating with corrugations, the idea being similar to that embodied in the Italian system of corrugation for zinc sheets (see par. 7). Fig. 6 represents a tile of this form, in which the flutes are slightly tapered so that the upper end of one roll fits into the lower end of the roll above. The tile here

illustrated measures 16 $\frac{1}{2}$ in. long by 14 in. wide, the weight per square (requiring eighty tiles) is about 7 cwt.

Poole's Bonding Roll Tiles are somewhat similar to Italian tiles, but, as shown in Fig. 7, the centre flute in each tile is only continued for a sufficient distance along the lower part of the tile to provide a socket for the lateral joint between two tiles of the next course below. The weight per square (requiring ninety tiles) is about 8 cwt.

Plain Tiles of rectangular form, as illustrated in Fig. 8, measure 10 $\frac{1}{2}$ in. long by 6 $\frac{1}{2}$ in. wide by $\frac{1}{2}$ in. thick, and weigh about 2 $\frac{1}{2}$ lb. each. They are either moulded with two or three *nibs* or *stubs*, on the top under edge (see Fig. 10), or with two holes for oak pegs (see Fig. 11). For hanging on steep roof slopes these tiles are made with nibs and holes so that they may be secured by nails in addition to the projecting nibs, as shown in Fig. 10.

Plain tiles are also made in two special widths, *half-tile* and *tile and a half*, the former being used to break joint at the end of alternate courses, and the latter in positions where a half-tile could not be fixed efficiently.

The tiles are curved in the direction of their length just sufficiently to give the under surface a slightly concave shape, which has

the effect of causing the lower edge of one tile to fit closely against the upper surface of the tile below.

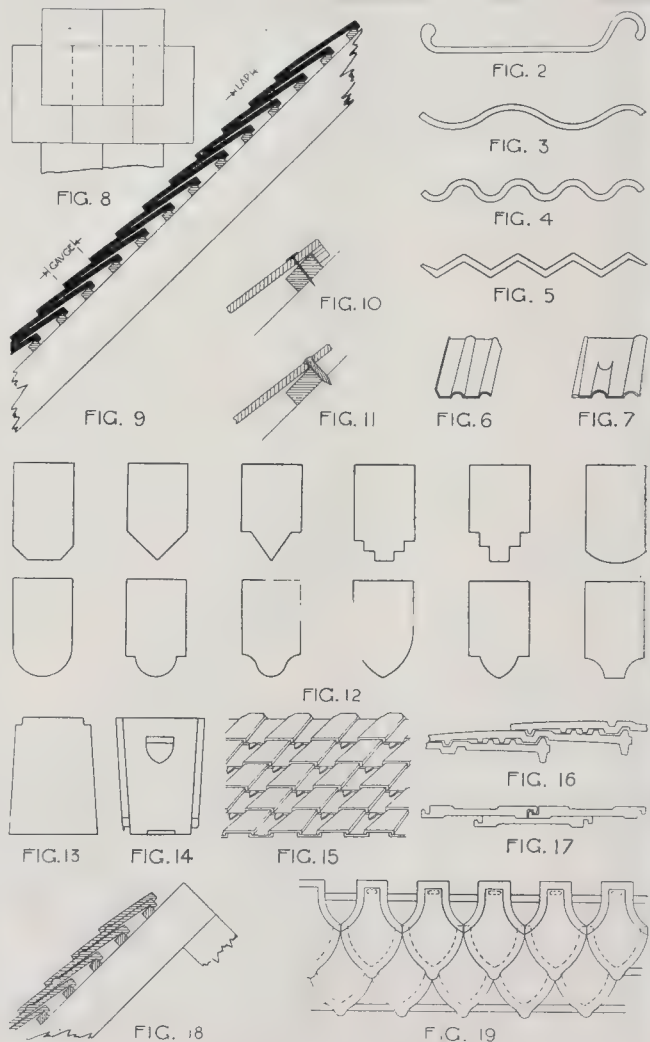
Plain tiles are laid with a lap of 2 $\frac{1}{2}$ in., 3 $\frac{1}{2}$ in., or 4 $\frac{1}{2}$ in., measured from one course to the next course but one below, as shown in Fig. 9. Therefore, as in the case of slates, the gauge is found by subtracting lap from length, and halving the remainder.

Table X. gives the number and approximate weight of plain tiles are practically non-absorbent, but for others which are more porous a small percentage should be added to the weight as an allowance for water absorbed.

TABLE X.—NUMBER AND WEIGHT OF PLAIN TILES PER SQUARE OF 100 SUPERFICIAL FEET.

Gauge.	Number of Tiles.		Approximate Weight.
	Net.	With Margin for Waste.	
3 in.	738	800	17 cwt.
3 $\frac{1}{2}$..	653	700	15 ..
4 ..	554	600	13 ..

Plain tiles are laid on laths similar to those



Illustrations to Student's Column.

used for paniles and supplied in bundles of 100 laths, each 5 ft. long.

It is open to question whether the practice of bedding the joints is a good one. In its favour it may be said that the work is made more watertight, and that the tiles are less liable to breakage in case workmen have to walk or climb over the tiling. On the other hand, it should be remembered that tiled roofs usually fall into disrepair owing to decay of the laths, and that the effect of mortar is to encourage such deterioration. Moreover, when mortar is employed, the natural tendency of the tiler is to rely upon that material to keep the tiles in place, and consequently to devote less care to the proper hanging and pegging of each tile. Further, all roofs are subject to movements, due to temperature variations and wind pressures, which tend to disturb the mortar and to cause it to fall away from the joints.

Plain tiles can be laid to any slope from 25 deg. to 60 deg., but, having regard to the possible penetration of rain and snow, it is often thought undesirable to give ordinary tiled roofs a pitch of less than 45 deg.

The practice of covering roofs with close boarding and felt, or other suitable sheathing material before laying the laths and tiles is one that should always be followed in good-class work. Boarding alone is not sufficient to stop draughts.

Ornamental Tiles, such as those illustrated by the various sketches in Fig. 12, are generally described as "plain" tiles.

Probably this somewhat inappropriate use of the term arose from the fact that it was necessary to apply the adjective for the purpose of distinguishing between curved paniles and plain, or plane, tiles. "Ornamental plane tiles" would be a perfectly intelligible designation, but "ornamental plain tiles" is decidedly contradictory.

Ornamental tiles, as we prefer to call them, have the same overall dimensions as plain tiles, and are laid in the same way.

Special tiles of several kinds have been introduced with the object of reducing weight by obviating the wasteful double lap necessary when ordinary, plain, and ornamental tiles are used. It is obvious that by moulding tiles in such shapes that they fit one into another and form watertight lateral joints, the successive courses need only be overlapped to such an extent as to prevent rain and snow from being driven upwards, an effect that can be further guarded against by suitable formation of the upper and lower ends.

Broomhall Tiles, formerly known as *Taylor's Patent Roofing Tiles*, are illustrated in Figs. 13 and 14. They are laid in alternate rows as "channel" tiles with the face uppermost, and as "capping" tiles with the back uppermost, so as to form a roof covering with the appearance generally represented in Fig. 15.

The tiles, which measure 12½ in. long by 9½ in. wide at one end, and 6½ in. wide at the other, are hung on battens 2½ in. wide by 1 in. thick, and laid with a lap of 3½ in. The channel tiles are first laid in rows at proper distances apart along the slope of the roof from eaves to ridge, the narrow end of each tile being pushed into the wide end of that next below it until the splay s fits into an undercut in the shield S of the lower tile. After the channel tiles have been fixed, the capping tiles are laid so as to fill the spaces between the channel tiles. The tiles are fixed by 2½ in. copper or galvanised iron nails. At the eaves and gables they are double nailed. Hip and ridge tiles are supplied of suitable design to work in with the other tiles.

These tiles form a handsome roof covering, and do not require stronger framework than that usually employed for slates. The number of tiles per square is 185, and the weight per square about 7 cwt.

Major's Interlocking Tiles, shown in section by Fig. 16, afford ample security against the penetration of rain and snow, and are fixed without nails, mortar, or cement. Owing to the double lap for which these tiles are designed, and the weight of the projecting ribs, they form a somewhat heavy roof covering.

Somerset Interlocking Tiles (Fig. 17) are made for single-lapped joints, which are said to be proof against rain and snow. Consequently the weight per square is not much

more than half that of ordinary plain tiling. The number of tiles per square is 160, with a 3-in. lap, and the weight per square is about 64 cwt.

Bainbar Plain Tiles, laid with double lap, resemble ordinary tiles except that there is a transverse groove on the under side and a corresponding rib on the upper side of each tile, as illustrated in Fig. 18.

Wade & Cherry's Tiles are of the shape illustrated in Fig. 19, and involve the use of far less material than ordinary ornamental tiles. The tiles are hung on battens in the usual manner by means of projecting nibs, and are held together by flanges on the upper and lower ends of each tile, shaped so as to form a dovetailed joint.

In addition to the tiles described above, *ridge, hip, valley*, and other special tiles for details of roof construction, are made in great variety to suit the pattern of the tiling adopted, and the structural features of the roof to be covered.

LONDON BUILDING ACT TRIBUNAL OF APPEAL.

At the sitting of the Tribunal on Thursday last week the Chairman, (Mr. A. Hudson), read the decision of the Tribunal in the case of Lilley & Skinner* to allow the appeal and reverse the certificate of the Superintending Architect. They would also order the London County Council to pay the costs of the appellants.

Mr. Morosby White, for the London County Council, said he must make the same objection as that taken by Mr. Avery the previous day, viz., that the Tribunal had no power to mulct the London County Council in costs. He also objected to the costs of expert witnesses, whose evidence he contended was not necessary to assist the Tribunal in arriving at a decision.

After some argument the Chairman said the Tribunal would fix the costs at 50l.

Mr. Morosby White asked for a case, both as to costs and the building line, to be stated, and this was granted, subject to the question of law at issue being stated.

The Tribunal then proceeded to consider an appeal by Mr. A. Cameron Corbett, M.P., under sect. 19 of the London Building Act, 1894, against an order of the London County Council, dated July 19, 1906, refusing to sanction the formation or laying out of new streets for carriage traffic upon the St. German's estate, Catford, leading out of the south side of Downhill-road. Mr. Cunningham Glenn appeared for the appellant and Mr. W. R. Adkins, M.P., represented the London County Council.

Mr. Glenn took an objection to the London County Council appearing in the case except as parties to it, but the Chairman overruled the objection. It was, he said, clear that the Council had a right to be present, but as to whether they were there in the capacity of parties to the case was a matter of law they were not competent to decide.

Mr. Glenn then opened the case for the appellants. He said that Mr. Corbett had a large estate at Catford, most of which had been laid out by the sanction of the London County Council. The streets for which permission were now asked formed the concluding portion of the estate, and the ground on which the Council had refused to sanction the plans submitted to them was that because one of the new streets would not afford direct communication between two other streets in the same property. His client was perfectly prepared to meet any reasonable requirements of the Council in the matter.

Mr. Adkins said that the only interest the London County Council had in the matter was to see that the estate was developed in such a way that the public were not inconvenienced.

After a lengthy consultation between counsel and the Tribunal the Chairman announced that the Court would allow the appeal, the appellant by consent undertaking not to build permanently over or prevent the continuation of Ardock-road and Mulki-road up to the boundary of the Corbett estate at a point to be indicated on a plan which the Tribunal would prepare before September 29, 1911, the undertaking to be in such a form, if not agreed between the two parties, to be settled by the Tribunal, and the London County Council to be at liberty to apply to the Tribunal before the expiration of five years, for an extension of the time.

No order was made as to costs.

PROPOSED NEW THEATRE, TWICKENHAM.—It is proposed to erect a new theatre at Twickenham in the Hampton-road. Shops and residential flats are included in the scheme. The architect is Mr. A. Parry Fielder. The theatre will be built of fire-resisting material, and is to accommodate some 2,000 persons.

* See our last issue, p. 184.

Obituary.

MR. R. H. MIDDLETON.—We regret to announce the death of Mr. R. H. Middleton, Borough Surveyor of Walsall, which took place in London on Saturday last. The late Mr. Middleton, who was fifty years of age, and who leaves a widow and a son and daughter, went to Walsall about sixteen years ago from Birkenhead, where he had been deputy surveyor. He received his training in the office of Mr. Hor-fall, who was an architect and railway engineer in large practice at Halifax. Previous to going to Birkenhead, Mr. Middleton had held an appointment as assistant surveyor at Dewsbury, in Yorkshire. He was an Associate of the Institution of Civil Engineers. At Walsall he was able to render valuable service in some of the more important works undertaken by the municipality.

General Building News.

ROMAN CATHOLIC SUNDAY-SCHOOL, BRADFORD.—On the 4th inst. the foundation-stones were laid of a new Sunday-school in connexion with St. Cuthbert's Roman Catholic Church, Manningham. The building comprises on the men's side three rooms, one of which is being prepared as a gymnasium. On the girls' side there is to be one large room, 28 ft. by 20 ft. On the floor above will be an assembly hall, 40 ft. square, with two stone staircases and with ante-rooms on either side of a raised platform. The designs have been prepared by Mr. W. H. Hebert Marten, architect, of Bradford. It is intended ultimately to erect a convent on a portion of the site which is in hand, and Mr. Marten's design includes this building.

COUNCIL SCHOOL, NEWCASTLE-UPON-TYNE.—On the 2nd inst. the new Council school at Wingrove, Newcastle, was opened. The school provides for the education of 1,260 children—420 seniors, 420 juniors, and a similar number of infants. There are two blocks, and in the larger one the juniors, boys and girls mixed, will occupy the ground floor; while the seniors, also mixed, will be located on the upper floor. It is a two-storied building. The other block will be used by the infants. The exteriors are of red brick—Lowry second quality facing bricks—with Denwick stone facings; and inside there is a dado running throughout of Lunley white glazed bricks to the height of 4 ft. The ground floors are of pitch-pine wood blocks, and the upper floors of pitch-pine flooring. Each school has seven classrooms and a central hall, and there are also private rooms for teachers. The premises are lighted by means of incandescent inverted burners. The work has been carried out from the plans of Mr. Chas. Walker, architect of Eldon-square, the general contractors being Messrs. Parkinson & Sons, Newcastle. The plumbing work has been done by Messrs. J. Tweedle & Co.; the heating by Messrs. Dinning & Cooke; the slating by Mr. Chas. Nicholson; and the sanitary goods have been supplied by Mr. W. E. Farrer, of Birmingham.

UNIVERSITY COLLEGE SCHOOL.—Sir George Barham, Mayor of Hampstead, laid the foundation-stone of the new buildings at Frognaul on July 25. In our number of February 4 last year we published Mr. Arnold Mitchell's designs, selected in competition, which will be carried out at an estimated total expenditure of 110,000l., including the cost of the site and equipment.

WORKMEN'S DWELLINGS, WESTMINSTER.—The Mayor, Major-General Lord Chylesmore, recently opened the Council's new workmen's dwellings at Marshall-street, W. These dwellings have been erected by the Westminster City Council, from the designs of Messrs. Joseph & Smithen, upon a small site with a frontage to Marshall-street of 72 ft., containing a superficial area of about 3,255 ft. The building is five stories in height, including half basement and an attic story, and is faced with red Leicester bricks relieved with dressings of stone. The staircase walls have been faced with marble mosaic. The floors throughout are of fireproof construction, and the pavings and landings are formed of praelithic material. The lavatories are paved with mosaic and the walls thereof have a similar dado. The buildings contain ten three-room tenements and ten two-room tenements; a total of twenty tenements containing fifty rooms, which will house about 100 persons. All the tenements are self-contained. The Council propose to charge 11s. and 11s. 6d. (according to position) for the three-room tenements and 8s. and 8s. 6d. for the two-room ones. The cost of the buildings will be about 4,600l.

PAROCHIAL HALL, SHIELDFIELD.—The plans for the new parochial hall in connexion with St. Jude's Church, Shieldfield, Newcastle, have been approved by the trustees and the Town Improvement Committee, and tenders for the work will shortly be received. The plans have been prepared by Mr. A. B. Plummer, architect, Newcastle. The site is at the corner of Rosedale-place and Rosedale-street. The present width of

Rosedale-place will be increased to 50 ft. There will be a frontage of about 109 ft., 22 ft. of which, at the south end, will be an existing house, which is to be the caretaker's residence. There will be a frontage of about 64 ft. to Rosedale-place, and about 81 ft. to the back lane. Some houses on the site will be removed. The ground along Rosedale-street frontage will remain; the back lane, however, will be raised 8 ft. at Rosedale-place and 18 ft. at the other end. The main entrance will be at the corner of the two streets; and there will be an entrance lobby and main stair leading to the first floor. From the lobby access is obtained to the main ground floor hall, 67 ft. by 46 ft., which will seat 500. Externally the building will be faced with red bricks with stone dressings, and with moulded brick architraves around the windows and doors. The first floor windows will be circular. In harmony with St. Jude's there will be brick pilasters and eaves and corbel tabling. The roof will be covered with green slates. The building will be heated with hot water pipes and will open fireplaces.

ELECTRICITY SCHEME. BRIGHTON.—The members of the Brighton Town Council, at a meeting of the General Purposes Committee held on the 1st inst., decided to promote a scheme of electric light and power supply, combined with the provision of a destructor for dealing with the refuse in the sanitary department. The matter came before the Council in the form of a report from the joint sub-committee appointed to deal with the subject nine years ago. This report was accompanied by a report from Messrs. Lacey, Sillar, & Leigh, electrical engineers and experts, and also by a report from the Borough Surveyor (Mr. S. S. Heywood) dealing principally with the erection of the buildings. The scheme will involve at least an expenditure of about 25,000*l.* It is proposed to place the combined electrical and destructor works on the site of the burned-out Alexandra Silk Mill, which is centrally situated, and yet not surrounded by residential property.

RESTORATION OF BIRSE CASTLE.—Forest of Birse Castle, which for many years was a ruin, has now been completely restored. The carrying out of the work was entrusted to Mr. George Bennett Mitchell, architect, Aberdeen, and the contractors were as follows:—Masons, Messrs. Andemon & Lealie; Torphians; carpenters, Messrs. W. Duguid & Son, Ballater; plasterers, Messrs. Mitchell Brothers, Ballater; slaters, Mr. J. Durnin, Aberdeen; painters, Messrs. G. Donald & Sons, Aberdeen; plumber, Mr. Peter Stewart, Aberdeen; grates, Messrs. J. Bannochie & Son, Aberdeen; furnishings, Messrs. Maple & Co., London; metal work, Messrs. G. & W. Miller, Aberdeen; and roads, Messrs. J. & H. Davidson, Banffshire.

ALTERATIONS TO THE BOROUGH THEATRE, STRATFORD.—The Stratford Borough Theatre has just been reopened, after having undergone various alterations and improvements. The decorations have been carried out by Messrs. J. De Jong & Co., Camden Town, under the personal direction of Mr. Hellier Eyke, architect to the firm. The carpeting has been done by Messrs. J. R. Roberts, Ltd., and the seating by the Hackney Furnishing Company, Ltd. The electric lighting has been re-installed by the West Ham Corporation.

YORK MINSTER.—The Dean of York has issued his ninth occasional paper upon the restoration of York Minster. It contains a dozen full-page illustrations, many of them showing the progress of the work. The results of the last year's operations, says the Dean, are not so apparent as heretofore, but have nevertheless kept a large staff fully employed. A hundred years ago, when the west front was carefully, though not scientifically refaced, large plates of "Hartley's rough patent glass" were inserted to protect the mediæval glass of the west window. The former glass has now been removed and replaced all over by clear "crown glass" in diamond quarries, and the stone mullions have been thoroughly repaired. This west window, which, as will be remembered, fell into the hands of William Peckitt, contains a large admixture of XVIIIth century glass. But, besides being, as the Dean thinks, not unworthy of the position which it holds in the Minster, it is almost the only one in the building which can be attributed to a definite donor, being due to Archbishop Melton (A.D. 1317-1340), of whom the Dean adds an interesting account. His register shows that in 1338 he gave 100 marks "pro opere vitre fenestras ex capite occidentali . . . de novo constructas." The other work upon which progress has been made has been the construction of the much-debated flying buttresses with their pinnacles. The Dean does not expect that the difference of opinion about them will be unanimously settled, but he suggests that the warm approval of what has so far been done in the matter will increase when the series is complete. The photographs tend to confirm his hope and to support his view that "nothing could exceed their grace and beauty." Mr. Bodley writes that "the artistic effect is to again lift that side of the Minster to its due proportion, and the constructional gain is the added strength—for its longer

continuance." During the year ended June 16, 1906, a sum of 62*l.* was subscribed to the restoration fund, and over 20,000*l.* has so far been expended. Further help is needed.

Sanitary and Engineering News.

PROPOSED SEWAGE DISPOSAL WORKS, OLD-BURY.—On the 30th ult., Colonel W. R. Slacke, an inspector appointed by the Local Government Board, held an inquiry at the Public Buildings, Oldbury, into the application by the Oldbury District Council for sanction to borrow 38,300*l.* for the improvement and extension of the Oldbury sewage disposal works, including the execution of works in the Rowley district. Mr. W. Shakespear (clerk) explained that land had been purchased at a cost of 1,719*l.* Mr. T. H. Shipton (Surveyor) stated that it had been necessary for some years to improve the system of sewage disposal at the works. He gave details of the existing works, and mentioned that it was proposed to make extensive alterations to the plant and system of dealing with the sewage. He considered it would be about three years before the whole of the works were completed, but it was hoped to purify the sewage in a much shorter period. The extensions had been rendered necessary by the increasing population in the district, and also the presence of the trade waste in the sewage. Professor Frankland also gave evidence. He said the Oldbury sewage was very difficult to deal with, because a large proportion of it was made up of chemical trade waste. Experiments had been made since 1903, and the present system was considered to be the best.

CAFE TO CAIRO TRAIL.—The late Mr. Alfred Beit has bequeathed 1,000,000*l.* sterling towards the accomplishment of Cecil Rhodes's vast project. The work is undertaken in sections of about 1,000 miles apiece. Thus far the line, of which 2,100 miles are practically completed, advances from Cape Town to a point nearly 300 miles distant, northwards, from Victoria Falls, and is rapidly drawing near the boundary of the Congo Free State. It is anticipated that Mr. Beit's bequest will be applied to extending the line in Rhodesia and northwards of the Zambesi where are rich copper deposits and goldfields and the Wankie coalfields near the Victoria Falls. Sir Charles Metcalfe's engineering staff are now engaged in completing the next section through the elevated tableland intersected by the river Kafue beyond the Broken Hill country wherein are valuable zinc and copper mines, with the object of reaching the copper deposits and the green malachite caves on the borders of the Congo Free State. In a statement recently made by Sir Charles Metcalfe, and published in the *Times*, he says that the direct line will probably branch away at Broken Hill, and will go to the south end of Tanganyika, and that in his opinion a railway line should be made northwards through Congo Free State to traverse the French territories and end at Algiers or some other port in the Mediterranean. In the north-east part of the continent there seems to be some prospect of the construction of a railway line across the Nile at Roseires, with an extension from the Uganda railway to the Victoria Nyanza and thence to Lake Tanganyika, which is about 650 miles distant. As Sir Charles Metcalfe observes, the entire scheme would be completed by joining up the Uganda Railway with Khartoum, the line of 600 miles through their own territory being made by the German Government.

Foreign.

FRANCE.—The Académie des Beaux-Arts has awarded the Grand Prix de Rome in the architectural section to M. Bonnet, pupil of MM. Daumet and Esquié. The subject for the competition was a new building for the Collège de France. The Rouvier prize was awarded to MM. Bernard Haubert and Pierre Paquet, *ex æquo*. The Lycée St. Louis has been the subject of important works of alteration and enlargement, necessitated by the prolongation of the Rue Vaugirard to the Boulevard St. Michel. The cost of the new building is estimated at more than 2,000,000*fr.*—A monument to Gounod is to be erected at St. Cloud. It will include a portrait bust which was executed by the late Carpeaux. M. Derna, Inspecteur des Bâtiments Civils, has been appointed architect to the Luxembourg, in succession to the late M. Sellier de Gisors; and M. Nénot has succeeded the same architect as Inspecteur des Bâtiments Civils. Important works of restoration are to be carried out at the Palais de l'Élysée, for which M. Bonnier has been appointed architect.—A new Custom-House is to be built at Nantes, at an estimated cost of 600,000*fr.*—M. Meinville, architect, of Bordeaux, has been elected President of the Société des Architectes du Sud-Ouest. There is a proposal to construct a barrage, with a bridge road-way, between St. Malo and Dinard, and also to form a dock or basin in the water

at St. Servan. The barrage would cost 800,000*fr.*, and the dock 37,000,000*fr.*—A monument to Villiers de l'Isle Adam is to be erected at St. Briac. M. Le Goff will be the sculptor. A large viaduct is to be built over the Rance, between Port Saint-Jean and Port St. Hubert. It will be a steel bridge, 225 metres in length over all, with a central span of 165 metres, at a height of 30 metres above the mean water level. M. Harel de la Noë is the engineer.

A Franco-Italian committee has been formed to erect a statue to the memory of Lamartine, at La Mergellina, on the Bay of Sorrento.

GERMANY.—Speculation, which has already sacrificed so many ideal buildings to material ends, is now threatening one of the most charming spots in the neighbourhood of Leipzig. If the proposed new street of its greatest charm, which is derived not only from the daintily decorated building, dated 1755, but from the laying out of the grounds with arched paths, statues, arbours, and picturesque enclosing walls. Schiller was a daily visitor to the "Poet's Walk" during his stay in Gohlis. On July 11 died Walter Körber, aged 54, one of the foremost of the works, as Principal of the Surveyors' Institute, has elaborate measured drawings of Strassburg Cathedral and prepared plans for the restoration of the Gross-Salz Church, near Magdeburg. The Prussian Board of Public Works has lost in Körber one of its most valued officials.

ITALY.—On June 1 the new bathing establishment was opened at Carlsbad. It is built in the Empire style, from the designs of Herr Drebnitz of Carlsbad. The buildings contain forty-two mud baths, twenty-nine shower baths, fifteen carbonic acid gas baths, two halls with cubicles for mud poulticing, rooms for cold water treatment, etc. A limited company has been formed which proposes to construct much-needed baths in Innsbruck. These will include an open-air swimming bath, 35 metres long, in which waves will be mechanically produced; a covered swimming bath, 23 metres long, which can be warmed in the winter; a vapour bath, etc.—One of the most interesting features in the Health Exhibition in Vienna is the Mining Section. The tragedy of Courrières has drawn the attention of the public to the precautions taken for safety and especially to the contrivances resorted to for rescue. The exhibition shows how Austria takes a leading place in the practical methods she adopts in mine rescuing operations.

ITALY.—Signor Marzocchi, engineer, has been making experiments with ferro-concrete in order to discover a method by which this material may be used with economy in ordinary dwelling-houses in Italy. According to his project, a ferro-concrete floor can be laid which in point of cost and lightness of construction compares favourably with the ordinary wooden floor.—Signor Reversi, in an article on higher technical education, urges reform in these matters, as most of the higher posts in the technical schools are now held by foreigners, Swiss, Germans, and Belgians. Not only are Italians thus thrust into the background, but the foreigners do not attempt to improve their contempt for the country which befriended their industries or to industrialise as in Hungary, a new and powerful barrier would be opposed to the mad but significant dreams of Germanophiles.—In a few months the Simplon Tunnel line will be added to the list of electric railways. Messrs. Brown, Boveri, & Co. will supply the locomotives, which will be of the same type as those in use on the Lecco-Colico-Chiavenna line.

SWITZERLAND.—Plans are invited from foreign architects for a library to contain 400,000 volumes to be built in Freiburg in connexion with the University. Particulars to be obtained from the "Kantonal Baudirektion," Freiburg. Latest date for sending in plans, September 30, 1906.

Miscellaneous.

THE HOUSING PROBLEM IN LIVERPOOL.—The City Council have had before them a report of the Housing Committee on Councillor Morrissey's motion, which asked the Corporation to put into force part 3 of the Housing of the Working Classes Act, 1890, and to instruct the Housing Committee to prepare a scheme for the erection of houses in the outlying districts of the city on land in possession of the Estate Committee, or on any other suitable sites. In accordance with the standing orders, Mr. Morrissey's motion was sent, before being discussed, to the Housing Committee for a report. This report they have now prepared, and it is as follows:—"The committee's housing operations have hitherto been confined to providing accommodation for those dispossessed from properties dealt with by the medical officer of health, and the greater portion of building work has been carried out under part 3 of the Housing of the Working Classes Act, 1890. The object of the motion, as expressed by its mover in committee, is the provision by the municipality of houses for

artisans, etc., at rentals of from, say, 7s. to 9s. weekly, with the view to the development of the suburbs by the erection of commodious houses to be let at low rentals and having more air space than is given to dwellings of this class at present being erected by private enterprise. He does not suggest any scarcity of accommodation for the mass of people proposed to be catered for. The committee have ascertained that during the last year about 2,000 houses, at rentals ranging from 12s. to 18s. per annum, and about 4,500 houses, at rentals ranging from 18s. to 25s. per annum, have been erected by private enterprise in the outlying districts. The inability of the Corporation to compete with private enterprise as regards cost of building for ownership purposes of the class proposed, and the fact that both interest and sinking fund charges have to be provided out of revenue, cause the committee to have serious doubts as to the Council being able to offer inducements in respect of rental if the undertaking proposed is to be conducted on a commercial basis. The stringency of the building by-laws in the city has from time to time been a factor in the committee's opinion that anything in the direction of more air space is necessary, it is a matter for the Health Committee to deal with. Failing a want of accommodation the committee do not recommend the Council to enter into competition with private enterprise in the direction suggested." Accordingly, this report was read by Mr. Streyer (Mr. the Mayor, Thomas Sheldermole), who has ascertained from the building surveyor (Mr. Goldstraw) that the number of houses from 12s. to 18s. rental per annum erected during the past five years by private enterprise is:—Old City, 307; Waverley, 529; Toxteth Park, 52; Walton, 294; West Derby, 186; Garston, 218; total, 2,187. Rentals from 18s. to 25s. per annum:—Old City, 261; Waverley, 766; Toxteth Park, 192; Walton, 540; West Derby, 1,619; Garston, 214—total, 3,622. The Head Constable's returns show that in December last there were vacant houses at rentals under 5s. a week and over 5s. a week as follows:—Old City, under 5s. over, 1,833; Waverley, under 5s. over, 283; Toxteth Park, over, 299; Walton, under, 69; over, 298; West Derby, under, 93; over, 618; Garston, under, 3; over, 109; total under 5s., 1,113; total over 5s., 2,240. The latter statistics are, says the surveyor, given for what they are worth; they do not discriminate the various rentals under 5s., and no doubt quite a number of these would be much in excess of that rental. The surveyor further states that the houses in the outskirts would have yielded 5 per cent. per annum net over the full period of a loan raised (sixty years for buildings and eighty years for land) in order that the ratepayers should not suffer financial loss. If the ratepayers are to suffer no loss, Mr. Morrissey desires to be erected would have to be let at 11s. per week, which, with 2s. added as the cost of the means of conveyance, would be a very large proportion of the earnings of the possible tenant.

TOWER-BUILDINGS, LIVERPOOL.—Tower-buildings, Water-street, for many decades a landmark and familiar institution, at the bottom of Water-street, is soon to be replaced by the new building. The Corporation of Liverpool are lessors of portion of the site, and the City Council will be asked to sanction an arrangement agreed between the Estates Committee and the lessees (the Right Hon. Joseph Russell, Baron Glasgow, and others), by which (1) the Corporation are to consent to the absorption of a portion of Prison Weint in the building site, the main new building line to be a continuation of the east side of Back Goree; (2) the lessees to give up the portion of the site required for the widening of Water-street; (3) the Corporation to extend the term of the leasehold portion of the building to ninety-nine years from February 1, 1907, to the lessees; (4) the lessees to pay to the Corporation the sum of 1,000s. as an equality of exchange; (5) the owners to construct the new buildings so as to leave a passage from the Old Churchyard to the front of the building leading to Prison Weint and the Pierhead; (6) the new buildings to be erected in accordance with the elevations submitted to and approved by the Building Committee; (7) the Corporation to be free from any responsibility as to any right of way over Prison Weint; (8) the corporation to remove such material as they may desire in either the wall or on the surface of Prison Weint; (9) the arrangement to be subject to the consent of the Local Government Board being obtained to the extension of the lease to 99 years, and to the authorities concerned approving of the absorption of the portion of Prison Weint and to a building line being prescribed in Water-street.

HOUSE OF COMMONS VENTILATION.—The report by Dr. M. H. Gordon on an investigation of the ventilation of the Debating Chamber of the House of Commons, dated August 9th, is published as an appendix to the recent Parliamentary Paper on the subject. It is of a highly technical character. Three problems were formulated at the beginning of the report as summarising the main points requiring investigation. These problems are

as follow:—(1) The relationship, if any, between the ventilation of the Debating Chamber and the spread of influenza; (2) The extent to which the air in the Debating Chamber is liable to pollution from material continually being brought in upon members' boots, the exact nature of such material, and its capacity, actual and potential, of producing disease; (3) The reason of the want of freshness in the air of the Debating Chamber, and especially the nature of the fault in the ventilation causing in members the undesirable symptoms drawing attention to in the report of the Ventilation Committee in 1903. In regard to the first point there is reason to believe that the mode of infection in the vast majority of cases of influenza is by the inhalation of particulate material disseminated from the mouth and upper respiratory passages of a person infected with the specific micro-organism of the disease. Such persons are liable to give off the *materies morbi* when they cough, sneeze, or loudly articulate. According to a passage in the report of the Ventilation Committee, at a time when influenza was prevalent, members still in a convalescent stage of the disease were present during a debate, and these members would be liable to transmit the infection by giving off particulate matter in performance of the acts above mentioned. Respecting the second point, it is stated that pollution from material brought in upon boots was found to occur chiefly behind the Speaker's chair and at the side gangways. Bacteriological analysis distinctly emphasises the desirability of excluding pollution of the air from this source as far as possible. In reference to the third point, it is held that the "want of freshness" was probably the result of a number of causes. A distinct improvement in the quality of the air, as judged by the subjective senses, was perceptible after the changes previously recommended had been carried out; and the quality of the air passed through the Chamber is no doubt as great as under the old conditions, and sometimes more than double, it seems clear that one of the chief reasons of the complaint was the deficient supply of fresh air. There is good ground for believing that further improvement in freshness of the air, not only in the Debating Chamber floor area, but in the galleries and also in the division lobbies, will be perceptible when the recommendations based on the results of the present investigation have been carried out.—*Morning Post.*

WATER SUPPLY TO TENEMENT HOUSES.—The Medical Officer of Health for Chelsea, in his annual report which has just been issued, points out that owing to the decision of the Marylebone magistrate, which was exactly the reverse of the decision previously given by the Woolwich magistrate, it was evident that before any steps could be taken—in the words of the London County Council—to secure the provision of a proper and sufficient supply of water for the tenants of every floor of a tenement house, it will be necessary to have an amendment of sect. 48 of the Public Health (London) Act, requiring in terms the provision of water supply and water supply fittings to every floor of a tenement house which is let in separate tenancies on the various floors. In his (the Medical Officer of Health's) opinion, a plentiful supply of water within easy reach of the upper tenements of a house would not carry with it its full advantage unless means were also adopted for enabling the tenants to dispose of their dirty water and slops with the same facility that they obtain clean water. This means the provision of slopsinks for the discharge of foul water from the upper stories and would in many instances necessitate structural alterations to the houses, and if enforced by the Borough Council an important extension of the scope of the work undertaken by the Public Health Department.

PROTECTION OF ANCIENT MONUMENTS.—Mr. Ralph Nevill, F.S.A., hon. secretary of the Congress of Archaeological Societies, has forwarded the following letter to the Prime Minister:—"By direction of the Congress of Archaeological Societies in union with the Society of Antiquaries of London I have the honour to send you the following resolution unanimously passed at their meeting held on July 4, 1906, under the presidency of Lord Avebury:—"That this Congress regrets that the Government has not carried out the provisions of the Ancient Monuments Protection Act for the appointment of an inspector. Various monuments have been placed under the Act on the faith that the provisions of the Bill would be observed; the Congress, therefore, urges that an inspector of ancient monuments should be appointed in accordance with the Act. I have been requested to say further that the Congress quite recognises the desire of the Government, in the arrangements that have been made, to protect the ancient monuments that have already been handed over to the care of the nation, and it has no intention of questioning either the zeal or ability of the official entrusted with the duties. I am instructed, however, to point out that it was intended by the Bill that the inspector should be a man of independent position, able to devote much attention to the duties of the office, and that these were intended to include, not merely the care of such monuments as were

named in the Act, but an official *status* which would enable him to intervene for the preservation from destruction of other similar monuments. The experience of the committee of the Congress formed for recording earthworks shows that such an inspector might be of the greatest service in preserving from destruction those important relics of the past. It is obvious that duties of this description cannot be adequately discharged by an official in Government employ who has other important duties to fulfil, and who does not possess the *status* contemplated in the Act. A salary is provided by the Act for the office of inspector, and I am to submit that this sum which is annually voted by Parliament should not be diverted by repayment to the Treasury as has been done for some years. The Congress wishes to call your attention to the statement made by the First Commissioner of Works (Hansard, August 3, 1906):—"It has been thought advisable not to make any appointment immediately, so that some indication may first be gathered of the probable effect of this year's resolution for the extension of the Ancient Monuments Protection Act." On behalf of the Congress, which represents forty of the principal archaeological societies in England, Ireland, and Wales, and some 12,000 members, I am to respectfully pray that you will see fit to revert to the original practice of appointing an independent inspector."

HYGIENIC STREET PAVING.—The Medical Officer of Health of Battersea, in his annual report which has just been circulated, states that in 1904 the Public Health Committee addressed a communication to the Highways Committee asking that body to take into consideration the question of paving the carriageways of certain side streets, particularly those in which diarrhoea had been prevalent in previous summers, with an impervious paving such as asphalt. The Highways Committee decided to give this form of paving a trial, and during the year the carriageways of fourteen streets were paved with tarred-slag macadam. This material gives a smooth impervious surface, and is much less expensive than asphalt. In 1905 further progress was made with the paving of street carriageways with impervious pavings, and during the year twenty-one streets (33,134 sq. yds.) were paved with tarred-slag macadam. In July, 1905, however, the Council decided to suspend any further use of this paving material for a period of at least twelve months, in order that its utility might be more severely tested. "It is to be regretted," the Medical Officer continues to write, "that the development of this important work should have been postponed, for although differences of opinion existed as to the value of tarred-slag macadam as a paving in main streets, there were none as to its value in side streets. The importance of impervious carriageway paving in urban sanitation cannot be too strongly emphasised, and it is to be hoped that the Council will see their way to make a much more extensive use of this form of paving in the future. The advantages of impervious paving in connexion with the prevention of infantile mortality are manifold."

Legal.

ACTION BY ARCHITECT FOR FEES.

THE case of Wakley v. Durant came before Mr. Justice Lawrence on the 4th inst., an action by Mr. Horace Wakley, an architect and surveyor, of Adam-street, Adelphi, to recover from the defendant, Mr. Edward Durant, a sum for architect's fees.

Mr. Trevor Lloyd was counsel for the plaintiff, and Mr. Liversidge for the defendant.

Mr. Lloyd, in opening, stated that the plaintiff was instructed in 1901 to draw out plans and specifications with the view to the building of a house at Sunningdale for the defendant. Plaintiff was told to prepare the plans for a house that would cost about 2,000s. Plans were accordingly drawn on this basis. Defendant, when he saw the plans, said the rooms were too small, and he began to suggest various alterations and extensions in the plans. Plaintiff pointed out that this would increase the cost, when the defendant said that a little more or less did not matter. Defendant arranged for a house without a drawing-room, but as his daughter objected to this a drawing-room was added to the plans. Eventually the plans were agreed upon, and it was arranged that the plaintiff should procure tenders from builders. Tenders were invited, and the result was that the lowest tender was for 3,450s. Defendant said that was rather a lot, but plaintiff went so far with the matter as to send down and plug out the ground. Eventually, however, the defendant decided not to build. Plaintiff had waited, and not having his account paid now sued to recover the amount, and his charges were repaid on the scale of the Royal Institute of British Architects, viz., 3 per cent. on the estimated cost of the work. When the plaintiff wrote for money on account, the defendant replied offering the plaintiff 20s. for out-of-pocket expenses. Plaintiff would not accept that offer,

but asked for a cheque for 50l. on account. Eventually plaintiff said he would settle the matter by accepting 86l. 5s., but this the defendant refused to pay.

Plaintiff was then called and gave evidence in support of his counsel's opening statement. He said the site was on the side of a hill, and a more costly site to erect a house upon he did not know, and this he pointed out to the defendant. He based his charges on the scale of the Royal Institute of British Architects. The house had never been built.

Cross-examined.

A suggestion was not made by the defendant that the cost should not exceed 1,500l., neither did the defendant suggest that he should correct his plans so as to reduce the cost to 2,000l.

Mr. Wm. Woodward, architect, of Southampton-street, Strand, said he had examined the plans drawn by the plaintiff, and his charges were fair and reasonable, and in accordance with the scale of the Institute.

This was the plaintiff's case.

Mr. Liversidge, for the defendant, said the defendant was desirous of building a house at Sunningdale, and he wanted plans of a house which would cost a certain amount of money only.

When he instructed the plaintiff to draw the plans he told him that he only intended to spend 1,500l. There were, however, certain alterations in the plans, and the plaintiff was asked what the house would cost, and he said they would not exceed 2,000l. Defendant only instructed the plaintiff to draw the plans on the understanding that the house was not to cost more than 2,000l. He gave the plaintiff a working margin of 500l. Defendant was called, and said he was a partner in a firm of merchants in Wood-street, E.C. When he gave the plaintiff his instructions he told him not to go beyond 2,000l. for the house. He made it perfectly clear that he would not go beyond 2,000l.

Cross-examined.

His opinion was that the plaintiff was only entitled to out-of-pocket expenses, as he had done work that was absolutely of no use. He thought the house could have been built for 2,000l. at the time, but after seeing the tenders he found he could not get it for that sum.

Mr. Ernest Flint, architect, examined, said that in his opinion if instructions were given for a house costing 2,000l. plans should be drawn accordingly. If plans were drawn for such a house, and the tenders came out at over 3,000l., that would not be a fulfilment of the instructions given.

His lordship: But if a lot of additions were made to the plans you would not then expect the house to cost only the original amount?

Witness: No; but I should have pointed out that those were extras, and would have to be added to the 2,000l.

Cross-examined.

If the plaintiff was entitled to call for tenders he would be entitled to 3 per cent. on the lowest tender, and his charges were, on that assumption, fair and reasonable.

In the result his lordship said he thought his judgment must be for the plaintiff for 85l. on the ground that there might have been some misunderstanding between the parties. His reason for coming to this conclusion was that there was not a single word in the whole correspondence which confirmed the defence set up that day.

Order accordingly.

ACTION BY A QUANTITY SURVEYOR FOR FEES.

THE case of Thompson v. the Westminster Contract Corporation and others came before Mr. Justice Darling and a common jury in the King's Bench Division on the 3rd inst.

Mr. F. Lowe, K.C., in opening the case, said the action was originally brought by the plaintiff, Mr. William Thompson, a quantity surveyor, against three defendants, one of whom was Mr. James D'Oyley, an architect, but so far as he was concerned it had been arranged between himself (counsel) and Mr. Ashton, who appeared for Mr. D'Oyley, that the latter should be struck out of the action on certain terms which had been agreed upon. There was no suggestion of any sort against Mr. D'Oyley.

Mr. Ashton said he agreed to this, and left the court.

Mr. Lowe, continuing, said the other defendants were Sir William Earle and the Westminster Contract Corporation, and the plaintiff brought the action to recover the price of clerk and labour done in respect of bills of quantities and other work in regard to certain proposed buildings. The plaintiff was instructed by Mr. D'Oyley, who was acting as the agent of the defendant corporation and the defendant Sir William Earle, and these two defendants denied that Mr. D'Oyley was acting as their agent. Sir William Earle was a bankrupt. The plaintiff's claim was for 340l. 18s., and the work in question was in respect of a large block of buildings which it was intended to erect on a part of the Duke of Bedford's estate in Russell-street, Covent Garden.

The defendant corporation were engaged in the financing of this project. Sir William Earle was a clergyman and, as unfortunately he was a bankrupt, he was not represented in these proceedings. Naturally, as Sir William Earle was a bankrupt and unable to pay the plaintiff for the work he had done, the defence to the action put forward by the corporation was that Sir William Earle was the only person responsible. So the only question the jury had to try was whether the work was done on the joint order of the corporation and Sir William Earle, or whether the latter was the only person liable to pay the money. If Sir William was the only person liable plaintiff employed an architect to get the plans, and nobody could suggest that that would be a very profitable undertaking. The history of the case was very short. The managing director of the defendant corporation was a gentleman named Allbutt, and the instructions that were given to get out the quantities for the work, and which were essential to its progress, were given by Mr. Allbutt. He thought the letters established beyond dispute that the work was being done at the request of the corporation and that on their instructions Mr. D'Oyley in his capacity as the corporation's architect instructed the plaintiff to do the work. If that was so there was an end of the case.

There could be no question that when anybody employed an architect to get the plans, and told him to have the quantities properly prepared, that person would be liable for the quantity surveyor's charges. He should establish beyond dispute that Mr. D'Oyley was the architect for the corporation, and to the knowledge of the managing director of the corporation the plaintiff was instructed by Mr. D'Oyley to prepare the quantities, and that he did prepare them and supplied them to the builders the corporation required them to be supplied to. When he had proved that he should ask the jury for their verdict for the plaintiff.

Mr. Thompson, having given evidence in support of counsel's statement, in cross-examination by Mr. Turrell, said that the reason he was entitled to debit the charges against the corporation was because Mr. D'Oyley told him the work was done for them. He said the work was to be charged against both the corporation and Sir William Earle.

Sir William Earle, examined by Mr. Lowe, said he was a clerk in Holy Orders. He remembered an interview in October, at which Mr. D'Oyley and Mr. Allbutt were present. He did not remember the date of that interview. At that interview the subject of quantities was discussed. He did not himself think the quantities necessary, but witness said that if they were necessary he knew a gentleman who would do the work on the same terms as any professional gentleman, and that if the thing did not go through there would be no fees at all. Mr. Allbutt said he knew another gentleman who would do it. He did not know the name of the person he mentioned. He understood it was to be on the same terms—"no cure, no pay"; that was the whole arrangement right through. He did not suggest that any such thing was said to Mr. Thompson. Mr. D'Oyley said he knew another gentleman, but he could not say whether he mentioned Mr. Thompson or not. He could not swear that any definite instructions were given by Mr. Allbutt or himself.

Cross-examined by Mr. Turrell, the construction of the flats was his own idea. His idea was to house some of their people who were scattered. The only interest the Corporation had in the scheme was that, in consideration of 2½ per cent. when the flats were erected, they were to find 20,000l., and that sum was to be got either by the corporation or somebody else on payment of 2½ per cent. on the 20,000l., and any profit beyond that 20,000l. was to be his. What he estimated was that when the scheme went through the property would be worth 35,000l. As a matter of fact, the claim fell through because the Duke of Bedford's agent refused to grant the lease. His contention was that he gave no authority to any one except on the terms of "no cure no pay." Rightly or wrongly, he gave Mr. D'Oyley no authority to engage plaintiff, except on the system of "no cure, no pay." He never had any communication with Mr. Thompson at all.

This being the plaintiff's case,

Mr. Turrell formally took the objection that there was no evidence of authority on the part of Mr. D'Oyley to pledge the defendants' credit. What he meant, he said, by that was that an architect had no implied authority to pledge a client's credit.

His lordship asked if there was any authority for such a proposition?

Mr. Turrell thought not. The learned counsel then proceeded to open the case for the corporation. As he understood it, except for one piece of evidence there would be no case for him to answer. That piece of evidence was that under the judge's ruling a person employed as an architect would have authority to employ on behalf of his principal a quantity surveyor. He would assume that he had authority, and then the question was, did the architect do it? The only piece

of evidence to show he did was the direct evidence of Mr. Thompson that he was told that he was employed on behalf of the corporation and on behalf of Sir William Earle. He should put Mr. D'Oyley in the box, and he would tell them what his position was, and that he was the architect employed on behalf of Sir William Earle and only on behalf of him. In order to answer that question it was necessary for the jury to look at the position of the parties. Sir William Earle had the idea that he would build the flats, that there would be a large profit, and that he would take every penny of that profit. Mr. Lowe had said that this was a joint adventure between Mr. D'Oyley, the corporation, and Sir William Earle. He (counsel) said it was nothing of the kind. Whose adventure was it? Who was going to take the profit if there was any? Sir William Earle. All the corporation had to do was to find the 20,000l., and for which they were to receive 2½ per cent. commission. Their liability began and ended. The story told by the plaintiff was most improbable. It was for the plaintiff to make out his case and to make out such a case as was supported by contemporaneous documents.

Mr. D'Oyley, examined, said he was an architect, and was employed by Sir William Earle to get out the plans for the proposed buildings. An express authority was given to Sir William Earle to employ a quantity surveyor. That was at the meeting in October at the corporation's offices. Mr. Allbutt told Sir William Earle that the matter could not be gone on with any further unless quantities were taken out. Nothing was said about "no cure, no pay." He afterwards saw Mr. Thompson and instructed him to take out the quantities for Sir William Earle.

Cross-examined by Mr. Ashton Cross, Mr. Thompson was a stranger to him before this. It was a common thing for an architect to instruct a quantity surveyor. Sir William Earle was introduced to him as a man of considerable property. He had no entry to show that he employed plaintiff on behalf of Sir William Earle. He had always looked on Sir William Earle as his client. He had only looked to Sir William for his fees.

Mr. Henry Allbutt, examined, said he was managing director of the defendant corporation. It was Sir William Earle who had instructed Mr. D'Oyley to employ the plaintiff in getting out the quantities. He had to do was to find the 20,000l. They had found the money, but the transaction fell through because the lease could not be obtained.

This being the defendants' case, learned counsel addressed the jury on behalf of their respective clients, and after his lordship had summed up the jury returned a verdict for the corporation, and judgment was entered accordingly.

CLAIM FOR COMPENSATION FOR BRICK-LAYER'S LABOURER'S DEATH.

THE case of Groom v. the Stanton Ironworks Company, Ltd., came before the Court of Appeal, consisting of the Master of the Rolls and Lord Justices Moulton and Farwell, on the 6th inst., on the defendants' application for security for the costs of the plaintiff's appeal.

Counsel, in support of the application, said the facts of the case were these. The plaintiff was the widow of a man named J. F. Groom, a brick-layer's labourer, who was killed while in the service of the defendants. The widow then started the action against the defendants for compensation under Lord Campbell's Act and the Employers' Liability Act, and the judge at the trial found in favour of the defendants. The plaintiff then exercised the option she had and applied to the judge to assess compensation under the Workmen's Compensation Act, 1897, but he refused to do so on the ground that the deceased man had not been employed "on, in, or about a factory" within the meaning of that Act. That was the only ground on which the learned judge gave judgment for the defendants and refused to grant a certificate under the Workmen's Compensation Act. As far as he could see, the defendants were not liable. The whole question in the case was whether the accident occurred "on, in, or about a factory" within the meaning of the Act. It appeared that the only ground for saying that the accident did occur "on, in, or about a factory" was this: The defendants owned a certain estate which had a factory on one portion of it, and labourers' cottages on the other, and the deceased man lived in one of these cottages; and the Great Northern Railway Company ran the line between the two portions of the estate. The place where the accident occurred was quite 200 yds. away from the factory. He submitted that the assumption was that the learned judge had come to a proper decision.

After hearing Mr. W. H. Stephenson on behalf of the plaintiff in opposition to their application, their lordships directed that the plaintiff should give security in the sum of 10l. within a fortnight, the costs of the application to be dealt with on the hearing of the appeal.

List of Competitions, Contracts, etc.

For some Contracts still open, but not included in this List, see previous issues. Those with an asterisk (*) are advertised in this Number: Competitions, —; Contracts, iv. vi. viii. x.; Public Appointments, xvii.; Auction Sales, xxvii. Certain conditions, beyond those given in the following information, are imposed in some cases, such as: the advertisers may not bind themselves to accept the lowest or any tender; that a fair wages clause shall be observed; that no allowance will be made for tenders; and that deposits are returned on receipt of a bona-fide tender unless stated to the contrary.

Competition.

AUGUST 31.—**Barnsley**.—SCHOOL.—The Governors of the High School for Girls, Barnsley, invite applications from qualified practising architects desiring to compete for the designing and erection of a new high school for girls, to accommodate 400 pupils, at a site in Huddersfield-road, Barnsley. The Governors propose to select from the applicants a limited number of competitors, who will be asked to submit plans. In connexion with such competition three premiums of 100l., 50l., and 20l. will be offered. The plans will be adjudicated upon by a fully-qualified non-competing architect acting as assessor. Applications must be sent in before August 15, to Mr. Wm. P. Donald, Clerk to the Governors, Education Office, Barnsley, should state (1) name of competitor; (2) business address; (3) particulars of secondary schools built from applicants' designs; (4) success of applicant in similar competitions; (5) the amount of commission (stated as a percentage on the amount for which the contracts are let) the competitor will be prepared to accept in the event of his plans being accepted; (6) the further sum required for taking off and supplying bills of quantities, also stated as a percentage; (7) any other information which the applicant may think it advisable to submit.

Contracts.

BUILDING.

AUGUST 14.—**Bothalgaugh**.—ENTRANCE LODGE.—The erection of an entrance lodge at Bothalgaugh, near Morpeth, for the Hon. and Rev. W. C. Ellis, Plans and specifications at office of Mr. L. A. Loades, architect, Market-place, Morpeth. Tenders, sealed and endorsed, to be delivered not later than August 14.

AUGUST 14.—**Halesworth**.—ALTERING FRONT.—Supplying and fixing new plate-glass shop front (about 40 ft. long), including inside and outside self-acting spring blinds, etc. Plans and specifications can be seen by applying to Messrs. Roe & Co., drapers, Halesworth, until August 14, on which day, before 6 p.m., tenders must be delivered to Messrs. Roe & Co., Mr. Arthur Ellis, F.S.I., architect, Beccles.

AUGUST 14.—**Halifax**.—CARPENTER'S HOUSE.—Halifax Health Committee invite tenders for the execution of the mason's, excavator's and bricklayer's, carpenter's and joiner's, slater's and plasterer's, plumber's and glazier's, and painter's work required in the erection of a carpenter's house at the small-pox hospital. Plans and specifications may be seen, and forms of tender obtained, on application to Mr. James Lord, M.Inst.C.E., Borough Engineer, Town Hall, Halifax, upon payment of the sum of 10s. Tenders, properly endorsed, must be sent to Mr. Hughley Walton, Town Clerk, not later than 12 o'clock noon on August 14.

AUGUST 14.—**Idale**.—CONVENIENCES.—Additions to, and alterations of, and alterations of, at the Springfield Mills, Idale, for the Idle Worstid Mill Company, Ltd. Plans, etc., may be seen, and quantities obtained, at office of Mr. James T. Coudingley, architect, Boothroyd, Town-lane, Idale, Bradford. Tenders to be sent to Mr. Edwin Thornton, Secretary, Marlborough-road, Idale, not later than 1 o'clock on August 14.

AUGUST 14-23.—**Mablethorpe**.—SCHOOL. ADDITIONS.—Lindsey C.C. Education Committee invite tenders for additions to the Council school at Mablethorpe. Bills of quantities and forms of tender may be had on application to Messrs. Scarce & Gumble, architects, Bank-street-chambers, Lincoln, on or before August 14, and on payment to them of 1l. 1s. The drawings and conditions of contract may be inspected at the offices of the architects. Tenders must be delivered to the Secretary, Mr. S. Mansdon Grant, 286, High-street, Lincoln, in the envelope provided for that purpose, before 10 a.m., August 23.

AUGUST 14.—**Royston**.—INSTITUTE, ETC.—Building an institute and gymnasium at Royston. Plans and specifications can be inspected on application to the Education Committee, Royston, or to Mr. F. J. W. Tenders to be in on or before August 14.

AUGUST 14.—**Strathaven**.—ADDITIONS.—Additions and repairs at Avonbank Farm (about one mile from Strathaven). Separate stamp office wanted for (1) mason work, (2) joiner work, (3) slater and plaster works, (4) plumber work. Plan and specification can be seen at the farm; and offers to be lodged with Mr. John Boyes, Woodhouse, Farm, Kirkmichael, not later than August 14.

AUGUST 15.—**Belfast**.—GATE LODGE, ETC.—Tenders, addressed to Mr. H. Williams, Secretary, Office of Public Works, Dublin, for the erection and completion of a gate lodge and technical school at Queens College, Belfast, will be received up to 10 o'clock a.m. on August 15. The plans and specification can be seen at this office, and at the office of Mr. F. G. Stead, 2, Wellington-road, Belfast, by whom forms of tender and bills of quantities will be supplied on deposit of 1l.

AUGUST 15.—**Briton Ferry**.—CHAPEL. ADDITIONS.—Additions and alterations to the English Baptist Chapel, Briton Ferry. Plans and specification may be inspected with Mr. A. H. Thomas, 45, Neath-road, Neath, and at the offices of the architect, from whom bills of quantities may be obtained. Sealed tenders to be sent to Mr. Thomas on or before August 15. Mr. W. Beddoe Rees, architect, 3, Dumfriess-place, Cardiff.

* AUGUST 15.—**Dronfield**.—EXTENSION OF GOODS YARD.—The Directors of the Midland Railway Company invite tenders for the above. Plans and specifications may be seen, and quantities and particulars obtained, on application at the Engineer's Office, Derby Station. Sealed tenders to be forwarded by post to the Secretary of the Way and Works Committee, Midland Railway, Derby, not later than 10 a.m. on August 15.

AUGUST 15.—**Halifax**.—WAREHOUSE.—For mason's, concrete's and steel erector's works required in connexion with the enlargement of warehouse at Stansfield Mills, Triangle, for Messrs. William Morris & Sons, Ltd. Plans and specifications may be seen, and bills of quantities obtained, at offices of Mr. W. Clement Williams, architect, 29, Southgate, Halifax, from August 8 until August 15, on which last-named date sealed tenders are to be delivered not later than 12 o'clock noon, endorsed "Tender for Enlarging Warehouse."

AUGUST 16.—**Dalton-le-Dale**.—CHURCH RESTORATION.—The restoration of the parish church at Dalton-le-Dale, near Sunderland. Plans and specification inspected on application at "The Glebe House, Dalton-le-Dale," from August 5 to August 16, when tenders are to be sent to Mr. C. Hodgson, F.S.A., architect, The College, Durham. Quantities, on written promise to submit a sole tender, may be obtained of Mr. W. Morton, quantity surveyor, 27, John-street, Sunderland.

AUGUST 17.—**Bruff**.—RESIDENCE, ETC.—Kilmallock Guardians will at their meeting, to be held on August 17, consider tenders for the erection of a dispensary residence, on the premises of Mr. Bruff, seen at office of Mr. P. J. Coll, Clerk of Union, Kilmallock Union, Clerk's Office, on any day Monday or Board Days excepted, between the hours of 10 a.m. and 4 p.m. Forms of tender can be had on application to Clerk. Sealed tenders, stating the names of two solvent sureties willing to join in a bond of 1,000l. for the due performance of the contract, to be addressed to the presiding Chairman, and endorsed "Tender for Erection of Dispensary residence."

AUGUST 17.—**Treorchy**.—ADDITIONS TO PREMISES.—Additions to No. 122, Bute-street, Treorchy, for Mr. Lewis Lewis, butcher, with whom plans and specification may be seen at 114, Bute-street, Treorchy. Sealed tenders to be sent to the proprietor on or before noon on August 17. Mr. W. D. Morgan, architect, Pentre.

AUGUST 18.—**Belfast**.—EXTENSION TO PREMISES.—Building extensions to the premises of Messrs. E. Watson & Co., Ltd., of Belfast, Donegall-street, according to the plans, specification, and conditions of contract, to be seen in office of Mr. William J. Fennell, M.R.I.A. architect, 2, Wellington-place, Belfast. Bills of quantities can be obtained from Messrs. McCarthy & Brookes, surveyors, Scottish Provident-buildings. Tenders to be sent to architect on or before August 18.

AUGUST 18.—**Halifax**.—ADDITIONS TO CLUB.—For the masons, carpenters and joiners, plumbers and glaziers, plasterers and slaters, heating engineers, ventilating engineers, and painters work in the extension of additions to Booth Town Liberal Club, Halifax. Plans and specifications will lay for inspection, and quantities may be obtained, at offices of Messrs. Chas. F. L. Horsfall & Son, architects, Lord-street-chambers, Halifax, from August 13 to August 18, on which last-named date sealed tenders must be delivered not later than 12 o'clock.

AUGUST 18.—**Milton**.—SCHOOL.—The Somerset County Education Committee invite tenders for the works required for the erection and completion of a new infants' school at Milton, Weston-super-Mare. Drawings, specification, and conditions of contract can be seen, and copies of bill of quantities obtained, at the offices of the architects, Messrs. Hans Price & Wm. Jane, Waterloo-street, Weston-super-Mare. Sealed tenders, endorsed "Milton Infants' School," must be delivered at the County Education Office, Weston-super-Mare, not later than 12 noon on August 18.

AUGUST 18.—**Sudbury**.—HOSPITAL. WORKS.—The Committee of Management of St. Leonard's Hospital, Sudbury, invite tenders for alterations and additions to the hospital. Drawings, specification, and conditions may be seen at the office of the architect, Mr. Alfred Howard Cornard-road, Sudbury, from whom further information can be obtained. Tenders, which are to be sent in by August 18, should be sealed, and endorsed "Tender for Alterations and Additions to St. Leonard's Hospital," and addressed to Mr. F. G. Stead, Secretary of the St. Leonard's Hospital, Sudbury.

AUGUST 20.—**Dublin**.—MOTOR-CAR SHED WORKS.—Great Northern Railway Company (London) Directors invite tenders for the following works in

connexion with the new motor-car shed at Amiens-street, Terminus, Dublin.—Contract No. 1, three timber smoke troughs, each 126 ft. long; contract No. 2, slating of roof. Parties wishing to tender for the works may see the respective drawings and specifications at the office of Mr. W. H. Mills, Engineer-in-Chief, Amiens-street, Dublin, or copies of them at the office of the district engineer, Belfast; and can obtain at the said offices forms of tender for each contract on payment of 1s. (not returnable) each. Tenders, made out on the forms supplied by the Company, and endorsed, respectively, "Tender for Smoke Troughs," and "Tender for Slating," should be delivered to Mr. T. Morrison, Secretary, Secretary's Office, Amiens-street Terminus, Dublin, not later than 10 a.m. on August 20.

AUGUST 20.—**Haslemere**.—ENGINE-HOUSE, ETC.—Hambledon R.D.C. invite tenders for the erection of an engine-house and pair of cottages at the pumping station on Blackdown, near Haslemere. The specification and drawings can be seen, and schedules of quantities and forms of tender can be obtained, on and after August 13, at the offices of Messrs. R. B. Grantham & Son, 23, Northumberland-avenue, London, W.C., on payment of a deposit of 3l. 3s. Sealed tenders, which must be in the prescribed form, and endorsed "Haslemere Water Works," must be sent to Mr. Ferdinand Smith-Peace, Clerk to the Council, 138, High-street, Guildford, on or before August 20.

AUGUST 20.—**Rhymney**.—VILLA RESIDENCE.—Villa residence at Rhymney for Councillor John Edwards. Drawings and specification may be seen, and further particulars obtained, from Messrs. James & Morgan, F.R.I.B.A., architects, Charles-street-chambers, Cardiff. Tenders, sealed and endorsed, to be delivered to Councillor Edwards, not later than August 20.

AUGUST 21.—**Bangor**.—FREE LIBRARY.—Bangor General Purposes Committee invite tenders for the erection of a new free library at Bangor, North Wales. Bills of quantities may be obtained, and plans and specification may be seen, by application to Messrs. Dixon & Patten, architects, 65, King-street, Manchester. A deposit of 2l. will be required from each applicant for a copy of the quantities. Sealed tenders, endorsed "Free Library," to be sent, not later than August 21, to the Chairman of the General Purposes Committee, Health Department, Municipal Offices, Bangor.

AUGUST 22.—**London**.—ALTERATIONS AT WORKHOUSE.—The Guardians of the Poor of the Parish of St. Leonard, Shoreditch, invite tenders for alterations at their additional workhouse, Hazelville-road, Stoney Rise, N., lately known as the "Alexandra Orphanage." Plans and specifications may be seen, and all information obtained, at the office of Mr. F. J. Smith, F.R.I.B.A., Parliament-mansions, Victoria-street, S.W., upon payment of 5l. Sealed tenders, upon the forms supplied, must be delivered to the Guardians, at their meeting to be held at the Board-room, 204, Hoxton-street, N., on August 22 at 5 p.m.

AUGUST 23.—**Sutton-on-Sea**.—LIFE-BOAT HOUSE.—The Hon. Secretary of the Royal National Life-boat Institution, Sutton-on-Sea Branch, invite tenders for the reconstruction of the existing life-boat house, adjoining the Promenade at Sutton-on-Sea, and the construction of an enlarged bathhouse on the same site. Contract drawings, terms and conditions of contract, and specification may be seen on application to Mr. B. Simons, Hon. Secretary, Sutton-on-Sea; or at the office of the Engineer and Architect to the Royal National Life-boat Institution, Mr. W. T. Douglas, 15, Victoria-street, Westminster, London, S.W. Copies of the form of tender, conditions of contract, and bills of quantities, may be obtained on application to the Engineer and architect upon payment of a deposit of 1l. 1s. Copies of certain of the plans may be obtained from the Engineer and Architect on payment of 2s. 6d., which sum is non-returnable. Sealed tenders, which will only be received on the form supplied, endorsed "Tender for the Reconstruction of Life-boat Station, Sutton-on-Sea," to be delivered to the Hon. Secretary, at Willoughby, Alford, Lincolnshire, at or before 10 a.m. on August 23.

* AUGUST 24.—**Greenwich**.—NEW SORTING OFFICE.—The Commissioners of H.M. Works and Public Buildings invite tenders for erection of new sorting office at Greenwich. Drawing, specification, conditions, and form of contract may be seen on application to Mr. J. Wager, H.M. Office of Works, Storey-gate, S.W. Bills of quantities and forms of tender are obtainable on deposit of 12s. 6d. Tenders, addressed to the Secretary, as above, and endorsed "Tender for Greenwich Sorting Office," to be delivered before 12 o'clock noon on August 24.

AUGUST 25.—**Newport**.—TECHNICAL INSTITUTE. ADDITIONS.—Isle of Wight County Education Committee invite tenders for additions and alterations at the Technical Institute, Newport. Plans and specifications may be seen at the County Education Office, Newport, I.W.; or at the office of the architect, 5, St. Thomas-street, Ryde, I.W., where all information may be obtained. Sealed tenders, endorsed "Technical Institute," must reach Mr. G. Flux, Secretary, County Education Office, Newport, I.W., on or before August 25.

* SEPTEMBER.—LONDON. WORKS AND REPAIRS.—The Commissioners of H.M. Works and Public

August 18.—**Portsoy.**—**DRAINAGE.**—Portsoy Town Council invite tenders for the opening and refilling of about four miles of pipe track; supplying, laying, and jointing five feet iron pipes, from 5 in. to 16 in. in diameter; building up manholes, flushing-tanks, and other relative works. Drawings and specifications may be seen with and schedules of quantities obtained from, Mr. James Young, Town Clerk, Portsoy; or from Mr. David Reid, civil engineer, Inverness. Sealed offers, marked "Tn

der for Drainage Works," to be lodged with the Clerk not later than August 18.

August 20.—**Gosport.**—Streets.—Gosport and Alverstoke U.D.C. invite tenders for making up certain private streets known as White's Slip, Queen's-road, and Avenue-road. Specifications may be seen, and further particulars, with forms of tender, obtained at the surveyor's office. Tenders, endorsed "Tender for Private Streets," to be delivered to Mr. E. Talbot Palmer, Clerk to the Council, Gosport, not later than noon on August 20. August 21.—**Glaston.**—Main Drainage.—Uppingham R.D.C. invite tenders for laying about 350 yds. of 9-in. glazed stoneware pipe sewer, with junctions, manholes, and ventilating shafts, at Glaston, for the Uppingham R.D.C. Forms of specification, with plan and section, may be seen by appointment with Mr. F. R. Chapman, A.R.S.I., sanitary surveyor, Glaston-road, Uppingham. Tenders to be sent to Mr. Oakley, Clerk, Uppingham, on or before August 21.

August 22.—**Barrow.**—Streets.—Barrow-in-Furness Corporation invite tenders for the construction of various streets. Further particulars may be obtained together with bills of quantities and forms of tender, upon application at the office of the Borough Engineer, Town Hall. Sealed tenders, suitably endorsed and addressed to the "Chairman of the Health Committee," to be delivered at the Town Clerk's Office, not later than 12 o'clock noon on August 22.

August 23.—**New Tredegar.**—Road.—The U.D.C. of Bedford U.D.C. invite tenders for the construction of new road across the Landship, near New Tredegar. Plans and specification may be seen, and forms of tender, obtained at the Council's surveyor, Mr. J. H. Lewis, A.M.I.C.E., L. Blackwood, Mon., upon payment of a fee of 11. 1s. The surveyor will meet intending contractors on the site by arrangement. Sealed tenders, endorsed "Tender for New Road," to be delivered to Mr. T. J. Thomas, Clerk to the Council, Bargoed, Glam., on or before August 23.

★ August 23.—**Stansted.**—Extension of Sewers.—The Stansted R.D.C. invite tenders for the provision, laying, and jointing about 641 yds. of 9-in. stoneware sewer and about 1,254 yds. of 6-in. sewer, together with all manholes and junctions in accordance with plans, sections, and detailed drawings prepared by the surveyor. Plans and specifications may be seen at the Central Hall, Stansted Essex, and further particulars obtained of Mr. E. J. Watts, surveyor, Thorley, Bishop's Stortford. Sealed tenders, endorsed "Stansted Sewer," to be delivered to Mr. A. D. Cayn, North-East, Bishop's Stortford, before 12 noon, August 23.

August 25.—**Sturminster Newton.**—Waterworks.—R.D.C. of Sturminster Newton invite tenders for constructing work for supplying Sturminster Newton with water, and for providing the materials comprising about 7,341 yds. of 4-in. and 4,514 yds. of 3-in. cast iron mains, hydrants, sluice and air valves, reservoir to hold 30,000 gallons, etc. The specification and form of tender can be seen at the office of Mr. A. W. H. Creech, Sturminster Newton,

from August 13 to August 21 inclusive, and the bill of quantities can be obtained of the engineer on payment of 6s., which will not be returned. Sealed tenders, endorsed "Tender for Sturminster Newton Water Supply," to be sent to Mr. A. W. H. Creech, on or before August 25. Mr. Cyrus Combes, Tisbury, Wilts, Engineer to the Council.

August 25.—**Morecambe.**—Sewerage Works.—The Morecambe Town Council invite tenders for the construction of certain intended stoneware and cast-iron pipe sewers in connexion with the sewerage works of the town of Morecambe, together with manholes, ventilators, connections, and other works, the whole to be let in one contract. Drawings and specification may be seen at the offices of the engineers Messrs. Beasley, Son, & Nichols, 111, Victoria-street, Westminster S.W., where also specification, bills of quantities, and forms of tender can be obtained on deposit of 5s. Copies of the plans and specification may also be seen at Town Hall, Morecambe. Sealed tenders, addressed to Mr. William Tilly, Town Clerk, Town Hall, Morecambe, and endorsed "Sewerage Works, Contract No. 3," are to be delivered at Morecambe before 10 a.m. on August 25.

STONE, MATERIALS, AND STORES.

August 14.—**Heywood.**—Lime, Tiles, etc.—Heywood Gas Committee invite tenders for the supply of lime, tiles and fittings, sulphuric acid, and also for the purchase of surplus tar. Specification and form of tender may be obtained from Mr. W. Whatmough, the Gas Manager. Sealed and endorsed tenders to be sent to Mr. Geo. G. Boncher, Town Clerk, Municipal Buildings, Heywood, not later than August 14.

August 14.—**Portsmouth.**—Stores.—Portsmouth Corporation invite tenders for the following purposes: (1) For the supply of Purbeck paving, etc.; (2) for the supply of gravel, sand, and shingle; (3) for the supply of granite; (4) for the supply of oil and paint; (5) for the supply of brooms and brushes; (6) for the supply of castings; (7) for the supply of lime; (8) for the supply of timber; (9) for the supply of disinfectants; (10) for the supply of ironmongery; (11) for the supply of drain pipes; (12) for the supply of Portland cement; (13) for the supply of stationery; (14) for the repairs of harness used by the corporation horses; (15) for plumbing work; (16) for drapery; (17) for erecting ventilating shafts; (18) for general printing (in sections); (19) for steam coal; (20) for house coal, smith's coal, and coke; (21) for the supply of officers' clothing. The specification and printed form of tender with regard to each of the above items may be obtained at the Town Clerk's Office, Town Hall. Sealed tenders on the prescribed form, endorsed "Tender for —," are to be delivered at the Town Hall not later than 10 a.m. on August 14.

August 15.—**Clacton.**—Paving.—Clacton U.D.C. in tenders for the supply of 1,700 yds. of flints. Endorsed tenders, with samples, to be sent to Mr. Geo. F. Lewis, Clerk to the Council, Town Hall, Clacton-on-Sea, not later than noon on August 15 next. Specification and further particulars may be

obtained upon application to Mr. A. R. Robinson, Surveyor to the Council, Town Hall, Clacton-on-Sea.

August 23.—**Pontypridd.**—Stores.—Pontypridd U.D.C. invite tenders for the supply of the following stores and materials required during the period ending June 30, 1907:—(5) Fireclay goods; (6) wrought-iron tubes and fittings; (7) lead and compound; (8) iron, steel, barrows, etc.; (9) dressers and paints; (10) oils; (11) brass fittings and sundries; (12) slot fittings; (13) nutters; (14) main taps and locks; (15) steam valves, packing, etc.; (16) castings; (17) incandescent lighting materials; (18) ironmongery; (19) lamps; (20) stable requisites. Forms of tender may be obtained on application to Mr. E. H. Swan, Engineer and Manager Gas Works, Treforest. Tenders, on the prescribed form, sealed, and endorsed "Stores, No. —," must be received by Mr. J. Colombo Jones, Clerk to the Council, Municipal Buildings, Pontypridd, on or before August 23.

August 31.—**Edinburgh.**—Sand, Pipes, and Specials.—Edinburgh and District Waterworks invite tenders for providing and delivering about 1,700 tons of dry sand, cast-iron pipes, and specials 30 in. in diameter. Copies of the specification and schedule may be obtained at the office of the engineer, Mr. W. A. Tait, C.E., 72a, George-street, Edinburgh, on payment of 11. Tenders, endorsed "Tender for Contract No. 49," must be lodged with Mr. William Boyd, W.S., Clerk, Edinburgh and District Water Trust Offices, Edinburgh, not later than August 31.

September 1.—**Loughston.**—Granite, etc.—Loughston U.D.C. invite tenders for the supply of the following: Granite 300 tons, broken to 12 in., delivered in quantities as desired free at Loughston or Chiswell Lane Railway Stations (G.E.R.); gravel 500 yds., clean gravel, delivered at Loughston when and where required; broken and destriated clinker 50 yds. of each, delivered to Loughston Station in 5-ton truck loads. Tenders, marked on the outside "Materials," must be delivered to Mr. J. H. Hayward, Clerk to the Council, Council Offices, Loughston, Essex, not later than 12 o'clock noon, September 1.

★ September 12.—**Kingston-on-Thames.**—Granite.—The Corporation of Kingston-on-Thames invite tenders for 1,250 tons of Quaint, Gournsey, or other granite, suitable for road-making, the whole of such granite to be broken so as to pass through a ring having a 14-in. internal diameter. Tenders to be on forms obtained of the Borough Surveyor at the Municipal Office, where samples must be lodged. Sealed tenders to Town Clerk, Kingston-on-Thames, by September 12.

See Day.—**Holme Cultram.**—Road Metal.—The Holme Cultram U.D.C. invite tenders for the supply of 800 tons of broken road metal in the months of October and November as may be required by the surveyor. The material and mode of delivery are as follows:—150 tons at Kirkbride Station; 150 tons at Abbey Junction Station; 500 tons at Abbey Town Station. If further particulars or information is required apply to Mr. R. Stubbs, Surveyor to the Council, Abbey Town.

Public Appointments.

Nature of Appointment.	By whom Advertised.	Salary.	Applications to be in
*INSPECTOR OF BUILDINGS	Beckenham U.D.C.	150l. per annum rising to 160l.	Aug. 10
*ENGINEER'S ASSISTANT	York Corporation	120l. per annum	Aug. 31

Auction Sales.

Nature and Place of Sale.	By whom Offered.	Date of Sale.
*PREMISES FOR BUILDER, DECORATOR, ETC.	Carwithen & Allen	Aug. 14
*CONTRACTOR'S PLANT, PLYMOUTH.	Alfred Parkhouse	Sept. 4
*JOINEY WORKS, HENRY STREET, GRAY'S INN ROAD	May & Rowden	Oct. 3

Patents of the Week.

APPLICATIONS PUBLISHED.*

10,467 of 1905.—J. HENDERSON and J. HENDERSON: Method of Constructing Grates, Ranges, and Fireplaces in order to consume and economise Fuel.

This relates to grates, ranges, and other fireplaces, and consists in constructing the same with one or more chambers or compartments at the rear of the back or sides thereof in order to form a combustion chamber into which the smoke and unburnt gases are made to pass and become consumed, and with a damper to cut off communication between the sides and bottom thereof and the top by closing the flue when required.

21,920 of 1905.—W. P. BULLIVANT and G. M. SELBY: Locking Device for Bolts.

This relates to a locking device for bolts, consisting of a piece hinged or pivoted to the head of the bolt and capable of being brought into contact with a part at or about right angles with the entrance of the bolt, and provided with an eccentric portion to lift the bolt when the device is turned into the unlocked position.

* All these applications are in the stage in which opposition to the grant of Patents upon them can be made.

21,979 of 1905.—M. COCKBURN and A. MURPHY: Kitchen Ranges.

This relates to a kitchen range hood, comprising wings vertically pivoted at the sides of an opening in the back plate of the range and adapted to engage and support a flap horizontally hinged to the edge of the opening when they are turned outwards about their pivots, and means for turning them about their pivots by the movement of a pivoted handle or the like.

22,752 of 1905.—W. R. T. SINCLAIR: Closet Cisterns and the like.

This relates to closet cisterns and the like, and consists of a semicircular or like vessel mounted on trunnions near the top edge of the cistern. To one of the trunnions outside the cistern a long lever handle is mounted; the arm and handle are connected to each other by a link in such manner that on the lever handle being rotated on its pivot it serves to rotate and invert the said flushing vessel.

975 of 1906.—A. DIAT: Window Frames.

This relates to an incombustible and rigid window frame formed of a number of component metal or other bars applied to each other and to the masonry in such manner that each bar is capable of a free expansion on becoming heated, thereby preventing the fracture of the glass panes.

2,462 of 1906.—J. TRONEY, D. W. GREIG, and W. E. FORSTER: Windows having Sliding Sashes.

This relates to windows having sliding sashes, and consists of means for locking the sashes in any desired position, said means comprising toothed racks arranged at the sides or ends of the sashes and disposed with their teeth opposite to each other, a double pawl adapted to be operated to engage and disengage said toothed racks and means for operating said double pawl.

3,831 of 1906.—S. REDFERN: Screw-down Valves and the like.

This relates to a small screw-down gun-metal valve with a body part, a bush with conical inner face, a nut, a packing ring, and a valve spindle, this latter being plain where it passes through the packing and screw threaded where it passes through the nut.

26,541 of 1905.—H. PENDELTON: A Cramp Holder for use by Carpenters, Builders, and the like.

This relates to a portable screw cramp for holding doors, window sashes, and the like when working on the same, comprising a foundation or base having lateral extensions with clamping means presented to a suitable abutment and passing through a fixed or stationary bracket situated upon the middle part of the top side thereof.

25,642 of 1905.—A. M. MACRUTCHON and J. MACRUTCHON: *Decorating of plain surfaced enamelled, Cast-iron Sanitary and other Ware.*

This relates to porcelain or vitreous enamelled cast-iron sanitary ware having designs or decorations produced on the surface by first enamelling with a ground colour of a one colour powdered enamel, and then, while still at fusing temperature, applying to the surface a powdered enamel or enamels of contrasting colours.

21,918 of 1905.—T. E. DEVONSHIRE: *Blocks and Slabs to be used in the construction of Floors and Ceilings.*

This relates to blocks or slabs to be used with flanged girders in the construction of floors and ceilings, the said blocks or slabs having at one end, beneath the part which is to rest on the flange of the girder, a metal-strengthened portion sufficient to extend beneath the whole or the greater part of the width of the flange of the girder, the other end of the said block or slab being without any such projection or with only a small projection beneath the part which is to rest on the flange of the girder, the projection or projections being provided to come against the edge of the lower flange of one of the supporting girders or the edges of the lower flanges of both girders.

3,386 of 1906.—DR. C. BORNER: *Apparatus for plastering or coating Walls and the like with Mortar.*

This relates to an apparatus for plastering or coating walls or the like with mortar, and consists in the combination of a receptacle to receive the mortar provided with a front wall provided with openings, a rotary plate mounted within such receptacle so that the said openings are in the path of the plate, a suitable number of racks, a toothed wheel to each of the latter carried by said receptacle, and a gearing to each such toothed wheel adapted to transmit motion from the latter to the said plate.

26,793 of 1905.—W. LE QUENNE: *Window Sashes.* This relates to window sashes, and consists of means for securing the sides of the sashes opposite to the hinges, said means comprising rollers, vertical boxes, or recesses in the window frame formed with one or more openings, together with flanges formed upon the sashes and sides of the boxes or recesses respectively and designed to overlap.

SOME RECENT SALES OF PROPERTY.

ESTATE EXCHANGE REPORT.

July 18.—By GILBERT & SONS (at Machevelly). Commences, etc., Montgomery.—Lord Harlech's Commence Estate, comprising farms, lands, etc., 1,443 a. f. (in lots) £20,275

July 24.—By RIPPON, BOSWELL & Co. (at Tiverton). Rackenford, Devon.—"Canworthy Farm," 116 a. 0 r. 27 p. f. 925

"West Nutcot Farm," 112 a. 0 r. 15 p. f. 800

Various enclosures, 7 a. 0 r. 10 p. f. 357

Five freehold cottages, and 2 a. 2 r. 3 p. f. 276

July 25.—By A. C. & A. NOTLEY (at Lowestoft). Mutford, Suffolk.—"The Red House Farm," 191 a. 3 r. 23 p. f. p. 3,000

"Marsh Lane Farm," 78 a. 2 r. 0 p. f. 1,100

House, blacksmith's shop, and 6 a. 2 r. 11 p. f. 183

Three freehold cottages, and 0 a. 3 r. 34 p. f. 100

July 26.—By SADLER & BAKER (at Camberley). Camberley, Surrey.—"Upper Gordon-rd." "Albion" and "Nine-ton," f. y. r. 1101. 1,500

By ROBERTS, SON, & TONY (at Sherborne). Poynton, Dorset.—The Poynton Manor Estate, 971 a. 2 r. 37 p. f. 20,000

By DICKINSON, ROGALL, & Co. (at Brigg). Thornton-le-Moor, Lincs.—"Thornton Farm," 327 a. f. y. r. 2501. 4,350

July 28.—By WRIGHT & SCRIBBY (at Cambridge). Longstanton All Saints, Cambs.—"Bar" or "Barriers" Farm, 200 a. 2 r. 0 p. f. y. r. 2001. 3,600

July 30.—By BALCH & BALCH. Chelsea.—36, Church-st. (s.), area 3,600 ft. f. p. Camden Town.—7, Cantlowers-rd., ut. 44 yrs. g. r. 74, p. 325

Holloway.—105, York-rd., ut. 54½ yrs. g. r. 51, p. 370

By ELLIOTT, SON, & BOTTON. Holloway.—Cottenham-rd., Lgr. 144. 7s. reversion in 48 yrs. 315

By E. J. GALE. Southminster, Essex.—High-rd., A freehold meadow, 1 a. 0 r. 21 p. f. 180

By KPMERSLEY. Rainham Creek, Essex.—Freehold factory land, 7½ acres 1,050

By T. B. WESTACOTT. Regent's Park.—68 & 70, Park-rd. (s.), ut. 15 yrs. g. r. 20, p. 1094. 575

Camden Town.—144, Great College-st. (s.), ut. 60 yrs. g. r. 91, p. 604. 415

By DILLEY, SON, & READ (at St. Ives). Colne, Hants.—Two freehold Cloves, Ta. 3 r. 37 p. f. 500

By DEBENHAM, TEWSON, & Co. Islington.—30, Alfred-st., ut. 20 yrs. g. r. 51, p. 401. 185

Rackney.—1 to 4, Ecomouth-rd., f. w. r. 87½. 500

By DREW & SON. Mile End.—10 and 12, Ewing-st., ut. 69 yrs. g. r. 101, 103, w. r. 371. 445. 400

By DREW & SON. Sutton, Surrey.—151, 153, and 155, High-t. (s.), also blacksmith's shop in rear, area 6,100 ft. f. y. r. 2101. 3,550

Blemond, Surrey.—61 and 62, George-st. (bank premises), area 1,400 ft. f. y. r. 3601. £9,250

By C. W. DAVIES & SON. King's Cross.—78, Winchester-st., ut. 34½ yrs. g. r. 43, 44, w. r. 57½. 200

Islington.—74, St. Peter-st., ut. 30 yrs. g. r. 61, y. r. 441. 280

Caledonian-rd.—43, Freeling-st., ut. 35 yrs. g. r. 51, w. r. 45½. 185

Stamford-hill.—24, Bastbourne-rd., ut. 63½ yrs. g. r. 61, e. r. 301. 225

By MATTHEWS, MATTHEWS, & GOODMAN. Hounslow, Mids.—9, 10, and 11, Castle-lor. (s.), f. y. r. 1001. 840

By PRICE, ARROW, & TAYLOR. Balham.—12, Henderson-rd., ut. 81 yrs. g. r. 101, y. r. 401. 400

By THURGOOD & MARTIN. Belmontsey.—30 and 39, Willow-st., ut. 17 yrs. g. r. 51, 103, w. r. 591. 168. 220

Gray's Inn-rd.—16, Pakenham-st., ut. 35 yrs. g. r. 41, y. r. 321. 250

Bethel Green.—Harold-st., l. g. r. 221, reversion in 31½ yrs. 510

Tottenham.—Seaford-rd., l. g. r. 511, reversion in 76 yrs. 1,080

By HERPER & SONS (at Leeds). Hunslet, Yorks.—Pepper-rd., freehold engineering works, area 22,203 yds. 13,500

By ALFRED RICHARDS (at Tottenham). Tottenham.—14, Bodford-rd., f. p. 545

By FLEURET, SONS, & ADAMS (at Mason's Hall Tavern). Long Acre.—Bettarion-st., the "Brownlow Arms" p.h., a freehold rental of 831, reversion in 20 yrs. 1,550

By GIDDY & GIDDY (at Swindon). West Overton, etc., Wilts.—The Manor Estates (second portion), 5,185 a. 2 r. 20 p. f. (in numerous lots) 92,800

Aug. 1.—By G. HEAD & Co. Maida Vale.—8, Randolph-gdns., ut. 44½ yrs. g. r. 101, y. r. 601. 481

By ALFRED SAVILE & SONS. Caddington, Beds.—"Chalk Farm," 90 a. 1 r. 39 p. f. 2,300

Markyate, Herts.—"Halfway House," f. y. r. 121. 325

Enclosure of land, 1 a. 0 r. 16 p. f. 100

Ashey, Isle of Wight.—"Great Upton Farm," 42 a. 2 r. 20 p. f. 2,500

Freehold Brick Works, and 15 a. 2 r. 20 p. f. 950

Enclosure of land, 23 a. 0 r. 2 p. f. 850

By E. & S. SMITH. Holloway.—113, Hornsey-rd., ut. 32½ yrs. g. r. 61, 68, y. r. 321. 200

August 2.—By FARBROROUGH, ELLIS, & Co. Wandsworth.—40 and 42, Birdhurst-rd., ut. 76 yrs. g. r. 101, w. r. 651. 465

Camden Town.—Park-st., l. g. r. 211, 198, reversion in 11 yrs. 5,180

By GALE & TWITCHELL. Mile End.—13, Beaumont-st. (s.), ut. 22 yrs. g. r. 51, 48, y. r. 401. 285

By NEWBORN, SHEPHERD, & EDWARDS. Balls Pond.—134, Balls Pond-rd. (with stabling and yard), ut. 45½ yrs. g. r. 71, 79, y. r. 651. 380

Holloway.—24, Sussex-rd., ut. 46 yrs. g. r. 51, 58, e. r. 341. 250

Fusbury Park.—32, 40, 46, and 57, Hertingford-rd., ut. 77 yrs. g. r. 261, y. r. 1341. 690

Clepham.—67 to 73 (odd), Manor-st., f. y. r. 1241. 1,550

By JOSEPH STOWER. Camberwell.—Denmark-rd., l. g. r. 251, reversion in 39 yrs. 570

Dulwich.—136, Rosendale-rd., ut. 81 yrs. g. r. 101, 108, y. r. 651. 510

By C. SPARROW & SON. Whetstone.—High-rd., freehold house and shop, y. r. 501. 720

Contractions used in these lists.—F. g. r. for freehold ground-rent; l. g. r. for leasehold ground-rent; p. for improved ground-rent; g. r. for ground-rent; r. for rent; p. for possession; e. r. for estimated rental; w. r. for weekly rental; q. r. for quarterly rental; y. r. for yearly rental; u. r. for unexpired term; p. a. for per annum; y. s. for years; l. a. for laps; st. for street; rd. for road; sq. for square; pl. for place; ter. for terrace; cres. for crescent; av. for avenue; gds. for gardens; yd. for yard; gr. for grove; b. h. for business; p. h. for public-house; o. for office; s. for shop; ct. for court.

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PRICES CURRENT OF MATERIALS.

* * Our aim in this list is to give, as far as possible, the average prices of materials, not necessarily the lowest. Quality and quantity obviously affect prices—a fact which should be remembered by those who make use of this information.

BRICKS, &c.
£ s. d.

Hard Stocks..... 1 10 0 per 1000 alongside, in river.
Rough Stocks and Grizles..... 1 7 0 " " " "

Picked Stocks for Facings..... 2 17 6 " " delivered
Platons..... 1 8 0 " " at railway dep. t.
Red Wire Cuts..... 1 14 0 " " "

Best Fareham Bed Best Red Pressed Buxton Facing..... 5 0 0 " " "

Best Blue Pressed Staffordshire..... 3 15 0 " " "

Do, Bullnose..... 4 0 0 " " "

Best Stourbridge Fire Bricks..... 3 14 0 " " "

GLAZED BRICKS.
Best White and Ivory..... 12 0 0 " " "

Stretchers..... 11 0 0 " " "

Quoins, Bullnose, and Flats..... 16 0 0 " " "

Double Stretchers..... 19 0 0 " " "

Double Headers..... 16 0 0 " " "

One Side and two Ends..... 19 0 0 " " "

Two Sides and one End..... 20 0 0 " " "

Splashed, Chamfered, Squinted..... 20 0 0 " " "

Best Dipped Salt Glazed Stretchers and Headers..... 12 0 0 " " "

Quoins, Bullnose, and Flats..... 14 0 0 " " "

Double Stretchers..... 15 0 0 " " "

Double Headers..... 14 0 0 " " "

One Side and two Ends..... 15 0 0 " " "

Two Sides and one End..... 16 0 0 " " "

Splashes, Chamfered, Squinted..... 14 0 0 " " "

Second Quality White and Dipped Salt Glazed..... 2 0 0 " " less than best.

Thames and Pit Sand..... 7 0 per yard, delivered.
Thames Ballast..... 5 6 " "

Best Portland Cement..... 27 0 per ton, " "

Best Ground Blue Lias Lime 190 0 " "

NOTE.—The cement or lime is exclusive of the ordinary charge for sacks.

Gray Stone Lime..... 11s. 61. per yard, delivered.
Stourbridge Fireclay in sacks 27s. 0d. per ton at rly. dep. t.

STONE

BARN STONE—delivered on road wag- a. d.
gons, Paddington Depot..... 1 1/2 per ft. cube.

Do. do. delivered on road waggon, Nine Elms Depot..... 1 3/4 " "

PORTLAND STONE (30 ft. average)—Brown Whitebed, delivered on road waggon, Paddington Depot, Nine Elms Depot, or Fimlico Wharf..... 2 1 " "

White Bacedbed, delivered on road waggon, Paddington Depot, Nine Elms Depot, or Fimlico Wharf..... 2 2 1/2 " "

Ancaster in blocks..... s. d.
Beor "..... 1 10 per ft. cube, delivered, rly. dep. t.

Greenishall "..... 1 10 " "

Burley Dale in blocks..... 2 4 " "

Red Corehill "..... 2 2 " "

Clooseburn Bed Freestone 2 0 " "

Red Mansfield "..... 2 4 " "

YORK STONE—Robin Hood Quality.
Scrapped random blocks, 2 10 " "

6 in. sawn two sides land- ings to sizes (under 40 ft. super.)..... 2 3 per ft. super., " "

6 in. rubbed two sides ditto, ditto..... 2 6 " "

3 in. sawn two sides land- ings to sizes (random sizes)..... 0 11 1/2 " "

2 in. to 24 in. sawn one side slabs (random sizes)..... 0 7 1/2 " "

1 1/2 in. to 2 in. ditto, ditto 0 6 " "

HARD YORK—
Scrapped random blocks, 3 0 per ft. cube, " "

6 in. sawn two sides land- ings to sizes (under 40 ft. super.)..... 2 8 per ft. super., " "

6 in. ditto "..... 3 0 " "

3 in. sawn two sides land- ings to sizes (random sizes)..... 1 2 " "

2 in. self faced random flags..... 0 5 " "

..... s. d.

Hopton Wood (Hard Bed) in blocks 2 0 per ft. cube, deliv. rly. dep. t.

" " " 6 in. sawn both sides random slabs..... 1 0 " "

" " " 2 in. do. 0 5 1/2 " "

SLATES.

s.	d.	
10	best blue Bangor	12 6
12	" "	13 7
13	" "	13 10
14	1st quality	13 10
15	" "	13 15
16	" "	7 5
10	best blue Portland	12 12
12	" "	6 12
13	best Buxton unfading green	15 17
14	" "	17 8
15	" "	13 5
16	" "	10 5
17	permanent green	11 12
18	" "	9 12
19	" "	6 12

TILES.

s.	d.	
42	best plain roof roofing tiles	42 0
43	Hip and Valley tiles	3 7
44	Ornamental tiles	53 6
45	Hip and Valley tiles	4 0
46	Random red, brown, or brindled do. (Edwards)	57 6
47	Ornamental do.	60 0
48	Valley tiles	4 0
49	Valley tiles	3 0
50	Best Red or Mottled Staffordshire do. (Peakes)	51 9
51	Ornamental do.	54 6
52	Valley tiles	3 8
53	Valley tiles	3 8
54	Best Rosemary brand plain tiles	50 0
55	Best Rosemary brand plain tiles	50 0
56	Hip tiles	4 0
57	Valley tiles	3 8
58	Best Rosemary brand plain tiles	50 0
59	Best Rosemary brand plain tiles	50 0
60	Ornamental do.	50 0
61	Hip tiles	4 0
62	Valley tiles	3 8

WOOD.

At per standard.		
1	Building Wood.	
2	Best m. best in 11 in. and 4 in.	13 10 0
3	Best m. best in 9 in. and 11 in.	13 10 0
4	Best m. best in 7 in. and 9 in.	13 10 0
5	Best m. best in 5 in. and 7 in.	11 0 0
6	Best m. best in 3 in. and 5 in.	11 0 0
7	Best m. best in 1 in. and 3 in.	10 0 0
8	Best m. best in 1 in. and 3 in.	10 0 0
9	Best m. best in 1 in. and 3 in.	10 0 0
10	Best m. best in 1 in. and 3 in.	10 0 0
11	Best m. best in 1 in. and 3 in.	10 0 0
12	Best m. best in 1 in. and 3 in.	10 0 0
13	Best m. best in 1 in. and 3 in.	10 0 0
14	Best m. best in 1 in. and 3 in.	10 0 0
15	Best m. best in 1 in. and 3 in.	10 0 0
16	Best m. best in 1 in. and 3 in.	10 0 0
17	Best m. best in 1 in. and 3 in.	10 0 0
18	Best m. best in 1 in. and 3 in.	10 0 0
19	Best m. best in 1 in. and 3 in.	10 0 0
20	Best m. best in 1 in. and 3 in.	10 0 0
21	Best m. best in 1 in. and 3 in.	10 0 0
22	Best m. best in 1 in. and 3 in.	10 0 0
23	Best m. best in 1 in. and 3 in.	10 0 0
24	Best m. best in 1 in. and 3 in.	10 0 0
25	Best m. best in 1 in. and 3 in.	10 0 0
26	Best m. best in 1 in. and 3 in.	10 0 0
27	Best m. best in 1 in. and 3 in.	10 0 0
28	Best m. best in 1 in. and 3 in.	10 0 0
29	Best m. best in 1 in. and 3 in.	10 0 0
30	Best m. best in 1 in. and 3 in.	10 0 0
31	Best m. best in 1 in. and 3 in.	10 0 0
32	Best m. best in 1 in. and 3 in.	10 0 0
33	Best m. best in 1 in. and 3 in.	10 0 0
34	Best m. best in 1 in. and 3 in.	10 0 0
35	Best m. best in 1 in. and 3 in.	10 0 0
36	Best m. best in 1 in. and 3 in.	10 0 0
37	Best m. best in 1 in. and 3 in.	10 0 0
38	Best m. best in 1 in. and 3 in.	10 0 0
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41	Best m. best in 1 in. and 3 in.	10 0 0
42	Best m. best in 1 in. and 3 in.	10 0 0
43	Best m. best in 1 in. and 3 in.	10 0 0
44	Best m. best in 1 in. and 3 in.	10 0 0
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47	Best m. best in 1 in. and 3 in.	10 0 0
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58	Best m. best in 1 in. and 3 in.	10 0 0
59	Best m. best in 1 in. and 3 in.	10 0 0
60	Best m. best in 1 in. and 3 in.	10 0 0
61	Best m. best in 1 in. and 3 in.	10 0 0
62	Best m. best in 1 in. and 3 in.	10 0 0

WOOD (continued).

s.	d.	
1	Prepared Flooring, etc.—	
2	1 in. by 7 in. white, planed and	0 12 0
3	1 in. by 7 in. white, planed and	0 12 0
4	1 in. by 7 in. white, planed and	0 12 0
5	1 in. by 7 in. white, planed and	0 12 0
6	1 in. by 7 in. white, planed and	0 12 0
7	1 in. by 7 in. white, planed and	0 12 0
8	1 in. by 7 in. white, planed and	0 12 0
9	1 in. by 7 in. white, planed and	0 12 0
10	1 in. by 7 in. white, planed and	0 12 0
11	1 in. by 7 in. white, planed and	0 12 0
12	1 in. by 7 in. white, planed and	0 12 0
13	1 in. by 7 in. white, planed and	0 12 0
14	1 in. by 7 in. white, planed and	0 12 0
15	1 in. by 7 in. white, planed and	0 12 0
16	1 in. by 7 in. white, planed and	0 12 0
17	1 in. by 7 in. white, planed and	0 12 0
18	1 in. by 7 in. white, planed and	0 12 0
19	1 in. by 7 in. white, planed and	0 12 0
20	1 in. by 7 in. white, planed and	0 12 0
21	1 in. by 7 in. white, planed and	0 12 0
22	1 in. by 7 in. white, planed and	0 12 0
23	1 in. by 7 in. white, planed and	0 12 0
24	1 in. by 7 in. white, planed and	0 12 0
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29	1 in. by 7 in. white, planed and	0 12 0
30	1 in. by 7 in. white, planed and	0 12 0
31	1 in. by 7 in. white, planed and	0 12 0
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33	1 in. by 7 in. white, planed and	0 12 0
34	1 in. by 7 in. white, planed and	0 12 0
35	1 in. by 7 in. white, planed and	0 12 0
36	1 in. by 7 in. white, planed and	0 12 0
37	1 in. by 7 in. white, planed and	0 12 0
38	1 in. by 7 in. white, planed and	0 12 0
39	1 in. by 7 in. white, planed and	0 12 0
40	1 in. by 7 in. white, planed and	0 12 0
41	1 in. by 7 in. white, planed and	0 12 0
42	1 in. by 7 in. white, planed and	0 12 0
43	1 in. by 7 in. white, planed and	0 12 0
44	1 in. by 7 in. white, planed and	0 12 0
45	1 in. by 7 in. white, planed and	0 12 0
46	1 in. by 7 in. white, planed and	0 12 0
47	1 in. by 7 in. white, planed and	0 12 0
48	1 in. by 7 in. white, planed and	0 12 0
49	1 in. by 7 in. white, planed and	0 12 0
50	1 in. by 7 in. white, planed and	0 12 0
51	1 in. by 7 in. white, planed and	0 12 0
52	1 in. by 7 in. white, planed and	0 12 0
53	1 in. by 7 in. white, planed and	0 12 0
54	1 in. by 7 in. white, planed and	0 12 0
55	1 in. by 7 in. white, planed and	0 12 0
56	1 in. by 7 in. white, planed and	0 12 0
57	1 in. by 7 in. white, planed and	0 12 0
58	1 in. by 7 in. white, planed and	0 12 0
59	1 in. by 7 in. white, planed and	0 12 0
60	1 in. by 7 in. white, planed and	0 12 0
61	1 in. by 7 in. white, planed and	0 12 0
62	1 in. by 7 in. white, planed and	0 12 0

JOISTS, GIRDES, &c.

s.	d.	
1	Bolled Steel Joists, ordinary	7 0 0
2	sections	7 0 0
3	Compound Girders, ordinary	9 0 0
4	sections	9 0 0
5	Steel Compound Stanchions	12 0 0
6	Angles, Tees, and Channels, ordinary	9 0 0
7	sections	9 0 0
8	Fluting Plates	9 0 0
9	Cast Iron Columns and Stanchions	7 10 0
10	including ordinary patterns	8 10 0

METALS.

s.	d.	
1	Iron—	
2	Common Bars	8 0 0
3	Staffordshire Crown Bars, good	8 10 0
4	merchant quality	8 10 0
5	Staffordshire "Marked Bars"	10 10 0
6	Mild Steel Bars	8 15 0
7	Hoop Iron, best quality	9 10 0
8	" Galvanised	17 0 0
9	("And upwards, according to size and gauge).	
10	Sheet Iron Black	9 10 0
11	Ordinary size to 20 g.	10 10 0
12	" 24 g.	10 10 0
13	" 28 g.	12 0 0
14	Sheet Iron, Galvanised, flat, best quality—	
15	Ordinary sizes, 6 ft. by 2 ft. to	14 0 0
16	3 ft. to 20 g.	14 0 0
17	Ordinary sizes to 22 g. and 24 g.	14 10 0
18	" 26 g.	15 10 0
19	" 28 g. and 24 g.	17 0 0
20	" 30 g.	18 0 0
21	Galvanised Corrugated Sheets—	
22	Ordinary sizes 6 ft. to 8 ft. 20 g.	14 0 0
23	" 22 g. and 24 g.	14 0 0
24	" 26 g.	15 10 0
25	Best Soft Steel Sheets, 5 ft. by 2 ft.	11 0 0
26	to 3 ft. by 20 g. and thicker	11 0 0
27	Best Soft Steel Sheets, 22 g. & 24 g.	14 15 0
28	" 26 g.	15 10 0
29	Cut Nails, 3 in. to 6 in.	9 10 0
30	(Under 3 in., usual trade extras).	

LEAD, &c.

s.	d.	
1	Lead—Sheet, English, 3 lb. and up.	19 7 6
2	Pipe in coils	19 7 6
3	Soil pipe	22 7 6
4	Comp. pipe	22 7 6
5	Zinc—Sheet	
6	Vielles Montagne	33 0 0
7	Silesian	32 15 0
8	Copper—	
9	Strong Sheet	0 1 1
10	Thin	0 1 2
11	Copper malle	0 1 0
12	Brass—	
13	Strong Sheet	0 1 0
14	Thin	0 1 1
15	Typ—English	0 0 8
16	Solder—Plumbers'	0 0 8
17	Tinmen's	0 0 10
18	Blowpipe	0 0 11

ENGLISH SHEET LEAD IN CRATES OF STOCK SIZES.

s.	d.	
1	15 oz. thirds	34 0 0
2	" fourths	34 0 0
3	21 oz. thirds	34 0 0
4	" fourths	34 0 0
5	26 oz. thirds	34 0 0
6	" fourths	34 0 0
7	32 oz. thirds	34 0 0
8	" fourths	34 0 0
9	Plated Sheet, 15 bars	44 0 0
10	" 21 oz.	44 0 0

ENGLISH BOLLED PLATE IN CRATES OF STOCK SIZES.

s.	d.	
1	At Hartley's	24 0 0
2	" "	24 0 0
3	" "	24 0 0
4	Figured and Oxford Bolled	44 0 0
5	" Oceanic " Glass, white	44 0 0
6	" Do. " tinted	54 0 0

OILS, &c.

s.	d.	
1	Raw Lined Oil in pipe	0 1 10
2	" in barrels	0 1 10
3	" in drums	0 2 1
4	Bolled	0 2 0
5	" in pipes	0 2 0
6	" in barrels	0 2 1
7	" in drums	0 2 3
8	Turpentine in barrels	0 3 8
9	" in drums	0 3 10
10	Genoue Hard Oil	21 0 0
11	Red Lead, Dry	21 0 0
12	Red Lined Oil Putty	0 1 0
13	Stockholm Tar	0 7 0

VARNISHES, &c.

s.	d.	
1	Fine Pale Oak Varnish	0 1 10
2	Pale Copal Oak	0 1 10
3	Superfine Pale Elastic Oak	0 1 2
4	Fine Extra Hard Elastic Oak	0 1 0
5	Superfine Hard-drying Oak, for	0 1 0
6	Churches	0 1 4
7	Fine Elastic Carriage	0 1 2
8	Superfine Pale Elastic Carriage	0 1 2
9	Fine Pale Maple	0 1 0

PERMANENT PAINTS, &c.

s.	d.	
1	Finest Pale Durable Copal	0 18 0
2	Extra Pale French Oil	1 1 0
3	Eggshell Plating Varnish	0 18 0
4	White Copal Enamel	1 4 0
5	Extra Pale Paper	0 12 0
6	Best Japan Gold Size	0 10 0
7	Best Black Japan	0 10 0
8	Oak and Mahogany Stain	0 6 0
9	Brunswick Black	0 8 6
10	Berlin Black	0 16 0
11	Knitting and Sewing	0 10 0
12	French and Brush Polish	0 10 0

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Denotes provisionally accepted.

ABERDEEN.

For widening Union Bridge, for the Town Council. Mr. W. Dyack, Burgh Surveyor, Aberdeen.—

G. Hall, Aberdeen..... £6,518 2 11

CLEATHROPES.

For extensions of the Wesleyan Church-Sunday-schools, for the Trustees of Wesleyan Church. Mr. H. C. Scapwing, architect, Court-chambers, Grimsby.—

T. Wilkinson, High Gate, Cleathropes*..... £2,378

CHURCH (Lancashire).

For erecting a fire-escape station, for the Urban District Council. Mr. W. E. Wood, Surveyor, Council Offices, Church. Quantities by Surveyor.—

Mason: H. Ramsbottom, Accrington.
Joiner: R. S. Duxbury, Oswaldtwistle.
Plumber: J. B. G. Hall, Accrington.
Heating Apparatus: J. H. Bury, Oswaldtwistle.
Plasterer: J. Barnes, Accrington.
Slater: W. Green, Clayton, Moor.

DARTFORD.

For structural alterations to the laundries at Danahall Asylum, for the Metropolitan Asylums Board. Mr. W. T. Hatch, Engineer-in-Chief.—

W. Hussey..... £1,920 2 10
Friday & Long..... 1,780 brock & Works
J. Ellingham & Sons 1,693 Sildcup..... £1,018

DARTFORD.

For building a cesspool and constructing new drainage for four cottages, etc., Gore Farm Hospital, for the Metropolitan Asylums Board. Mr. T. Hatch, Engineer-in-Chief.—

W. H. Wheeler..... £24 0 0
G. Gwyn..... 248 0 0
Gardner & Hazell..... 247 10 0
J. S. Smith & Son..... 247 10 0
T. Knight..... 225 0 0
J. Ellingham & Sons..... 223 0 0

DARTFORD.

For cleaning and painting works at Joyce Green Smallpox Hospital, for the Metropolitan Asylums Board. Mr. W. T. Hatch, Engineer-in-Chief.—

E. Proctor & Son..... £175
W. Hussey..... 167
W. J. Simms & Sons, 160, Derby-road, Nottingham..... £150

DARTFORD (Kent).

For engineering alterations to laundries at Danahall Asylum, for the Metropolitan Asylums Board. Mr. W. T. Hatch, Engineer-in-Chief.—

W. G. Cannon & Sons..... £4,484 14 4
Cannon & Hefford..... 3,788 0 0
W. H. Wheeler..... 248 0 0
W. Weeks & Sons..... 3,514 7 6
J. F. P. Myr..... 3,396 0 0
D. & H. Ellwood..... 2,988 0 0
E. W. Potter & Sons..... 2,988 0 0
D. & J. Tullis, 1, Southwark Bridge-buildings*..... 2,885 0 0

HEREFORD.

For erecting a block of cottages, Gwynne-street, for Mrs. Lucy Dutton, Messrs. Groomer & Bettington, architects and surveyors, Palace-chambers, Hereford.—

Kingstreet, Hereford.
Bowers & Co., £1,000 0 W. Powell..... £998 0 0
C. Cooke..... 1,045 0 T. Hiles..... 994 10 0
E. W. Potter & Sons..... 1,047 0 R. Taylor*..... 950 0 0
J. T. Jones..... 1,005 0
[All of Hereford.]

ISLEWORTH.

For iron staircases, verandas, etc., to be erected in buildings in progress, for Brentford Guardians. Mr. W. H. Ward, architect, Paradise-street, Birmingham.—

Iron Staircases, Verandas, etc.
H. & C. Davis & Co., Ltd., 1, The Pavement, Clapham, S.W. £1,495

KING'S HEATH.

For making good of Woodville road, for King's Norton and Northfield Urban District Council. Mr. A. W. Cross, Engineer and Surveyor, 23 Valentine-road, King's Heath.—

A. E. B.

LONDON : 352 to 364, EUSTON RD., N.W., and 218 and 220, HIGH ST., BOROUGH, S.E.
LIVERPOOL : Havelock Works, Litherland.
GLASGOW : 47 & 49, St. Enoch Square.
BRISTOL : Ashton Gate Works, Coronation Road.

ILLUSTRATIONS.

New City Hall, Belfast.....	Mr. A. Brumwell Thomas, Architect.
Sketches with the Architectural Association Excursion:—	
Bede House, Lyddington.	
The Courtyard, Kirby Hall.	
Sketches at Northborough, Stibbington, Stamford, etc.) Sketched by Mr. W. Curtis Green.

Illustrations in Text.

Some Further Notes on Asphalt:—

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New City Hall, Belfast. Plans. Mr. A. Brumwell Thomas, Architect.	Pages 234-35

Illustrations to Student's Column:—

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Brickwork Tests.

(1) materials employed in building construction are more familiar than bricks and mortar, and yet there are few whose physical properties have been less studied.

The lack of reliable data as to the strength of brickwork is even more marked. To some extent these anomalies are readily explained.

The strength of bricks depends upon the chemical composition of the clay from which they are made, upon the preparation of the clay, and upon the extent of the changes effected by the process of burning. Thus, pure clays contract considerably in burning and do not vitrify, with the result that the bricks are not durable. Sand has the effect of reducing contraction and of promoting vitrification. Oxide of iron is a useful constituent which by acting as a flux encourages fusion of the silica, and gives hardness and strength to the product. Sulphate of lime by rendering the clay too fusible leads to distortion in the kiln, and carbonate of lime being decomposed yields quicklime which, becoming slaked by the absorption of moisture, causes partial disintegration. Free silica is beneficial in moderate quantities, but in excessive proportions renders bricks brittle. In addition to the effects of different constituents, the processes of manufacture have an

important bearing upon the strength of bricks, and the influence of burning is so variable that differences up to 100 per cent. may exist between two samples taken from the same kiln.

Sufficient experiments have been made to indicate the compressive strength of the principal varieties of brick, but only in a general way. The lack of more definite information than that available may be attributed in great measure to the fact that, so far as concerns the bulk of the brick buildings erected in London and the chief centres of population in Great Britain, architects have no occasion to calculate the strength of the chief material used. Building regulations provide for certain thicknesses of brickwork, and the weakest bricks afford ample strength. This may account for the feeble interest displayed with regard to brick tests. It is true that bricks are used to some extent in engineering structures to which stereotyped laws do not apply. For such works data are certainly necessary, and are usually obtained by the designer for the particular description of brick which it is intended to employ.

Again, mortar is looked upon as a material intended merely to keep the bricks in place, and not to impart transverse strength to the construction. Moreover, lime mortar hardens so slowly that interior portions not exposed to the air may not set for many years. Consequently little or no demand has arisen for data concerning the strength of mortar used in ordinary building construction.

Reliable information as to the strength

of brickwork is still more lacking than data relative to its constituent parts. The extent of the knowledge to be extracted from Rankine's "Civil Engineering" is represented by this sentence: "A small pillar of brickwork, made of bricks of this quality laid in cement, should require from 800 to 1,000 lb. on the square inch to crush it." By "this quality" is meant bricks which, when set on end in a hydraulic press, cannot be crushed under a smaller pressure than 1,100 lb. per square inch. Thus, according to Rankine, a pier built of bricks having the ultimate crushing strength of 71 tons per square foot should not fail under loads less than from 51 tons to 64 tons per square foot. This implies that the strength of a brick pier in terms of the strength of a single brick is represented by a ratio ranging from 0.72 to 0.9. But as the strength of brick tested in its normal position is about twice as much as when tested on end, the ratio ought to be stated at between 0.36 and 0.45 approximately. Rankine's information does not extend to brickwork in lime mortar, and his statements are altogether too vague to be of the least practical use.

Results obtained by Dr. Böhme on brick cubes 10 in. by 10 in. by 9.5 in. are summarised in Professor Unwin's work on "The Testing of Materials of Construction." Two kinds of brick were chosen for these experiments:—Benecken-dorfer brick, with the crushing strength of 263.2 tons per square foot, and Hertzfelder brick, with the crushing strength of 160.9 tons per square foot.

The records are of little use except to throw light upon the influence of different mixtures of mortar upon the strength ratio of brickwork to single bricks. Taking the highest and lowest figures, the ratios were 0.64 for 1 : 3 cement mortar, and 0.44 for 1 : 2 lime mortar.

From an interesting series of tests

stage with the object of showing how great was the want for reliable and consistent information as to the strength of brickwork. Many of our readers have already had the opportunity of studying the report in the *Transactions* of the Institute.

The inquiry was undertaken by a sub-committee of the Science Standing

set were rendered practically useless. Hence six duplicates, constituting Series IA, were built and tested with the piers of Series II. Subsequently, at the suggestion of Professor Unwin, a pier was built of bricks simply laid in sand.

Those piers tested in the first series had the average age of about nineteen weeks; in the second series proper the were about forty-five weeks old. Series IA nearly thirteen weeks old, and the pier in sand was crushed during the day on which it was built.

Summarising the results of Series I and II. for comparison with those previously quoted in this article, we have the following record, the ratio of strength being calculated for whole, and not for half bricks as in the Report :—

Brick.	Average Crushing Strength.		Ratio of Strength Pier to Brick.	
	Lime Mortar.	Cement Mortar.	Lime Mortar.	Cement Mortar.
	Tons per square foot.		Tons per square foot.	
Yorkville 1st	364	76.5	0.123	0.268
Yorkville 2nd	282	73.3	0.141	0.266
Humber 2nd	210	81.4	0.177	0.284
Karston and 2nd	307	61.3	0.278	0.568
Carlton Clinker	43.9	173.4	0.121	0.476

conducted at the School of Practical Science, Toronto, on brick piers about 2 ft. high by 9 in. square, we select the above results for comparison. The strengths of the mortars were :—Lime mortar (1 part of lime to 2 parts of sand) 65 lb. per square inch, and cement mortar (1 part of Portland cement to 3 parts of sand) 1,352 lb. per square inch, the age of the mortar and piers being 10-11 weeks.

Some tests conducted at Watertown Arsenal* upon brick piers, 12 in. square, and from 1 ft. 4 in. to 10 ft. high, afford more striking testimony as to the vagaries of experimental results. From these records we quote the following as most applicable in this country :—

Mortar.	Ultimate Strength of the Pier.	Compressive Strength of the Mortar.	Mean Ratio of Strength, Pier to Brick.
	Tons per sq. ft.	Tons per sq. ft.	
Lime 1, Sand 3	97	1.5	0.101
Lime 1, Sand 3, Cement 1	91	1.5	0.094
Cement 1, Sand 2	64	5.5	0.170
Neat Cement	133	1.5	0.158

It should be remarked that the very small values of the ratio of strength is due to the fact that the average crushing strength of the bricks, tested flat, was nearly 965 tons per square foot. Notwithstanding the inconsistency of the relations between the strength of the brickwork and the mortar in the Watertown tests, it is clear from the two proceeding sets of results that the strength of brickwork depends mainly upon the strength of the mortar. This is also shown by a series of tests conducted at Watertown Arsenal by the American Society of Civil Engineers in 1887-8. The investigation was made upon piers of various dimensions built of different qualities of brick, some laid in 1 : 3 lime mortar, and others in cement mortar of different proportions. Examination of the results shows that the piers built with cement mortar possessed an average strength equal to about 11 times that of the piers built with lime mortar. For a useful summary of the results the reader is referred to the "Report on Brickwork Tests," recently issued by the Royal Institute of British Architects.*

We have reserved mention of this valuable publication until the present

* Report on Tests Watertown Arsenal, U.S.A., 1883-4, pp. 68-125.
 ** Report on Brickwork Tests, London: The Royal Institute of British Architects, 1905.

Brick.	Mean Crushing Strength.		Ratio of Strength, Pier to Brick.	
	Lime Mortar.	Cement Mortar.	Lime Mortar.	Cement Mortar.
	Tons per square foot.		Tons per square foot.	
London Stock	11.83	17.20	0.14	0.20
Gault	21.76	29.88	0.12	0.13
Leicester Red	32.41	54.45	0.06	0.10
Staffordshire Blue	73.98	77.61	0.08	0.08

Committee in the year 1893. Three series of tests were conducted, the first two upon thirty-eight piers all 6 ft. high by 18 in. square, and the third upon twenty lengths of brick walling 6 ft. high by 27 in. long by 18 in. thick.

The materials employed in the first and second series are given below, together with the strength of the bricks and mortar. It should be stated that the mortars tested were made with "Standard" sand, and not with the sand used in building the piers. When made with the latter the strengths would probably not be more than half the values given below :—

Brick.	Mean Crushing Strength.	
	Brick.	Brick.
	Lime Mortar 1 : 2, Age, 24 weeks.	Cement Mortar 1 : 4, Age, 24 weeks.
	Tons per square foot.	Tons per square foot.
London Stock	41.27	
Gault	182.2	
Leicester Red (half brick)	382.1	
Leicester Red (whole brick)	3,050	15.72
Staffordshire Blue (half brick)	701.1	
Staffordshire Blue (whole brick)	935.0	50.15

The Staffordshire bricks were so strong that they could not be crushed in the testing machine available. Consequently they were cut in half and tested as half bricks. We cannot see any reason why the same course should not have been followed in the case of Leicester red bricks, and it is to be regretted that the actual strength of these was not determined. As a separate series of tests suggested that the resistance per square foot of whole bricks was about one-third more than that of half bricks, we have inserted values on this basis in the foregoing table.

The piers were built in 1895 for the first two series of tests, sixteen piers for Series I. and sixteen piers for Series II. Owing to the fact that the bricklayers substituted London stocks as closers in the Leicester red and Staffordshire blue brick piers, some piers in the first

cracking of single bricks under unequal strains, the appearance of cracks indicating final lines of rupture, bulging of the brickwork, and, finally, collapse of the structure. The same phenomena were exhibited in both Series I. and II., and it was remarked that the vertical line of joints formed by the closers was always a plane of weakness where serious cracks first showed themselves. The result given by the pier built with dry sand shows that it carried 15 tons per square foot, or approximately half as much as other piers laid in lime mortar which had been allowed to harden for about twenty-two weeks and forty-six weeks. Examination of the diagram representing this experiment gives a clue to the manner in which brickwork is likely to fail if exposed to additional loads after the cohesion of the mortar has been destroyed.

For the purpose of Series III., Fletton

and Staffordshire blue bricks were used, the average crushing strengths being 220.85 tons and 779.6 tons per square foot respectively. As the Staffordshire bricks could not be tested whole, the actual crushing strength was probably about 1,040 tons per square foot. No comparative tests of the lime and cement mortar are published, a rather unfortunate omission.

The elements of uncertainty mentioned above clearly take away some of the value from the third series of tests: It should be noted that the brickwork, being built with a wall bond, was free from the vertical joint occurring at the angles of the 18-in. piers, and that all the specimens were about twenty-two weeks old at the time of test. The following table gives the average results, and the ratios of strength calculated for whole bricks as before:—

Brick.	Average Crushing Strength.		Ratio of Strength, Pier to Brick.	
	Lime Mortar.	Cement Mortar.	Lime Mortar.	Cement Mortar.
	Tons per square foot.	Tons per square foot.		
London Stock	187.4	179.24	0.22	0.47
Fletton	296.8	56.25	0.14	0.28
Gault	31.14	51.34	0.17	0.28
Leicester Red	457.6	83.38	0.18	0.16
Staffordshire Blue	114.34	135.43	0.12	0.14

While the report contains much valuable information, and most interesting details concerning the mode in which the failure of the different piers and wall sections occurred, the records are not so complete in some respects as could be desired.

Being dependent upon the generosity of Sir William Arrol for the 100-ton testing machine lent for the purposes of the investigation, the Committee cannot be blamed for the circumstance that some of the bricks could not be tested whole. Scientific bodies in the United States are far more favoured in this respect than our own institutions, for they have the privilege of using the 500-ton testing machine at Watertown Arsenal—one more evidence of the intelligent interest taken by the United States Government in scientific research.

There could not be any valid reason, however, for the omission to prepare samples of the lime and cement mortar with the sand actually employed in building the piers. It is said in the Report that "the quantity of sand was not sufficient for making more than a few briquettes, and therefore it was decided to use for most of the briquettes the standard washed and sifted sand which has been generally adopted for cement tests, and which is obtained from Leighton Buzzard." Sand is not a very expensive commodity, and the neglect to furnish it in sufficient quantity for the mortar tests could only arise from want of forethought. The result is that no direct comparison can be made of the strength of the piers in terms of the strength of the mortar.

A still more serious fault is that arising from the inefficient supervision exercised over the work of the bricklayers employed to build the first and second series of piers. As we have already pointed out, six of the piers were rendered practically useless by the reprehensible action of the workmen,

and there is good reason for inferring that the accuracy of the remaining results was appreciably affected by variations of workmanship.

The walls of Series III., and the six substituted piers, constituting Series IA, were built under the direction of a competent clerk of works, who certainly ought to have been engaged at the start. As this somewhat obvious precaution was neglected, the original intention of the committee has not been fully realised. The objects, as we understand them were (1) to obtain figures representing the strength of piers each built of a specified variety of brick, with a uniform quality of workmanship and tested in two groups at the ages of twenty-two weeks and forty-six weeks respectively; and (2) to make comparison of the values with those obtained from similar piers built with a wall bond

instead of the usual pier bond. These objects have been defeated in some measure by the introduction of London stock closers into the Leicestershire red and Staffordshire blue brick piers, and probably by variations of workmanship among the piers of Series I. and II. Even if such variation did not take place, the quality of workmanship in Series I. and II. as a whole differed very much from the workmanship of Series III., and it must also be remembered that some of the bricks used for the last series were of different quality from those in the two previous series. Hence discrepancies arose of the very identical kind which the Science Standing Committee of the Institute desired to avoid. Further discrepancy was due to the superior quality of the six substituted piers (Series IA), the tests suggesting the paradox that brickwork is weaker at the age of ten months than at the age of four months. Admitting that architects and building contractors have ample reason to be grateful for the useful information contained in the Report, it is impossible to avoid the feeling of regret that unpremeditated variations were allowed to disturb the complete consistency of the data: We must, however, express satisfaction that the Report states without reserve all the conditions attending the tests, and contains the fullest possible particulars relative to the behaviour of each pier and wall when under test. Under the circumstances, the best way to consider the data is under three separate categories—(a) Series I. and II., representing average building construction at different ages; (b) Series IA, indicating the greater strength of superior workmanship even when comparatively new; and (c) Series III., showing the combined, but not the separate, merits of superior workmanship, and of the wall bond as compared with the pier bond used in the two other series.

LIGHT AND AIR.

THE case of *Fear v. Phillips*, recently tried on Circuit, raised some interesting questions on the law of light and air: The plaintiff and defendant both held their premises on lease from the same landlord—the Corporation. The defendant had surrendered his original lease, and under a lease dated October, 1905, was building a large arcade and place of entertainment with access from three streets, having acquired additional premises for the purpose. The plaintiff had five windows looking out over a yard at the back of his premises, which was 11 ft. 8 in. in width. The defendant raised the wall to the north-east of this yard from 17 ft. to 41 ft. 8 in., and the side wall to the north-west from 21 ft. 1 in. to 48 ft. 9 in., so that the yard resembled a box without a lid. The Court held that this created a nuisance within the rule laid down in the House of Lords in *Coll's case*, in that sufficient light was not left for the ordinary use and enjoyment of the plaintiff's house as a dwelling-house. The Court further held that the plaintiff had not acquiesced in this obstruction: The defendant, however, raised a further issue, that from 1901, a date when the right to light had been acquired, down to 1903, the plaintiff had acquired the lease of that part of the land upon which the north-east wall stood, and himself had subsequently assigned it to the defendant, and that as the plaintiff had not expressly reserved the right to the light, he had parted with it. On this point the Court held that since the easement had been suspended and not destroyed, the severance had not the effect which the defendant contended for, but in view of an appeal on this point, the damages were assessed on a twofold basis, viz.—if both walls were improperly raised at 400%, viz.—200% for obstruction to light, and 200% for obstruction to air, with some special damages, 25%, in respect of loss of health. Whereas if the north-west wall only gave the cause of action the only damages were to be 100% in respect of loss of light alone. The judgment contains some instructive remarks as regards actions for loss of air. His lordship pointed out that the right to air could only be acquired by prescription at common law, or presumed lost grant, and that the obstruction must be of air coming in some definite channel, or to some aperture or window of the building. In the present case his lordship considered that if the north-east wall gave no cause of action the stoppage of air by the raising of the north-west wall alone would not be actionable, but if the whole structure enclosing the yard was improperly raised, then the salubrious character of the air was certainly affected and a cause of action shown.

The plaintiff's premises were used as a fish shop, and it was contended that, therefore, the air was self-polluted by the plaintiff; but this contention failed, the Court holding that a business like this which requires circulation of air was not of a character to prevent the plaintiff from recovering for deprivation of healthy air. The appeal in this case will be followed with interest, since it raises so many questions of importance:

NOTES.

Radium.

In the paper read by Professor Soddy before the British Association it was said that with the discovery in the laboratory under the direction of Sir William Ramsay of the production of helium from radium the fact of the gradual evolution of one element into others passed beyond doubt. That view has been widely accepted by the general public, but it should be remembered that it is merely an opinion, somewhat unwisely based upon an isolated observation which does not prove the transmutation of elements. On the contrary, we may reasonably assume, as Lord Kelvin suggests in his letter to the *Times*, that the helium emanations in question were due simply to the fact that radium contains helium. Certainly no proof is forthcoming to the contrary, and until further knowledge has been obtained concerning radio-active substances it is clearly undesirable that scientific investigators should give free rein to their imagination in public utterances.

Metropolitan Water Supply.

In a letter to the *Times* Professor Henry Robinson takes the opportunity of expressing his dissent from the somewhat alarmist views of Sir Alexander Binnie concerning existing sources of London water supply. Professor Robinson believes that by conserving flood waters in the Thames Valley the Metropolitan Water Board will find a solution of the question of improving the present supply and of meeting the requirements of the future. We have repeatedly advocated the creation of storage reservoirs as a means of obviating disastrous floods along the Thames Valley in rainy weather, and at the same time of furnishing ample supplies of water during the dry season. There is not the slightest difficulty in the way of a project of the kind which has been applied with such conspicuous success in Egypt, although with a different object. Considering the remarkable improvement that is now known to be effected in stored river water by bacterial agency, there really is no valid reason why flood waters should not be impounded in the manner and for the purpose suggested by Professor Robinson.

The Handcross Accident.

By the evidence given at the Coroner's inquest on those who were killed in the motor-omnibus accident on Handcross Hill it is made clear that the disaster cannot be regarded as one caused by defective brake design. There is no doubt that clumsy, top-heavy vehicles, built for use in the comparatively level streets of cities, are quite unsuitable for the roads and hills of country districts. It is the fact also that, in this particular case, the driver committed an error of judgment in commencing the descent at too high a speed. Then when the attempt was made to reduce the speed by use of the foot brake the strain was apparently too much for the gear-box, which broke owing to an unsuspected defect in the main casting. Another cause which contributed largely to the disastrous effects of the accident was the condition of the road, the elevation being on the wrong

side, and so leading to erratic behaviour of the vehicle in descending the hill. The preponderance of the scientific testimony, including that of Mr. Worby Beaumont, Professor D. S. Capper, and Mr. Godfrey Brewer, favours the view that the accident was caused, firstly by a hidden defect in the gear-box, and secondly by the condition of the road. The lessons of this disaster are that unsuitable vehicles must not be used in hilly country districts, and that more caution must be exercised by drivers in commencing dangerous descents.

Rail Motors.

The observations made in this column last week, under the heading of "Motor-cars v. Railways," may fitly be supplemented by a few remarks suggested by statistics since made public by the Chairman of the Great Western. This company was one of the first to meet the competition of tramways by the establishment of "rail-motor" services, and in demonstrating the success of the experiment Mr. Baldwin was able to quote some really remarkable figures. Ignoring the returns of the road motor-cars—a form of competition which should perhaps be classed with railway-owned coaches and omnibuses—it appears that the Great Western Company conveyed close on four millions of people by their "rail-motors" during the past half-year. This traffic, running on the existing lines, and opening up, as it does, intermediate roadside stations, represents a distinct gain to the community, as well as advantage to the companies concerned. In the country, indeed, it has been stated that villagers who had never been in a train in their lives have become regular patrons of the "rail-motors" now that stopping-places have been made where previously the trains only flashed by. Never, probably, was the popularity of this mode of travelling more apparent than on the August Bank Holiday; and it is not surprising that arrangements are being made for extensions of the system in various parts of the country.

Municipal Debt.

The return relating to the debt of the various London local authorities, as prepared by the statistical officer of the London County Council, a summary of which was published in the *Times* on July 30 should be read with interest. The return places the net debt of London, on March 31 last, at the enormous total of 103,237,454*l.*: 48,297,619*l.*, or 46·8 per cent., of this is attributed to revenue-producing services, but the total annual charge for interest and repayment amounted to 5,296,816*l.*, of which only 1,414,408*l.*, or 26·7, was contributed by the revenue-producing undertakings. One of the so-called revenue-producing services, the Thames Steamboat Service, it will be seen from the report of the Rivers Committee, is responsible for a loss of 50,096*l.*, exclusive of the capital locked up in plant. The ratepayers are now in the position of stock or shareholders in unlimited concerns, and the above figures would appear to show that they not only have to find the capital, but that they are rated to supply their own dividends, to some extent at any rate. Moreover, figures do not in themselves

disclose the burden laid upon the ratepayers since they are customers of the municipal monopolies, and therefore have not the security they used to have when public undertakings were in the hands of private companies and competition was an element which tended to secure the lowest prices. The public are gradually awakening to the fact that Utopia is not to be reached by municipal trading if we may judge from statements contributed to the press from time to time by private individuals; and there are signs which lead us still to hope that a reaction may soon set in, and that municipal indebtedness may receive a check and private enterprise once more receive encouragement.

Glow Lamps.

ALTHOUGH the paper read by Sir William Preece to the British Association on "Glow Lamps and the Grading of Voltages" contains nothing very novel, yet the clear historical *résumé* given and the convincing proof of the importance of scientific testing are of great value to electricians. A large number of 220-volt and 110-volt 16-c.p. lamps were purchased in the open British market and sent over to New York to be compared with similar lamps made in America. It was found that the American lamps were rated much more accurately, that their efficiency was much higher, and that their life was much longer than the British lamps. A similar test was made in the National Physical Laboratory, with like results. The standard adopted in this country for the applied pressures allows a variation of 10 per cent. above or below the mean, and hence there is no inducement for manufacturers to rate their lamps accurately, as they can find a market for virtually all that they make. Sir William spoke highly of the new American method of flashing carbon filaments at a temperature sufficiently high to convert all the filament into graphite. The electrical properties of this substance are quite unlike those of carbon, as its resistance increases with the temperature. As yet the lamps are only used in this country for street lighting, but, as their efficiency is very high, they will probably ultimately supersede the ordinary carbon filament lamp. Although many metal filament lamps are now on the market they are still, so far as their life on commercial supply circuits is concerned, in the experimental stage. Messrs. Siemens Brothers supply a lamp made from tantalum, a recently discovered metal with a very high melting-point and very hard and ductile. The efficiency of this lamp is almost twice as high as that of the ordinary glow lamp. The mercury vapour lamps made by Hewitt and Bastian are also considered very promising. The method of telling the age of a lamp by the blackening of the bulb is useful, as it enables the consumer to tell with considerable accuracy when the lamp needs to be replaced. In our opinion the method of rating lamps in this country as 8, 16, or 32 c.p. is not so convenient as the Continental method of rating them as 10, 20, or 30 c.p. Sir William also pointed out the crying need for the standardisation of the pressures of supply in this country.

The Port of Liverpool. APART from the progressive extension of facilities for the accommodation of shipping, much energy is displayed by the Mersey Dock and Harbour Board in maintaining the navigation channels and in preserving a clear passage through the bar. The annual report of Mr. A. G. Lyster, the Engineer to the Board, contains some figures which serve to convey a fair idea of the scale on which dredging operations are conducted in the Mersey. The quantity of sand removed during the year ending July 1 last from the two chief channels amounted to 8,901,300 tons, and from the bar to 1,753,100 tons, making a total of 10,654,400 tons, or nearly 25,000 tons a week. Since dredging was commenced in 1890 some 100 million tons of material have been removed from the bed of the river, with the result that along the centre of the Crosby channel the average depth at low water spring tides is 27 ft., which also is the ruling depth in the main portion of the dredged cut through the bar.

Drainage in Egypt. ONE satisfactory feature of the last Report of the Public Health Department is the announcement that the Government are now taking into serious consideration the necessity that has long existed for proper systems of drainage in the chief Egyptian cities, and particularly in Cairo and Port Said. To the inhabitants of Western Europe it seems a strange thing that these two centres of population should be totally unprovided with any system of main drainage, especially in view of the enlightened administration that has been exercised with respect to irrigation and other branches of the technical service. Since Cairo and large towns in Egypt generally have been provided with more ample water supplies the saturation of the subsoil with sewage in Cairo and Port Said has become a serious menace to the public health. Owing to the rapid growth of buildings in the European quarter of Cairo plots of vacant land are becoming both scarce and expensive. Consequently many of the new houses are drained by cesspools situated beneath the entrance hall or central courtyard, these receptacles being periodically cleared by an already overworked private company. Thus it will be seen that the sanitary arrangements of Cairo are extremely unsatisfactory, and in Port Said, where the subsoil water rises to within a few inches of the surface, matters are still worse. Drainage schemes have been submitted at various times to the Government, and the decision that these are to be examined by an expert with a view to the execution of the most suitable project shows that the authorities have at last realised the pressing need that exists for reform in the direction here indicated.

The Dust Nuisance. A REPORT presented by the County Surveyor at the last meeting of the Surrey County Council expresses the opinions that the best and most economical method of abating dust is to tar the surface of the roads, but that the surface of the tarred lengths is apt to lift in winter after rain and frost. While this may be the case

on roads that are simply tarred, the same effect is not found when the surface consists of properly-laid tar macadam. We know several stretches of main roads in Surrey and other counties where tar macadam is doing excellent service and remains in good condition after the heavy wear and tear of two or three years. The Kent County Council have been and still are most energetic in the improvement of their highways, and as a result the dust nuisance has been much mitigated in the county. We have recently made a careful inspection of the main road from London to Folkestone, a large proportion of which is treated with tar and faced with tar macadam, and where the laying of tar macadam is in active progress on intermediate sections. On the treated portions of this road there is generally a little dust. This is evidently due to the fact that in the middle of the track, where horses are usually driven, small stones are pounded out and ground to powder by the wheels of heavy road locomotives and the iron-tired wheels of other vehicles. The latter also seem to be wearing slight ruts on either side of the central horse track. Unless horses can be provided with shoes of less destructive character and vehicles generally with indiarubber in place of iron tyres, we fear it will be impossible to abolish dust altogether, although its production certainly can be very greatly reduced.

Power from the Rhone to Paris. PROFESSOR A. BLONDEL and MM. Harlé and Mähl, three well-known French engineers, have recently presented to the Paris Municipal Council a strikingly novel scheme for the lighting of Paris. They propose building a large hydraulic power station on the river Rhone near Bellegarde, about 250 miles from Paris. The electric power will be generated at a pressure of 120,000 volts, and will be transmitted to a distributing station either at Ivry or Charenton on the river Seine. Contrary to the usual practice the current used will be direct current. One of the advantages of using this kind of current is the reduction of the stress on the insulators supporting the overhead wires. The results of working the 60,000 volt three-phase transmission line from Colgate to San Francisco, a distance of 200 miles, have proved that insulators can be constructed to withstand a direct pressure of 100,000 volts to earth. In Blondel's scheme the maximum pressure across an insulator will never be greater than 60,000 volts, as the line is earthed both at the power and distributing stations. At the power station there will be forty-eight direct current series wound generators of the Thury type, each having an output of 1,000 amperes at 2,500 volts. They will be divided into two groups, and the routes for the outgoing and the return wire will be quite different so as to diminish any risk of a breakdown. M. Thury has proved by experiments on a commercial scale at Geneva that a complete break in either wire does not interrupt the working, as the earth can be used, at least temporarily, for the return circuit. At the distributing station there will be forty-eight motors in series, and the general arrangements will be similar to those

of the power station. The power will be transmitted to substations in Paris at a pressure of 15,000 volts, and polyphase currents will be used. At the substations the pressure will be lowered to 110, 220, and 440 volts, and the existing networks will be used. It is calculated that the cost price of the power leaving the substations will be between 3d. and 4d. per unit, and as the price of electricity in Paris at present is about three times this there is room for a substantial reduction in price. The cost price is very considerably higher than that estimated for the London County Council, and the other power schemes recently considered by Parliament, but it obviates the necessity of burning thousands of tons of coal per day all the year round.

Pevensey Castle and Anderida. In the course of next autumn some excavations will be made in the precincts of Pevensey Castle with the expectation of discovering vestiges of Anderida. The Roman settlement extended over some nine acres. In our leading article of December 16 of last year we described in detail, with many photographic illustrations, the existing condition of the outer walls of the Castle which C. Roach Smith declared in his report upon the excavations made in 1852 to be as good examples of Roman masonry and as the best preserved as any in the Kingdom. Our illustrations evince the singular perfection of the work, its solidity and beautiful finish. For the planning of the Castrum we may refer our readers to Mr. Figg's valuable plan, printed in the *Sussex Archaeological Collections*, showing that the way through the postern gate in the wall—some 10 ft. thick—on the north side was curved, and plotting an oblique postern in the south side of the later structure. Many interesting particulars, too, will be found in the Burrell MSS. at the British Museum, with drawings by Grimm. One MS. records that, in 1710, steps were taken to convey to the village the spring-water from the moat. It was then seen that the foundation of the ancient wall consisted "of piles planked over with slabs of extraordinary substance. . . . There appeared no decay in the slabs; . . . the leaves of faggots found there were sound." In the XVth-XVIIIth centuries, and during some thirty years since, the ruins served for a quarry; the facing of the north wall suffered wanton destruction. The operations of about fifty years ago revealed the foundations of the chapel having a nave 40 ft. by 16 ft. 8 in., and a chancel 12 ft. 8 in. long by 11 ft. 6 in. wide. The bastions of the main walls are solid masses of stonework. Whilst Pevensey may disappoint some antiquarians when compared, in a few points, with Richborough, it nevertheless presents features having an uncommon interest for students of archaeology, for it possesses a history to which Richborough cannot boast a like, and exhibits types of military architecture in two different styles of fortification. At Pevensey, *temp.* William II., English and Normans met in battle for the last time on English soil; the castle was the prison-house of the Duke of York

in the days of Henry IV., of Joan of Navarre, Henry IV.'s widow, and of James I. of Scotland. The lordship, at one time owned by John of Gaunt, has passed to the present Duke of Devonshire through the Comptons in the XVIIIth century, and their successors the Cavendishes, Earls of Burlington.

PARTICULARS of the work for the session 1903-1907 of the Architectural Association School of Architecture. have been issued, from which it appears that a full and useful programme has been arranged. The recent change in the system of the teaching classes in connexion with the Association has already been briefly referred to in our columns. The School Committee mention that—"The question of preparatory training has been, and still is, the subject of much discussion among architects, and the constitution of the Board of Architectural Education must be a source of great satisfaction to all interested in the practice of architecture. It must be particularly so to the founders of the day and evening school, inasmuch as the course recommended by the Board, after the most careful consideration, agrees in almost every particular with that adopted and followed by the Association, for not only is the complete preparatory day course of two years insisted upon, but the continuation for a further two years in the evening school is also strongly advised." Sir Aston Webb, R.A., and Mr. Basil Champneys have been appointed by the Board of Architectural Education to act as special visitors, who will keep themselves in touch with the work of the school, and confer with the masters from time to time as to the progress made and the methods adopted. The master of the day school is Mr. H. P. G. Maule, who is assisted by Messrs. H. A. Douglass, J. H. Squire, H. L. Samson, and T. O. Foster. As we have previously mentioned, the Royal Institute of British Architects has decided to accept the drawings made during the first and second year in the day school in lieu of the testimonies of study for the Intermediate Examination, conditionally upon these being of sufficient merit, and upon the student obtaining the certificate of the Board of Architectural Education signed by the master and two visitors. Complete exemption can be obtained from the Royal Institute of British Architects' Intermediate Examination upon the same terms if the student satisfactorily passes through the whole four years' course. The master of the evening school is Mr. T. Frank Green, and the assistant masters are Messrs. J. H. Markham and A. Welford.

UNIVERSITY COLLEGE SCHOOLS OF ARCHITECTURE. PROFESSOR F. M. SIMPSON sends us some particulars as to the B.A. degree for architectural students recently instituted by the Senate of the University of London. The day courses at the College provide systematic and practical training for students before they enter an architect's office on the lines recommended by the Board of Architectural Education. There are two courses—A. The Degree course (three years); B. The Certificate course (two years). The Degree course,

leading to the degree of B.A. (Honours in Architecture), provides the opportunity by which architectural students can continue their general studies at the same time as they are commencing their professional work. A sound general education is now more than ever a necessity for architects, owing to the increasing number of practical subjects with which they require to be acquainted. The course also brings architectural students into touch with students in other departments of the College, who are pursuing different branches of work. The College possesses in its Engineering Laboratories, its Slade School of Fine Arts, and its Arts and Science courses valuable aids to a School of Architecture. The architectural training is much the same in the Degree and Certificate courses, except that the additional year enables degree students to carry their studies one step farther. In both courses students are well-grounded in the details and theory of building construction and in the nature and properties of material. Arrangements have been made with the Carpenters' Company for a series of demonstrations in each year in the practical working of materials at the Trades Technical School, Great Titchfield-street. These are supplementary to the lectures and classes on Building Construction at the College. In addition, visits are paid to workshops and to buildings in course of erection. The Professor of Mechanical Engineering provides a course specially for architectural students in steel and iron construction and in testing of materials. Parallel with the classes on Building Construction are lectures on the History of Architectural Development. It may be added that the Royal Institute of British Architects exempt from their Intermediate Examination students who receive a First Class College Certificate. Students already in architects' offices or who have had some experience in building can join any of the day classes or lectures by the term or by the session. Professor Simpson's assistant is Mr. Alan G. James. In the evening classes Mr. Leonard Stokes and Mr. Ernest Newton are the special visitors.

CUSTOM HOUSE QUAY. THE Corporation of the City recently applied to the Chancellor of the Exchequer for permission to use the quay in the early hours of the day for purposes of Billingsgate fish-market. Having inspected the place, Mr. Asquith informs them that he is unable to comply with the request, in view of the current work of the Custom House and of the fact that the quay is an open space into which the public have (as, indeed, they had many years ago) the right of admission; the revived privilege is greatly appreciated. The quay, or wharf, 160 yds. long, was constructed for the rebuilding begun in 1813, after David Laing's designs, at the side of Ripley's Custom House, which contained the original "Long Room." A fire on February 12, 1814, consumed Ripley's edifice—the fourth Custom House in Lower Thames-street and the successor of Wren's, burned in 1718. The present front, however, of the middle portion is by Sir Robert Smirke, 1825-6; it was found necessary

to reconstruct that part of Laing's building and to repair the wharf, a settlement having occurred through a failure of the foundations.

THE ARCHITECTURAL ASSOCIATION ANNUAL EXCURSION.

THE thirty-seventh annual excursion began this year on August 13, the headquarters being Stamford, which has once before been the scene of the excursion, in 1872; one of the party of that year is taking a prominent part in the proceedings this year. As usual, a large proportion of the party travelled down on the Saturday afternoon, and spent Sunday in exploring the town, and reconnoitring the immediate neighbourhood. As the ruins of Wothorpe Priory, St. Leonard's Priory, now a farmhouse, but in good preservation, and Burghley House are all within a mile of the town, there was no lack of interest; and several interesting sketches were made, and a good deal of ingenuity expended over the very enigmatical remains of Wothorpe, with its four large turrets and extremely battered walls. Stamford itself is so well known, and has been so well illustrated of late years, that little need be said at present; Saturday is reserved for the town itself, with its six churches and numberless fine houses.

Monday, August 13.—Wansford.

The first stop on Monday's drive was at Wansford, between six and seven miles out; a small village, with a large bridge, a church, and a fine old inn, now a private house, in the characteristic style of the country. It stands at the bridge head, and owes its name, the "Haycock," to a legend, enshrined in deathless verse by the local poet. It appears that a labourer, making hay in a meadow a few hundred yards up the Nene, went to sleep after his labours on a large haycock; and while he slept the Nene rose in flood, and washed him and the haycock away, till they were brought up sharp by the bridge, on which the village of Wansford had assembled. The shock woke him, and, fancying himself washed out to sea, he asked where he was. They told him "Wansford," to which he answered: "What, Wansford in England?" And the scene has been depicted by the painter of the inn-sign with much spirit. The bridge is probably the most conspicuous object in the village, as it has no less than eleven archways (some say there were once thirteen), though the roadway is extremely narrow. Like everything else in the neighbourhood, it is built of the local grey stone, which weathers a beautiful colour, and grows a plentiful crop of red and brown lichens. The church has a remarkable Early English arcade on the north side, with round-headed arches, and is entered from a late (1663) porch covering a fine Norman doorway. Mr. Trailen has restored the chancel, and worked in several Jacobean panels there and in the pulpit. The tower is surmounted by the usual type of steeple, and the whole church stands well on a steep bank leading down to the water-meadows of the Nene.

Nassington.

Nassington, where the party was met by the vicar, the Rev. C. J. Perceval, who very kindly showed them round, has a good church, with a fine tower and spire. The east wall of the tower, through which a Norman arch has been pierced, is believed to be Saxon; the nave and aisles are remarkable for extensive remains of colour decoration. St. George and the Dragon, the Virgin and St. Michael, and parts of a choir of angels over the chancel arch can still be made out with tolerable certainty. A peculiar feature in the chancel is that it descends one step from the nave, while another step descends to the sanctuary, an arrangement which proved a trap to several members of the party; in the north aisle is the shaft of a Saxon cross and several carved stone coffin lids. The pulpit is Jacobean, and retains its iron hour-glass stand, a relic of a more stalwart generation, while the vestry, once used as a parish school, and formed by a curious prolongation of the aisle beside the tower, contains a fine Chippendale chair. The nave is very lofty in proportion, with a very flat-pitched oak roof, and the aisle windows show a little ancient glass, while externally there is a good Early English doorway in the west wall of

the tower, and a late Norman or Transitional door, now walled up, in the north aisle. The restoration here also has been done by Mr. Traylen.

A house opposite the west door has a good oriel window, recently opened out, and traces of mullioned windows still walled up, and near by is the Prebendal house, for Nassington was at one time a prebend of Lincoln. This has been terribly knocked about to make it into a farmhouse, but from the yard at the back can be seen an early doorway, and traces of Perpendicular windows under an earlier label that once lighted the hall. On the other side of the house is the bay window of this hall, with a curious little "squin" apparently to command the front door. The present cellar is, by some, believed to have been a prison, but there is no evidence that it was ever used for any but its present purpose.

Fotheringhay.

From here a drive of some twenty minutes took the party to Fotheringhay, the lantern of the church being visible for some distance. The church is approached by an avenue of trees, and is a fine specimen of Perpendicular work, making one wish to see that gorgeous choir it was built to match. But the choir was collegiate, and on the dissolution of the monasteries was used as a quarry, together with the collegiate buildings. The nave, however, survived as the parish church; but even then its troubles were not ended, for Cromwell's soldiers tore up the brasses to the memory of the masters of the college, and XVIIIth century churchwardens sold off stalls, bench ends, and font cover, and apparently mislaid the original glass, which had survived Cromwell's men through the piety of the vicar. By constant neglect the church was falling into ruins, but is now being carefully and conservatively restored by Mr. Temple Moore. The Rev. R. Croyd Burton told the excursionists the history of the church; how it was founded by Edmund of Langley, whose son, Edward, Duke of York, died at Agincourt, in whose memory the college was established; how it was completed by Richard of York, who fell at Wakefield; how his son, Edward IV., buried him with great splendour in the choir; and how Elizabeth, visiting the church, was shocked at the ruin of the tombs of such "mighty princes," and bade make tombs for them, which stand on either side of the altar. In the centre of the west end of the nave stands the fine Perpendicular font, contemporary with the church, and a very fine early pulpit, surviving the XVIIIth century, has been rescued from some twenty coats of paint and varnish by Mr. Temple Moore. The nave roof has now been restored, but much of the original timber, and all the original carving, have been re-used in their original positions.

But the chief glory of the church is the lantern, once glazed, and used as a sort of lighthouse to the wanderers in the now vanished forests around. The nave roof is supported by flying buttresses, but the architect has unduly sacrificed strength to lightness, and the result is not at all happy. Fotheringhay is one of the few Gothic churches for which the original contract remains, the client to find all materials and carriage, and to pay the master-mason 3,000*l.* "sterlings."

The village of Fotheringhay also contains the old hostel of the Dukes of York, one of the earliest inns in the country, though now a private house. It has a fine Tudor archway in the centre, in the room over which the executioner of Mary Queen of Scots slept the night before. Close by is all that remains of the castle, once one of the most splendid in England, now nothing but a meadow full of pits and trenches, the great mound of the castle keep, and one great mass of rubble masonry fallen from above beside the Nene. The approximate site of the scaffold is marked by a thorn tree, but the original plan of the castle is quite undecipherable, and no drawings or plans exist, so far as is known, either in the British Museum or the Record Office. All know the legend that James I. razed the castle out of respect to his mother's memory; but, unfortunately, it existed fairly complete for many years after his death, and

Cotton, the antiquary, bought the hall, which he re-erected at Cunnington. The staircase is in the Talbot Inn at Oundle.

Apethorpe Hall.

From here the party drove to Apethorpe Hall, till lately the seat of the Earls of Westmorland, now the property of Mr. Leonard Brassey, who most kindly threw the whole house open to them and provided tea in the old hall of the house. He also placed at their disposal an old manuscript book of 1830, which gave many particulars of the building and its history. From this it appears that there is no mention of Apethorpe in Domesday Book; in fact it is first heard of in 1173, passing to the Fanes, afterwards created Earls of Westmorland, in 1617, at which time there must have been a considerable mansion on the site. The earliest existing remains are of the Tudor mansion, built, like the present, round two courts, one containing the principal apartments, the other the kitchen, offices, etc. The hall is on the west side of the court, and the principal entrance, unless there were three of them, under the existing gate-tower in the centre of the north side. Of this Tudor mansion the chief remains are the aforesaid gate-tower and the side of the court between it and the hall, the bulk of the hall and a fragment on the south front; some of the kitchens may also be of this date. The whole of the east side of the court, most of the south front, and the parapets of the hall are Jacobean; but in the XVIIIth century the south side of the court and the north side as far as the gate-tower were refaced by Colin Campbell, who wished to destroy also the Jacobean east side and to re-erect it in a style strongly resembling the National Gallery. At the same period "Capability" Brown swept away the old formal gardens on the south front, and replaced them by the somewhat commonplace arrangement at present existing. Recently Mr. Reginald Blomfield has made certain alterations on this south front, part of which, apparently on no evidence, documentary or other, is ascribed to Inigo Jones. There is also a scheme to restore the old gardens, sketches of which still remain.

The Jacobean work is interesting, not only intrinsically but historically, from the resemblance it bears to Emmanuel College, Cambridge, which was founded by the Earl of Westmorland who built this. The hall is a small, rather plain building internally, with an unusually deep bay window, in which is an elaborately-carved door of much earlier date. It has the usual arrangement of screens at the north end, with a minstrel gallery over, and is panelled with unusually large oak panels. Over the fireplace, in Jacobean lettering, is carved the following poem, apparently alluding to the punning motto of the Mildmayes, once owners of the house:—

DURATURA DOMUS SIT JUSTI FIDA MINISTRIA
ET STATUT CERTUM SUMPTIBUS ILLA MODUM
VICINIS FAVEAT CAUSAS DEFENDAT HONESTAS
PELLAT AVARITIAS SORDIDA LUCRA PROCU
SUBLEVEIT OPPRESSOS TENUES ET PASCAT EGENOS
ET PROPE SIT VIRTUS VIS INIMICA MIGRET.

Below is a translation into English heroic verse.

The hall is formed by filling in the arches of the Jacobean cloister, and leads by a few steps to an anteroom hung with tapestry, giving on to the long range of living rooms in the south side of the court. In the smoking-room the stone walls are left bare of plaster, and the fireplace is a fine early specimen brought here from the older part. But the principal rooms are on the first floor, in this following the Italian fashion; all these rooms have most elaborate chimney-pieces and plaster ceilings, the patterns on the latter being worked right down over the cove and stopping on the cornice. In consequence there is some confusion at the angles, but the effect is not at all unsatisfactory. The boudoir, instead of the usual coved ceiling, has a barrel flanked by two flat pieces, all elaborately moulded. At the end of this range of rooms, over the hall on the east side of the court, is the Long Gallery, a most delightful room panelled to the ceiling, which is more restrained than the others. The fireplace, however, is one of the most elaborate, with a statue of King David playing the harp as the central feature. Over the fireplace of the

billiard-room, at the far end of the Long Gallery, is a curious wind-indicator, similar to that at Kensington Palace, communicating with a vane outside.

In the court are two early bronze cannon mounted on one carriage, one an English gun inscribed "THOMAS OWEN MADE THIS PENE 1567," the other a smaller one made at Bourges, and dated 1517, bearing the motto "Virtute monui."

The rain, which had threatened all day, came down sharply about half-past five, but only lasted some twenty minutes, and the party were able to start almost up to time. The drive back led through several very picturesque villages, notably King's Cliffe, whither some of the Fotheringhay stalls have found their way, but there was no time to stop there; as the excursionists approached Stamford by way of Wothorpe, they had several picturesque views of the town lying below in the valley.

Tuesday, August 14.—Grantham.

On Tuesday the party started from the Great Northern station at 9.30, and after about an hour's run arrived at Grantham, where brakes were awaiting them. Passing through the town in front of the Angel Hotel, and getting good views of the famous spire, they came to Belton House, the seat of Lord Brownlow. It is approached by a fine old gate and screen of wrought-iron, giving on to a wide avenue about a mile in length, at the end of which the house was seen, a not very interesting structure externally, with a projecting wing at either end and a pediment in the centre.

The front door is approached by a wide flight of steps and leads into the hall, panelled to the ceiling, with carved festoons by Grinling Gibbons over the door opposite and the two fireplaces flanking it. A door to the right leads to the main staircase, panelled in white and gold, off which was an anteroom, painted a dark green, containing some fine china. Indeed, at every turn the party were surprised and delighted by the magnificent collection of Chinese porcelain, many pieces being of the "famille Rose," while a few were "famille Verte." From this anteroom one door led to the gallery of the chapel, panelled and carved in the style of Grinling Gibbons. The panels in this chapel were very large, and in some places where they were exposed to the sunlight have bulged rather badly. Another door from the anteroom leads to the small drawing-room, panelled to the ceiling, and with a painted floor, a peculiar and not very satisfactory arrangement. This led into the great drawing-room, a fine room running along the south front of the house, and communicating with the hall by the central door. Here was more Grinling Gibbons' carving on the panelled walls, with an elaborate plaster ceiling of the same period. These ceilings, by the way, are found in all the rooms on this floor, and are modelled in very high relief, the stems of the flowers being made of lead as it would have been impossible to make them in plaster. From the windows of the drawing-room the party had a good view of the formal garden below, reached by a flight of stone steps. This is a very fine specimen, happily spared us by "Capability" Brown, and makes a most charming picture, with a white peacock strutting in the midst. Beyond the drawing-room is a smaller room, containing a portrait of Henrietta Maria, by Vandyck, and of Philip II, of Spain, said to be by Titian. Beyond this, and corresponding to the antechapel in the other wing, is a small room full of XVIIIth-century portraits, apparently of the greatest interest, but as the family are away they are covered up and the party could only get surreptitious peeps at them. The room corresponding to the chapel has more carved festoons in the style of Gibbons, but here, instead of being left plain, they are gilded on a green ground, producing a very good effect. Between are immense canvases of birds and landscape and game, and at the far end a passage (the only one on this floor) leading to the stables.

From this gallery the party came to a small room with a fine set of wheel-back chairs, which were much admired by the connoisseurs; and the next room was the library, coloured in green and gold. Next came a small room, leading back to the hall, with more panelling and carvings, and hung between with tapestries, to accommodate which the door

has been carried up to the ceiling, though the doorway is only the usual height. All the door furniture on this floor and many of the ceilings bear the Brownlow crest of the greyhound, which also occurs as the finial to the ironwork at the entrance to the avenue.

The floor above has all been redecorated in the Adam style, if not indeed by the great brethren themselves, and the simplicity and restraint is very restful after the rather over-elaborate ceilings and carvings below. The library has a beautiful wagon ceiling covered with delicate ornament. This has happily been left white, but the next room, the boudoir, has unfortunately been picked out in green and brown, and the effect is hardly satisfactory. The doors, door furniture, and architraves also of these rooms would well repay more study than could be given them in a single morning, while the rooms were full of old chests, Chinese and English, and delightful furniture of all kinds. From these rooms a passage led to bedrooms, some with curious old Chinese papers, and a second passage to the back stairs had its walls covered with splendid porcelain on brackets. The State bedroom is panelled to the ceiling, and contains, among other fine pieces of furniture, a very good inlaid cabinet and a large Chinese chest.

The formal gardens, both that beside the house and another containing a pond and overlooked by an orangery, excited much interest. At the end of these, through a wonderful thicket of box, a gate with fine wrought-ironwork leads to the church, a small and not very interesting building, containing many monuments to the Brownlow family. The arcade of the nave is Norman, as is also the font, but the bulk of the building is Perpendicular. The door has a curious wicket, not, as usual, at the side, but in the centre, and cut to fit the panels.

The tapestries in the house are early XVIIIth century, made at Stamford. A few members were privileged to see the fine collection of early manuscripts, particularly an illustrated French work of 1480 by Voragine, but most had by that time betaken themselves to the gardens to sketch or photograph. From here they returned to a late lunch at the "Angel."

The "Angel," where the party lunched, is one of the oldest inns in the country, with a fine Perpendicular front; the inside has been modernised, but there remains in the bar a delightful groined stone bay. The front to the street has the entrance in the centre, flanked by a bay window on either side, and a third bay over the entrance is supported by the gilded angel which gives the place its name. The parapet is considerably enriched, and the boss of the groining in the bay window bears the pelican. There is a tradition that the house belonged to the Templars, but everything existing must be of far later date. The stairs, of the XVIIIth century, have very good and delicate balusters, three to each step, the base of the first lining with the step above, the other two being slightly lower.

Grantham Church.

From the "Angel" the party made their way in a sharp shower to the famous church, whose spire dominates the town. Here they were welcomed by the senior curate on behalf of the Bishop and by Mr. Bentley Rudd, a churchwarden and builder, who explained the history of the church. Originally a Norman church, it was enlarged by adding two bays at the west end. Then the south aisle was built up outside and over the Norman aisle, without troubling to centre the windows with the arcade, and the Norman aisle removed. At the same time the Norman arches were taken down and replaced by the present pointed arcade on the very graceful late Norman piers, and a similar treatment of the north aisle to the other was begun but only carried on spasmodically till it was finished by Bishop Fox with the "Corpus Christi" Chapel at the east end. Before this, however, the Norman chapel was removed, the end bay of the nave made of considerably larger span (probably to accommodate a great roodscreen, now vanished), and the present chancel built, though no chancel arch was made, a most unusual feature. Below the Lady Chapel (the eastern end of the south aisle) is a crypt, with the original stone altar, supposed once to have contained a relic of St.

Thomas of Canterbury, and of interest to ecclesiastical experts from the light it throws on the position of the priest during the mass, as the stone is considerably worn where he stood. West of this crypt is a second smaller one, once a chancel-house, and now used for the heating apparatus. The approach to the first crypt from the choir is by a fine Perpendicular structure of the nature of a companion-way, fitted with a heavy door and curious spring locks. At the west end of the south aisle is a small chained library, and in the west end of the nave is the pulpit, a most beautiful piece of decorated work, having almost the appearance of alabaster, richly carved with figures and emblems, now sadly mutilated. To the west of this rise the piers of the tower, beneath which is the richly-decorated west door.

The church was drastically restored by Sir Gilbert Scott in 1866. He abolished the clear-story, and put in the present screen. The rood-vault was the work of Sir A. Blomfield, but was altered and enlarged by Mr. Tapper, who also designed the altar case and font cover.

The north porch is remarkable, enclosing a very fine doorway of earlier date. The porch had three entrances, of which two are now glazed, and originally was vaulted with a room above, apparently a guild room. To make room for this floor the builder of the porch cut away the apex of the older doorway, and in this mutilated condition it survives. The vestry is very late, and contains traces of an altar. Here there is an early chair with carving on the back and arms.

But the glory of the church is the spire, which must be known to all travellers by the Great Northern. It is one of the tallest in England, being 281 ft. high, and has a slight cant to the eastward. The tower is about 140 ft. high, and 34 ft. square, of four stages, the lowest the west door and window, ornamented with the ball-flower, the second three bands of ornament, the third two windows in each side, and the belfry two very lofty windows with crocketed hood moulds. The stair is in the south-west corner, and the tower is crowned by four turrets with crocketed spirelets crowned by figures. From between these rises the spire, octagonal, with very slight broaches, and with bands of crockets along each angle. There is a peal of ten bells, one of the most numerous in England, some of which bear curious inscriptions. The spire has suffered several times by lightning, but has always been rebuilt.

Externally, the church is, in general, a very fine specimen of Decorated work, with a few later additions. The string course under the parapet, and, indeed, wherever else there was an excuse, is thickly carved with grotesque heads of men and monsters, done with splendid spirit and expression, and many of the windows, especially in the tower, have the ball-flower ornament. There are few monuments in the church, but some of the modern glass is good, particularly three windows by Mr. Kempe. The church is dedicated to St. Wulfstan, a saint of France, whose relics were preserved here till 1565. From here the party made its way to the station, and got back to Stamford about six.

[Our report of the proceedings will be concluded in our next issue.]

THE ROYAL SANITARY INSTITUTE.—The usual autumn course of lectures and demonstrations on sanitary science as applied to buildings and public works has been arranged by the Royal Sanitary Institute. The demonstrations commence on September 15th and the lectures on Friday, September 28th, at 7 p.m. The lectures have been arranged to assist those desiring instruction in sanitary science as applied to buildings and public works, and are suitable to foremen of works, builders, and those engaged in allied trades, managers of property, teachers and lecturers, and others who are desirous of obtaining the certificate of the Institute in sanitary science as applied to buildings and public works. Inspections and demonstrations are arranged, and include visits to disinfecting stations, municipal depots, artisans' dwellings, waterworks, sanitary works in progress, refuse and sewage disposal works, etc., and other public and private works illustrative of sanitary practice and administration. The various subjects to be dealt with will be given by well-known authorities, and will be illustrated with diagrams, drawings, models, and lantern slides. The fee for the course is 2s. 12s. 6d.

MAGAZINES AND REVIEWS.

We are glad to see in the *Quarterly Review* a really thoughtful and well-reasoned article on "Modern British Art," which affords something like a counterblast against the hysterical nonsense which passes for art-criticism at present. It is, to quote a phrase used towards the end of the article, "an appeal to the educated public, and not to the art-faddist." The writer of the article appears to retain the belief that there is after all, something in the great tradition of painting, and that they are not to be regarded as merely worn-out conventionalities. He is even bold enough to stand up for beauty in art. "The neglect of beauty," it is observed, "has even gone so far that in some cases" (as far as the critics are concerned one might say, "in most cases") "modern art prides itself upon its ugliness, and any beauty based upon the great art tradition of the past is scouted as mere conventionalism. It will seldom go out of its way to seek or find this once so highly-appreciated quality; and if it did, some modern critic would begin to talk of want of truth, as, if forsooth, the beautiful were not as true as the ugly. In this respect both artist and critic might well learn from the inborn craving of the ordinary mind, and enrich the sphere of art by trying to express some at least of the qualities which it craves." We are the more glad to meet with this sound common sense on the subject, because we have seen evidences of late that the *Quarterly*, too, had got into the hands of the hysterical school of critics; and we hope such an article as this is a sign of its return to a healthier state of feeling and perception.

Under the heading "Art Handiwork and Manufacture" the *Art Journal* offers some remarks on stained-glass design in connexion with some illustrations of designs by Mr. R. Anning Bell. The writer takes Milton's well-known line

"And storied windows richly dight"

as a kind of concentrated expression of the true artistic character for a stained-glass window attributing to "dight" a special meaning in the poet's mind, as indicating a design scrupulously prepared, "pre-trimmed" for the situation. The opinion is sound, but we do not think Milton had any such critical idea in his mind; he simply meant to convey the impression of the rich effect of colour of the windows; that they were "richly dight" means in modern phrase "richly got-up," and has only a reference to the general effect: Milton was not an art-critic. Mr. Anning Bell's windows as illustrated in the article represent in their treatment the kind of design which is best suited for stained glass, and perhaps the medieval character maintained in them is defensible for churches, which are an institution descending to us from the medieval period. But we shall not know all that can be done with stained glass until we get rid of the idea of medievalism as especially connected with it, and recognise that classical, Renaissance, and abstract ideals can be equally well realised in this medium, provided that the treatment is such as is proper to the material. Mr. Wall has done something to suggest this, but he has not had much following. The number includes one of those foolish trumpet-blowings over artists of the ugly which have become almost the special note of what passes for art-criticism nowadays—a glorification by a Mr. Blaker of the pictures of Mr. J. Wilson Steer, whose landscapes, we are told, "sparkle with colour, they are happy, they laugh, and shout, and weep, and sing!" This kind of hysterical nonsense, which would be hyperbolic even if applied to the work of Turner or Alfred Hunt, and becomes doubly ridiculous when applied to paintings which, to the eye of a sane person, appear only as *outré* and eccentric, is a fashion of the day; but one must regret to see it in a periodical which was once characterised by the breadth and soundness of its judgments on art.

In the *Burlington Magazine* Mr. Lawrence Weaver, in the seventh article of his series on "Architectural Leadwork," deals with the interesting subject of "Scottish leaded spires," giving illustrations of those of St. Nicholas, Aberdeen; St. John's, Perth; St. Mary Magdalene, Edinburgh; and King's College Chapel and Gordon Chapel, Aberdeen.

The two last-named are spires covered with a surface decoration of panelling formed by lead rolls arranged to form a somewhat intricate design; these are interesting, but hardly things to be imitated; it is using lead in such a way as to create practical difficulties in jointing, and the effect is not worth the trouble and risk. The most satisfactory of all these designs is the comparatively plain one at Edinburgh; an octagonal spire with the vertical lines emphasised by a roll at each angle and one in the centre of each face; all these stopped near the top by a horizontal projecting moulding, above which is a little cupola-like finish with an ogee outline. Article V. on "English Miniature Painters," by Sir Richard R. Holmes, deals with that remarkable early miniature painter Cooper, the contemporary of Vandeyck, of whom Walpole said that "if his heads were to be enlarged to the size of Vandeyck's they would appear as if painted for that proportion"; adding that if his portrait of Cromwell could be enlarged to that extent, he thought Vandeyck would suffer by the comparison. Judging by the illustration of the Windsor portrait of Cromwell, one would say there was reason in Walpole's conclusion; it is a head of remarkable force of character and expression; and it may be added, much more flattering to the Lord Protector's intellectual than moral attributes; it is the countenance of a determined but decidedly unscrupulous man. Mr. S. W. Bushell commences an essay on "Chinese Porcelain with 'Marks,'" with two pages of illustrations of some beautiful work of this kind from the collection of the late Sir Robert Meade. Mr. C. J. Holmes continues his essay on "The Development of Rembrandt as an Etcher," which we gather is to be concluded in the next issue. The article is interesting, the more so by aid of the introduction of comparative illustrations from a good many of Rembrandt's etchings; but we think we can foresee a time when people will ask whether too much has not been made of some of these works. It seems to us that Rembrandt's fame as an etcher lives mainly on a few very remarkable works, in consequence of which a kind of enthusiasm has been got up over his etchings which they will not all bear out. What, for instance, is the charm of the "Christ Carried to the Tomb," with its scrawly landscape background and undignified figures? Would anyone have thought very much of it if it had not been signed "Rembrandt"? The "Christ Appearing to His Disciples," given on the same page, is a rough sketch for a powerful effect, but certainly not a realisation of it. Rembrandt was a great genius, but there is rather a tendency at present to exaggerate him, or, at least, to attach an exaggerated value to works in which he is not at his best.

The *Architectural Record* (New York) has an illustrated article on "Old Houses in Jefferson County." The subject of these old Colonial houses is one which Americans who take interest in history do not seem to tire of, and no wonder, for it is one of the most interesting and picturesque chapters in the history of domestic architecture; interesting it should be to Englishmen too, for these houses are essentially English in style and feeling, only modified by the nature of the materials most available in the new country—wood being often employed where stone would have been used in England, and so on. Not only are these old houses interesting architecturally, but the names connected with them are full of historic associations. One of those illustrated, called the Peugnet House, a stone house built on the banks of the St. Lawrence at Cape Vincent in 1808, is said to have been prepared by Count Champaunt for the use of Napoleon, when the latter was debating whether he should accept the advice of some of his friends to sail for America—so it is put in the article; it would be more correct to say, when he was endeavouring to get to America, which was certainly his intention after Waterloo, could he have succeeded in carrying it out. The choice of the house for him was probably due to its having been built by French hands and with French materials originally; though, oddly enough, it is as English-looking in general character as most of the Colonial houses. It has elliptic arched windows and doors on the ground floor, with wooden transoms and centre mullions; square windows

above, and a parapet which is solid except over the windows, where there is an open balustrade introduced. The house was owned by Hyacinthe Peugnet, who fled from France after Napoleon's first abdication, and opened a school "which was attended by boys from Canada and Louisiana as well as the neighbourhood"; and here the Confederate General Beauregard (still a French name) had been at school; while the ballroom was used for drilling soldiers during the English war of 1812-14. Truly a historic house.

In the *Architektonische Rundschau* the only two noticeable things among the large plates are an interior of a "Protestant Church," by Herr Schumacher, of Dresden, which represents a more or less clever adaptation of art nouveau decoration to a church interior—angels entangled in knots of tape-worms, etc.; and an interior of a "Galerie," by Professor Grenander, of Berlin, which is apparently photographed from an actual interior, and represents what may be called the extreme of perversity in ugliness and anti-architectural character. That any client should wish for such an interior and any architect be found to design it is a sad reflection on the state of the art in Germany. An article on the third Arts and Crafts exhibition at Dresden, this year, is headed by an illustration of an interior of a church vestibule, by Professor Schumacher, which is original and picturesque, especially the deep frieze decorated with separate groups of professional figures in high relief, almost in the round, against a background of decorative walling.

An illustration of a dwelling-house—No. 3, Durlacher-strasse, Berlin—in the *Berliner Architekturwelt*, is worth looking at for its effective treatment of recesses and balconies in solid masonry, and the manner in which decorative bas-relief sculpture is introduced. This is a street front which is original without being eccentric. The architects are MM. Herbst & Jonatha, of Berlin.

An article of historical interest in *Public Works* is that on "Places of Public Resort in Ancient Rome," by Mr. Thomas Ashby, Jun., F.S.A. In a previous number of the same magazine the writer described the great bathing establishments which were very largely used as places of public resort. The present contribution is a collection of notes upon places such as the camps and the fora, where the people were wont to congregate, and the basilice and porticoes, which afforded refuge from the summer sun and winter wind to those bent on business or pleasure. The article closes with a brief reference to spectacular buildings, such as theatres, amphitheatres, and circuses. The subject is one upon which Mr. Ashby is well qualified to write, and it is to be regretted that the space at his disposal has prevented him from dealing with it in a manner likely to satisfy lovers of archaeology. In "The Practical Design of Canal Falls" Mr. W. G. Bligh, M.Inst.C.E., describes and criticises various types of canal weirs to be found in India, and gives numerous data and formulae for the scientific design of such structures. The only other original articles are one on "The Development of Mechanical Boat Propulsion," by Dr. John S. Owens, A.M.Inst.C.E., and the concluding part of a serial article on "Phenomena of the Ebullition of Water," by M. E. Wickersheimer, *Ingenieur-en-chef des Mines*, the last-mentioned being chiefly devoted to discussion of the economy of fuel to be effected by a variety of boiler fluid manufactured in Paris.

In the *Contemporary Review* Mr. L. March-Phillips writes an article on "Form and Colour" which combines a good deal of thought in its main thesis with a good deal of captiousness in detail. His main point is that Form appeals to the intellect and Colour to the imagination; that Form is the essential quality of Western architecture and Colour of Eastern; and that the simultaneous dominance of both qualities is impossible, the real appeal of colour to the emotion being only when it has become the master element and form is neglected for it. Of course it is almost a commonplace to students of architecture that where colour is a predominating element less attention is given to form; Oriental architecture is poor in and almost neglectful of profile in mouldings, for instance. We think he is quite right in his position that Gothic

architecture is in reality purely an architecture of delight in form and construction, the colour which was largely used in it internally being colour limited by and defining the form—in other words, decorative colour. The following remarks have a good deal of truth, and are at least suggestive as a new way of regarding the subject:—

"So long as it is strictly defined by the shapes of things colour remains a mere attribute of form, subordinate to and dominated by the meaning of the form it belongs to. This is the decorative use of colour. But no sooner does it call in the help of light and shade than it is delivered from this servitude. Indeed, it asserts a tyranny of its own, and, instead of being used by, it uses form, no longer defining shapes and outlines, but helping itself to just so much as may be necessary to the carrying out of its own schemes and effects."

With this deliverance, too, colour puts on its rich, emotional hues, those hues which never can exert their real and characteristic form so long as they are used strictly and obediently to define shape. I dare say the reader has often noticed how painful is the effect of the painted scarlet coats of hunting men or soldiers, with their accurate, bond-street cut, of which there are usually several to be seen in our yearly exhibitions. The fact is there is always something outrageous and revolting in the utter subjection of so great a colour to so mean a form. Colours there are which may rightly enough be subjected to form, but they are not the great emotional colours. It is the nature of emotional colour to assert the qualities inherent in itself and to demand the help of light and shade to overcome the restrictions of form."

But we hardly think that Titian can be cited as an example of an artist in whose works form is subordinated to the aims of colour. Rather is Titian an exceptional instance of a painter with whom form and colour are of equal importance and work together to the effect. Mr. March-Phillips suggests that the quality we find in the works of Titian and the Venetian school of painters generally, in regard to the supremacy of colour, we also find in St. Mark's, as architecture; but if it is intended that there is any common cause for this, he must be forgetting that the architecture and the painting referred to are separated by several centuries, and that the Venetian architecture contemporary with Titian is to be found in the late Renaissance palaces and not in St. Mark's. Nor is it quite correct to say that symmetry and centrality is the special note of Western as distinguished from Eastern architecture. St. Mark's itself, though very badly set out, is symmetrical in its main disposition; the Taj is as symmetrical as the Parthenon, and much more so than the Erechtheion; so is St. Sophia as far as the interior is concerned, which was the main object with its designer. The carelessness as to form in Oriental architecture applies rather to details of ornament and profiling than to general design. The contemptuous and sweeping condemnation of modern London architecture in which the writer indulges is of course part of the stock-in-trade of the ultra-modern critic, and is not worth notice; it is a cheap and easy way of filling in a page; but there is something too absurd in the criticism of the London County Council for intending to erect on the cleared site in the Strand "a series of buildings in the style of the French aristocracy prior to the Revolution," and the remark that this recurrence of a democracy to "the cast-off trappings of Versailles" is one of the most ludicrous incidents in architectural history. It is needless to remark that the London County Council, as such, have no intention of erecting anything there; they proposed to lease the land to a French company; and the reference to Versailles as a typical building of the period only shows the writer to be exceedingly ill-informed as to XVIIIth century French architecture. Versailles is poor with the poverty of the individual architect; the same reign produced Gabriel's fine Ecole Militaire and the group of buildings at the top of the Place de la Concorde, to name nothing else; and the best traditions of Renaissance architecture have more of noble and beautiful than Mr. March-Phillips seems able to understand. How far classic tradition should influence modern architecture is no doubt a subject for argument; but it is not one that can be lightly dismissed in an off-hand sentence in a magazine article.

The *Pall Mall Magazine* contains a short account of the remarkable undertaking of the railway to the top of the Jungfrau, still in progress. It has fortunately been stipulated that this should be entirely a tunnel railway, in order to avoid vandalising the Alps; but the stations will have openings to the face of

the rock to give the view of the panorama at each station; as each will be at a much higher level than the last, the successive effects ought to be very fine. The blasting out of the tunnels through hard rock is of course a slow and costly business, only to some extent compensated for by the fact that no arch ringing is required. The railway, it is stated, is to be a rack-rail one, to be worked at a speed of about four miles an hour; and the fare for the complete trip is to be 45 francs, at which price the undertaking is expected to be remunerative. On the whole the result seems likely to be less objectionable, from the æsthetic point of view, than might have been expected.

Harper contains a really useful and valuable article, for the general reader, under the title "Some Rare Elements and their Application." It is written by Mr. R. Kennedy Duncan, Professor of Chemistry in Washington and Jefferson College, and is in fact an explanation of the history and the scientific basis of the Welsbach, Nernst, Osmium, and others of the most modern lamps. It will surprise many readers, no doubt, to learn what delicate scientific investigation and experiment has been necessary before these various forms of burner could be brought into operation.

The *Century* contains eye-witness accounts, with numerous illustrations, of two great recent calamities, the burning of San Francisco and the eruption of Vesuvius.

SOME FURTHER NOTES ON ASPHALT.

The following account of recent developments in the knowledge of asphaltic substances is intended to be supplementary to the series of articles which appeared in Vol. LXXXVII. of the *Builder*, in pages 609 *et seq.*, concluding on page 703:—

1. Ascertaining the Melting-point of Asphaltum, Pitch, and Similar Substances.

The apparatus devised by Kraemer & Sarnow (see Vol. LXXXVII., page 703) has been found by M. Wendriner to give results which in general are satisfactory, but capable in one or two particulars of amendment. The variation in results is due to the difficulty of making the plugs of pitch of uniform shape and exactly equal depth, and more especially to differences in the rate at which the temperature rises during the operation of determining the melting-point.

As modified by him the apparatus assumes the form shown in Fig. 1, for insertion in

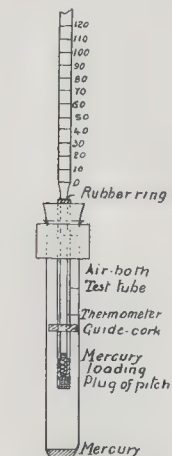


FIG. 1.

the heating bath of the one shown (Vol. LXXXVII., page 703). This new portion consists of a wide test tube, enclosing a narrower tube closed at the end by the plug of pitch. The pitch is covered with mercury, and into this mercury a thermometer dips. The melting-

point temperature is indicated by this thermometer at the moment the load of mercury drops through the plug of asphalt or pitch. Three or four plugs of the substance to be tested are prepared for each determination of melting-point, and this is done in the following manner:—A glass tube 16 cm. long and 8 mm. wide, 1 mm. thick, and with one end ground perfectly flat, is fixed in a clamp, and a glass rod 20 cm. long and 7½ mm. thick is inserted from below until the end is exactly 10 mm. from the upper end of the tube. Into the hollow space left in the upper portion of the tube a drop of water is introduced, and the glass rod is turned a little, so that the capillary space around it becomes filled with water. The water is then removed by filter paper and by gently warming the tube. The molten pitch, in a thinly fluid condition, is dropped into the hollow space, allowed to cool, the excess cut off level with the edge of the tube, and the glass rod withdrawn. The interior of the tube is now dried by means of a glass rod covered with filter paper, and 10 grms. of mercury are introduced. The thermometer is fixed in the tube by means of a rubber ring, so that its bulb is, as far as possible, immersed in the mercury, but does not touch the pitch. The tube is then suspended within the wide test tube by means of a cork 20 mm. high and a guide cork. The wide test tube, 20 cm. long by 25 mm. diameter, serves as an air bath. It is provided with a cork stopper, by which it can be suspended from the cover of the heating bath.

The method of using the apparatus is as follows:—A preliminary test is made for the purpose of ascertaining approximately the melting point, so that the water in the heating bath may for the proper tests be maintained at about 10° C. above the melting-point temperature found by the preliminary test. In the preliminary test the water in the heating bath is brought to the boil, the air bath containing the tube closed by the plug of pitch is introduced, and the temperature at which the mercury drops through the pitch is noted. The air bath is then removed, allowed to cool to the ordinary temperature, and fitted with a fresh tube with a pitch stopper. The heating bath is allowed to cool to a temperature of 10° C. above the melting-point previously found, and is maintained at this degree during the true determination, which is carried out in other respects as in the preliminary test. A series of three tests should be made, and the results should not differ by more than a small fraction of 1° C. The description will have made it clear that the improvements consist in bringing the thermometer much nearer to the pitch than in the original apparatus, and in providing a more uniform application of heat by limiting the temperature of the heating bath to the margin of 10° above that of the melting-point of the asphaltic substance.

2. Carbon Tetrachloride as a Solvent for Differentiating Bitumens.

Messrs. Clifford Richardson and C. N. Forrest find that when moderately pure this solvent possesses distinct value in the examination of asphalts, thus providing an additional agent for the classification of the constituents of bitumen and its congeners. Their investigations may be summarised as follows:—Considered merely as a standard for extraction on a commercial scale, it is the equal in its solvent power of almost all other solvents, exceeding them to some degree with certain substances. The material as supplied to the trade by the Acker Process Company, of Niagara Falls, New York is practically pure, and has a specific gravity of 1.604 at 15° C., as against 1.270 for carbon bisulphide. It requires 13 lb. of tetrachloride to go as far as 1 lb. of bisulphide, and experiments have also shown that its solvent action on bitumens at least is not as prompt as that of the bisulphide, probably the lower rate of diffusion being due to its greater density. The value of the tetrachloride as a solvent in the examination of bitumens lies in the fact that it exercises a selective action on the hydrocarbons and their derivatives, composing many of the native bitumens, residual pitches, and tars; while the true asphalts are dissolved thereby to the same extent as by carbon bisulphide. The same may be said in regard to gilsonite, but such native

bitumens as grahamite are not soluble in tetrachloride at air temperatures to the same extent as in carbon bisulphide, as much as 75.3 per cent. of an insoluble nature having been found in a grahamite from Colorado, although the type of grahamite from West Virginia contained but 1.3 per cent. in this form. The value of the solvent for differentiating the extent to which any native bitumen has been weathered and condensed is, therefore, apparent. It is of additional value in another way in revealing any changes which may be brought about in a bitumen which, although quite soluble in tetrachloride in its native state, has been injured by treatment at excessively high temperatures in industrial processes. For example, residual pitches carefully prepared from California and Texas petroleum having an asphaltic base are entirely soluble in tetrachloride at air temperatures, but, as they are prepared industrially, they contain from 1 to 7 per cent. of bitumen not soluble in tetrachloride, very conclusive evidence that the original bitumen has suffered a change in character at the high temperature to which it has been submitted, this often reaching 700° to 900° F. In the same way, in the careless refining of asphalt for industrial purposes the bitumen may become more or less altered and insoluble. If this has taken place, it can be readily detected by determining if anything is present insoluble in tetrachloride which is soluble in carbon bisulphide. For instance, an asphalt recently introduced commercially showed 47 per cent. of bitumen insoluble in tetrachloride, but with improvements in the process of refining the asphalt, this form of bitumen (*viz.*, the insoluble in CCl4) disappeared.

To obtain all the advantages of carbon tetrachloride as a selective solvent it must be employed at a temperature not exceeding 25° C., and it should be free from carbon bisulphide. Its odour is aromatic, it is non-inflammable, and its toxic effect is nil, in each respect comparing most favourably with carbon bisulphide. (Compare page 671 *lococitato*.)

3. The Constituents of Asphalts and Pitches.

The investigations referred to on page 671 *lococitato* and the results scheduled in sections 2 and 4 of Table III. by Messrs. E. Donath and B. M. Margosches have been continued. The former gentleman, employing the method described, finds that a number of commercial products sold under the name of "stearine pitch" are derived from the distillation of fatty acids separated from wool washings. They are brownish to black pitchy residues, differing materially in characteristics from true stearin pitch, which latter is used for varnishes, for insulating materials, and in the preparation of roofing boards and of waterproof paper. The last-named gentleman has examined by the same method a number of varieties of wood-tar pitch sold as artificial asphalts. The samples of beech wood-tar pitch tested had the following percentage compositions:—

Bosnian pitch.....	63 carbon ...	6 hydrogen.
Hungarian pitch	66 carbon ...	10 hydrogen.

The amount of oxygen in wood-tar pitch is thus much greater than in other artificial "asphalts." For distinguishing between individual products the following method is recommended:—Ten to fifteen grammes are subjected to dry distillation. In the case of wood-tar pitch a small quantity of a strongly acid aqueous liquor is obtained on which an oily layer floats. A confirmatory test for wood-tar pitch is that when treated with carbon tetrachloride the latter is scarcely coloured. In the case of coal-tar pitch the oily distillate dissolve completely in absolute alcohol and glacial acetic acid. Coal-tar pitch also always contains anthracene, which can be recognised by oxidising it by chromic acid, and then producing the intense red coloration by boiling with caustic soda solution and zinc dust.

If the distillate does not give a clear solution with alcohol and glacial acetic acid, the product may be lignite-tar pitch, petroleum pitch, asphaltum, or a stearine pitch. A portion of the original product is boiled for some time with alcoholic potash, and the hot liquid filtered. In the case of wood-fat pitch a fairly abundant precipitate forms on cooling, which gives the cholesterol reactions.

In the case of stearine pitch no separation, as a rule, takes place, but on evaporating the alcohol and treating with dilute hydrochloric acid the fatty acids separate. Natural asphaltum when treated with alcoholic potash colours the liquid only slightly at first, but more intensely after some time, lignite-tar pitch colours the liquid immediately, and petroleum pitch gives either no coloration at all or an extremely weak one.

In testing the behaviour of the Bosnian pitch and the Hungarian pitch with the different solvents, about 0.1 to 0.3 grm. was treated with about 10 to 15 c.c. of the liquid. Carbon tetrachloride acquired a faint yellow tinge after about twenty-four hours, whilst at 30° C. the yellow coloration was more pronounced. Carbon bisulphide remained colourless for some minutes, and then acquired a faint yellow coloration, which reached its maximum intensity after about fifteen minutes, and did not darken perceptibly after standing for twenty-four hours at the ordinary temperature of 30° C. This test, therefore, affords another means of distinguishing between wood-tar pitch and other artificial "asphaltums." A still more characteristic test was given by petroleum spirit, which remained absolutely colourless after standing for twenty-four hours in contact with the pitch, although it dissolved about 2 per cent. of the samples. Experiments with other light petroleum (benzene and ligroin) as solvents gave the same results.

Margosches compares these results with those found by Davies in 1884. The samples of wood-tar pitch tested by Davies were much more soluble in petroleum spirit, viz., from 16 to 24 per cent., and Margosches accounts for this by the fact that in 1884 a smaller amount of tar oils was expelled from the pitch during distillation. On the contrary, the present-day samples were derived from wood-tars that had been distilled at 270° C. On wood-tar pitch chloroform had the greatest solvent action, a dark brown solution being obtained; alcohol dissolved only a small amount, the liquid becoming yellow after some time; ether behaved similarly, though its action was somewhat greater. To benzene the Hungarian did not impart any coloration for a long time, and after twelve hours it had only a faint yellow tint; but with the Bosnian it became yellow in about five minutes, changing to reddish yellow after thirty minutes and to red after about twelve hours. Successive extraction of this sample with petroleum spirit, benzene, and carbon bisulphide showed that those portions that were soluble in carbon bisulphide were for the most part insoluble in benzene and petroleum spirit.

4. Detection of Adulterants in Natural Asphaltum.

For this purpose B. Malenkovic has adopted two principal and several subsidiary methods, and in the following summary of his contribution to the *Oesterreichischer Zeitung*, 1905, is set forth the mode of application to the bitumen of natural asphalt and to the usual commercial substitutes.

Method No. 1.—The tests were made with the bitumen extracted from the several commercial products by extraction in a Soxhlet apparatus with carbon bisulphide and dried for half an hour at 105° C. (a) When 1 grm. of each class of bitumen was boiled for about fifteen minutes with 100 c.c. of decinormal sodium hydroxide solution, the following were the manifestations:—

Bitumen from	Appearance with Test (a).
Natural asphaltum	Light brown liquid, in which the coloured particles appear to be uniformly suspended, but not dissolved.
Petroleum pitches	A colourless solution.
Coal tar pitches	A lemon yellow solution.
Beech tar pitch	A reddish brown liquid, having an odour of creosote.

(b) On boiling 1 grm. of the bitumen for a quarter of an hour with 100 c.c. of 40 per cent. formaldehyde, that from natural asphaltum does not colour the liquid, but all the adulterants do so.

(c) If 1 grm. of the bitumen be dissolved as far as possible in 10 c.c. of carbon bisulphide, the solution filtered, treated with 90 c.c. of petroleum ether, and again

filtered, the filtrate has the following appearance:—

Bitumen from	Appearance with Test (c).	Appearance with Test (d).
Natural asphaltum	Red	Colourless
Petroleum pitches	Red to brown	Yellow
Coal tar pitches	Yellow	Yellow

(d) To the filtrate from (c) on adding an equal volume of 85 per cent. alcohol and gently shaking the alcoholic layer remains colourless in the case of natural asphaltum, but is coloured yellow with adulterants. Malenkovic states that by this test the presence of 2 to 5 per cent. of petroleum pitch in natural asphaltum can be recognised.

(e) For the detection of larger quantities of paraffin, ceresin, mineral wax, etc., the bitumen is extracted (not by bisulphide of carbon as in the foregoing) with petroleum ether, the extract evaporated to dryness, 1 grm. of the residue dissolved in 10 c.c. of petroleum spirit, and 90 c.c. of acetone added. The results of tests are as follows:—

Bitumen from	Appearance in Test (e).
Natural asphaltum	Solution generally remains clear.
Petroleum pitch	Solution becomes turbid.
Petroleum pitch and paraffin, etc.	A flocculent precipitate is obtained.

Method No. 2.—This is based upon the percentage of bromine taken up by the various bitumens, and is called the maximum bromine value.

About $\frac{1}{2}$ grm. of the bitumen is dried for exactly half an hour at 105° C., is then heated in a Soxhlet apparatus with carbon tetrachloride and 25 c.c. of bromine without water, for twenty-five hours, or until hydrobromic acid is no longer evolved. The mixture is then poured into a porcelain dish, the excess of bromine and carbon tetrachloride expelled on the water bath, the residue dissolved in carbon tetrachloride, the solution placed in a weighing-bottle, evaporated to dryness, dried for a quarter of an hour at 105° C., and weighed.

The following were the results with the various sources of the bitumen so tested:—

Bitumen from	Percentage of bromine taken up.
Natural asphaltum	89-93
Petroleum pitches	62-72 (average 67)
Coal tar products	173-191

5. Bitumen for Electrical Uses.

For much of the information contained in this note the writer is indebted to a paper read before the Faraday Society by Mr. D. A. Sutherland and the discussion thereupon.

The specific resistance to electricity of bitumen is not very high, and consequently its use as an insulator has been confined mainly to installations of low-pressure currents. It is, however, largely used in the laying of electric cables for the purpose of excluding moisture, and to be effective in this respect it must not crack under changes of temperature or vibration due to traffic in streets. When refined bitumen *per se* is heated with from 5 to 20 per cent. or more of sulphur it becomes hardened and altered in character, and some of these mixtures are used on cables prepared with so-called vulcanised bitumen. Whilst refined bitumen is used in the best of such vulcanised coverings, there are others where the various substitutes enter very largely.

Insulating compositions vary according to the purpose for which they are intended, whether (a) for joint boxes, (b) for the filling of troughs, or (c) for the covering of cables.

It is important that the composition of the bitumen should be known, especially when it is to be brought into contact with indiarubber, as a whole length of cable may be permanently injured even by contact at one end with the objectionable material. Another danger to be guarded against is the possible loss of the non-hygroscopic property of bitumen by admixture with crude Trinidad pitch of clay, plaster of Paris, or siliceous matter. Bitumen used in the joint

boxes employed in making connexion between different lengths of cable should be effective in excluding water, which otherwise would cause leakage of current, and it is important that the bitumen should not be brittle when cold, otherwise it will not be able to accommodate itself to the linear expansion and contraction of the cable due to changes of temperature. With "solid laid" cable to secure the complete exclusion of moisture even lead-covered cables—which may have a pinhole in the sheath—are frequently laid in troughs filled with bitumen.

Bitumen cables, such as "bitite," as used by the Callender Company, are usually laid in such troughs, and even naked wires have been laid in this way. Under these circumstances it is obvious that the bitumen should be inactive towards the metal or other material employed in the cable. Wooden bridges in troughing are frequently a source of weakness, especially in damp places, and the porcelain bridges are to be preferred for keeping the cable straight, even to wood bridges that have been impregnated with damp-proofing liquids. In covering the cable every part must receive a reasonable thickness of bitumen. The liquid bitumen taken from the boilers at a temperature of about 450° F. is cooled by pouring into smaller buckets until it has reached about 350°, at which temperature it is poured into the troughs. Work should be suspended when moisture is on the cable, as bitumen will only adhere to a dry surface. Asphalt conduits or troughs—as in the Howard conduit—consist of a layer of asphalt $\frac{1}{2}$ in. thick immediately inside a sheet-iron cover of about 1.16 in. thickness. The cables are laid in the trough and a sufficient quantity of bitumen poured to cover them, and the rest of the trough filled in with asphalt concrete. Joint boxes or the trough on this system may be bent on warming where necessary to avoid obstructions, and the connexion between the two made impervious by molten bitumen.

For cable insulation vulcanised or unvulcanised bitumen should be neither too hard or brittle as to crack when bent, nor, on the other hand, so soft as to allow the conductor to become eccentric; should be impervious to moisture, have considerable mechanical strength, and yet be so tough that it is not readily torn or split; should not soften or deteriorate by fairly high temperature, and not be affected by gases or weak acids.

Typical or standard substances possess the following characteristics:—

Natural bitumen is brownish-black in colour. In structure it is amorphous. The specific gravity varies from 0.95 to 1.6 or more, according to the mineral matter present. Its melting-point varies widely from 180° to 600° F., sometimes only softening and melting with decomposition at over 600° F. It varies from the liquid form of maltha through tough and leathery substances to brittle solids. Its value in compositions for electrical uses depends chiefly on the nature of the pure bitumen, which can be prepared from the natural substance, its melting-point and most of all its natural elasticity and capability of being drawn out into threads.

Bitumen extracted from Trinidad crude is brilliant and glossy, pitch-like in appearance, semiconchoidal in fracture, but yields to gentle pressure and flows slowly under the influence of heat. It softens rapidly at 169° F., flows freely at 181° F.; it is not liquid until above 212° F. Its specific gravity after correction for 2.6 per cent. of mineral matter is 1.032.

Refined bitumen is black in colour, and has the consistency of bees-wax. It melts at about 220° F., and if well made should be capable of being drawn out into long strings. The further it can be drawn, the better the quality. It is a mixture of the most suitable ingredients of natural bitumen. Trinidad pitch has to be freed from water, volatile oils, unstable sulphur compounds, and most of its mineral matter, and has in consequence to be rendered softer by the addition of some suitable oil. Goudron de schiste, a shale oil, is very largely employed for this purpose, and a specially-prepared petroleum residue is also made use of. It is to the wise selection of this softening agent and to the care exercised in the heat

treatment during refining that the qualities of refined bitumen are chiefly due.

The influence of sulphur, although not fully understood, is important. The soft bitumens usually contain much less sulphur than the harder ones. If they are at all rich in sulphur they, as a rule, become hard eventually.

Trinidad bitumen has a particularly high bromine absorption, amounting to 30 per cent., whereby about 12 per cent. of hydrobromic acid is liberated, indicating the presence of a large amount of unsaturated hydrocarbons. This figure for bromine absorption must be distinguished from those given by Malenkovic in the second of his methods of testing set forth in the preceding "Note" of this series. In this case the figure relates to the whole of the sample, whereas Malenkovic's refers to an extract of bitumen prepared from the sample as directed.

Dr. O. J. Steinhardt gives the result of testing two samples, each sold as "best refined bitumen," and directs attention to the fact that one contained almost twice as much ash as the other:—

Moisture at 100° C.	1.18	...	52.33
Soluble in carbon bisulphide	58.44	...	52.33
Insoluble in carbon bisulphide	16.36	...	52.33
Ash insoluble in carbon bisulphide	26.29	...	46.40
	100.27	...	98.93

Mr. E. Kilburn Scott has recorded some of his experiences of bitumen in electrical uses. He has found that pure bitumen by itself was too costly for rough filling, and pitch by itself was not satisfactory, because it was liable to crack with the vibration from traffic passing over it. In his opinion, the best commercial result was a mixture of the two, having a specific gravity of 1.5 to 2. The kind of filling does not seem to matter much so long as it keeps out moisture and does not attack the lead covering or the cable insulation. A breakdown occurred on an extra high-tension feeder laid in iron troughing filled with bitumen. As a result of expansion and contraction, the cable crept in its troughing, and at a sharp corner it gradually pulled itself straight between two of the bridges, and became sufficiently decentralised to touch the inner radius of the troughing. The pull was so great, in fact, that the copper conductor actually decentralised in its own insulation. The viscosity is important, because, given sufficient pressure and time, any cable will move through a bituminous compound, just as a lump of pitch several inches in diameter will find its way by gravity through a 1-in. diameter hole. If a cable is laid over rising ground there is a tendency for the filling material to gravitate gradually downwards and leave the cable at the summit uncovered. There are often some places not filled in or leaks which will allow of this movement.

MACADAMISED ROADS AND DUST.*

ONE of the requirements of a macadamised road on which horse traffic is used is that it shall be slightly elastic. Theoretically an unyielding surface may be better for vehicles; but practically a considerable amount of wear will ensue both to the road and to the vehicle unless the road surface is slightly responsive to any jar. For the horse a slightly yielding surface is imperative. This vital requirement of elasticity is really one of the chief causes of the trouble experienced with dust.

It has been pointed out that a cubic yard of metalling 2 in. to 24 in. cube, when screened and laid down in regular layers of 6 in. thick, contains no less than 40 per cent. of interspaces. These interspaces have to be filled with smaller material, some of it gravel or sand, but most of it fine dust or mud, according to the state of the weather and the character of the road stone. The function of this soft intervening material is to form a cushion to preserve the stone from the heavy blows of the traffic and to absorb the shock that would otherwise be unpleasantly felt by the horse or the vehicle. The character of the intervening cushion thus becomes important, for if when the road surface dries it is converted into a fine mobile dust that is easily dispersed a stone

gets kicked out, and an opening is made which, if not quickly attended to, will soon result in the disintegration of the road. The way in which some of the material used for metalling is affected by water adds to this process. If the surface will be that where the material filling the interspaces has a high specific gravity, is not easily pulverised by shocks, and is not reduced to fine dust or mud by the action of the weather.

Another common defect arising also from the same source is that a macadamised road surface rarely for long retains the even convex shape in which it was left by the steam-roller. The soft material interspersed between the stones will be greater in one part than in another; consequently, as it gives way or comes out, especially if a stone or two is loosened from the road surface, the road wears away and a hollow is formed.

It has been said, and is very generally believed, that motor-cars are the cause of dust. But motor-cars would not raise the dust if the dust were not already there, either on the surface or in the interspaces of the metalling. Everyone will agree that the dust raised by cars is a great nuisance, making other road-users as well as residents by the roadside utterly miserable; but it is better to get at the cause of the trouble than blame the instrument, and the cause is undoubtedly the fine material that lies upon and between the metalling.

It has been pointed out by Mr. O'Gorman that the hollows and the irregularities of the surface are largely the cause of dust raised by motor-cars. It constantly happens that while one driving-wheel is making good and effective contact with the road the other wheel is skipping lightly into a hollow in which a dust puddle may be lying. When a vehicle is moving slowly the wheel has time to traverse the full contour of the hollow, but when travelling rapidly it bounds from the ridge into the midst of the hollow, spinning round meanwhile, and so acts like a brush directly it comes in contact with the dust. The effect of this action is very easily realised.

On every macadamised road there must always be some breaking down of the surface from the pounding of the horse's hoof and the grind of the tyre. The only way to deal with this is to get rid of it as quickly as possible, for it does no particular good to the road to leave it there, and it certainly does no good to the road-user or to residents by the roadside. Slow-moving traffic may not disturb it, but directly a motor-car or bicycle comes along the light debris is sent flying; whilst, if there is nothing else, the wind will see that it gets thoroughly distributed.

The more that sand and silicious material is used the less will be the dust produced. Sand, moreover, cannot so easily blow about in clouds, neither can it be churned into a fine impalpable dust, like limestone can be.

There appear to be three directions along which efforts may be made to reduce dust:—

- By treating the macadamised surface in such a manner as to retard the formation of dust or fix it when it is formed.
- By introducing another substance as a cushion between the metalling in place of the grit and dust with which the interspaces are usually filled.
- To use as road material stone of a silicious or basaltic nature less liable to be broken down by wear or dissolved by moisture.

(a) The City Engineer of Bristol has very kindly furnished the results of experiments as to the relative cost of dressing the roads with different dust-preventing solutions. The experiments took place in Coronation-road, Bedminster.

The first preparation was spread on June 24, 1905. Subsequent applications were made on June 26 and 27 and July 4, 5, and 7, six applications in all. At the end of a week there were complaints of the dust rising, but after the fourth, fifth, and sixth applications the road stood fairly well until July 17, when the whole road had to be watered, and it was found necessary to resume the ordinary street-watering on July 29. The cost of this application worked out to 6s. 9d. (or 0.136 of a penny per square yard) per day, as compared with 4s. 4d. (or 0.086 of a penny per square yard) per day had ordinary watering been adopted.

The second preparation was applied from July 8 to 17, altogether five applications. The dressing stood till August 17, no water being required during this interval except in channels, which were flushed out once a day from July 28. The cost worked out to 4s. 7d. (or 0.091 of a penny per square yard) per day, as compared with 4s. 10d. (or 0.096 of a penny per square yard) per day had the road been treated with ordinary water. Those who had formerly complained as to the street-watering both spoke and wrote of the good results.

No record was kept of the reduced cost of cleansing, but it is probable that there would be a saving as compared with ordinary street-watering.

In Liverpool records were kept in 1902 and 1903 of the cost of treating certain macadam roads with oil. The cost appears to have varied between 4d. and 2d. per square yard, according to the amount of oil used, and Mr. Rathbone, from whose paper these particulars are gathered, states that the total reduction in the cost of cleansing and watering was from 13d. to 5.5d. per square yard for a period of twenty-one days. Apparently the treatment resulted in a distinct saving in maintenance as well as reduction of wear, but, on the other hand, the oil did not form a very pleasant surface for traffic, and the smell was complained of. In 1903 the oil was applied more carefully, and renewed at intervals of three weeks, and the cost was stated to be 0.022 of a penny per square yard per day, as compared with 0.033 of a penny per square yard per day, the cost of ordinary street-watering.

The difference in results obtained in Bristol and Liverpool is probably due to factors which have not been noted, such as the kind and quantity of traffic. No two roads are exactly comparable.

It is probable that the trouble from dust can be very much palliated on existing roads by the use of calcium chloride and other similar solutions without appreciably increasing the cost of watering, if at all. On the other hand, the best way to make dustless roads is to use better material. A bad material can never be made permanently satisfactory by simply fixing the surface dust.

(b) Treating the roads with a watering solution may be possible in urban, but, as a rule, it is altogether beyond the means of rural districts, and another method must be found. The dust nuisance has been successfully tackled by coating newly-rolled metalling with boiling tar and pitch. Immediately after the road is formed the tar and pitch is applied in a flat stream from a watering-pot. It is then dressed with fine flint grit, and allowed to stand a day or two for consolidation before the traffic passes over it. Even with mendip limestone, which is notorious for giving off dust, this method has been found to be successful.

Another example of the second way of overcoming the dust question is the use of tarred macadam. This has been tried for some years with more or less successful results. Tarred slag appears to have answered well in some of the busy thoroughfares of London. The tar, as in the previous case, is applied hot, the slag being also heated to dryness. Apparently better results have been obtained with slag than with limestone or basalt.

This method will probably be followed up still further, and there can be no reason why, in course of time, it may not become uniformly successful. It appears to aim in the right direction of substituting for dust an elastic and non-friable material as a cushion between the stones.

(c) Anyone who travels over the country will notice how much less dust there is where basaltic or silicious stone is used as compared with limestone, lias, or oolite. If every macadamised road could be made up with basalt the dust question would assume a very different aspect. It is not only that such roads are less easily broken down by weather, but the material, being of greater specific gravity, is not so easily moved by wind. The argument against the more general use of basalt, in districts remote from basaltic quarries, is its cost. But it does not necessarily follow that a material which is cheapest in first cost will be cheapest when the cost of maintenance is taken into account.

In Bristol we have about 234 miles of

* Part of a paper by Mr. A. P. I. Cotterell, M.Inst.C.E., F.S.I., read at the recent Bristol Congress of the Royal Sanitary Institute.

macadamised roads, of which thirty-two miles are repaired with basalt and the remainder with local mountain limestone. We have been considering the advisability of repairing an additional thirty-two miles with basalt.

The effect of the increased use of granite will be to increase the expenditure for four years, and afterwards to decrease it, so that on an average of thirteen years the actual additional outlay will be only 354l. per annum. Against this must be set the saving in cleansing and watering, which is always less with granite than with limestone, so that the probabilities are that the granite road will cost less to the ratepayers than the limestone one, although the limestone quarry that would be given up is worked by the city itself, and lies close to the river in one of the finest possible positions for supplying stone economically.

This may be an answer to the natural argument that expenditure in dust-prevention may be all very well for towns, but quite out of the question in the country, for in many parts it is possible, by means of a bold capital expenditure, to provide a better and less dusty road at practically no greater cost to the ratepayers, especially if a short-period loan can be obtained. The City Engineer has also kindly furnished results of some tests made by him into the wearing properties of different classes of stone. The first test was in Clarence-road, New Cut, where ten different kinds of stone were tried. Three basaltic areas outlasted the period of the test. The basaltic stones also gave off less debris as measured by the loads of slop removed.

BUILDING DANGERS:

A DEPARTMENTAL COMMITTEE APPOINTED.

THE Home Secretary has appointed a Departmental Committee to inquire into the dangers attendant on building operations, and to prepare a draft for regulations embodying the precautions which may, in their opinion, be desirable for the safety of the workers. The members of the Committee are:—

Mr. William Dawkins Cramp, I.S.O., Deputy Chief Inspector of Factories (Chairman).

Mr. John Batchelor (Operative Bricklayers' Society).

Mr. E. T. Jessup (Amalgamated Society of Carpenters and Joiners).

Mr. William Shepherd (London Master Builders' Association).

Mr. Alexander R. Stenning (Surveyors' Institution).

Any communications on the subject should be addressed to the Secretary, Mr. Leonard Ward, Home Office, Whitehall.

THE ROYAL SANITARY INSTITUTE.

THE following new Members and Associates have been elected:—

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W. B. Barclay, L.R.C.P., M.O.H., Weymouth	J. A. Hutchinson, M.D., L.R.C.P., Quebec
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J. Miller, Edinburgh	Miss S. K. Smithson, Doverbury
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D. J. O'Halloran, Hong Kong	C. E. Taylor, London
W. G. Packer, Richmond	H. Wharton, Chester
E. C. C. Prosser, Luton	S. W. Wingfield, London.

Correspondence.

OLD SURREY CHURCHES.

SIR,—Among the town-like village churches should be added the noble one at Lingfield, with its nave, aisles, and choir, nearly all of the same width and height, and mainly of the XVth century. Its lofty tower, unusually placed, is supported on two of its sides by a huge third buttress practically up to the parapet. The church has no transepts, thus giving a fine sweep of aisle with wide bays and a telling window effect.

Round the church are clustered some exquisite "timber-houses," including the celebrated "Guest Hall."

JOHN A. RANDOLPH.

REDNESS OF WATER FROM HOT-WATER SERVICE.

SIR,—I should be glad if you would kindly let me have your opinion on the following:—

A few months ago I fitted up a large house in the West-end, with a complete new hot-water service, using the ordinary iron steam barrel (not galvanised) throughout. Although the boiler and cylinder are both thoroughly cleaned out at frequent intervals, yet my customer complains that whenever the water is heated for baths, etc., it comes out of the taps heavily charged with rust, and leaves a deposit on the sides of the baths, basins, etc., which, through being constantly scoured, lose their surface. To my mind the redness of the water is due to its being over-heated and actually boiled in the pipes, but I should like to know what you think, and if there is any remedy you can suggest.

J. R. C.

* * We are afraid that the only effectual remedy for the complaint mentioned is to replace the black pipes by galvanised iron or copper pipes, which should always be used for hot-water services. It is also advisable to employ galvanised iron or copper boilers if complete protection is required against rusty water. To adopt ungalvanised iron pipes is simply to court corrosion and consequent discolouration of the water. ED.

ST. NICHOLAS, GUILDFORD.

SIR,—I must protest against the unjustifiable attack on the architecture of St. Nicholas, Guildford, made by the contributor of "Old Surrey Churches."

This excellent example of modern Gothic was designed, I believe, by the late Mr. Ewan Christian (though I have also heard it attributed to S. Teulon), and is the only satisfactory example of modern ecclesiastical work in the town. It is in the Early French style, and would have done Mr. Street credit. The proportion of the nave and tower, and the charming grouping as seen from the east end, are as original as they are admirable.

Internally the decoration leaves something to be desired, but the delightful clearstory and excellent disposition of levels must surely strike any unprejudiced observer. In all respects this charming building contrasts most forcibly with the despicable new church of St. Saviour, in which the seeming impossibility of producing anything worse than the nave and chancel has been ingeniously achieved in the recently erected west end and spire.

For students of XIXth century architecture who are not disposed to speak of "nightmares" and stigmatised fine examples as "awful" perhaps I may mention four admirable specimens in the neighbourhood, viz., Fleet Church by W. Burges, Blackheath Church by Mr. Harrison Townsend, and Graffham Church and Hascombe Church by Wooddyer.

Graffham also boasts a beautiful parsonage-house, designed by the architect of the church.

H. S. GOODHART-RENDEL.

BOOKS RECEIVED.

THE A B C DIGEST OF THE BUILDING BY-LAWS FOR THE COUNTY BOROUGH OF BOURNEMOUTH. By Ingallton Sanders. (Southampton: *Hants Independent Offices*, 45, Abovebar. Price 1s.)

QUAINT AND HISTORIC YORK: IN AND AROUND THE OLD CITY. From drawings by E. Ridsdale Tate, with Notes by George

Benson. (York: E. R. Tate, 4, The Crescent. London: B. T. Batsford, High Holborn. Edinburgh: W. J. Hay.)

COMMERCIAL DRY DOCKS. By J. Mitchell Moncrieff, M. Inst. C.E. (Newcastle-on-Tyne and London: A. Reid & Co., Ltd.)

THE CLAYWORKER'S HANDBOOK. (London: Charles Griffin & Co., Ltd., Exeter-street, Strand.)

Illustrations.

BELFAST CITY HALL.

THE new City Hall which has been erected for Belfast was opened recently by the Lord-Lieutenant.

The Hall is situated on the site of the Old Linen Hall in Donegall-square, and covers an area of about an acre and a half of ground. The contract for its erection was entered into in 1897, and in the following year its foundation stone was laid by Lord Cadogan, the then Lord-Lieutenant of Ireland.

In form the Hall is quadrangular, with an internal courtyard. The main façade is 300 ft. long, and the sculpture which adorns it represents Hibernia wearing a mural crown and bearing the torch of Knowledge, the symbol of light and advancement, her right hand resting on a harp. Minerva is also represented, attended by Mercury and Liberty, and a female figure holding a bale of finished linen is included in the group. At her feet is seated another figure, with an Irish spinning-wheel, while the youth and energy of the country are expressed by the boy figures which the sculptor has introduced.

The external façades are enriched with Ionic columns, and above the parapet at the four corners of the building the four angle towers rise to a height of 115 ft. The dome over the entrance is 173 ft. in height, and terminates in a stone lantern. The entrance-hall is approached through a stone portico and an octagon vestibule. It is 70 ft. by 40 ft., and rises to a height of 100 ft., terminating in a dome 42 ft. in diameter.

The grand staircase is in Carrara, Pavenozzo, and Brescia marbles, the ceiling being treated with modelled plaster work. Seven three-light windows light the staircase. These windows are of stained-glass, on which the different stages in the history of the Corporation have been portrayed. The banquetting-hall, communicating with the reception-room, is 68 ft. long by 38 ft. wide, and is surmounted by a dome 36 ft. high. The walls are panelled to a height of 9 ft. in wainscot oak, carved. In addition to the Royal Arms, the windows in this hall show the arms of Lord Donegal and Shaftesbury.

The council-chamber communicates with the reception-room, and is 68 ft. long by 38 ft. wide. The centre bay has arches springing from piers 17 ft. high in a dome of original design in modelled plaster, the two end pieces having curved panelled vaults. The chamber is provided with balconies for the accommodation of the public and the Press. It is arranged for the members of the Council after the style of the House of Commons, with a gangway, at one end of which there is a raised dais for the Lord Mayor's chair.

In the great hall, which is 120 ft. in length, the ceiling is vaulted, and in three of the seven windows which supply it with light there are portraits of the Sovereigns who have visited Belfast—viz., King William III., Queen Victoria, and King Edward VII. The four remaining windows bear shields of the Provinces of Ireland. The hall provides accommodation for 1,000 persons, while the gallery will accommodate an additional 250.

The architect of the building was Mr. A. Brunwell Thomas (London), the contractors being Messrs. H. & J. Martin (Belfast). The contractors for the stained-glass work were Messrs. Ward & Partners, Belfast. The cost of the building exceeds 300,000l. All the oak parquet flooring was laid by Messrs. Ellis Geary & Co., of London.

SKETCHES WITH THE ARCHITECTURAL ASSOCIATION EXCURSION.

THESE illustrations are given in connexion with the excursion of the Architectural Association to Stamford, a report of the first two days' proceedings of which appears on another page.

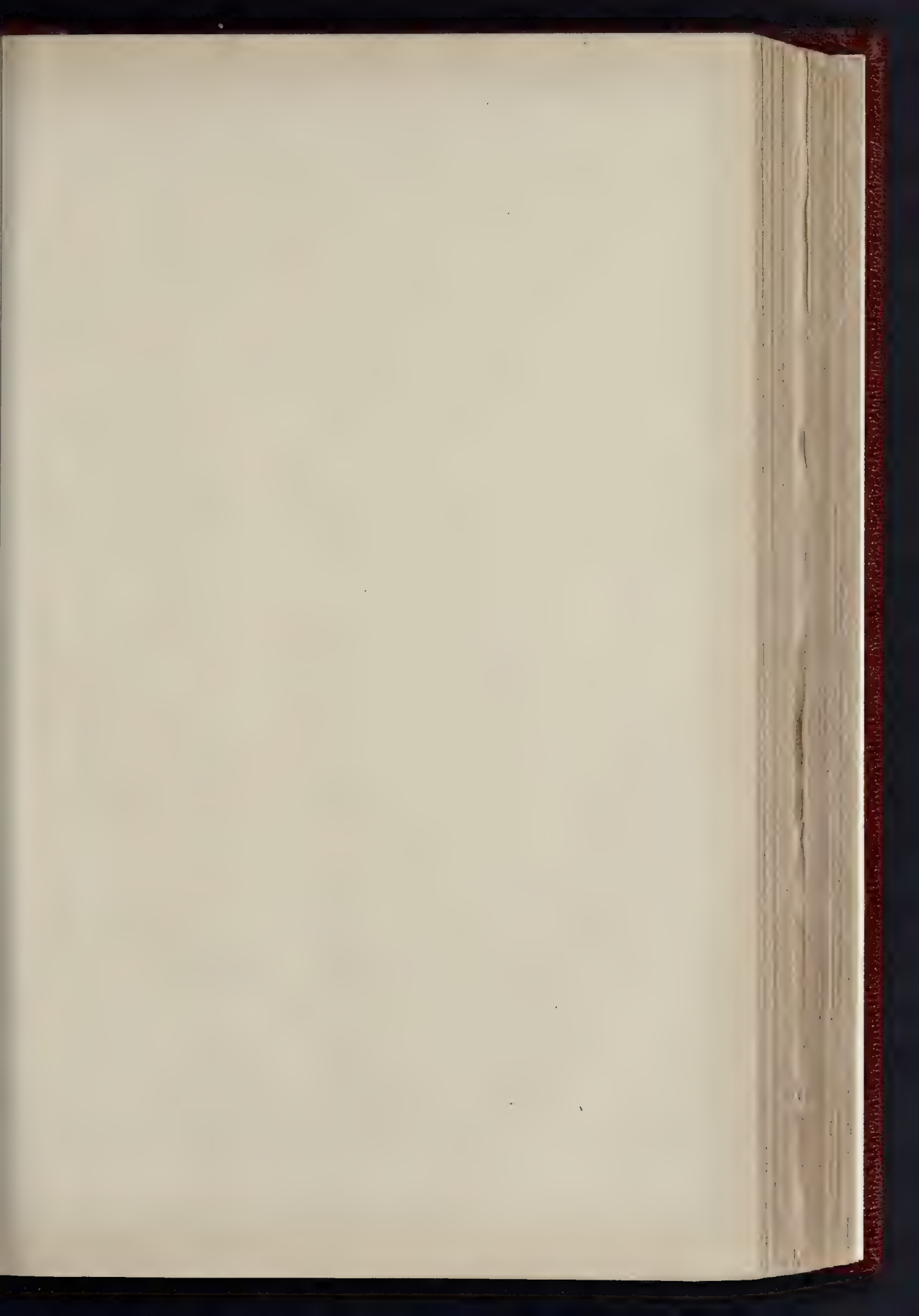




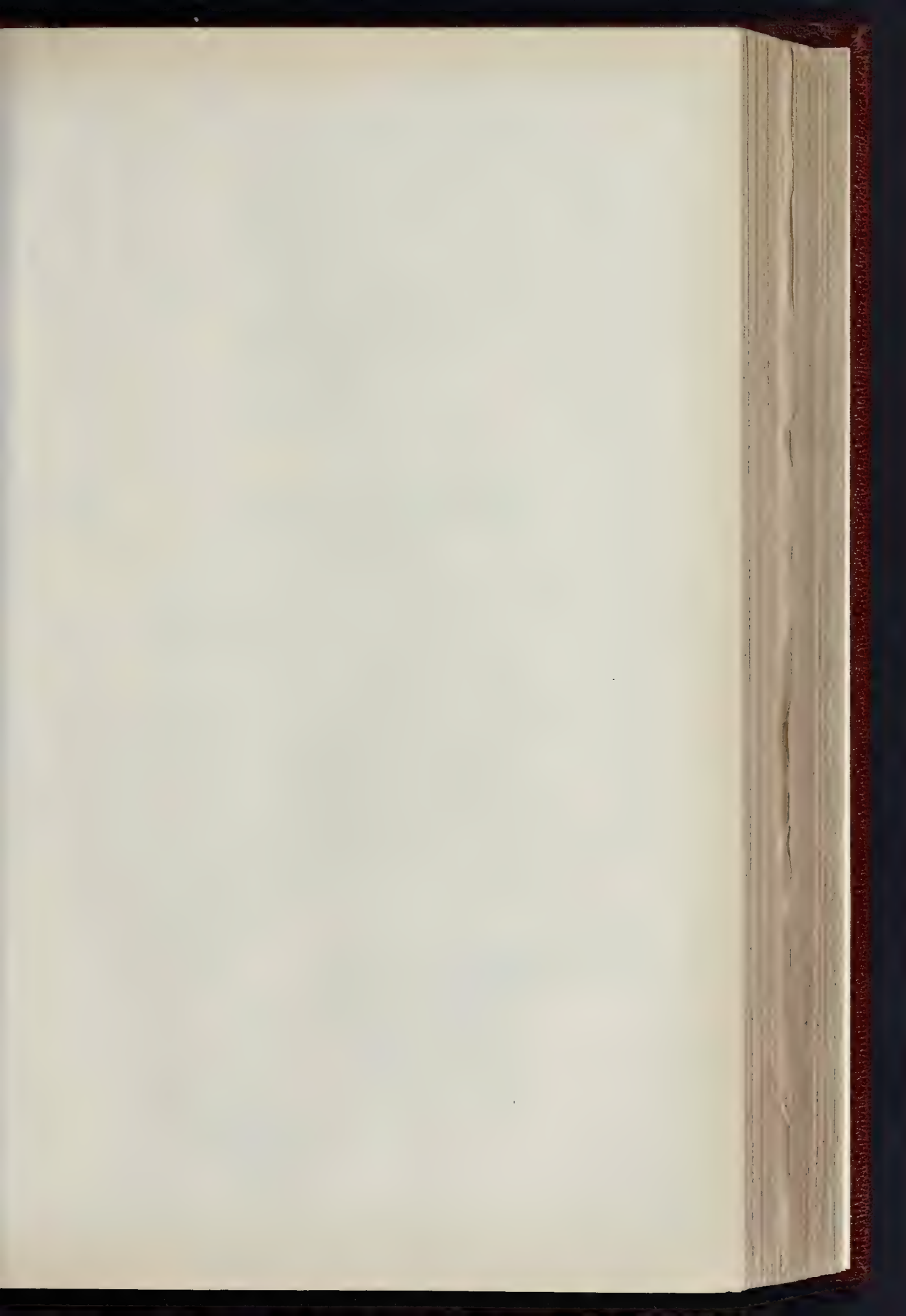
PHOTO BY A. R. HODG BELFAST

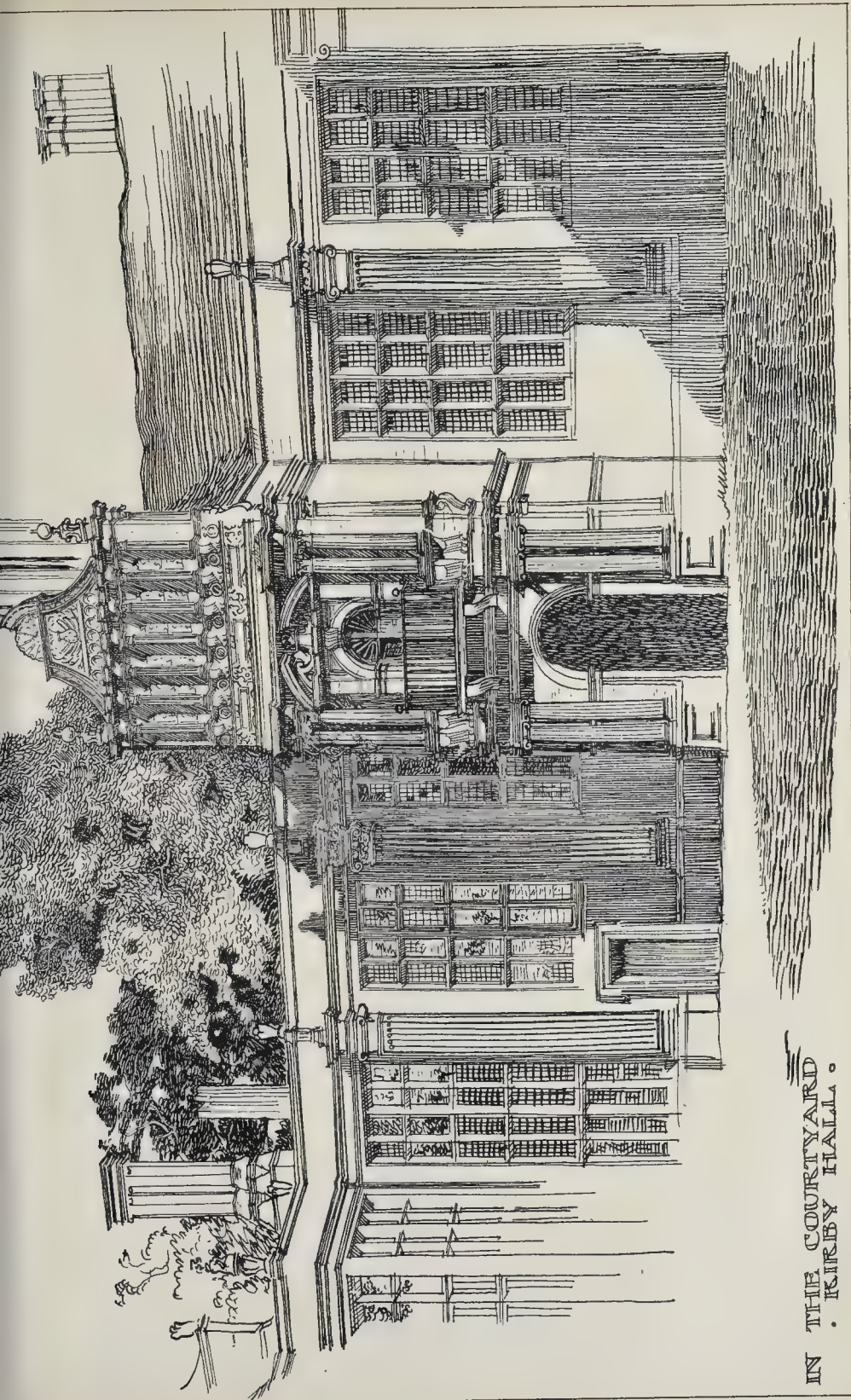
NEW CITY HALL, BELFAST.—



INN PHOTO S. RAGUE S.C. L. 4 & 5 EAST HARD R.C. STREET FETTER LANE. F.C.

BRUMWELL THOMAS, ARCHITECT.

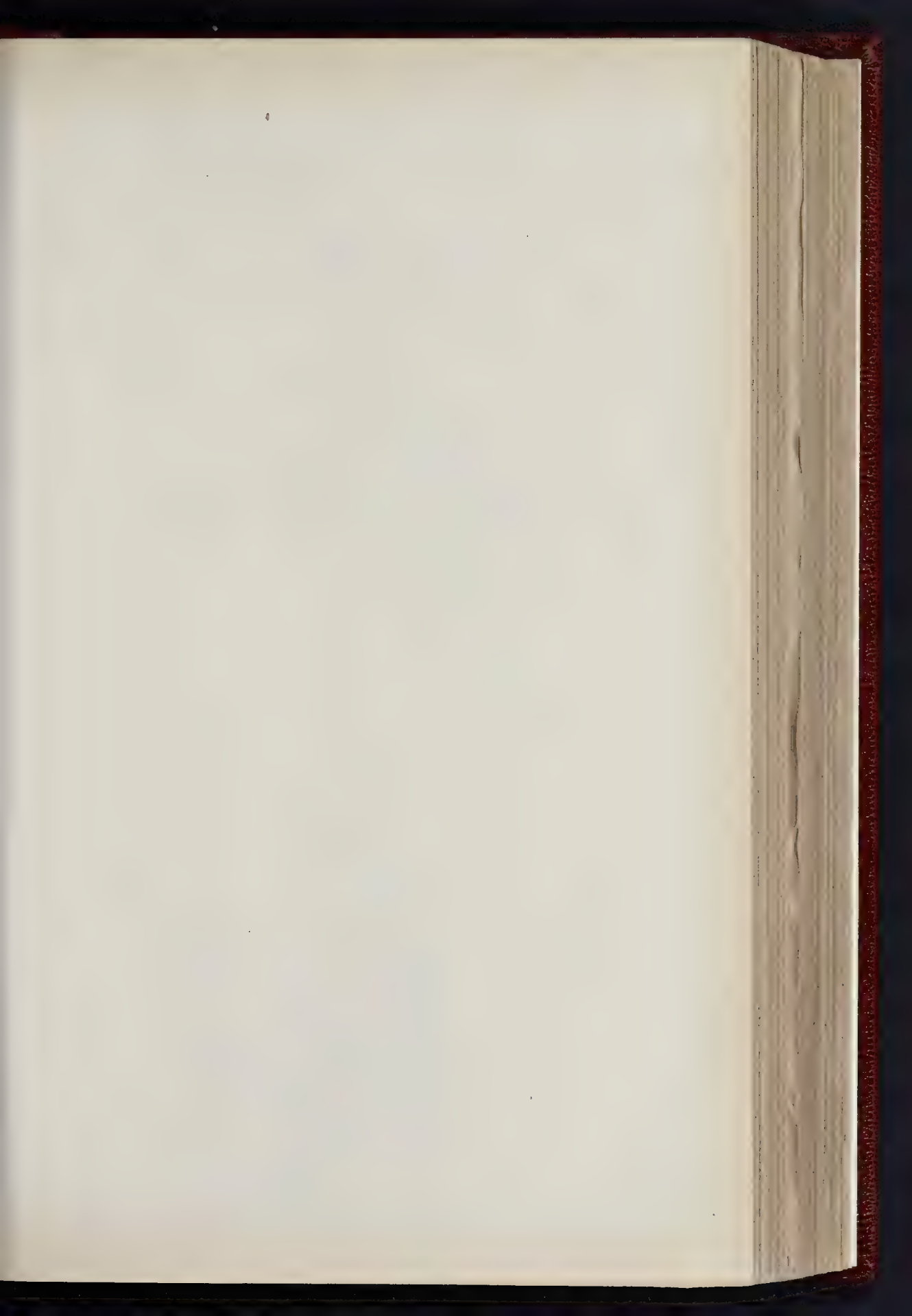




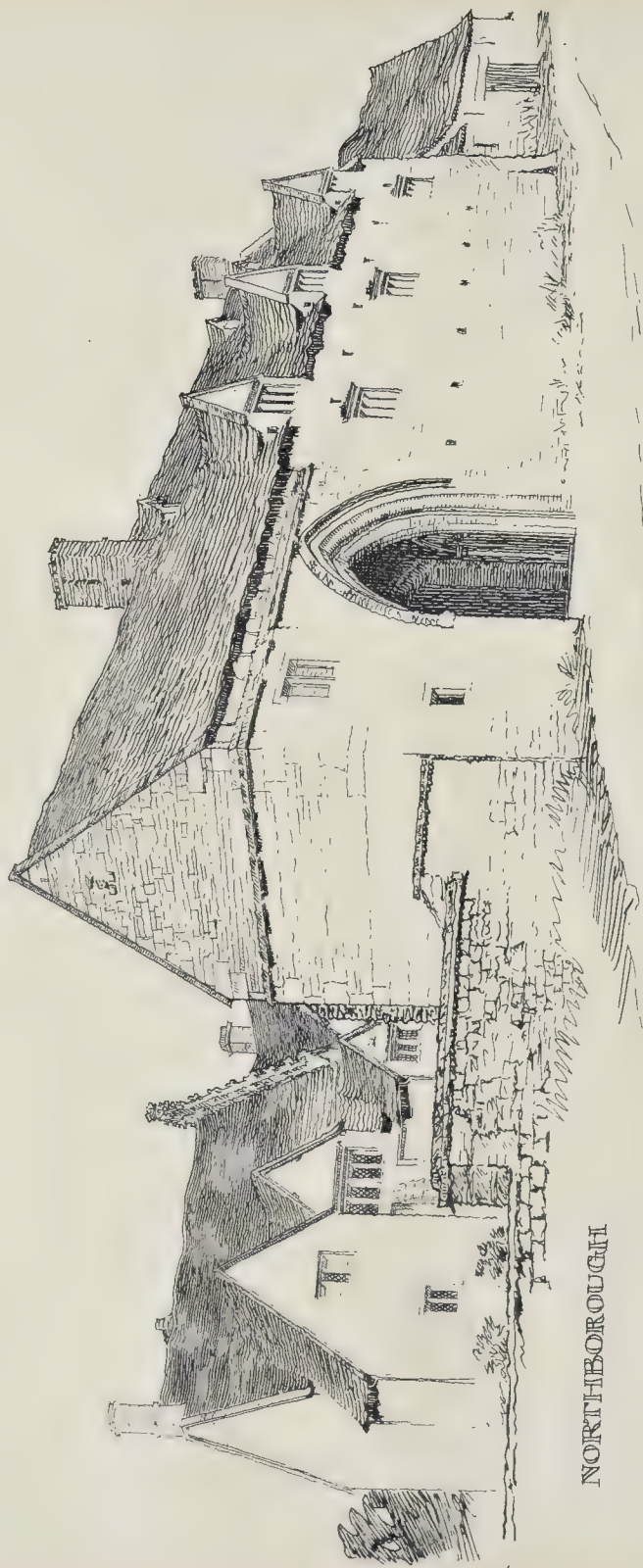
IN THE COURTYARD
· KIRBY HALL ·

SKETCHES WITH THE ARCHITECTURAL ASSOCIATION EXCURSION

PHOTOGRAPH BY SYDNEY P. C. L. L. EAST, HARBOR STREET, CLEVELAND, OHIO



THE BUILDER, AUGUST 18, 1906



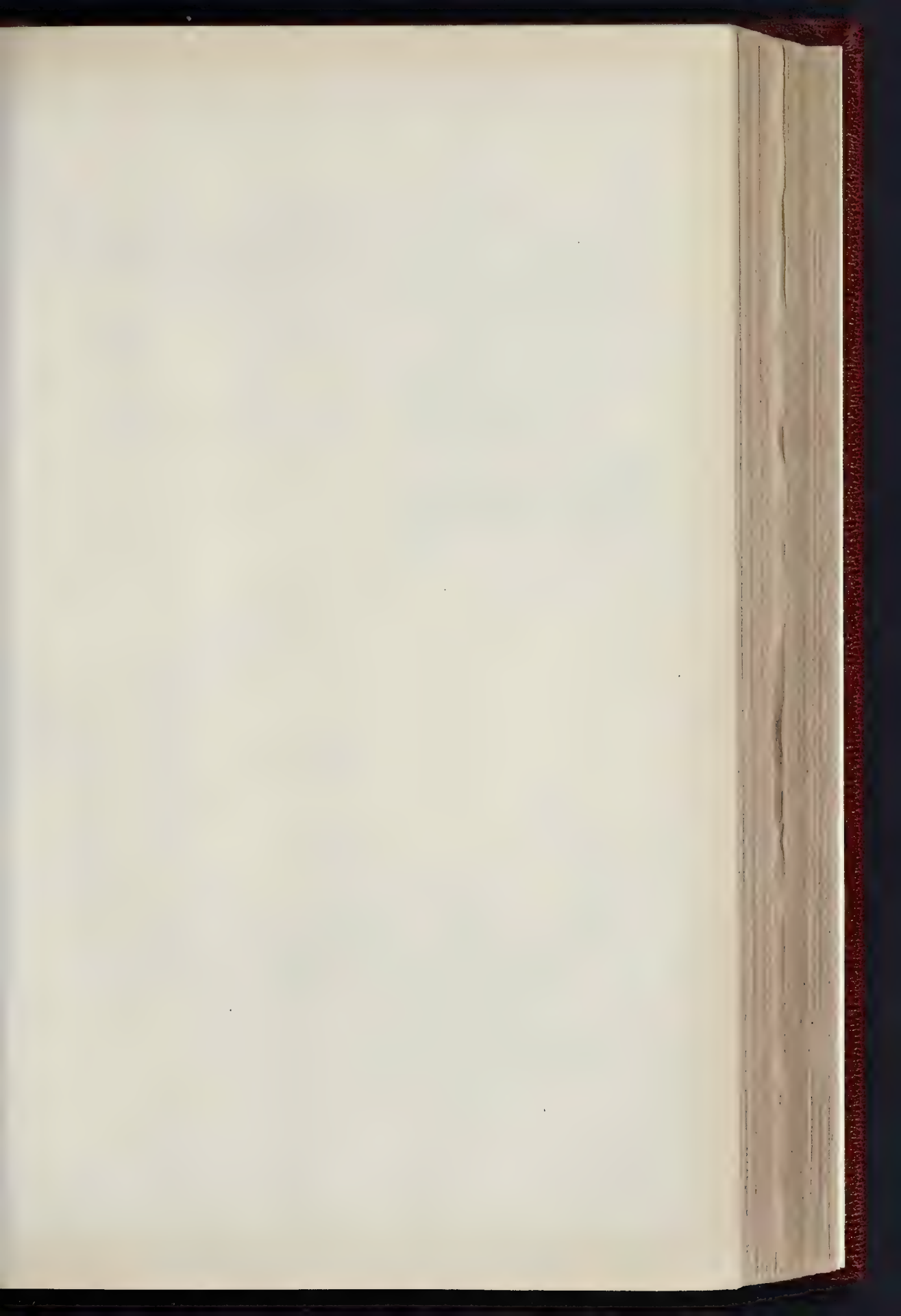
NORTHBOROUGH

W. G. G. del. .06



FORMERLY THE HAYCROFT INN, STURBRIDGE.

SKETCHES WITH THE ARCHITECTURAL ASSOCIATION EXCURSION





A SHOP, HIGH STREET STAMFORD



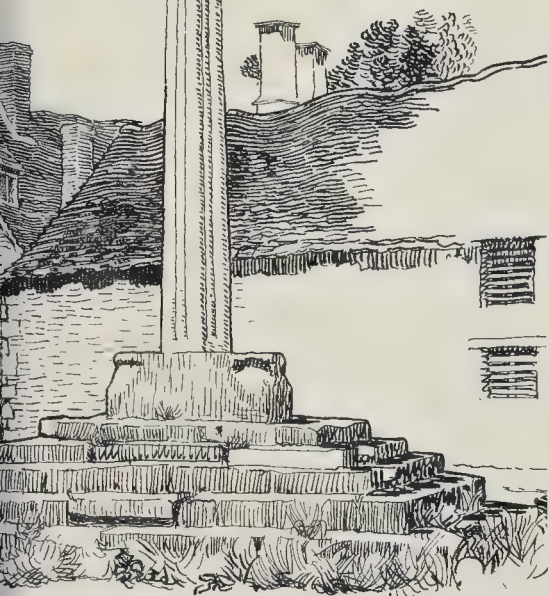
FORESTERS INN, STAMFORD.



HARRING



S. PAUL'S STREET, STAMFORD

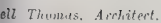


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S. PAUL'S STREET, STAMFORD.

PHOTO LITHO SPRAGUE & CO. L. 3-5 EAST HARD NO STREET FETTER LANE E C



Trade Catalogues.

MESSRS. CROMPTON & Co. send us their catalogue of small continuous current electric motors specially designed to meet the demand for a series of reliable machines of small power at a reasonable price. The motors are built in large quantities, strictly to gauge, and interchangeable. The armatures are of the slotted drum-wound type, the coils being "former" wound; the commutators are of hard-drawn copper, and the bearings self-oiling. The brush-holders are adjustable, and the machines are stated to be as complete in every electrical and mechanical detail as it is possible to make them. The motors are of the protected type, made in three standard sizes of $\frac{1}{4}$, $\frac{1}{2}$, and 1 brake horse-power respectively, and can be applied as direct-coupled, or belt-driving, motors, according to the speed of the apparatus to be driven. In cases where very low speeds are required the motors are supplied with self-contained spur or worm reduction gears. Judging by the illustrations and particulars contained in the catalogue these motors constitute a well-designed series that ought to become very popular among small power users.

We have received from the Simplex Conduits Company, Ltd., a leaflet describing a novel method of mounting switches and ceiling roses. The flush mounting-box used is so constructed that the channelling of the brick-work required for the electric wiring is reduced to a minimum. The fitting is separated from the box by an insulating-disc $\frac{1}{8}$ in. in thickness, and so it is quite suitable for use at the pressures now customarily used. The box is of polished and lacquered brass, and has a neat appearance. As these boxes are for use with a concealed system of wiring, and as no plastering is required, they will be appreciated by many who have to plan the electric wiring of buildings.

The Student's Column.

ROOFS: STRUCTURALLY
CONSIDERED.—V.

12.—Glass.

IN ordinary buildings glass is only incidentally a roof covering material, occurring chiefly in lanterns and other forms of roof lights. There are, however, many buildings where extensive roof areas, such as those of courtyards, winter gardens, and conservatories, have to be glazed throughout their full extent, and others of special character in which glass is either the only or the chief covering for the roof framework.

Engineers who design railway-stations and large steel buildings may have occasion to employ glass on a scale of great magnitude, but it is probable that in the aggregate they do not use so much of the material for roofing purposes as architects. Therefore, we are justified in regarding glass roofing as an essential and a very important branch of architectural practice.

Glass may be defined in very general terms as a compound of an alkaline silicate, with a silicate of an alkaline earth, and one or other of the metallic oxides.

For roofing purposes only two varieties are used—sheet glass and plate glass, the chemical composition of these being similar, although not actually identical.

Very little is known concerning the strength of glass as a material of construction, but consideration of the few data that are available suggests that the values in Table XI. may be taken as roughly indicating the chief mechanical properties of the material.

TABLE XI.—APPROXIMATE STRENGTH OF GLASS.

	Sheet Glass.	Plate Glass.
Tensile strength	per sq. in. 2,500 lb.	per sq. in. 2,850 lb.
Compressive strength	30,000 lb.	31,000 lb.
Transverse strength.....	1,500 lb.	1,700 lb.

While the compressive strength of glass is usually ample, the weakness of the material is to be found in its low resistance to transverse stress, a deficiency which is

particularly marked when the load is suddenly applied or rapidly increased.

Experiments by M. Grenet show that the resistance of glass to transverse rupture varies within wide limits, since in accordance with the speed of loading the strength may vary in the proportion of 1 to 4.* It is evident, therefore, that a good deal of latitude must be allowed in all calculations relative to the resistance of glass sheets applied as slabs.

The coefficient of expansion for glass is from 0.000048 to 0.0000527.

The weights of sheet and plate glass are approximately as follows:—

	Per cub. ft.	Per sq. ft.
Sheet glass	158 lb.	13.17 lb.
Plate glass	173 lb.	14.34 lb.

The percentage of light intercepted by glass is as stated below:—

	Per cent.
Sheet glass..... $\frac{1}{8}$ in. thick	22 per cent.
Polished plate .. $\frac{1}{8}$ in.	18 "
Rough plate .. $\frac{1}{8}$ in.	30 "

Sheet Glass is blown in the form of a hollow cylinder, the end and neck of which are removed, and while still hot, the cylinder is cut open longitudinally by a diamond fixed upon a long handle and guided by a wooden straight-edge. Having been placed in a flattening kiln, the split cylinder opens out into a sheet which is carefully annealed and gradually cooled down. The dimensions of the sheets made in this manner range from 45 in. to 85 in. long, and from 34 in. to 49 in. wide, according to the quality and thickness of the glass.

Sheet glass is sold per square foot, but is described by weight in ounces per square foot, and not by thickness.

The following are the recognised weights and the corresponding thicknesses of sheet glass, but it should be noted that 15-oz. glass usually weighs 16 oz. per square foot, and is $\frac{1}{8}$ in. thick:—

Weight.	Thickness.
10 oz.	$\frac{1}{16}$ in.
11 oz.	$\frac{1}{16}$ in.
12 oz.	$\frac{1}{16}$ in.
13 oz.	$\frac{1}{16}$ in.
14 oz.	$\frac{1}{16}$ in.
15 oz.	$\frac{1}{16}$ in.
16 oz.	$\frac{1}{16}$ in.
17 oz.	$\frac{1}{16}$ in.
18 oz.	$\frac{1}{16}$ in.
19 oz.	$\frac{1}{16}$ in.
20 oz.	$\frac{1}{16}$ in.

Table XII. gives the maximum lengths, widths, and areas in which the different weights and qualities of sheet glass are supplied. Any sheet may be of the maximum length or width, but no product of these dimensions must exceed the corresponding maximum area for which values are stated in the table.

TABLE XII.—SHEET GLASS, MAXIMUM LENGTHS, WIDTHS, AND AREAS.

Weight.	Best.		Second.		Thrd.	
	Length.	Width.	Length.	Width.	Length.	Width.
10 oz.	in.	in.	in.	in.	in.	in.
11 oz.	35	38	33	35	30	33
12 oz.	35	38	33	35	30	33
13 oz.	35	38	33	35	30	33
14 oz.	35	38	33	35	30	33
15 oz.	35	38	33	35	30	33
16 oz.	35	38	33	35	30	33
17 oz.	35	38	33	35	30	33
18 oz.	35	38	33	35	30	33
19 oz.	35	38	33	35	30	33
20 oz.	35	38	33	35	30	33

Patent Plate Glass is simply sheet glass polished on both sides, and may be distinguished from genuine plate glass by the different shape of the air bubbles. In the former material the bubbles are of oval or irregular form, and in the latter they are spherical. The surface of patent plate is not so plane as that of genuine plate glass.

Patent plate is made in two colours, crystal and extra-white, each of best, second,

and third qualities, denoted by the letters B. C. and CC. respectively. For glazing purposes, the crystal variety is to be recommended as it is more lustrous and, being harder, less liable to be scratched than the extra-white glass.

The average weight and dimensions of patent plate glass are contained in Table XIII.

Plate Glass is made by pouring molten glass from a large crucible or "melting-pot" upon the polished surface of a heated cast-iron table, and rolling out the mass to the required thickness by means of a polished cast-iron roller, very much as dough is rolled upon a pastry-board. The thickness and width of the plate are regulated by strips of cast-iron bolted to the table, so that they come beneath the roller. The depth of the strips determines the thickness of the glass plate, and the lateral spacing of the strips its width. After the plate has been rolled, it is moved to an adjoining table, and thence by a wire gauze conveyor to the annealing kiln. The lower surface of the plate is dull and crinkled, and the upper surface wavy, but polished by the action of the roller.

Plate glass made as described above is termed rough-cast plate, or rough plate. It is rolled in the thicknesses of $\frac{1}{4}$ in., $\frac{3}{8}$ in., $\frac{1}{2}$ in., $\frac{3}{4}$ in., and 1 in., the maximum sizes being 60 sq. ft., $\frac{1}{4}$ in. to $\frac{3}{4}$ in. thick, and 40 sq. ft. 1 in. thick.

Rough plate is strong and cheap, and is particularly suitable as a roofing material in buildings where the interception of a part of the light constitutes no disadvantage.

Rough plate ground on one or both sides can be obtained at a small additional cost, but for roofing purposes this variety possesses no advantages.

The process of grinding is performed by bedding one plate on a table, and fixing a second plate to a movable arm arranged so that the upper plate is pressed against and moved over the lower one. Thus the two surfaces grind each other, sand and water being sprinkled upon the lower plate as a medium.

Polished Plate Glass, generally described as British Polished Plate Glass, is of superior quality, cast, rolled, and ground in the same way as rough plate. It is then smoothed and polished. The operation of smoothing is similar to that of grinding, except that emery powder is employed as a medium instead of sand. In the process of polishing, the smoothed plate is fixed to the top of a table

with reciprocating movement, and caused to pass backwards and forwards beneath rubbers faced with felt or leather. The medium used being rouge, or "red raddle," as it is termed in the North of England.

Rolled Rough Plate Glass is manufactured in the same way as ordinary plate, but on a smaller scale, the molten glass being ladled from the crucible instead of being poured. The plates are smaller and thinner than cast plates.

This variety of plate glass is rolled upon a table having lines or flutes cut upon the surface, or upon a plain table, and finished by means of a lined or fluted roller, and is supplied in three forms of which full-size sections are given in the figures mentioned below:—

"Plain." Fig. 20, with closely-spaced parallel lines on one side.

"Fluted," Fig. 21, small pattern, with about eleven flutes to the inch.

"Fluted," Fig. 22, large pattern, with about four flutes to the inch.

The thickness, weight, dimensions, and

*Bulletin de la Société d'Encouragement pour l'Industrie Nationale, June, 1899.

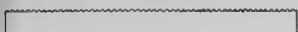


FIG. 20



FIG. 21



FIG. 22



FIG. 23

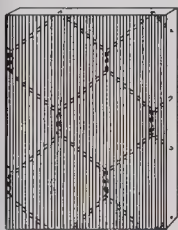


FIG. 24

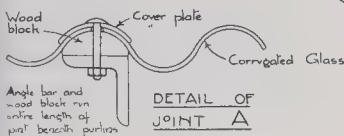


FIG. 25

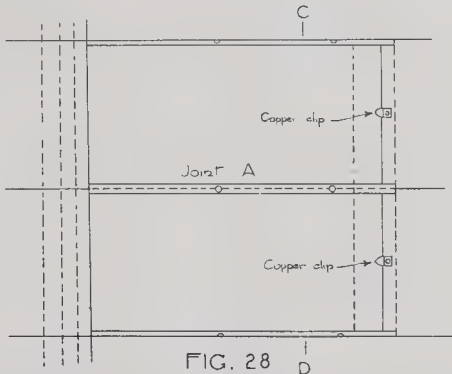
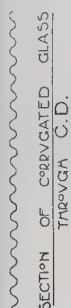


FIG. 26

Illustrations to Student's Column

limiting area of rolled rough plate are given in the subjoined table.

TABLE XIV.—ROLLED ROUGH PLATE GLASS.

Thickness.	Weight per sq. ft.	Maximum Dimensions.		
		Length.	Width.	Area.
in.	lb.	in.	in.	sq. ft.
$\frac{1}{8}$	2	110	42	25
$\frac{3}{16}$	3	110	44	25
$\frac{1}{4}$	4	110	44	25
$\frac{5}{16}$	6	100	42	25

This glass is well adapted for glazing roofs of all kinds where transparency rather than translucency is necessary. The large-fluted form is especially suitable for roofs of considerable area.

Roller plate corrugated on one side is made by Pilkington Bros. in sheets up to 110 in. long by 36 in. wide by $\frac{1}{4}$ in. thick at the bottom of the flutes, and with a maximum thickness of about $\frac{5}{16}$ in. This glass, of which Fig. 23 is a section, is very suitable for roofing purposes, especially where ample light is required.

Pilkington's Patent Wired Glass is plate glass in which 24 S.W.G. wire netting of about $\frac{1}{8}$ in. mesh is embedded, as represented in Fig. 24. Being hermetically sealed in the

glass, the metal is effectively protected against corrosion, and the additional strength afforded by the reinforcement enables the glass to resist heat and blows that would fracture ordinary glass. One special advantage possessed by the combination is that even if the glass is cracked the pieces are held in position so that they cannot fall. This is a strong recommendation of the material for roofing purposes.

The valuable fire-resisting properties of wired glass have been demonstrated by the tests made upon it in July, 1905, by the British Fire-Prevention Committee, as well as by practical experience with similar material at the Baltimore fire and elsewhere.

For use in roofwork, wired glass is rolled in "plain plate," about $\frac{1}{4}$ in. thick, in sizes up to 110 in. long by 36 in. wide.

Pilkington's Corrugated Glass is made for glazing without frames in corrugated iron or zinc roofs, and is capable of bearing a much greater weight than glass having a plane surface.

It is made with corrugations 3 in. and 5 in. wide, and so can be substituted for any required area of roofing sheets.

Corrugated glass is procurable in 21-oz. and 32-oz. sheet glass in squares from 48 in. to 62 in. long, and up to 27 in. wide; and in $\frac{1}{8}$ in. rolled plate in lengths of 60 in. and 70 in., and up to 27 in. wide.

Figs. 25 to 28 illustrate the method of

fixing this form of glass in corrugated iron roofs.

Glass Slates are made in sheet and rough-rolled plate glass—plain, small fluted, and large fluted—in the sizes and thicknesses stated in Table XV., and are very useful in parts of a roof where a small amount of light is desired. They are laid among the natural slates and secured by wooden pins, for which holes are provided.

TABLE XV.—GLASS SLATES (IN 16-OZ. TO 32-OZ. SHEET, AND $\frac{1}{8}$ -IN. TO $\frac{1}{4}$ -IN. PLATE).

Designation.	Nominal Size.
Duchesses	34 in. x 12 in.
Duchesses (small)	22 in. x 12 in.
Countesses	20 in. x 10 in.
Viscountesses (wide)	18 in. x 10 in.
Ladies (wide)	16 in. x 10 in.
Ladies	16 in. x 8 in.
Doubles	13 in. x 7 in.

Glass Tiles are made of sheet and rough-rolled plate glass—plain, small fluted, and large fluted—in sizes to correspond with those of pan, plain, Roman, corrugated, and angular tiles so that they can be worked into roofs to save the expense of framed skylights.

The substance per square foot is the same as for glass slates.

LONDON BUILDING ACT TRIBUNAL OF APPEAL:

MR. HENRY THOMAS TUBBS, J.P., v. THE LONDON COUNTY COUNCIL.

On Friday last week at the Surveyors' Institution, Great George-street, Westminster, the Tribunal of Appeal heard an appeal by Mr. Henry Thomas Tubbs, J.P., under sect. 22, subsect. 1, of the London Building Acts (Amendment) Act, 1905, against the conditional grant by the London County Council, by their notice dated June 1, 1906, of their approval of the means of escape in case of fire as shown on the plans submitted by the applicant on May 2, 1906, for the approval of the London County Council, in the matter of the erection of new buildings at 13 and 15, Leather-lane, E.C.

Mr. F. F. Daldy appeared for the appellants, and Mr. Moresby White for the London County Council.

Mr. Daldy, in opening the case, said that it was the first of the kind that had come before the Tribunal and it was a very important one. Under the Act of 1905 the London County Council were to prescribe what provisions they thought necessary for escape in case of fire, both in old and new buildings, but an appeal lay against their decision to that Tribunal. Until a man got his certificate he was prevented either from letting or occupying the premises. In the present case the superintending architect of the London County Council had approved the means of escape as submitted on plans sent in by his client, but subject to certain conditions, and it was those conditions he appealed against.

At this point Mr. White took the technical objection to the appeal being heard that the appellant had not given the notice prescribed under sect. 145 of the Act. He contended that the deposit of the plans was not sufficient, although he admitted that they gave much of the information which was required to be given in the notice.

A long legal argument took place and in the end the Tribunal decided against Mr. White and directed the appeal to proceed.

Mr. White said that the point was a very serious one for the London County Council, and he should ask the Tribunal to state a case.

The Chairman said they were bound to state a case on a legal point, but the Tribunal were of opinion that the point ought not to have been raised in this case.

Mr. Daldy then proceeded with his opening statement. He explained that the building was a rebuilding of two old buildings and was being so constructed that a very large portion was given up to staircases that would stand long after the rest of the premises had been gutted by fire. There was no substantial risk of the staircases being rendered impassable by smoke in the event of fire. The London County Council wanted them to provide lobbies on each floor with direct ventilation to the outer air. Such lobbies were not only unnecessary but would prove a positive danger to those employed in the building in winter time, as it would necessitate passing from a warm room into an ice cold lobby.

Mr. P. B. Tubbs, the architect for the appellant, stated that the premises were well on towards completion. The total height of the building was 35 ft. above the pavement level. The floors were of steel and concrete construction throughout—the floor boards, the battens on which they rested and the roof were the only combustible materials on the premises. The lobbies that the London County Council wanted them to provide were not necessary to provide a

means of escape from fire, as there was to be a concrete staircase out on to the roof.

The Chairman said that they had no plans before them showing a staircase on to the roof, and if Mr. White objected he was afraid they could not take that into their consideration.

Mr. White replied that he did not think he had any legal power to give his consent to the Tribunal adjudicating on something that was not before them. He would be quite willing to an adjournment in order that the plan of the top floor might come before a committee of the Council, because, of course, if they had got an alternative means of escape by the roof, it might be that the smoke lobbies would not be necessary.

Mr. J. Douglas Mathews, architect, gave it as his opinion that the smoke lobbies would be of no practical use whatever, and that they might act as an inlet for smoke instead of an outlet.

Mr. Ernest Flint, architect, and Mr. J. F. Dane, late engineer to the Metropolitan Fire Brigade, gave similar evidence, the latter giving it as his opinion that the smoke lobbies might constitute an added source of danger in the event of fire by creating a draught.

Mr. White addressed the Tribunal on behalf of the London County Council, contending that as the staircase was the only means of escape from the building in case of fire, it was their duty to see that that one means of outlet was made as effective as possible. He should call witnesses who would say that the best way to do that was by the provision of the smoke lobbies which the superintending architect had required to be provided here.

At this point the further hearing of the appeal was adjourned until Tuesday.

On the resumed hearing of the appeal, Mr. Morsey White called Mr. J. C. Strausson, who said that he was assistant architect in the works section of the London County Council, which was the department that dealt with the means of escape from fire. Witness had had over seventeen years' experience in the matter. They had settled hundreds of cases amicably under the Act, and this was the first appeal. When the plans were deposited on May 2 he had not the faintest idea that the building was practically erected. Smoke lobbies were being erected or had been erected in at least thirty or forty buildings in London, and experience had shown that the workpeople did not suffer from draughts through them. His opinion was that smoke lobbies would intercept the smoke in case of fire and prevent it getting out on to the staircase. In the building in question the only means of escape was by the staircase. If Mr. Tubbs would provide an alternative means of escape, they would prefer that rather than smoke lobbies, but with only the staircase to rely on, they regarded the lobbies as absolutely necessary.

Replying to the Tribunal, witness said that these smoke lobbies were first adopted in 1903, but there had never been a fire in a building which contained one, so as to put them to a test. He understood that the Americans used them largely. The extra cost of carrying out the requirements of the London County Council would only be 927.

The Chairman suggested that it would be very useful to the Tribunal if an experiment was made by filling a room with smoke and observing how these ventilating lobbies really acted. At present they had only theory to work upon, and it would be a very serious matter to put owners to the expense of these lobbies if they were no good.

Cross-examined by Mr. Daldy, witness said that the London County Council did not regard a staircase leading on to the roof as a second means of escape; such a staircase was only regarded as valuable to the top story.

Mr. John Slater, F.R.I.B.A., gave it as his opinion that in a building like the one in question it was not unreasonable for the London County Council to ask for these smoke lobbies, in lieu of an alternative means of escape. In modern buildings constructed of fireproof materials there was really very little danger to be apprehended from fire; the main risk to be guarded against was getting the staircase smoke blocked. These ventilating lobbies would, in his opinion, diminish that risk.

Cross-examined, he had had no practical experience that would warrant him saying that these smoke lobbies would be effective, but it was certain that they were an additional precaution.

Mr. H. D. Searles Wood, past Chairman of the Board of Examiners of the R.I.B.A., and past President of the Architectural Association, said he agreed with the evidence of the last witness. In the event of a fire breaking out in a room provided with a smoke lobby, the smoke would go out through the opening into the street and would give an alarm.

Mr. Sidney Gamble, second officer of the Metropolitan Fire Brigade, also gave evidence in favour of smoke lobbies.

Replying to the Tribunal, Mr. Gamble said it was possible that the British Fire Protection Committee might make the suggested experiment to see whether smoke lobbies possessed the advantages claimed for them, but the experiment would have to be very carefully conducted to be of any use.

Mr. White then addressed the Tribunal for the London County Council. He said that the real reason of the appeal was the question of expense, but he had shown that it was only a matter of 900. or 1000. If the Tribunal thought that the carrying out of the conditions of the London County Council would tend to lessen the risk of danger from fire to the ninety or more persons who would be in the building, he was sure they would not allow the consideration of expense to stand in the way. The Council was willing to give and take in these matters, but the attitude taken up by Mr. Tubbs was one of hostility to all the conditions. If the conditions were onerous it was due to the appellant putting up his building without telling the Council anything about it, and the Tribunal could not take that fact into consideration in arriving at their decision.

Mr. Daldy, for the appellant, contended that the question really resolved itself into this—whether the difference between smoke lobbies and the single door amounted to a substantial increase in the risk to people employed in the building. This case would create a precedent, and the Tribunal was asked to say on mere theoretical evidence that in every case there must be these smoke lobbies, unless there was an alternative means of escape. He submitted that the evidence was not strong enough to warrant the Tribunal coming to such a decision which would have very far-reaching effects in the future.

After consulting in private for a short time the Chairman said the Tribunal had decided to allow the appeal. The Tribunal had arrived at the decision simply in respect of this case, and it did not lay down any principle which would create a precedent. The appellant was awarded 60 guineas costs.

Obituary.

MR. BARNES-WILLIAMS.—The death on August 8, at Margate, is announced of Mr. Thomas Barnes-Williams, of No. 98, Piccadilly, in his fifty-ninth year. Mr. Barnes-Williams was senior member of the firm of Messrs. Barnes-Williams, Ford, & Griffin, of No. 30, Coleman-street, E.C., and St. Thomas's-chambers, No. 24, Railway-approach, London Bridge, S.E., architects and surveyors. That firm was dissolved on August 1, 1903, as far as regards Mr. L. R. Ford upon his acceptance of the appointment of District Surveyor for West London, and Mr. A. Griffin dissolved partnership by mutual consent; the latter carrying on the practice of the firm, the former retiring from general practice whilst rendering himself available for purposes of consultation. In January, 1898, Mr. Barnes-Williams retired from the post of Architect and Surveyor to the Coopers' Company; in January, 1901, he resigned his appointment as District Surveyor for St. Mary Magdalen, Bermondsey; St. John, Horsleydown; St. Olave, and St. Thomas, Southwark; and on January 1, last year he retired as Surveyor to the Trustees of Morden College, Blackheath. He was elected in 1871 an Associate and in 1886 a Fellow of the Royal Institute of British Architects; in 1888 he became a member of the Architectural Association; and he was a Fellow of the Surveyors' Institution. On January 22, 1899, he was elected Mr. Barnes-Williams's design for Mr. E. Stanford's premises, Nos. 28-7, Cockspur-street, built upon the site of the old British Coffee-house, and on March 26, 1892, his designs for Messrs. F. C. Matheson & Sons' premises, 'Token House,' in Copthall-avenue, E.C. Of the more important architectural works erected after his firm's plans and designs we may mention, in nearly their chronological order, the stabling and other premises for the Acme Wood Block Company in Gainsborough-road, Hackney Wick; a residence at Knockholt, Kent, for Dr. Storrier (1895); shops and premises at Nos. 241-7 (even), City-road with subsequent extensions, for Betts & Co. Ltd.; a warehouse and printing offices, Cross Keys-court, London-wall, for Mr. G. J. Matheson; the personage-house and a cottage residence at Woldingham; Messrs. Boone & Sons' warehouses in Long-lane, Bermondsey; the billiard-room, Conholt Park, Wiltshire, for Mr. George Knowles, and some cottages for him at Conholt; extensive warehouses (1898) in Tooley-street, S.E., for W. France & Co., Ltd., costing about 12,500.; the reinstatement after a fire, of the Salvation Army shelter in Bermondsey; No. 54, Stamford-street; rebuilding of Nos. 23-4, St. Martin-street, N.W., for Mr. T. Dent Gardner; warehouse premises in Pirkleherring and Vine streets, Horsleydown, with a widening of part of Stoney-street; new buildings to accommodate thirty-three additional patients, St. John's Hospital, Lewisham, built by Mr. H. L. Holloway in 1899 on a contract for 5,370.; alterations and improvements of No. 31, Old Leury, E.C., for Messrs. Freshfields & Williams, at an outlay of some 7,500.; hospital buildings at Morden Hall, Lewisham, for the Nursing Sisters of St. John the Divine; buildings in Farncombe-street, Bermondsey; and in 1902, the alterations, etc., for the conversion of the old Clarendon Chapel, Pentonville-road, into a centre of London Congregationalism, the cost amounting to 8,000.

They also won the first premium in a limited competition for the rebuilding at a cost of about 10,000., of the Whitefield Tabernacle, Tottenham Court-road, on behalf of the Special Committee of the London Congregational Union.

General Building News.

BOSTON PARISH CHURCH ROOF.—The state of the chancel roof of the Boston Parish Church has been the subject of a report, prepared for the Boston Town Council by Mr. S. Weatherley, architect, and Mr. G. E. Clarke, the Borough Engineer, who state that the roof of the chancel is in a very serious condition. Mr. Weatherley states that the time has passed for repairs, and that the roof must be reconstructed. Mr. Clarke estimates that the cost of the necessary work will be about 1,000.

CHURCH, ROSS.—The opening service was recently held in the new church at Hom Green, Ross, built at a cost of over 3,000. The building, which is in the Gothic style of architecture, is built of sandstone with tracings and buttresses of Bath stone, and is covered with ancient stone tiles removed from Queen's College. The church is entered by way of a carfax porch, from which the whole of the interior can be seen through two apertures. A feature in connexion with the building is that a series of Bath stone pillars and arches run down the centre and form the support for the barrel-shaped roof. An oak screen, made by Mr. Clarke, of Hereford, divides the church in equal halves, one portion being the chancel, and the other being used for the congregation. The flooring of the major part of the chancel is raised steps above the other portion of the church, and is laid with black and white marble slabs in various designs. The altar frontals were made by Messrs. Watts, of London. The interior of the church is plastered, and the belfry, made for one bell, is over the porch. The seating accommodation is for sixty, but over 100 worshippers can be seated. Wooden blocks form the floor where the congregation sit, and the remainder of the flooring is composed of concrete. Heating will be by means of hot air. Mr. G. F. Bodley, R.A., of London, was the architect, and the builders were Messrs. Rattee & Kett, of Cambridge.

ALL SAINTS', WORCESTER.—A good deal of anxiety is felt for the safety of the tower of this church. For some time (says the *Birmingham Daily Post*) the bells have not been rung owing to the damage caused by the vibration, and some days ago, without the slightest warning, a piece of stone, weighing upwards of a hundredweight and forming part of the base of a small window sill, fell from the tower and crashed through the roof of the adjoining schoolroom, which at the time, fortunately, was unoccupied. The diocesan architect (Mr. A. Hill Parker) was at once called in, and it is expected that a considerable outlay will have to be undertaken.

WESLEYAN CHURCH ENLARGEMENT, WARE.—The Wesleyan Church in the New-road, Ware, is undergoing renovation and enlargement. The schoolroom has hitherto occupied a position above the entrance to the building, and the vestries commenced the work by leading up into the church. The front portion of the building, however, has now been taken down, and the gallery will be removed, and the entrance set back 8 ft. 1 in. but an enlargement of the church will be effected, as a new building, comprising schoolroom, vestry, church kitchen, and sanitary offices, is in course of erection at the rear of the church. The architect is Mr. Lewis Moore, of Hertford; and Messrs. Dewbury & Sons are the builders.

PRIMITIVE METHODIST CHURCH, WEST SLEEK BURN.—On the 11th inst. the memorial stone of the new Primitive Methodist Church at West Sleekburn was laid. The church has been designed by Messrs. Phillipson & Davison, architects, of Newcastle, and the cost, including the erection of a pipe-organ, is estimated at about 1,050. The building will be faced with pressed bricks supplied by the Bedlington Coal Company.

CHAPEL AND SCHOOL, VILVERTON.—The foundations of a Bible Christian chapel were laid at Vilvertton on the 8th inst. Mr. W. Beddoe Rees, of Cardiff, is the architect. The new edifice, including the land, will cost about 4,500. It will be in the Gothic style, and built of Pennant stone, with Bath stone dressings, and roofed with red Broadley tiles. Seating accommodation will be provided for nearly 500 persons. In addition, there will be a school-room, classrooms, deacons' room, etc.

SCHOOL ADDITIONS, HERTFORD.—The new buildings at the girls' school of Christ's Hospital were opened a short time ago by H.R.H. the Prince of Wales. The buildings were erected by Messrs. Ekins & Co., of Hertford, the premises being designed by Mr. Alex. R. Stenning. The principal building is the chapel, planned to seat about 350 persons, and finished externally with red kiln bricks. The interior is lined with stone, and this, together with the whole of the stone used in the building, has been obtained from the West Hothly Quarries, Sussex. Externally, the roof is tiled, and surmounted by an oak fleche carrying

the bell, the upper part being covered with copper. The interior of the roof is of oak enriched with Gothic pierced work and carving, with moulded hammerbeam principals. The eaves are paved with black and white marble, the portion occupied by the pews being floored with oak blocks. The ceiling is fitted up with electric light and heated by low-pressure hot-water system and open grates. The sick-house is a three-story building containing accommodation for twenty-four children, with nurses' sitting-room and bedrooms, doctor's surgery, pantries, offices, etc., with the bath-rooms and lavatories in an annex shut off from the remainder of the building. The larger wards are heated by radiators in addition to the open fireplaces, the building is fitted with electric light, and there is a lift from the basement to the upper floors. The building is also faced with red kiln bricks, with Portland stone dressings, and tiled roof. The isolation block, which adjoins the sick-house, is similar in design and accommodation. The bath and gymnasium buildings contain a swimming-pond 14 ft. by 20 ft., varying in depth from 3 ft. to 6 ft. 6 in., lined with white glazed tiles. Twenty children's dressing-boxes and four boxes for mistresses are provided, with towel store and other offices. The interior walls are lined with buff bricks, with a dado of white oolite tiling. The interior walls of the gymnasium—which is 72 ft. by 32 ft. 6 in.—are lined with glazed bricks, the roof and floor being of pitch pine. The building is heated by hot-water pipes running round the walls, and there are two basins, fitted with steam-heated radiators. These buildings are faced with red kiln bricks, with Portland stone dressings, and are roofed with green Westmorland slates.

SCHOOL ENLARGEMENT, CALLANDER, N.B.—At a recent meeting of the School Board of Callander the plans for additions to the Main School, prepared by Messrs. Stewart & Paterson, architects, Glasgow, sanctioned by the Education Department, were finally agreed upon, and arrangements made for beginning the work. It was resolved to borrow the sum of £1,200, for the purposes of the contract.

CONGREGATIONAL EXTENSION SCHEME, RYTON.—A scheme which involves the rebuilding of the Congregational Sunday-school and the renovation of the church at Barnmore, Ryton, is now being carried out. The Sunday-school, which is to be also used as a hall, will provide accommodation for 400, whilst a small intermediate hall will seat about eighty, and a ladies' parlour forty. There are to be eight classrooms. The scheme will involve an expenditure of about £1,250. Mr. John Arkless, of Ryton, is the contractor, the architect being Mr. J. W. Taylor, of Newcastle.

DISINFECTING STATION, KENSINGTON.—The Mayor of Kensington recently attended the Kensington Depot at Woodlane and inaugurated the new disinfecting station which has been erected there at a cost of nearly 7,000. The exterior of the building is constructed to a height of 4 ft. with blue Staffordshire bricks and the upper part with selected salt-glazed bricks with glazed terra-cotta dressings. The interior is built to a height of 4 ft. with glazed bricks, the walls above being lined with glass tiles. The whole of the structure is impervious to water, so that it may be washed down both inside and outside. The drawings and specifications were prepared by the late Borough Engineer (Mr. William Weaver). The architect is of the "A. & A." pattern.

A NEW CITY WORKHOUSE.—The City of London Union Guardians have adopted a report made by a special committee recommending the erection of a new workhouse and infirmary, to be administered from one block, upon the freehold site of the existing Homerton workhouse, and the disposal of the infirmary buildings, with their site at Bow, valued as a going concern at about 40,000. The scheme will, it is calculated, effect an annual saving of 3,000, in respect of salaries and rations, of 400l. in rates, and of 2,000l. in water, coal, electricity, and gas. The approximate cost of the new buildings, for 700 beds, would be 140,000. While the number of paupers in the City has decreased during some years past, it is found that, in addition to the 75,000, which have been lately expended upon the buildings at Homerton and Bow, their continuance would involve a heavy outlay for necessary improvements and repairs.

PROPOSED ADDITIONS TO THE SHIREHALL, BURY.—Mr. Bury St. Edmunds, on the 1st inst., Mr. M. K. North, Inspector of the Local Government Board, held an inquiry as to the proposal of the West Suffolk County Council to borrow 12,500l. for alterations and additions to the Shirehall. Mr. A. Townshend Cobbold, Clerk to the West Suffolk County Council, showed that the Shirehall accommodation had been insufficient to meet requirements both as regards the Court-room and the office accommodation. He reviewed what steps had been taken, resulting in designs for more commodious buildings. The lowest tender was 10,340l., and there were other expenses, making a total of 12,500l. Mr. A. Ainsworth Hunt (West Suffolk County Surveyor) supplied detailed information as to the buildings.

INFECTIOUS DISEASES HOSPITAL, BELFAST.—The Lord-Lieutenant and the Countess of Aber-

deen recently opened the new Infectious Diseases Hospital which has been erected by the Council of the County Borough at Purdyburn. The scheme of the block plan is arranged as follows: The main entrance from the county road is opposite the old entrance to Purdyburn demesne, and is guarded by a lodge and shelter for admittance of authorised persons and patients only; from this a private road within the ground communicates with all the buildings. Directly facing the entrance to the west is the administrative block. To the south are the pavilions for diphtheria and enteric cases. Opposite these on the west are two similar pavilions for scarlet fever. On the extreme south is an observation pavilion. Behind the administrative block are arranged the disinfecting house, laundry, engine and boiler houses, stables, and mortuary. The smallpox hospital, which is at present of a temporary character, occupies an isolated position on the west side of the other buildings. The administrative buildings consist of (1) the office, with residences for the matron, for the assistant medical officers, for servants; (2) the nurses' home, containing rooms for fifty persons; (3) the female servants' rooms; (4) dining-rooms for nurses and servants; (5) the hospital kitchen, matron's store-rooms, dispensing staff consultation room, and medical superintendent's room. In the basement are various store-rooms, coal cellars, etc. From the kitchen will proceed glass-covered ways to each main pavilion, with subway beneath for steam, hot and cold water, and gas pipes, electric mains, etc. The hospital pavilions are set axially north and south, with ample windows arranged on both sides, and having sanitary annexes placed outside at each end. The patients are received in the hall at the middle of the block, with observation rooms and bath rooms attached at either side. The nurses' kitchen is placed between the wards with ten beds each, which are designed for males on one side and females on the other. In addition there are two single-bed wards for special cases adjacent to a room for a nurse, who is thus able to see all the patients under her charge. Beneath each of the pavilions is a cemented open basement about 6 ft. high. The ward floors are of polished teak, tongued and grooved, laid on the concrete. The walls are lined for a height of 8 ft. with glazed tiles of neutral tint; above this level they are cemented. The heating is effected by passing fresh air through radiators, which are fed with water from Boyle's calorifiers in every pavilion. The extraction is done by fires and aspirating flues placed in the centre of the ward, and lined with glazed tiles to the ceiling. In addition an electric fan, to which ducts are led, is employed in close weather as an auxiliary. The lighting is entirely by electricity. The style of architecture adopted is a plain treatment of early Georgian, but the windows have large panes of plate glass for cleaning purposes. All the walling is of best Belfast red brick, with trimmings of rubbed sandstone from Hunter's Hill, Glasgow. At the main entrance of the administrative block is a carving of the Belfast city arms, and the curved gable above contains an electric clock by Messrs. Sherman D. Neill, Ltd. All the roofs are covered with Staffordshire red tiles and ridges. In addition to the main pavilion there is an isolation pavilion for doubtful or complicated cases. The hospital kitchen, lighted from the roof, and lined with white glazed brick, is furnished with cooking apparatus supplied by Messrs. Riddells, Ltd., Belfast. The laundry has two distinct installations of washing and drying machines for patients and staff respectively, supplied by Messrs. Tullis & Co., Glasgow. The general contractors for the works are Messrs. Robert Corry, Ltd. Messrs. Diespeker, London, have executed the terrazzo; and Messrs. J. P. Corry & Co., Ltd., had the contract for the wall tiling. The gables and chimneys and ward kitchen range were entrusted to Messrs. Richard Patterson & Co. Messrs. Riddells, Ltd., supplied the locks and fastenings; Messrs. John Dowling & Sons executed the plumbing work, and Messrs. William Coates & Sons, Ltd., carried out the electric lighting, etc., Davidson's Sirocco fans being used; and Messrs. Workman, Yeames & Co. supplying the dynamo engines. The boilers have been furnished by Messrs. J. Marshall & Co., Motherwell, and the large storage water tank was made by Messrs. Victor Taylor & Co., Belfast. Messrs. Charles Ritchie & Co., Edinburgh, have executed the hot water heating of the hospital buildings. Mr. J. E. Winter carried out the carving. The contractors for the furniture were Messrs. Robert Watson & Co., Ltd.; Messrs. Bell & Mayrs, and Messrs. Gillespie & Woodside. The architects of the work were Messrs. Young & McKean, and Mr. Acheson Ferguson acted as quantity surveyor. Mr. Quinton Dunlop as consulting mechanical engineer, and Mr. John Woodside as consulting electrical engineer. The water supply to the hospital is from the Mourne section of the Belfast City and District Water Commissioners' undertaking, and was provided under the personal supervision of the Commissioners' engineer, Mr. Fred W. McCullough, M.Inst.C.E. The sewage of the establishment, acting on the advice of the City Surveyor, Mr. H. A. Cutler, M.Inst.C.E., it was decided to pump into the city system of sewers at Belmorale avenue. The tender of Messrs. Mather & Platt,

Ltd., of Salford Ironworks, Manchester, for the necessary pumping engines was accepted. In order to prevent the possibility of any risk of infection being conveyed by the sewage, a system of sterilisation has been installed, the contractors being Messrs. Goddard, Massey, & Warner, Ltd., of Nottingham.

PALACE THEATRE, HALIFAX.—Alterations and improvements are now being made to this theatre. Messrs. R. Horsfall & Son are the architects, and the various contractors have been placed with the following firms:—Joiners, Messrs. J. Wadsworth & Sons; ironfounders, Messrs. A. Pulman & Co.; painters and decorators, Messrs. J. Binns & Sons; upholstery, Mr. Greenwood Howarth; and carpets, Messrs. Baxter & Granger.

CO-OPERATIVE PREMISES, BRADFORD.—The City of Bradford Co-operative Society have opened a new suite of premises in Central-avenue, Little Horton-lane. Mr. W. Rycroft was the architect of the work.

INSTITUTE PREMISES, BEDFORD.—The building, which has been built by Mr. W. H. Allen, J.P., Chairman of W. H. Allen, Son & Co., Ltd., for the use of the workmen employed at the Queen's Engineering Works, was recently opened. Mr. George Allen prepared the plans for the work.

BURGH QUAY MEMORIAL, DUBLIN.—On the 3rd inst. the monument to perpetuate the memory of the Burgh quay disaster was unveiled by the Lord Mayor. A design submitted by Mr. William Patrick O'Neill, architect, of Dublin, was selected in competition. Messrs. C. W. Harrison, of Dublin, executed the work.

Stained Glass & Decoration.

CHANCEL SCREEN, RIDDINGS CHURCH, NOTTS.—A new chancel screen has been placed in this church. It is of wrought iron. The screen was manufactured by Messrs. Taylor, Whiting, & Taylor, Oakes-yard, Derby, from a design by Messrs. P. H. Curry and C. C. Thompson, architects, Derby.

Sanitary and Engineering News.

DRAINAGE IN FULHAM.—The Medical Officer of Health for Fulham, in his annual report which has just been issued, says:—"Fifteen systems of combined drainage, for portions of which the Council was liable, owing to certain of the pipes which received the drainage of more than one building, forming 'sewers' within the meaning of the Metropolitan Local Management Act, were reconstructed during the year at a cost to the Council of 135l. 9s. 6d., the work being carried out by a contractor under a schedule of prices. The sum of 142l. 7s. 10d. was also paid to owners in respect of work executed by them in compliance with notices served by the Council at twenty-four houses in connexion with house drains, which were 'sewers' as defined by the Metropolitan Management Act. Ventilation shafts continue to be erected by the Council in suitable positions whenever the necessary consent of the owners of the houses against which they can be placed is obtained. Many complaints having been received respecting offensive smells from the surface ventilators of the London County Council's main sewer in Fulham Palace-road and Dawes-road, the London County Council has, at my suggestion, installed some of Reeves' sewer ventilators in that sewer, which so far appear to have answered satisfactorily. The heavy rains at the beginning of June resulted in an extensive flooding of the basements in all parts of the borough. It has been hoped that the increase of pumping power at the London County Council's pumping station in Lot's-road would prevent this evil, from which Fulham has suffered so much, but on this occasion it utterly failed to cope with the storm water, as many basements were flooded which had never previously suffered. The matter was considered by the Public Health Committee, who recommended that strong representation should be made to the London County Council, pointing out the inconvenience and damage that is caused by these floodings, and the danger to health caused by the deposit of sewage, and enlisting upon them to take such steps as will rectify the evil."

LINCOLN WATER SUPPLY.—Mr. N. McK. Barton, the Lincoln waterworks engineer, has submitted a report to the City Council dealing with the present mode of water distribution, and the condition of the reservoirs, and making certain recommendations. Mr. Barton is of opinion that the right situation for a new reservoir is on the high ground near Cliff Hill reservoir. This he considers preferable to the Westgate side because of the possibility of utilising the existing mains. It is also pointed out that it would be impracticable to provide a good supply for the County Asylum from Westgate. The report, which will be considered at the October meeting of the Council, estimates the total cost of the works recommended at 55,100l.

WATERWORKS, NORTH SUNDERLAND.—The works for the new water supply to North Sunder-

and have recently been completed. Messrs. Anson & Shenton, civil engineers, of Westminster, prepared the scheme and estimate for the trustees of Lord Crew's Charity. The present scheme brings water from the moors by gravitation in 4-in. iron pipes from the collecting reservoir at Brockdam on the moors through the villages of North Sunderland and Chatham to the main reservoir at Seahouses. The capacity of the Brockdam reservoir is 30,000 gallons and that of the Seahouses reservoir 60,000 gallons. The pipes deliver about 80 gallons a minute into the Seahouses reservoir with a fall of 275 ft. The water from the various springs has been caught in collecting tanks on the site of the springs, and is led thence to the reservoir at Brockdam. The cost of the works, including pipe trench, reservoirs, collecting tanks, fittings, and purchase of existing works has been £4,791. The pipes were supplied by Messrs. Cochrane & Co., and the work on the pipe trench and reservoirs was carried out by Messrs. Elliott Brothers, of Chatham. The construction was carried out under the supervision of Messrs. Anson & Shenton.

HOUSE DRAINAGE IN MARYLEBONE.—The Medical Officer of Health of Marylebone, in his annual report which has just been issued, says:—“Plans properly indexed of the majority of houses exist and are in the custody of the Public Health Department; some of the plans date back from the year 1856. They can be consulted by any person interested. The new plans deposited during the year amounted to 419, and dealt with 433 premises. The length of drainage supervised and tested by the inspectors during the year amounted to 50,440 ft. If laid out in one continuous line the pipes would reach from Westminster Bridge almost to Croydon, for the length is over 9 miles. Since so much time is taken up in the supervision of drainage, and such supervision necessarily requires considerable technical knowledge, the Public Health Committee adopted the suggestion that two of the staff should practically confine their attention to this matter as an experiment until the duties of the whole staff were revised and settled accordingly. Messrs. Gorniot & Perry have undertaken this important duty, the one being allotted to the district south of the Marylebone-road, the other the district north of the Marylebone-road. So far they have carried the work out to my entire satisfaction. The only defect that the author can see in the supervision of new drainage works is the sub-division between the two Committees, the Works Committee being responsible for the portion of drain between the house and sewer and for ‘combined’ drains, and the Public Health Department for the drain within the house and fittings generally. Hence a builder or owner has to deal with two offices and much time may be, and in fact is, occasionally wasted by this arrangement.”

Foreign.

FRANCE.—M. Detaille has just completed an allegorical ceiling painting, the last remaining portion of his commission from the Paris Municipal Council for the decoration of the Hôtel de Ville. This decoration includes two large mural compositions; the enrolment of volunteers at Paris in 1792 and the reception of the Imperial troops on their return from the campaign of 1807. The ceiling, which completes the scheme, represents a figure of Victory mounted on a winged horse, waving a tricolour flag, and encouraging the advance of a troop of horsemen in the uniform of the cuirassiers of the First Republic. Above the mounted Victory hovers a flying figure of Liberty carrying crowns and palms. The design of the painting is full of energy, and the tone of colouring bright and harmonious.—The works have been commenced for the enlargement of the Mairie of the second arrondissement of Paris. The cost is estimated at 300,000 francs.—A sixth lunatic asylum has been built in the Department of the Seine.—The Municipality of Suresnes have decided on the demolition of the ancient church of that Commune, which is in a ruinous condition. The church dated back originally to the XIIIth century, but was partially rebuilt in the XVth century.—A competition is to be opened for the erection of an Infirmary at Belduc.—There is a scheme talked of for the formation of a tunnel under Mont Blanc. The cost of the operation is estimated at 50,000,000 francs.—Important works of public improvement are contemplated at Cambrai, at an estimated cost of a million and a half francs. Besides new buildings and street improvements, it is proposed to fill up or to turn one arm of the river Escaut.—The Municipality of Marignane (Bouches du Rhône) has voted the funds necessary for the construction of a canal to connect the lake of Berre with that of Bolmon.—M. Coureau, architect, of Agen, has been commissioned, as the result of a competition, to carry out a new post-office building in the Boulevard Carnot in that town.—The death is announced, at Dieppe, of M. Haquette, a pupil of Cabanel and of J. P. Laurens, who several times gained medals at the Salon. He painted principally sea-pieces and coast-scenes in Normandy.

GERMANY.—Though Herr v. Bulow can find water with a diving rod, he is reported to have said he could not detect water over long thin pipes. Herr Franzius consequently made experiments in this direction and found that the rod twisted in his hands when he crossed over a conduit or walked up stream, but that it was unaffected when he walked down stream or when the mouth of the pipe was blocked up and the water ceased to flow.—Messrs. Brown, Boveri & Co., of Mannheim, are providing a steam turbine of 24,000 h.p. for the rollers and smelting furnace of Krupp's Works. On the London Underground railway the turbine installation amounts to 65,000 h.p., while in Paris the St. Denis generating station has ten turbines producing 90,000 h.p., and is consequently the biggest steam turbine installation existing.—About 2,000 persons are engaged on the technical dictionary which the Society of German Engineers is compiling in three languages, German, English, and French. At present the words number 3,000,000 and the alphabetical list is so far completed that the printing will be put in hand early next year. J. J. Weber, Leipzig, is the printer and publisher.—On June 18 the foundation stone was laid in Helsingfors of the Finnish National Museum. In this building will be gathered together various scattered collections of furniture, costumes, and objects of historical, ethnographical, and archaeological value.—The German Government has built for the harbour of Tsingtau one of the largest and most complete floating docks in existence. It has a capacity equivalent to 16,000 tons and measures 125 metres by 39 metres by 19 metres high. Since its opening in October, 1905, the dock has been in constant use. The construction of such a work in East Asia is of great importance for the development of German interests in the Far East.

AUSTRIA.—On July 19 the Archduke Franz Ferdinand visited the railway between Asolo and Trieste *viz* Gorz. The ground presented problems of the greatest difficulty which were overcome by an almost continuous series of tunnels, viaducts, and bridges. This line, besides increasing the commercial activity of Trieste, opens up a country of extraordinary beauty, which till now has been neglected by tourists on account of the difficulty of access.—In November will be celebrated the centenary of the German Technical University in Prague.—Roofing paper as a lining for slates has been pronounced superfluous in the report prepared at the instigation of the Austrian Ministry of Public Works. The great disadvantage of this covering lies in the fact that it hides the joints of the boarding, so that the nails cannot avoid the joints; also the workman relies more and more on the impervious nature of the paper to the detriment of his work. Repairs are made more difficult when paper is used, for defective slates cannot be traced, the damp only showing itself where the paper is by chance damaged. It is also injurious to the wood. Roofing paper is only to be recommended where a close atmosphere is required, free from soot and dust or when a building has to be rapidly roofed in during unreasonable weather. In this case, however, the paper should be fixed at a distance from the slate by a method altogether different from the one at present adopted.

Miscellaneous.

PROFESSIONAL AND BUSINESS ANNOUNCEMENT.—Mr. Walter Emden, J.P., of 2, Lancaster-place, Strand, architect, has retired, and has presented his business to his four principal assistants, namely, Mr. S. H. Egan, Mr. W. S. Emden, Mr. A. J. Croughton, and Mr. T. C. Ovenston, who will now carry on the firm at the same address under the name of Messrs. Emden, Egan & Co.

CALMON ASBESTOS SLATE.—This fire-resisting material has recently been introduced by the Calmon Asbestos and Rubber Works. It is made in sheets ranging in size from 13 in. square to 78½ in. by 39½ in., and in thickness from ½ in. to 1½ in. It has a smooth egg-shell finish on one side, and has been used for a lining for walls instead of plaster or tile-board, and as an insulator for electric cables, etc. The material is non-flammable, and one of the two qualities made is guaranteed to be waterproof.

THE HEAVING OF PILES BY FROST.—A curious instance of the heaving of piles in frozen ground is recorded by the *Engineering News* of New York. This movement of the piles was experienced at a trestle viaduct about 2,200 ft. long, with a maximum height of 80 ft., built across a peat swamp to the west of Winnipeg, on the Grand Trunk Pacific Railway. The structure is a framed trestle, with seven piles under each cross-section. The piles were driven to an average depth of 30 ft., the first 10 ft. being soft peat and the underlying material a mixture of sand and clay. The penetration during the last blows of the pile-driver was only 1 in. or 2 in.; a 2,200 lb. hammer was used, having a maximum drop of 40 ft. The three centre piles were spaced 2 ft. 6 in., centre to centre, and capped

with a 12 in. by 12 in. sill, 10 ft. long; beyond these on each side were two piles spaced 5 ft. and 11 ft. apart, supporting the inner and outer batter sill. As the piles sank, when the ground became frozen, the outside piles in some of the groups were raised about 3 in. and 4 in., but those in the centre showed no disturbance whatever. The heaving occurred only at bents where the superstructure had not been erected, but was framed and lying on the bents ready for raising, and the sills were simply bolted to the piles. Instead of cutting the piles off to the level of the ground, they were driven home with a few light blows of the hammer, but even heavy blows failed to increase the penetration, thus showing that the piles were simply restored to their original position.

TABLET, GROESWEN CHAPEL, NEAR CAER-PHEILLY.—Sir Alfred Thomas, M.P., unveiled on the 3rd inst. a bronze tablet at Groeswen Chapel, near Caerphilly, to the memory of Mr. William Edwards, who during the forty years he officiated as pastor of the Groeswen Independent Church built many bridges in Wales, including Pontypridd Bridge. The tablet is the work of Mr. Goscombe John, A.R.A.

THE BUILDING EXHIBITION, NEWCASTLE.—The Newcastle Exhibition, Ltd., are organising an exhibition specially for builders, decorators, and sanitary engineers. A committee has been formed of architects, surveyors, and contractors, who are giving the venture all the assistance possible. The exhibition will open on Saturday, September 16. Mr. W. A. Cowie is the manager.

POST OFFICE BUILDINGS.—In his annual report, just presented to Parliament, the Postmaster-General (the Right Hon. Sydney Buxton, M.P.) remarks that in October last the foundation stone of the new General Post Office (King Edward's Building) was laid by His Majesty and that the plans for the building have now been settled and the construction of the Eastern District Office of London has been nearly completed. Plans for considerable extensions of the Western Central District Office, London, of the Paddington District Sorting Office, and of the Belfast Head Post Office. The erection of new buildings for the Northern District of London and for Aberdeen and the enlargement of the Eastern District Office of London have been nearly completed. Plans for an extension of the General Post Office at Edinburgh, for a new letter sorting office at Manchester, for an enlargement of the Head Post Office at Bristol, and for a new Head Post Office at Sheffield have been under consideration. The second Central Telephone Exchange in the General Post Office South, the new Parcel Office for the South Eastern District of London, and the Postal Stores building at Islington have been completed and occupied. Telephone exchanges at Epsom and Ealing have been completed and occupied, the exchanges for the Western District of London and for Richmond have been enlarged, and considerable progress has been made with the provision of other exchanges in London and the provinces. During the year 207 Crown Post Office buildings have been provided, of which 99 are new offices specially erected for Post Office purposes, and 54 are offices of which the tenancy has been taken over by the Department after the buildings had been altered and enlarged. Forty-two Crown Post Offices have been enlarged or improved, and 98 are in course of enlargement or improvement. The expenditure out of the Post Office votes for the purchase of sites and buildings during the year amounted to 185,015s. as against 122,728s. in 1904-5. The expenditure in London was 56,524s. During the year the expenditure by the Commissioner of Works and Public Buildings on new Post Office buildings and on the enlargement and maintenance of existing buildings amounted to 443,131s. in Great Britain and 23,554s. in Ireland. The corresponding figures for the previous years were 480,183s. and 37,652s.

ARCHAEOLOGICAL DISCOVERY, WORCESTER.—The preliminary work in connexion with the intended demolition of the shop upon the Cross, where Messrs. Masters' tailoring establishment stood, in order that new premises may be erected on the site, was the cause of an interesting discovery. From what was the front shop a trap door leads into a cellar, from which access is given into a kind of crypt, which is, roughly, about 20 ft. by 15 ft., and between 10 ft. and 12 ft. high at its highest point. The roof, light—and this is very faint—is obtained by means of a flap, and has to percolate through the front cellar before it reaches the crypt. The floor of the crypt is 8 ft. below the level of the street, a fact which, taken in conjunction with the fact that the doorway gives entrance to the chamber, suggests that the level of the street has risen. The crypt has a groined, stone roof, the ribs springing from the four corners of the chamber, and two central corbels. The central rib or arch spans the crypt singly, but those upon either side cross each other.

BIRMINGHAM CORPORATION CONTRACTS.—At a meeting of the Birmingham Trades Council held Saturday, under the chairmanship of Mr. W. J. Morgan, a discussion arose on a question moved by Mr. Targett expressing the regret of the Council that in the large number of contracts recently let by various committees of the Corporation

provision was inserted to prevent the ever-increasing importation of quarry-worked stone. The resolution urged upon members of the Corporation the necessity, whilst the prevailing lack of employment continued, of restricting as much as possible the importation of such stone in future contracts, "believing that thereby great assistance will be rendered to the solution of the unemployment problem." The Secretary expressed the opinion that the continual sub-letting and re-sub-letting of this branch of the building trade was detrimental to both ratepayers and workmen. Mr. Targett said something was bound to go when there were two or three to get a profit out of the same contract. The ratepayers suffered because they did not get the quality of work they should have for their money, and the workmen suffered because they had to work under more harassing conditions. What they wanted to know was why the Corporation could not let work to a good substantial builder, who could carry out the whole of it. Mr. Badham seconded the resolution. The Secretary (Mr. J. E. Berry) admitted the evil of sub-letting, but recognised that it was not always possible to avoid it. He sympathised with the desire of the stonemasons to keep work in the city as much as possible, but he thought they would find their remedy was to secure adherence all round to the fair-wage clause. The men must then suffer. Mr. Eades supported the resolution, and was followed by Mr. Haines. Mr. Fred Hughes pointed out that the working of stone would inevitably drift into the quarry districts. Councillor Keegan said the resolution was bad in principle and would be unworkable in practice. It was frequently stipulated that stone must be worked in the quarries, not for reasons of cheapness, but because the men who got the stone in the first place knew how it was bedded, and were therefore able to dress it better than anyone else. In his reply to the discussion Mr. Targett contended that the Corporation could help them, if they liked, and that they had been in a position to do so for months past. The fair wage clause was a farce. On being put to the meeting the resolution was lost, twelve voting for and thirty-five against.

A NEW BOILER FEED PUMP.—In the present-day use of direct-acting steam pumps has become fairly general for boiler-feeding purposes, and the various types of such apparatus already on the market are doubtless well known to our readers. A new pattern vertical pump of the same class, recently introduced by Messrs. Mather & Platt, of Salford, presents several special features, which should be of interest to steam users. The steam valves are simple, having only two moving parts, and the valve lever, fitted with a roller bearing to reduce friction, is arranged so that the pistons and rods turn round while working so as to insure uniform wear. The water end is a tubular casting designed to withstand high pressures, and is fitted with patent group valves of small lift designed so that they can be readily withdrawn whenever required. The water cylinders are lined with gunmetal, and the water pistons are fitted with bronze or sabbonite rings according to the nature of the service. These pumps are supplied in four stock sizes, with capacities ranging from 2,700 gal. to 8,600 gal. per hour, and as all parts are made to standard gauge and templates, repairs and renewals can be effected with a minimum amount of trouble.

Legal.

ACTION BY ARCHITECTS FOR FEES.

THE case of Elms and Jupp v. Foyat came before the Court of Appeal, composed of Lords Justices Moulton and Farwell, on the 10th inst., on the appeal of the defendant from an order of Mr. Justice Bucknill in Chambers.

Mr. Schiller appeared for the appellant, and Mr. Scott for the respondents.

Mr. Schiller, in opening the case, said the learned judge had refused to give the defendant unconditional leave to defend the action and that was the order appealed from. The action was brought by the plaintiffs, a firm of architects, for 77l. 18s. 4d., their fees for the preparation of plans and specifications. What the learned judge had said was that the defendant should have leave to defend on paying 11l. odd to the plaintiffs' solicitor and on bringing the remainder of the plaintiffs' claim into court. His (counsel's) first point was that plaintiffs could not apply for judgment under order 14 at all, as their claim was not for a liquidated amount. What the plaintiffs had done was to estimate the value of their services and that did not entitle them to specially endorse the writ.

Lord Justice Moulton: Under order 14 you can proceed for work and labour done. There is nothing in your affidavit which says it is not a proper amount. We must assume therefore that it is the proper amount.

Mr. Schiller said he thought he should be able to show that the defendant was not liable for any portion of the sum claimed. With regard to the item in the claim for 66l. 13s., the first defence was that the work was done, not for the defendant, but for Willis's Restaurant Company, Ltd.

Lord Justice Moulton: In which company the defendant appears to hold the whole of the shares.

Mr. Schiller said that appeared to be so.

Lord Justice Moulton: Then there is another fact that the defendant, in giving the order for the work, was not careful to distinguish between himself and the company. At that I am not surprised. Mr. Schiller said that the defendant managed the restaurant, and in the correspondence which ensued he wrote in the first person, but that was not inconsistent with his acting on behalf of the company. A man had a perfect right to write in the first person and say he was acting for a limited company. But apart from that there was another defence so far as the item of 66l. 13s. was concerned, viz., that it was for work done on speculation. What he meant by that was this. It was in contemplation that some alterations should be made in the restaurant, and Mr. Foyat approached the plaintiffs, who were the successors of a firm who had previously done work for Willis's Restaurant, and in whose employ Mr. Jupp was, he being the managing clerk. Plaintiffs knew that these alterations were in contemplation at the restaurant and discussed them with the defendant. The defendant said that the plans could be got out on the terms that the plaintiffs could be allowed their fees if the work was carried out. The work was never done. It was clear there was an issue as to whether the plaintiffs were entitled to anything at all. Mr. Jupp, in his affidavit, said that his firm undertook the work and looked to the defendant personally for their fees. Defendant agreed that the 11l. was due to the plaintiffs from somebody.

Lord Justice Moulton said that so far as the 11l. was concerned, the order appealed from would have to stand. He had looked through the correspondence on the matter and as far as he could see there was no ground for setting aside the order of the learned judge as to that. Mr. Scott, for the plaintiffs, said that the real defence was that the work was done for the company and that the company would only pay for it if the alterations were carried out. That contention was not borne out in the correspondence.

Lord Justice Moulton: You say the defendant's affidavit is contradicted by his letters?

Mr. Scott said that was his contention.

Mr. Schiller said that the defendant personally did all the negotiations.

Lord Justice Moulton: You cannot look at his affidavit without seeing that he did the work on his own behalf consciously.

Mr. Schiller: He was the manager of the company and did, of course, everything for the company. He was the head and shoulders of the company.

Lord Justice Moulton: I think he was.

Mr. Schiller: Well, probably he was the company, but in law he cannot be the company. There must be two separate entities.

Lord Justice Farwell said he thought that the statements made by the defendant in his affidavit were untrue, or at least inconsistent with the letters he had written.

Lord Justice Moulton, in giving judgment, said in his opinion the affidavit which the defendant had put forward was one they could not accept in face of the letters. All they had to consider was the actual affidavit which had been filed. He was satisfied they could not accept that and therefore the appeal must be dismissed with costs.

Lord Justice Farwell concurred.

Mr. Schiller: I think the time has run out for bringing the money into court.

Lord Justice Moulton: We will give you another fortnight.

Mr. Scott: I suggest ten days, my lord.

Lord Justice Moulton: No, I think a fortnight. It is the Long Vacation and it will not hurt you.

POINT UNDER THE LONDON BUILDING ACT, 1894.

THE hearing of the case of Adams v. the Mayor, etc., of St. Marylebone concluded before a Divisional Court of King's Bench, composed of Justices Ridley and Darling, on the 9th inst., on the plaintiff's appeal from a decision of the learned County Court Judge of Marylebone, who upheld an award made under the London Building Act, 1894.

It appeared that the plaintiff was the occupier of a restaurant which adjoined premises which the defendants were in the course of erecting and which were to be used as workmen's dwellings. It was necessary for the defendants to raise the party-wall between the two properties, and in carrying out the work injury was caused to the plaintiff in her business, the damage alleged being the loss of lodgers caused through the chimney being affected so as to prevent a fire being lighted and also through her being unable to cook food owing to the defective state of the chimney. The matter went before two arbitrators under the provisions of the Act, and they refused to consider those damages, their contention being that they had no power under the Act to deal with damages of a consequential nature. From this decision the plaintiff appealed to the learned County Court Judge, who upheld the views of the

arbitrators and dismissed the appeal. Hence the present appeal of the plaintiff.

Mr. Poyser appeared for the appellant; and Mr. G. A. Scott for the respondents.

Mr. Poyser contended that sect. 91 (1) of the Act enabled the arbitrators to award compensation not only for structural damage but also for the consequential damage. The plaintiff had, he said, suffered considerable damage, and ought to be compensated.

Mr. Justice Ridley said that the Act did not lay down that the plaintiff could not get damages elsewhere.

Mr. Poyser submitted that the Act was intended to be a code under which all matters as to damage with regard to party-walls was to be settled.

Mr. Scott, on behalf of the respondents, contended that it was not intended that compensation by this character should be awarded under the section. The scheme of the Act was to refer to the tribunal of surveyors questions of work only, viz. the manner of carrying out the work.

At the conclusion of the arguments of counsel, Mr. Justice Ridley, in giving judgment, said that the case raised a point of some importance, viz. whether or not the arbitrators were entitled to take into consideration consequential or trade damage in awarding compensation under the Act. For himself he was of opinion they had no such jurisdiction. All the cases cited during the arguments seemed to be pregnant with the idea that structural damage was only to be considered by them. The whole scope of the Act was to refer to the arbitrators the question of the way in which the work had been done. It was recognised, however, that there might be some cases where compensation for damage of the character in question ought to be given to an adjoining owner and provision was made by the Act for such compensation to be paid by the building-owner. He thought that the object of the Act was to remove difficulties caused by the joint ownership of party-walls, but he did not think that it necessarily followed that the Legislature intended in the London Building Act to provide a remedy for every species of damage which might arise from dealing with party-walls. It was intended to give a specified remedy for things done in the public interest, as the operations conducted under the Act were for the public interest. In this case if the arbitrators had done what the plaintiff submitted they should have done, they would, in his opinion, have gone beyond their jurisdiction. He thought, therefore, that the appeal should be dismissed.

Mr. Justice Darling concurred, and the appeal was accordingly dismissed with costs. Their lordships granted the plaintiff leave to appeal.

STRAND BUILDING DISPUTE.

THE case of Draper v. Lorden came before Mr. Justice Buckley in the Chancery Division on the 10th inst.

Mr. Buckmaster, K.C., said the plaintiff was the lessee of certain premises at the east corner of Bedford-street and the Strand, and his lease included Nos. 422, Strand, and No. 61, Bedford-street. The defendant had acquired the premises, Nos. 421 to 419, Strand, on the eastern side of the plaintiff's premises. On May 3 last a notice was served on the plaintiff signed by one Hunt, purporting to be a party structure notice under the London Building Act. It appeared that after the notice was served, the defendant acquired from Hunt his interest in the premises and nothing was done under that notice. On July 1 without any notice at all, workmen began to demolish the premises No. 421, Strand, and on July 14 another notice purporting to be a party structure notice under the London Buildings Act and signed by the defendant was served on the plaintiff.

Mr. Cozens-Hardy, on behalf of the defendant, said that the notice was addressed to the freeholder.

Mr. Buckmaster, continuing, said it could not be alleged that the work had been done pursuant to the terms of the notice, because a month must elapse before they could act on the notice served. The plaintiff complained that what was done was not justified upon the ground that it was not done pursuant to the statutory rights following the notice. The defendant proposed to remove the premises adjoining the plaintiffs'. On July 21 a dangerous structure notice was served on the plaintiff and the defendant with regard to the party wall that formerly divided plaintiff's house from the defendant's. There was no dispute whatever that the defendant intended to demolish No. 421, Strand, and there was nothing in controversy on the present motion with regard to the plaintiff's right to support. But what was suggested was that what had been done at the present moment was not to withdraw support from the plaintiff's wall. It seemed impossible for the defendant to deny that what he admittedly proposed to do must of necessity withdraw the support with most dangerous consequences to the party wall. They had not shored the party wall for the reason that, having regard to the age of the premises, if they were to shore it they would shelve the whole building into Bedford-street.

LEGAL.—Continued on page 245.

SEPTEMBER 3.—**Burscough Bridge.**—OFFICES AND STORES.—The Latham and Burscough Bridge.

tenders for the erection of public offices and stores at Bursough Bridge. Plans and specifications can be inspected at the office of the architect, Mr. C. S. Beeson, Albany Buildings, Ormskirk, from whom plans and specifications after information may be obtained. Tenders to be delivered at office of Mr. Fred. C. Hill, Clerk to the Council, 22, Derby-street, Ormskirk, not later than 12 noon on September 3.

SEPTEMBER 3.—Castleblayney.—GOODS STORE.—Great Northern Railway Company (Ireland) Directors invite tenders for the erection of a goods store (50 ft. by 25 ft.) and office (20 ft. by 14 ft.) of timber, with galvanised corrugated iron roof, etc., at their Castleblayney Station. Parties wishing to tender may see the drawing and specification at the office of Mr. W. H. Mulla, Engineer-in-Chief, Annuis-street terminus, Dublin, or copies of them at the office of the District Engineer, Belfast, and forms of tender can be obtained at either of the said offices on payment of 1s. (not refundable) each. Tenders, made out on the forms supplied by the company, and endorsed "Tender for Goods Store," should be delivered to Mr. T. Morrison, Secretary, Secretary's Office, Annuis-street terminus, Dublin, not later than 10 a.m. on September 5.

SEPTEMBER 4.—Birmingham.—ENGINE-SHED, ETC.—The Directors of the Great Western Railway Company invite tenders for engine-shed, etc., at Tysley, near Birmingham. Plans and specifications may be seen, and forms of tender and bills of quantities obtained at the office of the resident engineer at Acocks Green Station, between 10 and 4 p.m. Tenders, addressed to Mr. G. K. Mills, Secretary, Paddington Station, W., and marked outside "Tender for Tysley Engine-shed," by September 4.

SEPTEMBER 4.—Birmingham.—NEW STABLES, ETC.—The Directors of the Great Western Railway Company invite tenders for new stables, cattle pens, etc., at Spon Lane, near Birmingham. Plans and specifications may be seen, and forms of tender and bills of quantities obtained at the office of the resident engineer at Acocks Green Station, between 10 and 4 p.m. Tenders, addressed to Mr. G. K. Mills, Secretary, Paddington Station, W., and endorsed "Tender for Stables, etc.," by September 4.

SEPTEMBER 4.—London.—WORKS AND REPAIRS.—The Committee of the H.M. Works and Public Buildings invite tenders for ordinary works and repairs to buildings, etc., in their charge in the London district for three and a half years from September 4, 1906, to August 31, 1910. Form of tender, may be obtained at H.M. Office of Works, Storey's Gate, S.W., between 11 and 5, on payment of 1s. Tenders to be delivered before 12 noon, September 4, addressed to the Secretary, H.M. Office of Works, Storey's Gate, S.W., and endorsed, "Tender for Ordinary Works and Repairs, London."

SEPTEMBER 10.—Pendleton.—EXTENSIONS OF CAR DEPOT.—Salford Tramways Committee invite tenders for contract 145, constructional steelwork, including 445 built work, in the extension of the Pendleton extensions to Central Car Depot, Frederick-road, Pendleton. Form of tender, specification, and bill of quantities for either contract may be obtained at the above-mentioned office. Tenders, endorsed "Steelwork" or "Builders' Work," as the case may be, "Car Depot Extensions," and addressed to the Chairman, Tramways Committee, Town Hall, Salford, must be delivered at the office of Mr. L. C. Evans, Town Clerk, Town Hall, Salford, not later than 3 p.m. on September 10.

SEPTEMBER 11.—Audenshaw.—SCHOOL.—Lancashire Education Committee invite tenders for the erection of a new public elementary school at Audenshaw. The plans may be seen, and bills of quantities obtained, at the office of the County Architect, Mr. Henry Fowler, 1, Market-street, Preston, on payment of a deposit of 2s. Tenders must be delivered before 12 o'clock noon on September 11. Sealed and endorsed "Tender for Mr. W. F. Knott, Parish Office, Ashton-under-Lyne."

SEPTEMBER 11.—Benton.—ALTERATIONS TO INFANTRY.—Lancashire Education Committee invite tenders for the erection of alterations at the Benton Technical Institute. The plans may be seen, and bills of quantities obtained, at the offices of Messrs. J. W. Beaumont & Son, 10, St. James's-square, Manchester, on and after August 21. Tenders must be delivered before 12 o'clock noon on September 11, sealed and endorsed, to Mr. W. F. Knott, Parish Office, Ashton-under-Lyne.

SEPTEMBER 12.—Merthyr Tydfil.—CHAPEL, ADDITIONS.—Additions and improvements to Bethesda Congregational Chapel, Merthyr Tydfil. The plans and specifications can be seen with Mr. Rees Jones, grocer, Bethesda-street. The tenders to be sent, sealed and endorsed, to Mr. John Thomas, 90, Brecon-road, Merthyr Tydfil, not later than September 12. The architect, Mr. Morris Roberts, architects and surveyors, Portmadoc.

SEPTEMBER 17.—Willowtown.—SCHOOLS.—Ebbw Vale Education Committee invite tenders for the erection of two new school buildings and infirmaries, together with cookery and manual instruction rooms, at Willowtown, Ebbw Vale. Plans, specifications, and conditions of contract may be seen at the office of the architect, Mr. Henry Walters, Wagoner Beaufort. Personal application must be made to the architect for the bills of quantities, accompanied by a deposit of 3s. 3d. Separate tenders are required for (1) the infants' block, (2) mixed block, (3) cookery and manual block, (4) the remainder of the works, and (5) the whole of the works. Tenders, enclosed in a sealed envelope, endorsed on the outside "Tender for Willowtown Schools," should be delivered at office of Mr. Tho. Hughes, Secretary, Ebbw Vale, on or before September 17.

SEPTEMBER 18.—Bathurst.—VILLAS.—For the erection of a pair of semi-detached villas, Bathurst. For particulars apply Messrs. Frank Caws, Steel, & Caws, 22, Fawcett-street, Sunderland.

NO DATE.—ADDITIONS, ETC., TO K.O.T.L. DRILL HALL, BANK-STREET. Additions and alterations in forming club-rooms, lavatories, sergeants-room, etc. Names to Messrs. Simpson &

Firth, Architects and Surveyors, Southgate-chambers, Wakefield.

NO DATE.—Ynysyhir.—CONVERTING HOUSES INTO SHOPS.—For converting two houses into shops. Address sealed tenders, marked "Tender," by Saturday August 25, to Co-operative Stores, Ynysyhir.

ENGINEERING, IRON, AND STEEL.

AUGUST 20.—Booth.—FURNACES AND COVERINGS.—Booth Corporation invite tenders for the supply of (1) Equipment of four boilers for hand-firing with luminous oil, (2) stoves, heating apparatus for same; (3) non-conducting covering for steam and water pipes, and boiler surfaces, to the Electricity Works, Pains-grove, Booth. Copies of the specification, forms of tender, general conditions, etc., can be obtained from the Borough Electrical Engineer on depositing the sum of 1l. 1s. Tenders, endorsed "Furnaces and Coverings," to be addressed to the Chairman of the Electric Power and Lighting Committee, Town Hall, Booth, and delivered at office of Mr. J. Henry Farmer, Town Clerk, Town Clerk's Office, Town Hall, not later than 10 a.m. on August 20.

AUGUST 20.—Dublin.—PIPES.—Dublin Lighting Committee invite tenders for the supply and erection of certain solid-drawn copper feed water-pipes at their Pigeon-house generating station. Specification, general conditions, and form of tender, can be obtained from the Electric Power and Lighting Committee, Dublin, on payment of 1l. 1s. for each specification. Tenders, addressed "Chairman of the Lighting Committee," 3, Cork-lane, Dublin, and marked "Tender for Copper Pipes," to be delivered not later than noon on August 20.

AUGUST 20.—Lidgate.—BRIDGE REBUILDING.—Moulton R.D.C. invite tenders for rebuilding a bridge at Lidgate, Norfolk. The plans and specifications can be seen at the offices of Messrs. Holland & Sons, High-street, Newmarket. Sealed tenders to be sent to Mr. S. Clerk to the Council, Newmarket Chambers, Newmarket, not later than 10 o'clock in the forenoon of August 20, endorsed "Tender for Lidgate Bridge."

AUGUST 20.—Rhonda.—IRON FENCING.—Rhonda U.D.C. invite tenders for about 400 yds. of strong unclimbable iron fencing, 6 ft. high, with gates. Particulars may be obtained on application to Mr. W. J. Jones, engineer and surveyor, at the Public Offices, Centre, Rhonda. Sealed tenders, endorsed "Fencing," to be sent in not later than August 20.

AUGUST 21.—London.—RAILS.—Bombay, Baroda, and Central India Railway Company Directors invite, up to noon on August 21, tenders for the supply of the following stores, viz.:—(1) Class A. (1) 20 fishplates, and (2) spikes. (3) spikes. Specifications can be obtained at offices of Mr. W. V. Constable, Secretary, Gloucester House, 2, 3, and 4, Bishopsgate-street, Without, London, E.C., on payment of 1l. 1s. each (which will not be returned).

AUGUST 22.—London.—METAL INGOTS AND WAGGONS.—The East India Railway Company invite tenders for the supply and delivery of (1) white anti-friction metal ingots; (2) bogie waggon (for carrying rails, etc.), as per specifications to be seen at the Company's Office. Tenders are to be sent to Mr. C. W. Young, Secretary, Nicholas-lane, London, E.C., not later than 12 o'clock noon, marked "Tender for White Metal Ingots," or as the case may be, for No. 1 on August 22, and for No. 2 on August 23. For each specification a fee of 1l. 1s. is charged, which cannot under any circumstances be returned.

AUGUST 22.—Walton.—CONDUCTORS.—West Derby Guardians invite alterations and additions in connection with the building of two new ovens at Walton Workhouse. Contractors having places of business and workshops, and being bona-fide contractors carrying on business within the Unions of West Derby, township of Toxteth Park, or the parish of Liverpool, may see specification and plans at the office of the architect, Mr. C. H. Lancaster, Brougham-terrace, West Derby-road, Liverpool. Sealed tenders, endorsed "Tender for Alterations to Ovens, Walton Workhouse," to be delivered to Mr. Harris P. Cleaver, Clerk to the Guardians, Brougham-terrace, West Derby-road, Liverpool, not later than 9 o'clock a.m. on August 22.

AUGUST 22.—Walton.—CONDUCTORS.—West Derby Guardians invite tenders for the erection and completion of two new steam-pipe peel ovens. Specification and particulars, also position of same on plan, can be seen at the office of the architect, Mr. C. H. Lancaster, Brougham-terrace, West Derby-road, Liverpool. Sealed tenders, endorsed "Tender for Harris P. Cleaver, Clerk to the Guardians, Brougham-terrace, West Derby-road, Liverpool, not later than 9 o'clock a.m. on August 22."

AUGUST 22.—West Derby.—ALTERATIONS TO BOILERS.—West Derby Guardians invite tenders for alterations and additions in connection with new boilers, Mill-road Infirmary, from contractors having places of business and workshops, and being bona-fide contractors carrying on business within the Unions of West Derby, Township of Toxteth Park, or the Parish of Liverpool. Specifications and plans can be seen at the office of the architect, Mr. C. H. Lancaster, Brougham-terrace, West Derby-road, Liverpool. Sealed tenders, endorsed "Tender for Alterations, New Boilers, Mill-road Infirmary," to be delivered to Mr. Harris P. Cleaver, Clerk to the Guardians, Brougham-terrace, West Derby-road, Liverpool, not later than 9 a.m. on August 22.

AUGUST 22.—West Derby.—BOILER.—West Derby Guardians invite tenders for the supplying and fixing one new multibular marine dry-backed boiler, complete with all fittings, steam-pipings, fan, etc. Specifications and plan can be seen at the Steward's office, Infirmary, Mill-road, Liverpool. Sealed tenders, endorsed "Tender for Boiler, Infirmary," to be delivered to Mr. Harris P. Cleaver, Clerk to the Guardians, Brougham-terrace, West Derby-road, Liverpool, not later than 9 a.m. on August 22.

AUGUST 24.—Hopetoun.—RAILWAY.—Young's Paraffin Light and Mineral Oil Company, Ltd., invite tenders for the construction of fully a mile of Hopetoun railway with sidings leading to No. 4 Mine. Tenders, also, for construction of a branch railway to Spent Shale Bing, at Hopetoun Works.

Drawings may be seen, and specifications and schedules obtained, from Messrs. D. & G. R. Rankine, civil and mining engineers, 238, West George-street, Glasgow. The works will be pointed out on August 17, leaving Uphall Station in conveyance provided by the Company after arrival of trains from the East and West, due shortly after 11 o'clock. Offers to be lodged with Mr. John Fyfe, Managing Director, 7, West George-street, Glasgow, on or before August 24.

AUGUST 28.—Climping.—GROYNES.—The erection of three wooden groynes, average 300 ft. in length, and for the extension by 150 ft. of an existing groyne, on the foreshore at Climping, Sussex. Plans and specifications can be seen at the office of Mr. Arthur Holmes, Clerk to the Commission of Sewers for the Rape of Arundel, Arundel, between the hours of 10 and 4 any day. Tenders, marked "Tender for Groynes," to be delivered to the Clerk on or before August 28.

AUGUST 28.—Lambeth.—STEAM PIPE.—Lambeth Board of Guardians invite tenders for the provision and fixing of about 170 yds. on 5-in. to 5-in. steam pipe, with valves and accessories, at the Workhouse, Renfrew-road, Lower Kennington-lane, S.E. Specification and form of tender can be obtained from the Consulting Engineer to the Guardians, Mr. George E. Arnold, 195, Kennington-road, S.E., and form of contract can be seen at that address. Tenders must be sent by post not later than August 28. Mr. W. Thurnall, Clerk to the Guardians, Kennington Board Room and Offices, Brook-street, Kennington-road, S.E., sealed, and superscribed "Tender for Steam Pipes."

AUGUST 29.—Bradford.—HOT-WATER SUPPLY.—The Bradford Corporation invite tenders for hot-water supply apparatus at the City Hospital, Leeds-road. Drawings and general conditions of contract may be seen, and bill of quantities and form of tender obtained, on application to the City Architect, Whitaker Buildings, Brewery-street, Bradford. Sealed tenders must be sent to Mr. E. W. F. Stevens, Town Clerk, Town Hall, Bradford, not later than 12 o'clock noon on August 29.

SEPTEMBER 6.—Islington.—ENGINEERING WORKS.—The Guardians of St. Mark, Islington, invite tenders for (1) provide and fix hot water and heating arrangements; (2) fire mains and hydrants; (3) gas supply and fittings; (4) electrical installation at the two new blocks now being erected at the St. John's-road Workhouse, Upper Holloway. Copies of specification and further particulars, with forms of tender, can be had of Mr. W. G. Gunn, assistant surveyor, Chancery-lane, W.C., up to August 30, on deposit of 2d. Tenders, addressed to the Guardians, and to be delivered at the Offices, St. John's-road, Upper Holloway, N., before 2, September 6, endorsed "Tender for Engineering Works."

SEPTEMBER 11.—Newcastle-on-Tyne.—STEEL RAILS, POINTS, AND CROSSINGS.—The Tramways Committee of the Corporation of Newcastle-on-Tyne invite tenders for the supply of rails, points, and crossings, together with the necessary fishplates, tie-rods, bolts and nuts, in connection with the renewal and extension of a double junction in Northumberland and Blackett streets. Alternative offers are asked for, viz.:—(1) In hardened cast-steel points and crossings and roller steel rails; (2) in manganese steel throughout. Plans may be seen at the offices, schedule of quantities, and form of tender obtained, at the office of the City Engineer, Town Hall, Newcastle-upon-Tyne. Payment of 1l. 1s. Tenders endorsed "Tender for Renewal, etc., of Northumberland-street Junction," and addressed to the Chairman of Tramways Committee, to be delivered at the City Engineer's Office on or before September 11.

NO DATE.—Swansea.—SLICES AND MACHINERY.—The Swansea Harbour Trustees invite tenders for five pairs of main slices and ten pairs of supplementary stop paddles, together with hydraulic and hand-power machinery for working them. On and after August 27 drawings may be inspected between 9 a.m. and 4 p.m. at the offices of the Trustees, Engineers, Mr. A. O. Schenk, M.Inst.C.E., Harbour Offices, Swansea, and copies of the drawings, specification, conditions, and forms of, and instructions for, tender may be obtained of Mr. Tailford Strick, Clerk, Harbour Offices, Swansea, on payment of 5l. 5s.

MISCELLANEOUS.

AUGUST 20.—Linthwaite.—WALLING.—Linthwaite Industrial Co-operative Society, Ltd., invite estimates for 220 yds. of dry walling. Particulars on application to the Central Stores. Tenders to be sent in not later than August 20.

AUGUST 21.—Belfast.—FITTING-UP BATHS.—Belfast Board of Guardians invite proposals for fitting-up and completing five baths and the heating by steam of a dormitory at girls' school department of the Workhouse, in accordance with plan and specification prepared by Messrs. Young & Mackenzie, civil engineers, Tenders, endorsed "Baths," to be lodged in the tender box, board-room, before 12 o'clock noon on August 21. Mr. Joseph W. Robb, Clerk of the Union, Clerk's Office, Union Workhouse.

AUGUST 22.—Houghton-le-Spring.—GAS.—The Houghton-le-Spring U.D.C. invite tenders for the supply of gas for lighting the public street lamps for the year ending August 31, 1907. Tenders to be delivered to Mr. D. Miller, Clerk of the Council, Houghton-le-Spring, not later than August 22.

AUGUST 23.—Manchester.—OIL.—Manchester Corporation Gas Committee invite tenders for the supply of a cargo, by December 20 next, of 3,000 to 3,500 tons of oil for the manufacture of carburetted water-gas. Description of the oil, conditions of contract, and further particulars may be obtained on application (in writing only) to Mr. Charles Nickson, Superintendent of the Gas Department. Sealed tenders and samples, addressed to the Chairman of the Gas Committee, and endorsed "Tender for Gas Oil," must be delivered at the office of the Superintendent of the Gas Department, Town Hall, Manchester, on or before August 23.

AUGUST 23.—Prestwich.—POINTING WALLS.—Prestwich Guardians invite tenders for a quantity of pointing at their Workhouse, Delamays-road, Crumppall. Tenders, endorsed "Tender for Pointing," to be addressed to Mr. Edward W. Alden, Clerk to the Guardians, Union Offices, Chertem

Hill road, Manchester, and delivered by 10 a.m. on August 23.

AUGUST 23.—Newcastle-under-Lyme.—FRANISHING KING'S MEMORIAL BATHS.—Tenders are invited for the furnishing of the Turkish baths. Building now in course of erection. Particulars may be obtained from Mr. J. B. Langley, architect, 49, Deansgate, Manchester. Tenders, endorsed "Tender for Furnishing Turkish Baths," to be sent to Mr. Joseph Griffith, Town Clerk, Town Clerk's Office, Newcastle-under-Lyme, on or before August 25.

AUGUST 23.—Wrotham.—EMPTYING OF CESSPOOLS.—The Wrotham U.D.C. invite tenders for working the cess-pool-emptying plant within their district for one year, from September 29, 1906, as per specification, to be seen at the office of the surveyor, Mr. A. J. H. Powell, Borough Green. Tenders to be sent to Mr. George F. Carwell, Clerk to the Council, 130, High-street, Sevenoaks, sealed and endorsed outside "Tender for Cesspool Emptying," not later than noon on August 25.

AUGUST 27.—Brechin.—BOWLING GREEN.—The Royal Burgh of Brechin invite offers for the construction of a bowling green in Brechin Public Park. For particulars apply to Mr. Wm. Eggle, Burgh Surveyor, Brechin, who will supply copies of specification and schedule of quantities on payment of 11. 1s. Marked tenders to be lodged with the subscriber not later than August 27.

AUGUST 27.—Hendon.—SHELTER.—The Hendon U.D.C. invite tenders for the wood and corrugated iron shelter to be erected in the Hendon Public Park, N.W. Drawings and specifications may be seen, and forms of tender obtained, of Mr. S. Slater Grimley, Engineer, Council Offices, Hendon, N.W. Tenders, on such forms only, endorsed "Shelter," addressed to the Chairman of the Council, to be sent to Mr. H. Humphris, Clerk, Council Offices, Hendon, N.W., before August 27.

AUGUST 27.—Sunderland.—CARTING.—Sunderland R.D.C. invite tenders for carting road material, being the balance of the metal required during the half-year ending March 31, 1907, viz. in the Parish of Ryhope and the Parish of Funnishall. Tender forms which may now be obtained on application to Mr. J. C. Wilson, Clerk to the Council, Clerk's Office, 17, John-street, Sunderland, to whom they must be returned not later than August 27, marked "Tender for Carting."

AUGUST 27.—Warrington.—MOTOR.—Warrington Sanitary Works Committee invite tenders for the supply of one 10 B.H.P. D.C. motor. Specification can be obtained from Mr. James A. Parfitt, Cleansing Superintendent, Cleansing Dept., Warrington, on payment of 11. 1s. to the Borough Treasurer, Bank House, Sankey-street, Warrington. Tenders in securely-fastened envelopes, endorsed "Tender for Motor," and addressed to the Chairman, Sanitary Works Committee, Town Hall, Warrington, to be delivered not later than 10 a.m. on August 31.

AUGUST 31.—New Malden.—FENCING.—The Guardians of the Kingston Union invite tenders for the provision and erection of wrought-iron unclimbable fencing at Norbiton Common Farm, New Malden, Surrey. A copy of the specification and form of tender may be obtained on application to Mr. Jas. Edwell, solicitor, Clerk to the Guardians, Union Office (opposite Norbiton Railway Station), Kingston-on-Thames. Tenders to be delivered not later than August 31, at noon.

SEPTEMBER 12.—Barking Town.—LIGHTING.—The U.D.C. of Barking Town invite tenders for the cleaning, lighting, extinguishing, renewal of lamps, lanterns, fittings, etc., of the whole of the public street incandescent, Nernst, and Arc lamps within their district for alternative periods of 1, 2, or 3 years. Form of tender, conditions, and specification may be obtained from the Engineer at the Electricity Works, East-street, Barking. Sealed tenders, endorsed "Street Lighting," addressed to the Chairman of the Electricity and Tramway Committee, must be delivered to Mr. H. Hargreaves, Clerk of the Council, Public Offices, Barking, not later than 12 o'clock on September 12.

SEPTEMBER 15.—Handsworth.—ELECTRIC WIRING, etc.—The U.D.C. of Handsworth invite tenders for the supply and fixing of the following:—Wiring, fittings, etc., for the electric lighting of the new Council schools, Canterbury-road, Handsworth; wiring, fittings, etc., for the electric lighting of the new Council schools, Westminster-road, Handsworth. Drawings, specifications, and conditions of contract may be obtained on or after September 1, from Mr. F. A. Nixon, electrical engineer, Generating Station, Soho-road, Handsworth, on payment of 11. 1s. Tenders, on the prescribed form, must be sealed and forwarded in the endorsed envelope supplied for that purpose, and should be delivered at the Education Office not later than September 15.

NO DATE.—Plumstead.—ELECTRIC INSTALLATION.—The Guardians of the Woolwich Union require tenders for rearrangement of a portion of their electric installation at Plumstead-Innfirm. Firms desirous of tendering should communicate with Mr. Tom Cutler, Clerk to the Guardians, Union Offices, Plumstead, and a copy of the specification of the necessary works will be sent to applicants on receipt of a deposit of 21. 1s.

NO DATE.—Rochdale.—ASPHALTING.—For Asphaltizing work. Apply Mr. J. White, Dunster, Rochdale.

NO DATE.—Rochdale.—CABLE CONDUITS.—Rochdale Electricity Committee invite tenders for cable conduits. For particulars apply to Mr. C. C. Atchison, Electricity Works, Dane-street, Rochdale.

NO DATE.—Rochdale.—WOODWORK.—The woodwork of two houses to be erected on the Dunster Estate. Apply J. White, Dunster, Rochdale.

PAINTING, etc.

AUGUST 20.—Gosport.—PAINTING, etc.—Gosport and Alverstoke U.D.C. invite tenders for the exterior painting, etc., at the Council Offices, Free Library, Fire Station, Air Compressing Station, Cemetery, and Park. Specifications may be seen and further particulars, with forms of tender, obtained at the surveyor's office. Tenders, endorsed "Tender for Painting," to be delivered to Mr. E.

Talbot Palmer, Clerk to the Council, Gosport, not later than noon on August 20.

AUGUST 22.—Sheffield.—PAINTING.—Sheffield Guardians invite tenders for painting the wood and iron work on the carriage house at the Works, 11, Vaile, in accordance with a specification prepared by the Clerk of Works, which may be seen, and further particulars obtained, on application at the Works. The work will be divided into three sections, which must be tendered for separately. Tenders, marked "Painting," must be sent to Mr. Albert Edwd. Booker, Clerk to the Guardians, Union Offices, Westborough, Sheffield, before 12 o'clock noon on August 22.

AUGUST 23.—Greenwich.—PAINTING, etc.—The Guardians of the Greenwich Union invite tenders for cleaning, painting, colouring, and general repairs to the Relief Office and Dispensary, Royal-hill, Greenwich. Copy of the specification will be furnished upon application to Mr. Louis Jacob, A.R.I.B.A., architect and surveyor, Globe-chambers, 493, New Cross-road, and payment of 10s. Tenders to be sealed and endorsed "Tender for Painting, etc., Relief Office," directed to Mr. S. Saw, Clerk to the Guardians, Guardians' Offices, Greenwich Union, S.E., and delivered before August 23.

AUGUST 30.—Stepney.—PAINTING, etc.—The Guardians of the Stepney Union invite tenders for certain distempering and painting works at Children's Receiving Home, Barnes-street, Ratcliff, E., their casual wards, Eastfield-street, Limehouse, E., and 43, Barnes-street, Ratcliff, E. Specifications and forms of tender, etc., can be obtained of Mr. T. G. Slacey, Clerk, Guardians' Offices, Barnes-street, Ratcliff, E., and to whom tenders must be delivered before August 30.

AUGUST 30.—Sunderland.—PAINTING.—Sunderland Corporation invite tenders for the painting of 180 tramways. Specification in form of General Manager, at his office, Wheat Sheaf-corner, Monkwearmouth. Tenders, in a sealed envelope, endorsed "Tender for Painting Tramways," must be delivered at office of Mr. Frank M. Bowyer, Town Clerk, Town Hall, Sunderland, not later than 12 noon on August 30.

SEPTEMBER 12.—West Ham.—PAINTING, etc.—Tenders invited by the Council of the above borough for painting, cleaning, repairs, etc., of public buildings. Specifications, form of tenders, and further particulars of Mr. J. H. Hargreaves, Borough Engineer, Town Hall, West Ham, on payment of 11. 1s. Tenders to be endorsed "Tender for Painting, etc.," and sent to Mr. Fred. E. Hillery, Town Hall, West Ham, E., before August 12.

NO DATE.—Port Talbot.—CLEANING AND PAINTING.—For cleaning and painting all roofs, girders, cranes, and gantry cranes, at Port Talbot Steel Works. Approximate area, 100,000 sq. yds. Approximate length girders, 2,200 ft. Address tenders to Baldwin, Ltd., Landore.

NO DATE.—Rochdale.—The Rochdale Corporation invite tenders for painting garden chairs, hurdles, etc., at Faining Park. For further particulars apply to the Borough Surveyor, Town Hall.

ROADS, SANITARY, AND WATER WORKS.

AUGUST 21.—Acton.—MAKING-UP.—Acton U.D.C. invite tenders for making-up Wyldford-avenue from Creffield-road to the Great Western Railway. Plans and specifications can be seen, and bills of quantities obtained, of Mr. D. J. Ebbsitt, Surveyor to the Council, 242, High-street, Acton, W., during office hours. Tenders to be delivered at the Council Offices, 242, High-street, Acton, W., not later than 5 p.m. on August 21. Mr. D. J. Ebbsitt, Surveyor to the Council, 242, High-street, Acton, W.

AUGUST 21.—Bargoed and Gilfach.—STREET WORKS AND DRAIN.—Gelligier and Rhigos R.D.C. invite tenders for the following:—Laying out, and laying down, new kerb, channel, and pavement; also laying surface-water drain, etc., at Heol Dydd, Bargoed. Tenders, on the required form, must be done in laying new 6-in. stoneware pipe drains, about 210 yds. in length, with necessary manholes, etc., at Thomas-street and Llewellyn-street, Gilfach. Plans and specifications can be seen, and bills of quantities obtained upon application to the Council's Surveyor, Mr. James P. Jones, Council Offices, Hen-god, via Cardiff. Sealed tenders, endorsed "Street Works and Drain," to be sent to Mr. Frank T. James, Clerk, 134, High-street, Merthyr Tydfil, on or before August 21.

AUGUST 22.—Holwell Green.—PAVING.—The Stainland-with-Old Holwell U.D.C. invite tenders for paving about 767 super. yds. with new 7-in. setts, and other works in connexion therewith, at Holwell Green. Specifications may be seen, and full particulars obtained, on personal application at the surveyor's office. Tenders, sealed and endorsed "Tender for Paving, etc.," must be delivered to Mr. James H. Baker, Surveyor to the Council, and Mechanics' Hall, Stainland, not later than 5 o'clock on August 22.

NO DATE.—Oldham.—SEWERING AND PAVING.—Oldham Surveyor's Committee invite tenders for the sewerage and paving of:—Passage leading from Egerton-street to Spencer-street, lying between Egerton-street and Beechey-street; passage leading from Beechey-street to Governor-street, at the rear of Nos. 59 to 75, Spencer-street; passages between Spencer-street and Lennox-street, lying between Governor-street and Bel-street; passages off Brackley-street, lying between Brackley-street and the rear of street at the rear of Nos. 1 to 15, Brackley-street; passages between Egerton-street and Douglas-street, lying between Brackley-street and Bridge-water-street; passages between Egerton-street and Moorby-street, lying between Bridgewater-street and Stephen's-street; passages between Egerton-street and Boldred-place, lying between Boldred-place and street and Edge Lane-road. Also for the sewerage, paving, flagging, and completing of Cobden-street (part off). Plans and specifications can be seen, and bills of quantities and forms of tender obtained at the office of the Borough Surveyor. Sealed tenders, endorsed "Tender for Private Street Works," and addressed to the "Chairman of the Surveyor's

Committee," to be returned not later than August 22. Mr. J. H. Hallsworth, Town Clerk, Town Hall, Oldham.

AUGUST 24.—Birmingham.—SEWER.—Birmingham Public Works Committee invite tenders for the reconstruction of a length of about 43 yds. of 3 ft. 6 in. brick barrel sewer and about 27 yds. of 3 ft. 6 in. by 2 ft. 6 in. egg-shaped sewer, together with manholes, junctions, and other incidental works. The plans and specification may be seen and quantities and forms of tender obtained, on deposit of a sum of 21. Tenders, sealed and endorsed "Sewer," to be sent to Mr. J. H. Hallsworth, Town Clerk, Birmingham, not later than August 24.

AUGUST 24.—Rhonda.—PAVING, etc.—Rhonda U.D.C. invite tenders for paving, kerbing, and channelling (1) Hannah-street, Porth; (2) Nyvyscon-road and Partidee-road, Trevalay. Plans may be seen, and specification and forms of tender obtained, at the Council Offices, Centre, on depositing the sum of 11. 1s. for each section. Sealed tenders must be delivered not later than first post, on August 25, and addressed to the Chairman of the Council, Council Offices, Centre. Mr. W. J. Jones, Engineer and Surveyor, Council Offices, Centre, Rhonda.

AUGUST 25.—Borden.—NEW ROADS, etc.—The War Department invite tenders for new roads, completing existing roads and parades, and the execution of certain surface drainage, etc., at the Royal Priddy andillery Lines Ordnance Barracks, Hampshire. Drawings and specifications may be inspected, and bills of quantities obtained, at the office of Mr. Harry B. Measures, F.R.I.B.A., Director of Barrack Construction, Portsmouth, Gosport-road, N.W., from August 22 to 25 inclusive, on payment of 10s.

AUGUST 27.—Cowdenbeath.—DRAINAGE WORKS.—The Town Council of the Burgh of Cowdenbeath invite tenders for additional drainage works within the Burgh of Cowdenbeath, and sections of the works may be seen, or copies of specifications and schedules of measurement may be obtained, at the office of Messrs. Buchan & Bennett, C.E., 12, Hill-street, Edinburgh. Tenders, on the required form, marked "Additional Drainage Works," are to be lodged with Mr. Geo. Terria, Town Clerk, Cowdenbeath, not later than August 27.

AUGUST 27.—Leatherhead.—ROAD WORKS.—Leatherhead U.D.C. invite tenders for widening, reforming, kerbing, and providing and laying 1,425 yds. of 12-in. and 9-in. stoneware storm-water drain in connection with the improvement of a portion of Kingston-road, Leatherhead. Also for the providing and laying of about 300 lin. yds. of 9-in. diameter sewer, with all necessary manholes, etc., at the same place. Plans, drawings, and quantities may be seen, and copies of the specification, of tenders, and schedules of work obtained, at the office of Mr. J. E. Snales, Engineer and Surveyor to the Council, Leatherhead, on payment of the sum of 3s. 6d. Tenders, sealed and endorsed "Road Improvement," to be sent, addressed to the Clerk of the Leatherhead U.D.C., on or before 4 p.m. on August 27.

AUGUST 28.—Mayland.—WATER SCHEME.—The Maldon R.D.C. invite tenders for supply and laying of about 4,000 yds. of 3-in. cast-iron water mains in the Parish of Mayland. Specification and form of the plans may be obtained of Messrs. Price & Beisham, 52, Queen Victoria-street, E.C., on deposit of 21. 2s. Copies of the same may be seen at, but not obtained from, the office of the Maldon R.D.C. at 10, Market-hill, Maldon, Essex. Tenders, endorsed "Mayland Water Scheme," addressed to Mr. A. W. Freeman, Clerk to the Council, Maldon, Essex, on or before August 28.

AUGUST 28.—Morecambe.—SEWERAGE WORKS.—The Morecambe Town Council invite tenders for the construction of certain intended stoneware and cast-iron sewers with manholes, ventilators, and other works of the town of Morecambe, together with manholes, ventilators, connexions, and other works, the whole to be let in one contract. Drawings and specification may be seen at the offices of the engineers, Messrs. Beesley, Son, & Nichol, M.M.Inst.C.E., of 11, Victoria-street, Westminster, S.W. where also specification, bills of quantities, and forms of tender can be obtained on deposit of 15s. Copies of the plans and specification may also be seen at Town Hall, Morecambe. Sealed tenders, addressed to Mr. William Tilly, Town Clerk, Town Hall, Morecambe, and endorsed "Sewerage Works, Contract No. 3," are to be delivered at Morecambe before 10 a.m. on August 28.

SEPTEMBER 1.—Swanage.—MAKING-UP ROAD.—Swanage U.D.C. invite tenders for making-up a certain road on the De-Moulham Estate, Swanage, viz. Cranborne-road. The works are to be done in accordance with plans, specifications, and conditions prepared by the Surveyor to the Council, which can be seen at Town Hall between the hours of 10 a.m. and noon on any day except Sunday. Tenders must be furnished on forms which can be obtained at the Council Office, and must be sent to Mr. Thomas Randall, Clerk, in a sealed envelope, marked out, side "Tender for Making-up Cranborne-road," to be delivered to the Clerk, on or before September 1. Tenders must be accompanied by a deposit of 11. 1s. will be required for form of tender supplied.

SEPTEMBER 5.—Whiston.—SEWERAGE WORKS.—The Whiston R.D.C. invite tenders for about 17,350 lin. yds. of 8-in. cast-iron sewer, and 1,400 lin. yds. of 15-in. varying in diameter from 15 in. to 9 in. together with manholes, lamp-holes, flushing chambers, sewage tanks, etc. The drawings may be seen, and copies of the specification and quantities obtained at the office of the engineer, Mr. John T. Wood, 3, Cook-street, Liverpool, on deposit of 51. Sealed tenders, endorsed "Tender for Sewerage Works," to be delivered to Mr. F. A. Mayor, Union Offices, Whiston, Prescot, on or before September 5.

SEPTEMBER 6.—Sutton.—DRAINAGE WORKS.—Sutton U.D.C. invite tenders for the construction of main drainage works. The drawings, specification, bills of quantities and forms of tender, may be inspected at the offices of the engineer, Mr.

Holston-Landley, M. Inst. C.E., 53, Victoria-street, Westminster, between 10 a.m. and 5 p.m. (Saturday excepted), until September 3. Tenders, sealed and endorsed "Surrey Main Drainage," are to be addressed to Mr. J. F. Bell, County Clerk, Sutton U.D.C. Offices, Ewell road, Sutton, and opened on September 6 by 12 o'clock noon. A post of 10d. Bank of England note will be required.

SEPTEMBER 7.—**Caistor.**—When Main.—The R.D.C. Caistor invites tenders for the construction and siting of a new water main at Moorstown. The general conditions, and specifications can be obtained on payment of 2s. 6d. from the offices of the Council at Caistor, and also the offices of the engineer, Mr. E. J. Silcock, Inst. C.E., 10, Park-row, Leeds. Sealed tenders, endorsed "Moorstown Water," must be delivered to A. A. Padley, solicitor, Clerk to the Council, inst. Offices, Caistor, not later than September 7.

SEPTEMBER 10.—**Harpden.**—Road-making.—The D.C. of Harpenden, Herts, invite tenders for levelling, paving, metalling, kerbing, channelling, and making good Douglas-road, Harpenden. The general conditions, and specifications of work, and terms, and general conditions may be seen between the hours of 9.30 and 10.30 a.m., and bills of quantities and forms of tender may be obtained on receipt of cheque for 1s. 3d., upon application to Mr. H. H. Leverton, Surveyor, the Public Hall, Harpenden. Sealed tenders, together with fully-priced antiques, endorsed "Tender for Private Street," must be delivered at the office of Mr. C. S. S. Cley, Clerk to the Council, High street, Harpenden, before 12 noon on September 10.

SEPTEMBER 11.—**Llanfarchia.**—Drainage.—Llanfarchia U.D.C. invite tenders for the construction of main sewers and outfall works for their ban district, comprising about 2,368 lin. yds. of 18-in. and 15-in. stoneware pipe sewers, 141 lin. yds. of 18-in. cast-iron pipe sewers, with necessary manholes, settling tanks, etc. Plans may be seen, a copy of specification and bill of quantities (ained, on payment of 2s. 6d. at the office of Mr. Isaac Jones, Clerk to the Council, Haddon House,

Pontnewydd, Newport, Mon., by whom tenders will be received not later than noon on September 11.

STONE, MATERIALS, AND STORES.

AUGUST 20.—**London.** Red and White Lead.—Boulogne and North Western Railway Company Directors invite tenders for supply and delivery of red and white lead, as per specification to be seen at the company's offices. Tenders, addressed to Mr. Alexander Izat, Managing Director, 237, Gresham House, Old Broad-street, London, E.C., and marked "Tenders for Red and White Lead," are to be lodged not later than noon on August 20. For each specification a fee of 10s. will be charged, which cannot, under any circumstances, be returned.

AUGUST 25.—**Bromley.** Materials for Roads, etc.—Bromley R.D.C. invite tenders for the supply of red-picked flint, granite and ragstone of approved quality, and for the carting of gravel, from the date of the execution of the contract to September 30, 1907, for the following parishes—Chelsfield, Cudham, Down, Farnborough, Hayes, Keston, Knockholt, Mottingham, North Cray, Orpington, S. Mary Cray, S. Pauls Cray, West Wickham. Separate tenders must be made in respect of each item as separately numbered on the form of tender relating to each parish. Tenders to be delivered to Mr. Edward Haselhurst, Clerk to the Council, Park House, Bromley, Kent, prepaid, not later than 1 o'clock on August 25. Forms of tender may be obtained at the offices of the Council, and no other forms will be accepted. Tenders received after August 25 will not be entertained.

AUGUST 27.—**Bradford.** Stores.—Bradford Gas Committee invite tenders for the supply of the following stores required in their several departments during a period of one year, ending September 30, 1907:—Wet and dry gas meters; pipes and castings, wrought-iron steam tubing, best merchant iron and steel, 30 tons; charging shovels, 70 doz.; oxide sockets, 25 doz.; cotton waste, 60 cwt.; best engine oil, 1,500 gall.; common oil, 1,800 gall.; cylinder oil, 1,000 gall.; tarred gaskin, 90 cwt.; brass main gas cocks, 160 doz.; weed brooms, 72 doz.; best lime, 120 tons; copper lumps, 500; lamp trims, 100.

sheet glass for street lamps, 21 oz., 9,000 sq. ft.; opal glass for street lamps, 21 oz., 3,500 sq. ft. Forms of tender, with any further information required, may be had on application to Mr. Chas. Wood, Gas Engineer, Town Hall, and samples may be seen at Mill-street Gas Works. Tenders, endorsed "Tender for Stores," to be sent to Mr. Frederick Stevens, Town Clerk, Town Hall, Bradford, not later than August 30.

SEPTEMBER 1.—**Loughton.**—GRANITE, ETC.—Loughton U.D.C. invite tenders for the supply of the following: Granite—300 tons, broken to 12 in., delivered in quantities as desired, free at Loughton or Chigwell lane Railway Stations (G.E.R.); gravel—500 yds. clean gravel, delivered at Loughton when and where required; hoggin and destructor clinker—50 yds. of each, delivered to Loughton Station in 5-ton truck loads. Tenders, marked on the outside "Materials," must be delivered to Mr. J. H. Hayward, Clerk to the Council, Council Offices, Loughton, Essex, not later than 12 o'clock noon, September 1.

SEPTEMBER 10.—**Bishop's Stortford.**—STEAM ROAD-ROLLER.—The Bishop's Stortford U.D.C. invite tenders for the supply and delivery of a 10-ton steam road-roller. Tenders, accompanied by a complete specification of the roller proposed to be supplied, and stating when it can be delivered, to be sent to Mr. Thomas Swathredige, Clerk, Council Offices, 7, North-street, Bishop's Stortford, by September 10.

SEPTEMBER 12.—**Kingston.**—GRANITE.—Kingston-upon-Thames Corporation invite tenders for the supply of 1,250 tons of Quenast, Guernsey, or other granite, suitable for road-making, the whole of such granite to be broken so as to pass through a ring having a 1½ in. internal diameter. Tenders to be on forms to be obtained of the Borough Surveyor, at the Municipal Office, where samples must be left. Sealed tenders, endorsed, to be delivered at office of Mr. Harold A. Wanser, Town Clerk, Town Clerk's Office, Kingston-upon-Thames, on or before September 12.

NO DATE.—**Durham.**—Pipes.—The supply and delivery at Durham Station of 207 yds. 18-in. cast-iron pipes 1 in. thick, 5 ft. lengths. Messrs. John Laing & Son, Milbourn-street, Carlisle.

Auction Sales.

Nature and Place of Sale.		By whom Offered.	Date of Sale.
BUILDER'S STOCK AND PLANT, DEDDINGTON, OXON.—On the Premises		Frazer & Holday	Aug. 27 & 28
CONTRACTOR'S PLANT, PLYMOUTH		Alfred Parkhouse	Sept. 4
BREHOLD BUILDING LAND, ETC., WALLINGTON, SURREY.—At the Mart.		Reid W. Fuller, Moon & Fuller	Sept. 12
MINING WORKS, HENRY STREET, GRAY'S INN ROAD		May & Rowden	Oct. 3
BREHOLD PROPERTIES, GODALMING.—King's Arms Hotel, Godalming		Messrs. Mellersh	Oct. 9

LEGAL.—Continued from page 241.

His lordship said they could shew both sides. Mr. Buckmaster said that the party wall was a structure that was not safe, and it seemed to him at the defendant ought to be restrained from further pulling down his building in such a manner as to cause a danger to the party structure. The defendant said that the plaintiff was entitled to the premises adjoining No. 422 were premises that had a gable roof the Strand with a cross gable roof at the back, and all that had been done was to remove the tiles and the slating from the gable roof. His lordship asked Mr. Cozens-Hardy what the defence was. Mr. Cozens-Hardy said his case was that the defendant had not touched the wall at all. He had not been near it or touched any part of it. He was willing to give an undertaking not to interfere with any support until the machinery of the Act had been worked out. His lordship said that the proper form would be "without prejudice to any directions given in the London Building Act the defendant should be restrained from taking the wall down." Mr. Cozens-Hardy said that he was perfectly willing to give an undertaking in that form. The defendant had not touched the party wall and he had no intention of touching anything that supported the party wall until after it had been dealt with under the Act. His lordship, upon the defendant giving the undertaking in question, made no order on the motion and directed that the costs of the motion should be made costs in the action.

Patents of the Week.

APPLICATIONS PUBLISHED.*

6,633 of 1905.—T. E. DEVONSHIRE and H. STEPHENS: Construction of Floors and Ceilings and Blocks for use in such Construction. This relates to the construction of floors and ceilings and to blocks for use in such construction. The blocks or slabs are made arch-shaped on their upper sides and preferably flat on their under-sides and hollow for the passage of air, the hollows arranged so that they run longitudinally.

* All these applications are in the stage in which opposition to the grant of Patents upon them can be made.

to the supporting joists, or girders. The metal network, expanded metal, or the like extends throughout both the upper or arched portions of the lower or soffit portion of the blocks or slabs, and the said blocks or slabs are strengthened by a rod or bar of metal extending through the said blocks or slabs so that one end of the said rod or bar is adapted to be supported on the lower flange of one joist or girder, and the other end of the said rod or bar is adapted to be supported on the lower flange of the opposite joist or girder.

18,707 of 1905.—J. THOMAS: Fire Doors and Door Frames for the Grates of Domestic Boilers or Set Pots.

This relates to a reversible door frame, for the fireplaces of domestic washing boilers formed with pinholes or sockets in the body of the frame and having pins or parts which taper from the back to the front, so as to more firmly bind the frame in position in the brickwork.

18,764 of 1905.—A. W. BOON: Fastener or Holder for the Cords of Window-blinds and the like.

This relates to a fastener or holder for blind cords and other purposes, consisting of a base and an arm or shank provided with a head and pivotally mounted on said base, said arm or shank being adapted to be turned towards the upper part of the base by the weight or pull of the blind or other body so as to retain said blind or body in position, and to automatically assume its horizontal or inoperative position when relieved from the action of the blind.

23,453 of 1905.—M. J. ADAMS: Combination of a Lavatory Basin and Filling Apparatus.

This relates to the combination of a lavatory basin and filling apparatus in which the lavatory basin is hung upon pivots, and has an extension or cup, which dips into the water supply when the lavatory is tipped upwards. When the lavatory basin is brought down to its position for use it causes the water in the cup to be raised and emptied into the basin ready for use, the lavatory basin and cup being arranged in the manner of a "see saw."

1,407 of 1906.—E. L. BATES: Fire-resisting Glazing for Windows and the like.

This relates to a fire-resisting casement consisting of an outer frame of single or double channel bars, in combination with double channel cross-bars mortised together with solder so that one bar passes completely through the other bar and

having their flanges tongued into the web of the outer frame bars, and a series of glass sections held within the flanges of the channelled bars.

26,725 of 1905.—R. T. FORD, E. PESTER, F. J. WALTON, and R. H. VOICEMAN: A Device for making Joints between the ends of Pipes for Drains and the like.

This relates to a device for making joints between the ends of pipes for drains and the like, consisting of a thimble having a socket at its upper end with a conical base which receives the lower correspondingly bevelled end of the water pipe, a metal joint being made round it in the socket. The lower end of the socket being reduced to the diameter of the upper pipe and carried down for a sufficient distance in the lower pipe, the upper end of which is attached by a metal or plumber's joint to the outside of the socket.

4,918 of 1906.—E. COFFIN: Tiles.

This relates to a tile in the shape of a lozenge having on its upper surface a rib and a groove parallel and adjacent to each upper edge of the lozenge, and adjacent on the end surface a groove parallel and adjacent to each lower edge of the lozenge, so that when laid on the roof the tiles partially cover each other and the grooves on the under surface take over the right half rib and the left half rib respectively of the two tiles which lie below it, and also form with the grooves on the upper surface of the tiles below a closed channel or passage; such tile being also provided with holes upon lateral ears for fixing outside the said grooves, thus preventing access of water through the said holes or grooves and at the same time permitting perfect drainage without penetration.

22,643 of 1905.—W. J. SWAIN: A Tubular Latch and Lock.

This invention consists of an improved construction of mortise latch which is made tubular in shape so that it can be fixed in the thinnest door as an ordinary mortise latch, by drilling a hole of the required diameter and length, without the use of chisels.

2,872 of 1906.—W. NEWMAN & SONS, LTD., and H. G. NEWMAN: A Panic or Emergency Latch for Doors and the like.

This relates to a panic latch or bolt employed in conjunction with a crush bar, co-operative latch or lock fastening mechanisms, said mechanisms being selectively and independently operated either by the said crush bar or by a handle or knob.

4,916 of 1906. W. B. JENKINS: *Ridging Tiles*. This relates to ridging tiles for roofs and like purposes and is characterised by the provision of projecting flanges, ridges, or their equivalents and corresponding sockets or recesses.

4,478 of 1906. H. ODENBACH: *Adjustable Platform Apparatus for Cleaning the Outside of Windows*.

This relates to a window cleaning platform having downwardly and outwardly sloping feet which are adjustably arranged on uprights by bolt and slot connexions for the purpose of compensating for the difference in height between the outer and inner sill.

5,783 of 1906. J. P. COMSTOCK: *Window Frames*. This relates to a window frame and consists of a sash or transom bar formed of angle irons secured back to back with distance pieces between them and secured to the window frame by means of plates located between the said irons and provided with a foot whereby it is secured to the window frame.

2,102 of 1906. C. E. CHALLIS: *Device for Suspending and Supporting Curtains and the Like*.

This relates to a device for suspending curtains and the like. A cord or rod is used for supporting the curtain, and is usually a helix of wire which passes through the hem of the curtain, but is somewhat shorter when unextended than the space it is intended to span. Into each end of the helix is inserted a screwed pin having the same pitch as the helix and terminating in a ball or knob or equivalents of somewhat larger diameter than the outside of the helix. The knobs fit in cupped recesses in plates or their equivalents which are allotted to pass the helix but retain the knobs; the plates are attached to the window sash or the like or the ends of the helix may be inserted into hollowed balls and fixed there by soldering or otherwise or the ends of the helix may be inserted in tubes, preferably with closed outer ends and be retained there by pressing the groove or tongue, by means of a suitable tool, in each tube, these grooves displace certain coils of the helix and engage with others, and so retain the ends, the grooves further serve as sockets in which hooks inserted in the window frame or the like engage when the device is erected, or the tube may terminate in a ball or the like and fit in a socket.

PUBLISHER'S NOTICES.

Mail Tel. 5112 Gerrard. Telegrams, "The Builder, London."

THE INDEX (with TITLE-PAGE) for VOLUME XC. (January to June) has been given as a supplement with the issue for July.

CLOTH CASES for Binding the Numbers are now ready, price 2s. 6d. each, also the NINETEENTH VOLUME of "The Builder" (bound), price Twelve Shillings and Sixpence. SUBSCRIBERS' VOLUMES, on being sent to the Office, will be bound at a cost of 3s. 6d. each.

CHARGES FOR ADVERTISEMENTS.

COMPETITIONS, CONTRACTS, ALL NOTICES ISSUED BY CORPORATE BODIES, COUNTY AND OTHER COUNCILS, PROSPECTUSES OF PUBLIC COMPANIES, SALES BY TENDERS, LEGAL ANNOUNCEMENTS, &c., &c.

Six lines or under 6s. 0d.
Each additional line 1s. 0d.

SITUATIONS VACANT, PARTNERSHIPS, APPRENTICESHIPS, TRADE AND GENERAL ADVERTISEMENTS.
Six lines (about fifty words) or under 4s. 0d.
Each additional line (about ten words) 6s. 0d.

Terms for series of Trade advertisements, and for front page and other special positions, on application to the Publisher.

SITUATIONS WANTED (Single-handed-Labour only).
Four lines (about thirty words) or under 2s. 0d.
Each additional line (about ten words) 6s. 0d.

PREPAYMENT IS ABSOLUTELY NECESSARY.
* Stamp must not be sent, but all sums should be remitted by Postal Orders, payable to J. MORGAN, and addressed to the Publisher of "THE BUILDER," Catherine Street, W.C.

Advertisements for the current week's issue are received up to HALF PAST ONE P.M. on THURSDAY, but "Classification" is impossible in the case of any which may reach the Office after HALF PAST TWELVE P.M. on that day. Those intended for the Outside Wrapper should be in by TWELVE NOON on WEDNESDAY.

ATTENTION IN STANDING ADVERTISEMENTS OR ORDERS TO DISCONTINUE same must reach the Office before TEN O'CLOCK on WEDNESDAY MORNING.

The Publisher cannot be responsible for DRAWINGS, TESTIMONIALS, &c., left at the Office in reply to advertisements, and strongly recommends that of the latter COPIES ONLY should be sent.

ADVERTISERS IN "THE BUILDER" may have Replies addressed to the Office, Catherine Street, Covent Garden, W.C., free of charge. Letters will be forwarded if addressed envelopes are sent, together with sufficient stamps to cover the postage. Unused notices are returned to advertisers the week after publication.

N.B.—The Reply Boxes are not intended for trade letters, circulars, and the like; should these be received, they cannot (if noticed) be forwarded.

AN EDITION Printed on THIN PAPER, for FOREIGN and "COLONIAL CIRCULATION," is issued every week.

READING CASES { NINEPENCE EACH.
By post (carefully packed) 1s.

MEETING.

SATURDAY, AUGUST 19.

Northern Architectural Association.—An Excursion Meeting. Members to assemble at Jemond Church (adjoining the train line from Central Station) at 3 p.m., and proceed to the new Grammar School. After inspecting the school, the new wing, &c., of the Medical College will be visited.

SOME RECENT SALES OF PROPERTY:

ESTATE EXCHANGE REPORT.
August 2.—By DRIVER, JONAS, & Co. (at Ros).
Welsh Newton, Hereford.—Portions of the Pembridge Castle Estate, 600 acres, f. (in lots) £7,264
By PERKINS & SONS (at Southampton).
Southampton.—Howard-st., f.g. rents £22. 13s. 6d., reversion in 970 yrs. (in lots) 5,410
By VENTON, BULL, & COOPER (at Winchester House).
St. John's Wood.—2, Hall-rd., u.t. 10 yrs., g.r. 50l., y.r. 300l. 1,500
Dalston.—213 and 215, Dalston-lane, f., y.r. 74l. 1,000
August 3.—By DRIVER, JONAS, & Co. (at Leominster).
Leominster, Hereford.—Upper and Lower Nicholson Farm, 258 a. 3 r. 13 p., f., y.r. 180l. 4,100
August 8.—By LEEDER & SIMS (at Neath).
Neath, Glamorgan.—9, Wind-st. (s.), area 5,982 ft. f., y.r. 110l. 2,300
11, Green-st. (s.), area 1,838 ft. f., y.r. 65l. 2,300
Contractions used in these lists.—f.g. for freehold ground-rent; l.g. for leasehold ground-rent; i.g. for improved ground-rent; g.r. for ground-rent; r. for rent; f. for freehold; c. for copyhold; l. for leasehold; p. for possession; a.r. for estimated rental; w.r. for weekly rental; q.r. for quarterly rental; y.r. for yearly rental; u.t. for unexpired term; p.a. for per annum; yrs. for years; la. for lane; st. for street; rd. for road; sq. for square; pl. for place; ter. for terrace; cres. for crescent; av. for avenue; gds. for gardens; yd. for yard; gr. for grove; b.h. for house; p.h. for public-house; o. for office; s. for shops; ct. for court.

TO CORRESPONDENTS.

NOTE.—The responsibility of signed articles, letters, and papers read at meetings rests, of course, with the authors.

We cannot undertake to return rejected communications; and the Editor cannot be responsible for drawings, photographs, manuscripts, or other documents, or for models or samples sent to or left at this office, unless he has specially asked for them.

Letters or communications (beyond mere news items) which have been duplicated for other journals are NOT DESIRED.

All communications must be authenticated by the name and address of the sender whether for publication or not. No notice can be taken of anonymous communications.

We are compelled to decline pointing out books and giving addresses.

Any commission to a contributor to write an article, or to execute or draw a drawing for publication, is given subject to the approval of the article or drawing, when received, by the Editor, who retains the right to reject it if unsatisfactory. The receipt by the author of a proof of an article in type does not necessarily imply its acceptance. The Editor cannot undertake to read and consider articles offered for acceptance unless they are type-written.

All communications regarding literary and artistic matters should be addressed to THE EDITOR; those relating to advertisements and other exclusively business matters should be addressed to THE PUBLISHER, and not to the Editor.

PRICES CURRENT OF MATERIALS.

* * Our aim in this list is to give, as far as possible, the average prices of materials, not necessarily the lowest. Quality and quantity obviously affect prices—a fact which should be remembered by those who make use of this information.

BRICKS, &c.
2 s. d.
Hard Stocks 1 10 0 per 1000 alongside, in river.
Rough Stocks and Grizzles 1 7 0 " " " "
Picked Stocks for Fencing 2 17 0 " " delivered.
Flettons 1 8 0 " " at railway depôt.
Red Wire Cuts 1 14 0 " " " "
Best Farnham Red 3 12 0 " " " "
Best Red Pressed Ruabon Facing 5 0 0 " " " "
Best Blue Pressed Staffordshire 3 15 0 " " " "
Do. Bullnose 4 0 0 " " " "
Best Stourbridge Fire Bricks 3 14 0 " " " "
GLAZED BRICKS.
Best White and Ivory Glazed Stretchers 12 0 0 " " " "
Headers 11 0 0 " " " "
Quoins, Bullnose, and Flats 16 0 0 " " " "
Double Stretchers 16 0 0 " " " "
Double Headers 16 0 0 " " " "
One Side and two Ends 19 0 0 " " " "
Two Sides and one End 20 0 0 " " " "
Splays, Chamfered, Squints, Best Dipped Salt Glazed Stretchers, and Header, 12 0 0 " " " "
Quoins, Bullnose, and Flats 14 0 0 " " " "
Double Stretchers 15 0 0 " " " "
Double Headers 14 0 0 " " " "
One Side and two Ends 15 0 0 " " " "
Two Sides and one End 15 0 0 " " " "

BRICKS, &c. (continued).

GLAZED BRICKS (continued).
Splays, Chamfered, Squints, 14 0 0 per 1000, at railway depôt.
Specially Quality White and Dipped Salt Glazed 2 0 0 " less than best.
Thames and Pitt Sand 8 d.
Thames Ballast 5 6 " per yard, delivered
Best Portland Cement 27 0 per ton,
Best Ground Blue Lion Cement 19 0 " "
NOTE.—The cement or lime is exclusive of the ordinary charge for sacks.
Grey Stone Lime 11s. 6d. per yard, delivered
Stourbridge Fireclay in sacks 27s. 0d. per ton at rly. depôt.
STONE
BATH STONE—delivered on road wag- s. d.
sons, Fiddington Depôt 1 6 3 per ft. cube
Do. do. delivered on road wagons, Nine Elms Depôt 1 8 3 " "
PORTLAND STONE (20 ft. average).
Brown Whitbed, delivered on road wagons, Fiddington Depôt, Nine Elms Depôt, or Pimlico Wharf 2 1 " "
White Bashed, delivered on road wagons, Fiddington Depôt, Nine Elms Depôt, or Pimlico Wharf 2 2 3 " "
Ancaster in blocks 1 10 per ft. cube, deld. rly. depôt.
Bear 1 8 " "
Greenhill 1 10 " "
Darley Dale in blocks 2 4 " "
Red Corehill 2 2 3 " "
Closeburn Red Freestone 3 0 " "
Bed Mansfield 2 4 " "
YORK STONE—Robin Hood Quality.
Scrapped random blocks, 2 10 " "
6 in. sawn two sides land- ings to sizes (under 40 ft. super.) 2 3 per ft. super., " "
8 in. ditto, ditto 2 6 " "
3 in. sawn two sides slabs (random sizes) 0 11 3 " "
2 in. to 2 3 in. sawn two side slabs (random sizes) 0 7 3 " "
1 3 in. to 2 in. ditto, ditto 0 8 " "
HARD YORK—
Scrapped random blocks, 3 0 per ft. cube, " "
6 in. sawn two sides land- ings to sizes (under 40 ft. super.) 2 8 per ft. super., " "
6 in. rubbed two sides ditto 3 0 " "
3 in. sawn two sides slabs (random sizes) 1 2 " "
2 in. self-faced random slabs 0 5 " "
Hopton Wood (Hard Red) in blocks 2 0 per ft. cube, deld. rly. depôt.
" " " " 6 in. sawn two sides landings 2 7 per ft. super. deld. rly. depôt.
" " " " 3 in. sawn both sides random slabs 1 0 " "
" " " " 2 in. do. 0 8 3 " "

SLATES.

In. In. s. d.
20 x 12 best blue Bangor 13 0 0 per 1000 of 1200 at r. d.
20 x 12 " " " " 13 7 6 " "
20 x 10 first quality " " 13 0 0 " "
20 x 12 " " " " 13 15 0 " "
16 x 8 " " " " 7 5 0 " "
20 x 10 best blue Fort- madoe 12 13 6 " "
16 x 8 " " " " 6 12 6 " "
20 x 10 best Euroka un- fading green 15 17 6 " "
20 x 12 " " " " 18 7 6 " "
16 x 8 " " " " 13 5 0 " "
16 x 8 " " " " 10 5 0 " "
20 x 10 permanent green 11 12 6 " "
18 x 10 " " " " 9 12 6 " "
16 x 8 " " " " 6 12 6 " "
TILES.
Best plain red roofing tiles 42 0 per 1000 at rly. depôt.
Hip and Valley tiles 8 7 per doz. " "
Best Broseley tiles 50 0 per 1000 " "
Do. Ornamental tiles 52 6 " "
Hip and Valley tiles 4 0 per doz. " "
Best Ruabon red, brown, or brindled do. (Edwards) 57 0 per 1000 " "
Do. Ornamental 60 0 " "
Hip tiles 4 0 per doz. " "
Valley tiles 3 0 " "
Best Red or Moulded Staffordshire do. (Peakes) 51 9 per 1000 " "
Do. Ornamental do. 54 6 " "
Hip tiles 4 1 per doz. " "
Best " Rosemary brand plain tiles 48 0 per 1000 " "
Best Ornamental tiles 50 0 " "
Hip tiles 4 0 per doz. " "
Valley tiles 3 8 " "
Best " Harshill " brand plain tiles, sand-faced 50 0 per 1000 " "
Do. pressed 47 6 " "
Do. Ornamental do. 50 0 " "
Hip tiles 4 0 per doz. " "
Valley tiles 3 6 " "

WOOD.

BUILDING WOOD. At per standard.
Deals: best 3 in. by 11 in. and 4 in. 2 s. d. 2 s. d.
by 9 in. and 11 in. 13 10 0 " 15 0
Deals: best 3 by 9 13 0 0 " 14 0
Battens: best 3 in. by 7 in. and 8 in. 11 0 0 " 12 0
8 in. and 3 in. by 7 in. and 8 in. 11 0 0 " 12 0
Battens: best 2 by 6 and 3 by 6 10 10 0 " less than 7 in. and 8 in.

GOSPORT.—For the reconstruction of No. 5, North-
street, and 62, King-street, for Mr. F. G. Nobes. Mr.
J. Thomas, P.A.S.L., surveyor, 26, High-street,
Gosport:—

Croad	£545 0	C. M. Dash	£457 0
E. Gibbons	503 17	Middleton & Co.,	
J. Lear & Son	498 0	Ltd.	445 0
W. Lowe	492 0	J. Hunt*	437 0
[All of Gosport.]			

HARROGATE.—For private street works required in back roads off Studley-road and back road on west side of Harrogate Hotel, Starbeck, for the Corporation. Mr. F. Baskin, Borough Engineer and Surveyor, Harrogate:—

Back Roads off Studley-road.
C. H. Dickinson, Forest-lane, Starbeck, Harrogate* £166 17 0

Back Road on West Side of Harrogate Hotel, Starbeck.
J. Lee & Sons, 16, Oneka-terrace, New Park, Harrogate* £69 12 6

HIPPERHOLME.—For constructing main pipe sewers, Syke Lane Valley, for the Urban District Council. Mr. F. Massie, engineer, Tetley House, Kirkgate, Wakefield:—
W. Dolman, Dewsbury £1,721 8 10

HOLYHEAD.—For additions and alterations to the C.M. Chapel, Llangoch, Mr. J. Owen, F.R.I.B.A., Exchange-chambers, Holyhead:—
R. Morris £1,082 W. Roberts £986
J. S. Parry & T. & R. Owen 1,080

KIRTON.—For the erection of a villa residence at Kirton, near Boston:—
J. Conson £209 10 S. Parker & Son,
T. H. Cade 289 10 Wallisell, Lincs* £269 0
J. Longley & Son,
Lid. 275 0

LEE-ONSOLANT.—For the erection of workshops, engine-house, etc., at Seaford Park College. Mr. N. Atker, architect, 65, West street, Farnham:—
J. Cockerell £583 0 0 R. Wilcox £628 0 0
C. Newbury 660 0 0 J. Hunt 595 16 0
A. H. Tubbeck 668 10 6 G. Dawes & Son 586 0 0
Lane Bros. 680 0 0 C. Conway 590 0 0
W. Latty 644 0 0 H. Plummer 559 14 0
C. M. Dash 623 0 0

LONDON.—For rebuilding No. 33, Fish Street-hill, E.C. Messrs. McKilliam & Preter, Architects, 83, St. Paul's Churchyard, London, E.C. Quantities by the architects:—

	Time.	Months.
J. Cannon	£1,418 17 6	7
H. J. Green & Co.	1,380 0 0	31
Battley, Sons, & Holmes	1,386 0 0	4
T. Laphorne & Co.	1,275 0 0	31
J. Greenwood & Co.	1,229 0 0	44
Braid, Pater & Co.	1,226 0 0	3
Peacock Bros.*	1,217 0 0	3
Courtney & Fairbairn	1,200 0 0	4

[Architects' estimate, £1,200.]

LOSSIEMOUTH SCHOOLS (N.B.).—Accepted for (1) new latrines, (2) relaying and extending drain system, (3) levelling and gravelling playgrounds, (4) new seating. Mr. Robert B. Pratt, A.R.I.B.A., Architect and Surveyor, Town and County Bank-buildings, Elgin:—
Mason: W. Christie, Lossiemouth
Carpenter: Ritchie & Son, Lossiemouth
Sentry: M. Andrew & Son, Aberdeen
Plumber: J. Ross, Elgin £495
Slater: Thompson & Fraser, Elgin
Painter: W. F. Smith, Lossiemouth
Playgrounds: W. Falconer, Elgin
The sanitary fittings are from Adam & Co., Scotswood-on-Tyne.

LYME REGIS (Dorset).—For erecting an hotel adjoining the railway-station, for the Directors of Messrs. Mitchell, Toms, & Co., Ltd. Mr. A. W. Yeoman, F.R.I.B.A., Cornhill, Chard:—

	C. Turner	£2,053 2 10
Westcott, Austin, & White	£2,412 0 0	0
F. J. Clark	2,389 10 0	0
Bird & Phippard	2,104 0 0	0
F. W. Crab	2,155 0 0	0
H. Pittard & Son	2,100 0 0	0
H. J. Spiller & Son	2,060 0 0	0

NEW HUNSTANTON.—For making-up part of Northgate, for the Urban District Council. Mr. R. Shanks £285 [F. Southgate, Hunstanton* £266]

NORWICH.—For supply of 100,000 creosoted red deal paving blocks, for the Corporation. Mr. A. E. Collins, City Engineer, etc., Guildhall, Norwich:—
Arms Flooring and Paving Co. (1904), Ltd., Gainsborough-road, Victoria Park, London, N.E.* £5 1 0

NOTTINGHAM.—For completion of church, Lady Bay, West Bridgford. Messrs. A. R. Calvert and W. B. Gleave, architects, 18, Low-pavement, Nottingham:—
G. T. Lovett* £770
(Lowest of four tenders.)

OKABANK (Whitehaven).—For the erection of a dwelling-house at Okabank, for Mr. Fergus Watson. Mr. J. S. Stout, architect, 30, Lowther-street, Whitehaven:—
Mason: J. Young, Catherine-street, Whitehaven £300 18 8
Joiner: J. Fletcher, Workington 153 11 3
Plumber: W. H. Holloway, Queen-street, Whitehaven 90 0 0
Plasterers: J. Lawson & Sons, Gordon-street, Workington 76 2 0
Slater: E. Burrow, Station-road, Workington 39 17 2
Painter: T. W. Pearson, Scotch-street, Whitehaven 15 5 0

SEAFORD (Sussex).—For erecting a boarding-house, for Seaford West Co. Mr. T. W. B. Blackman, F.A.S.I., 24, Old Steyne, Brighton. Quantities by Mr. H. Curtis Kirton, Lewes:—
Saunders Bros. £3,876 0 0 Morling Bros. £2,972 0 0
T. Rich 3,271 8 3 Potter Bros. 2,950 0 0
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VOL. XCI.—No. 3316.

AUGUST 25, 1906.

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Reason and Tradition.

 E are possibly in this present decade coming to a kind of parting of the ways in regard to architectural design, when the question must be answered—and the effect of the answer will operate for some time to come—whether modern architecture is to be carried out according to the dictates of reason, or choice, or by the acceptance of traditional treatment. The century just past may be regarded as an era of experiments in archaeological imitation; experiments which, in the case of modern Gothic especially, were commenced with great hopes and in the belief that we had now found the right course, that of developing our indigenous architecture; and which have successively run out their course and led to the conclusion that life cannot be put into modern architecture by any such revival process. The Gothic revival, however, was actually regarded by its originators as the carrying out of the tradition of English architecture, which had been broken into by the Renaissance revival of Classic forms; but in this respect, as we can all recognise now, they deceived themselves. If the Gothic revival had consisted in taking up late Gothic at the point at which it had been abandoned and endeavouring to develop it further from that point, it might have claimed to be a traditional architecture; but what was actually done was to choose

a certain phase of Gothic and reproduce it; which was mere revival.

Then what is that influence of tradition, on which Mr. Blomfield lays a good deal of stress at the conclusion of the chapter on Palladio in his "Studies in Architecture"?* Mr. Blomfield sums up Palladio in a manner rather different from that in which he has usually been regarded. He characterises the famous Italian architect (who may be called perhaps the Vitruvius of the Renaissance) as one who was desirous not merely to reproduce Roman forms, but "to find in the past the guide for the future"; and he compares Palladio's relation to Italian architecture with that of Chambers to English architecture. Both men were purists with little genius; but both made a conscious and deliberate stand against the merely fashionable license of their time, and endeavoured to recall the art of architecture to the graver practice of the past. This, says Mr. Blomfield, "is a service that needs doing again."—

"The classical tradition was the last effective influence in England, but that influence practically came to an end a hundred years ago, and the efforts of English architecture have given us nothing in its place except varieties of false sentiment. With rare exceptions, the architectural exploits of the XIXth century were of the nature of guerrilla fighting: they may or may not have been magnificent, but they certainly were not war. The work of steadying English architecture has yet to be done, if it is to resume its rightful place in the great procession of history."

Yes: English architecture certainly needs to be "steadied," if we look at the manifold vagaries of style which one sees about in the streets, and even in the designs which have undergone a certain

amount of selection for the annual Royal Academy Exhibition. But it is rather strange to find the example or tradition of the Renaissance, half a century ago supposed to have been the curse of English architecture, now suggested as furnishing the saving element of tradition as the guide for our future course. Is there anything in this, or is it only another delusive hope? An able and original contemporary mind has proposed exactly the contrary course; the deliberate hunting down of all school detail—columns, pilasters, cornices, and mouldings—and beginning afresh on the bare materials of construction, to see what we can make of them for our own purposes. That sounds attractive, as a ground for new developments; the drawback is that it is impossible. The human mind cannot shut itself out from precedent, nor can it be long content with bare walls and roof—if reforming architects were content, their clients would not be; and when we began again endeavouring to give architectural expression to these bare walls, we should find ourselves almost unavoidably falling back on something very like the old discarded forms of detail, the difference perhaps being only in inferiority and not in improvement. And, as Mr. Jackson pointed out in his Royal Academy lectures, the mere fact that buildings for the same general purpose, in civilised societies, require the same nature and arrangement of interiors, inevitably stamps upon architecture a certain conservatism. And as for the direct endeavour at originality in detail, we have seen

* "Studies in Architecture." By Reginald Blomfield, A.R.A. London: Macmillan & Co. 1905.

too much of what that may lead to, in the disease called *art nouveau*.

The remark that the Classic tradition was "the best effective influence in England," though it came to an end one hundred years ago, puts one on thinking whether, after all, the classical tradition is not the most permanent element in civilised architecture. Column and entablature have played a larger part, have been a more persistent element in architecture, than any other principle of structure and expression: even in Gothic architecture the column and capital, or shaft and capital, are directly derived from the Classic column. Gothic architecture was a development out of Roman; after it had passed through all its development, the minds of educated men seem to have had a disposition to recur to the Classic order again as a more cultured form of architectural expression. Its world-history is far longer than that of Gothic, and it is almost a question whether the Classic column and capital, at all events, have not become in truth part and parcel of architecture itself. And the adoption of the Classic tradition, while thus bringing us back to what has proved the most permanent element in architectural style, does not preclude novelty and originality of treatment, as the example of the Italian and French Renaissance architects, as well as of Wren and the best men of his school (such as Hawksmoor and Archer), very clearly shows. These men were not mere copyists; they worked out their own architectural conceptions with materials borrowed from Classic architecture; and of this cult they certainly did not exhaust the possibilities. There is room therefore for further development on the basis of this oldest and most widely-extended tradition of architecture, the maintenance of which may, as Mr. Blomfield seems to suggest, prove itself the steady influence which English architecture requires to restrain it from wandering into aimless vagaries. It has proved such an influence in France. Whatever criticism may be passed on the too Academical tendencies of the Ecole des Beaux-Arts system of education, the fact remains that the French have a school of architecture and we have not.

Mr. T. G. Jackson, in the book already referred to, in which he has published the series of lectures delivered to the students of the Royal Academy this year,* suggests an entirely different principle for obtaining the "steady" influence on architecture which both he and Mr. Blomfield, from their different points of view, unite in desiring, by bringing all details in architecture to the test of "reason," using the word in its practical and not in its abstract sense. Our readers are already acquainted with much of the substance of these lectures, as we published a pretty full *résumé* of them from notes taken at the time they were delivered; but it is well worth while for all readers interested in architecture to have the text as a whole, accompanied by the numerous illustrations. The book is one which ought (if they will take the trouble to study it) to be especially useful to amateur students of architecture.

* "Reason in Architecture." Lectures delivered at the Royal Academy of Arts in the year 1906. By T. G. Jackson, B.A., M.A., F.S.A., Hon. Fellow of Wadham College, Oxford. London, John Murray, 1906.

since it brings before its readers, in language intelligible to every educated person, a view of architecture with which all architects who are worth anything ought to be familiar, but with which the public generally are very unfamiliar. The title, "Reason in Architecture," may be rather misleading, as the author by no means intends to inculcate the view that architecture or architectural style is the outcome of a process of mental reasoning; in fact, he seems to us scarcely to allow enough influence to the intellect in the evolution of style, or of some styles at all events; for in the Greek orders of the purest type there does appear to us to be evidence of a good deal of what may be termed abstract thought in regard to architecture; the selection and elaboration of features or style on intellectual grounds. And we should say also that the form of the interior architecture of St. Sophia was the result of a deliberate mental conception exercised beforehand, and to which the building was made to conform.

What Mr. Jackson really aims at showing is not so much that there is Reason as that there are reasons for everything in architecture; reasons arising mainly out of conditions of structure and materials. This is nowhere so true as in respect of mediæval architecture, and it is on the history and practice of mediæval architecture that Mr. Jackson's thesis is mostly built. In his Chapter III. he announces what to many readers will at first sight seem a paradox, to the effect that the subordination of arches, which is so peculiarly characteristic of Gothic as opposed to Roman building, and the magnificent effect produced by it in the great sculptured porches of the French cathedrals, was not a result of invention, but of a process of evolution arising in the first instance out of the poverty and restricted means of the Romanesque builders, who had no appliances for conveying or handling the great masses of stone used by the Romans, and were thus compelled to build their arches ring by ring of smaller stones, the first ring moreover serving as a centring for the next one, which was built half on it and half over-sailing. The process, and its results when more elaborated and ornamented, are illustrated by a number of diagrams and examples. That mediæval architecture is the architecture of small stones has been often remarked; but the initial practical reasons for this, and their ultimate effect on the more elaborated architecture of the later Gothic, have never been illustrated in so complete and logical a manner. In the second chapter the history of the development of the mediæval carved capital from the Classic capital is traced out in a similar manner, through a number of examples, attention being called, among other points, to the curious retention, in some early French Gothic examples, of the hollow Classic abacus beneath the square abacus derived from Byzantine sources, which had become the real impost; the Classic abacus beneath being a useless survival, not yet got rid of. The gradual change from the Classic to the Gothic form of leafage in the capital, in great measure the result of the use of stone instead of marble, is also traced out through a number of examples. But

we cannot agree that the Southwell capital on Plate IV. retains the supporting character which belonged to the Classic and to early Gothic capitals. Between the Early English capital from Wells on Plate III. and the capital on Plate IV. there is in the æsthetic sense a gulf. The great beauty of the Early English foliage is that it combines freedom of line and an appearance of growth, with the appearance of giving support; moreover it is a conventional treatment exactly suitable to stone carving. The Southwell capital, beautiful as it is in a sense, is an attempt at realism in a material in which realism was impossible, and it is not a true growth from the bell of the capital; it is foliage *appliqué*.

It is noticeable that while Mr. Blomfield's book (to which we shall return) is almost entirely devoted to studies in Renaissance architecture, which is more especially the architecture of tradition, Mr. Jackson's thesis of practical reason or cause as the basis of architectural development is almost entirely illustrated from the development of Gothic architecture. This is natural, for Gothic above all other styles is that in which the details and development are influenced by structural causes. On this account we entirely agree with him in his criticism on an article in the *Edinburgh Review* (evidently not written by a real student of architecture) in which it was asserted that a style so forcible as Gothic supposes the existence of a distinct thought—"if it must have existed in the minds of its builders before it existed as architecture." No one who had studied the development of Gothic out of Roman and Romanesque, step by step, could have written such a sentence. As already observed, there may have been styles, or separate buildings, which were in part the result (*pace* Bishop Berkeley) of an "abstract idea" previously conceived in the mind. But most assuredly Gothic is not of them. It was the result of a long series of struggles with structural problems.

It is for this reason that the Gothic style was so well suited to form the basis of the lesson enforced in Mr. Jackson's book, which is not without an object and an application. The object is to show, to the general reader especially, that architecture is not to be regarded as design capriciously evoked as a matter of invention; that architectural style and detail are evolved out of and are the expression of structure; and indeed that mere structure, as in the case of the three-aisled timber barn at Harmondsworth (illustrated in one of Mr. Jackson's plates), may rank as a work of architecture, awakening in us emotions weaker, no doubt, but of the same kind as those that move us when we stand in the nave of a great minster. We might instance the Forth Bridge as an example on a greater scale. The essential thing is that the structure should be of a bold and of a capable description.

"Why do such structures as the crown steeples of Newcastle, Edinburgh, Aberdeen, and St. Dunstan-in-the-East excite not only surprise and curiosity, but also admiration? It is not that they are more beautiful than other steeples, for there are hundreds of steeples that surpass them in that respect. It is not merely that they are novel and surprising, though no doubt that has its effect on the observer. But the main

pression they make is that of constructive art, and of a difficult problem audaciously challenged and successfully solved. Such structures will never be forgotten by the most casual observer, and in their case no one can deny the interest which a feat of architectural construction is capable of exciting.

When, therefore, we plead with the unprofessional lovers of architecture that they ought not to be satisfied with knowing the mere outward forms of the style they affect, but should look a little deeper and try to trace their meanings as a step to a truer appreciation of their beauty, we can assure them that there is no mystery about it, but that if they were to analyse the impression which they receive from what they see, they will find that they have already been in the habit of applying, although imperfectly, those very tests which we would have them recognise more fully."

The moral is that we should regard modern architecture not as a mere outward form, governed by caprice or the taste of the moment, but as the expression of the structure which properly belongs to the building. And the author points out what a sham and pretence much of our modern architecture is from this point of view, with its imitation half-timbered structures consisting only of ornamental planking which has nothing to do with the construction, and its concealed iron-work, which is the real construction but is not allowed to appear, being masked by a pretended structure of masonry so designed that it could not really stand but for its concealed iron supports. In London this kind of sham building is being carried to such an extent that except in a few public or Government buildings we shall soon have no true architecture left; wherever a new building for business purposes is going up, the first thing we see is this scaffolding of iron standards and girders, the nucleus for the sham architecture which is to surround it. Formerly walls were built first and girders, where required for large floors, were placed on them or built into them as they went up; now the iron standards and girders are built first and the walls built as screens round them. And then, as Mr. Jackson points out, the walls are decorated with a profusion of showy and cheap ornament, and domes and oriels with no visible support and having nothing whatever to do with the construction. If iron is to be the essential construction of the shop building, let the architectural treatment, as Mr. Jackson urges, express the fact, and not continue, in a commonplace and gawgaw manner, a method of design proper to masonry construction.

Among other suggestions, he asks why should not a visible iron framework be used, filled in with whatever material is desired for walling, just as half-timber work used to be used in the days when it was a real construction and not an archaeological pretence; the iron framing taking the place which the oak framing once took. That is an idea worth consideration; though we do not think (nor, we gather, does Mr. Jackson) that there will ever be developed a satisfactory architecture of which iron is the main constituent. The main lesson is, however—consider architecture from the point of view of structure, and ornament as only desirable so long as it is really good and so long as it assists, or at all events does not contradict, the expression of structure. To the class of commercial architects, as they may be called, who erect most of these sham structures, it is probably useless to appeal; but if Mr. Jackson obtains anything like a hearing

from the general public, his book may lead to a demand for something better.

There are various points in Mr. Blomfield's book to which we intended to refer in connexion with our subject; but we must consider these in a second article.

NOTES.

The Latest Earthquake.

This year has been undesirably memorable in respect of physical disturbances, for the great eruption of Vesuvius was rapidly followed by the devastating earthquake of San Francisco, and that event by the equally destructive convulsion in Chile. According to the latest accounts that have reached this country the entire city of Valparaiso is in ruins, and, as the result of repeated shocks, very few, if any, buildings have escaped injury. As happened at San Francisco, the work of destruction was completed by fires that broke out in many parts of the city. The supply of gas ceased, probably owing to fracture of the mains, and the electric light failed, thus leaving the city without light during the night hours except that from the burning ruins. The lack of water and the unwillingness of labourers to assist in extinguishing the flames and in the work of rescue added to the troubles of the authorities. At Santiago de Chile a most severe shock occurred. Numerous public buildings and private houses collapsed or were seriously damaged, but fortunately the fires that broke out in various quarters were promptly extinguished by the firemen, whose labours were to some extent assisted by heavy showers of rain. Although the damage in the two chief cities is more striking it is probable that the loss of life in the smaller towns and the district generally between the Andes and the sea will be shown by later news to have been of far greater extent. In one respect the recent earthquake differs from previous upheavals on the South American coast. The earthquakes of 1724 and 1746, by which Lima was destroyed, were accompanied by a rising of the sea in gigantic waves, and similar disturbance was evidenced at the time of the Chilean earthquakes in the early part of last century.

The Column of Trajan.

EXCAVATIONS by Commandatore Boni outside the base of the pedestal of Trajan's column have led to some interesting results. The cavity made in mediæval times was found to be about 7 ft. 6 in. deep, and to extend nearly to the centre of the pedestal. This excavation and another one at the south-east corner of the base have been filled up with concrete, thus restoring the foundations of Apollodorus to their original security. Explorations beneath the pavement of the Bibliothecæ court, which flanked the column on either side, have revealed the existence of an ancient paved road buried beneath the area of the Alpien forum, and which was cut through by the foundations of Trajan's column. The road apparently ascends towards the Quirinal at a gentle gradient, and may possibly be the *Clivus Fontinalis*. If, as seems feasible, this road was

constructed during the same epoch as the tomb of Bibulus its existence is sufficient to prove that there never could have been a ridge of rock connecting the Quirinal and Capitoline hills, as suggested by the customary reading of the inscription—*ad declarandum quattuor altitudinis mons et locus tantis operibus sit egestus*. Commandatore Boni is now making investigations at the tomb of Bibulus, with the object of finding the road upon which it stood for comparison with that intersected by the column of Trajan.

Damages Under the London Building Act. In the case of Adams v. Mayor, etc., of St. Marylebone the question was raised whether in an arbitration under sect. 91 subsect. 1 of the London Building Act, 1894, the arbitrators could award special damages for loss of trade. The defendants, the building owners, were raising a party-wall, and the plaintiff, who occupied the adjoining premises as a restaurant-keeper, claimed damages for loss of lodgers and customers by reason of the fact that the chimney was affected by the building operations and fires could not be lighted. The Court held that the powers of the arbitrators under this section were limited to structural damages. A perusal of this section strongly supports this view apart from the decided cases. The section runs, "In all cases not specially provided for by this Act where a difference arises between a building owner and adjoining owner in respect of any matter arising with reference to any work to which any notice given under this part of the Act relates," the surveyors "shall settle any matter from time to time during the continuance of any work to which the notice relates in dispute between such building and adjoining owner with power by his or their award to determine the right to do, and the time or manner of doing any work and generally any other matter arising out of or incidental to such difference." The court pointed out that by sects. 93 subsect. 3 and 95 (2) (b) other classes of damages were "specially provided for." This section, though limited to structural damage, does not take away the right of the plaintiff to take the ordinary legal proceedings if he has sustained damages, giving a right of action at common law.

SINCE the appearance of Lord Kelvin's letter Sir Oliver Lodge has written to the *Times* in support of the theory that radium is capable of transformation into helium. The evidence quoted for the generation of the latter substance is not very convincing. In the first place it is said that Rutherford measured the magnetic deflection of the Alpha rays shot off by radium emanation, and made certain inferences which apparently were afterwards considered as facts. Then Ramsay and Soddy examined the spectrum of a minute quantity of radium emanation in a vacuum tube without finding any indication of helium, but in the course of a day or two the helium spectrum gradually made its appearance. This isolated experience is relied upon as a proof that no helium existed at first in the radium. Physicists are aware that the spectrum of a vacuum tube is

somewhat liable to eccentricity, and may change entirely under the prolonged passage of electric current. Gases at first indicated become no longer evident, and others appear that did not at first show a spectrum. No positive explanation has been found for these phenomena, but the fact that they are known to exist is sufficient to convince prudent scientists that the interesting observations so far made are not sufficient proof of the transmutation hypothesis. Moreover, we are not yet sure whether radium is not itself a compound of helium, a possibility that is directly suggested in the second edition of Rutherford's work on "Radio-activity."

Railway Accidents.

THE Report of the Board of Trade on Railway Accidents during the year 1905 has just been issued. The number of passengers killed in train accidents was 39, a greater number than in any year since 1889, but 38 of these deaths were attributable to four accidents. There is reason to fear that the current year will also be one comparing unfavourably with its predecessors in this respect. The number of persons injured in train accidents was curiously below the average despite the above fatal accidents. The injured numbered 396. The numbers of persons killed and injured in train accidents and owing to the movement of trains was 1,099 and 6,459 respectively, the average for the previous nine years being 1,149 and 6,651 respectively. It is satisfactory to note that the casualties to railway servants show a decrease. For the nine years ending 1904 they averaged 1 in 70, whereas in 1905 the proportion was 1 in 81. These figures are also considered in the Report, with reference to the causes of the casualties, in an interesting manner.

The Saltcoats Railway Accident.

UNLIKE some recent railway accidents the mishap that took place on Saturday last at Saltcoats on the Glasgow and South-Western Railway was the result of clearly definable causes. Briefly stated, the facts are that the breakage of an axle in the locomotive of a mineral train had the effect of blocking one track of the line so that up and down traffic had to be conducted on a single track. Owing to the number of passengers the 2.10 p.m. train from Glasgow was divided into two portions. The first train had arrived at Saltcoats, and while being shunted from one line to the other was run into by the second train. It is explained by the railway company that the reason for the rapid succession of the second train was largely due to the fact that traffic was being conducted on the pilot system. This does not strike us as a satisfactory explanation by any means. The curve leading to Saltcoats station is so sharp that an incoming driver cannot possibly see where he is going to, and the fact should have been sufficient to indicate the necessity for special precautions. When the Board of Trade inquiry takes place we shall know more exactly whether the railway company adopted adequate measures to provide for the safe working of the line under the exceptional circumstances here mentioned.

Expanded Cast Iron.

A NEW process for which the Elliott Cresson gold medal has been awarded by the Franklin Institute is based upon the permanent expansion of cast iron under the influence of heat, a phenomenon to which attention was directed in our "Note", of May 7, 1904, relative to the Baltimore fire. In the process to which we refer the bar of iron, whose volume it is desired shall be increased, is alternately heated and cooled several times. As a proof of what could be accomplished in this way, two bars were cast in the same mould, one of them being kept for the purpose of reference; while the other was expanded until its volume had been increased by 46 per cent. When the bars had been machined on one side very little difference was observable in the structure of the metal. It is stated that important applications have already been found for this interesting process, but we do not see that cast iron expanded in the manner described can possess any advantages that are likely to repay the cost of treatment, except perhaps the decreased liability to expansion during outbreaks of fire when employed in the form of window and door frames.

Concrete-steel Column Tests.

THE results of a series of tests upon plain and reinforced concrete columns, conducted by Mr. James E. Howard at Watertown Arsenal, are of more than ordinary value. The columns were of sufficient size to eliminate the errors practically inseparable from laboratory tests upon small specimens, and the varied character, both of the concrete and the reinforcement, renders these tests particularly useful for purposes of comparison. One very interesting portion of Mr. Howard's investigation was that relative to the influence of angle bars used in the form of longitudinal reinforcement. As might be expected, such sections were found to be peculiarly effective in adding stiffness as well as strength to the members in which they were embedded. Another point made clear by Mr. Howard is the superior stiffness of columns with longitudinal bars in comparison with those simply reinforced by steel hooping. It would be wrong, however, to infer from this fact that longitudinal reinforcement should be used alone, for it has been conclusively proved by numerous tests how valuable is the effect of hooping in adding to the bearing capacity of concrete. The real nature of this action is well illustrated by the tests made by Mr. Howard upon large-sized hooped columns at Watertown Arsenal.

Rights in Salt Mines.

THE case of the Salt Union, Ltd., v. Brunner, Mond, & Co., Ltd., recently heard in the King's Bench Division, raised a novel point, but since the judgment alone took up four columns of the *Times* we can only draw attention to the decision by a few words in these pages. The question involved was whether an action will lie for the abstraction of brine by the owners of one salt mine in working their own mine from the mines of neighbouring owners. The defendants were lawfully working their own mines, but in so doing were abstracting brine from neighbouring

mines. The finding of the Court seems to amount to this: That for many years before either the plaintiffs or defendants had acquired their mines, nine of the mines owned by the plaintiffs were connected by underground channels, which no human agency could close, and which would enable brine from other mines to collect and circulate, and that pumping operations on the plaintiffs' premises would inevitably lead to an abstraction of some of the brine from other mines. This condition of affairs was the result of mining and pumping operations and consequent flooding of old mines, and had existed for many years, possibly even for centuries. In these circumstances the Court held that the defendants had committed no actionable act, and the plaintiffs were not entitled to an injunction. Although the case resembled those concerning underground water the condition of things was artificially created by the mining operations. A claim for subsidence caused by the pumping operations also failed on the ground that the subsidence complained of could not be directly or exclusively connected with the defendants' pumping operations.

Waterworks and Mining Rights.

THE case of The Corporation of Manchester v. The New Moss Colliery, Ltd., commented upon by us in our issue for December 21, 1904, has been carried to the Court of Appeal, and the decision of the Court below has been reversed. The Manchester Corporation in 1875 purchased for the purposes of their waterworks two estates, one from the Earl of Stamford, the other from another owner, Taylor. This latter estate was conveyed to the Corporation with all mines and minerals, whereas the mines and minerals were reserved in the conveyance of the other estate, and had been leased to the defendants. The plaintiffs constructed their reservoirs, some part being erected on the Taylor estate. The defendants, wishing to work the minerals adjacent to or under the plaintiffs' reservoir, gave the notice required by sect. 22 of the Waterworks Clauses Act, 1847, giving the plaintiffs the opportunity to arrest the work by paying compensation, but the plaintiffs did not avail themselves of the provisions of the Act, and the defendants continued their mining operations, and there was a subsidence of a portion of Taylor's estate, and damage to the reservoirs and works ensued. Mr. Justice—now Lord Justice Farwell held that as the plaintiffs had not availed themselves of the provisions of the Waterworks Clauses Act, 1847, they were left without other remedy, whereas, to state the point very shortly, the Court of Appeal have held that, as owners of Taylor's land, the plaintiffs had the common law right to lateral support, independent of the statutes, a right not limited, moreover, to the 40-yds. limit prescribed by sect. 22 of the Act. This decision leaves the question still open as to what compensation, if any, can be claimed by the defendants for not working certain portions of the mines.

The Osram Lamp.

FULL details have now been published in the *Elektrotechnische Zeitschrift* of the new metallic filament lamp which is being

brought out by the German Gasglühlicht Company, of Berlin. The results of the tests of many of these lamps made by the Reichsanstalt fully bear out the statements made at the recent electrical congress at Stuttgart, and prove that a very important step has been made in the utilisation of electricity for lighting. In appearance the lamps are practically the same as the ordinary glow lamp, but the filament is made of an alloy of osmium and wolfram instead of carbon. For this reason it is called the Osram lamp. The life of the lamp averages a thousand hours, and so is practically the same as that of the ordinary lamp. It gives the same light, however, for less than one-third the consumption of electric power. It is twice as efficient as a Nernst lamp, and, unlike the latter, it lights the moment the switch is turned on. It will be seen that if any consumer replaces his glow lamps by Osram lamps he will reduce his meter bills to less than one-third their present value. At present the lamps are only made for 10-volt circuits, but arrangements are being carried out on a large scale for making 220-volt lamps, and the German Company hope to place them on the market next month. It is interesting to notice that nearly all the most important recent improvements in glow lamps have been made in Germany, and the most obvious explanation of this seems to be that the German electrician has a much more thorough technical education, especially in physics and chemistry, than his rivals elsewhere. He more fully appreciates the importance, therefore, of having a white instead of a dead black filament for radiating light. One probable effect of the general use of metallic filament lamps will be a momentary drop in the "load" of electric supply stations, but it would be a short-sighted electrician who would regard this as a misfortune, as the greatly increased demand for the electric light would conduce enormously to the progress of the industry.

Business Methods. We are so accustomed to read of our trade slipping away in various parts of the world owing to the lack of energy and foresight on the part of the British trader, that it is really refreshing to read some remarks on this subject recently published by the Department of Commerce and Labour at Washington. The American "hustler" is generally held up for comparison with his out-of-date conservative British competitor, to the great disparagement of the latter; but in the official report alluded to it is actually asserted that "the manufacturers of the United States are far behind European manufacturers in enterprise, and in adapting their goods to the Eastern markets; and as a result they are making comparatively little headway in countries in which a great deal is open to them." Statistics follow proving that the European imports of the principal markets of the Eastern world are increasing at a far greater rate than those from the United States—the United Kingdom taking the lead in this advance in some of the most important of the markets named. The figures, of course, are in agreement with our own steadily-improving export returns, and

call for no comment. A similar statement to this was made some years back by the leading organ of the American Agricultural Engineering industry, but a pronouncement of this nature in an elaborate report issued by a Government department is deserving of as wide publicity as that given to the strictures so frequently made upon our own traders.

THE ARCHITECTURAL ASSOCIATION ANNUAL EXCURSION.*

Wednesday, August 15.—Woodcroft Castle.

On Wednesday morning the party took the 8.40 train on the Midland to Helpstone station, where brakes were waiting to take them to Woodcroft Castle, a moated and fortified mansion now so modernised as to have little interest remaining. It has been often illustrated, and is founded on a manor house of the period of Edward I. The space enclosed by the moat is roughly a square, of which the house occupies the west side and part of the north, being L shaped on plan, with a round tower at the angle. The gateway is near the centre of the long or western side, and over it the house rises to three stories, forming a square tower. The house to the south of this, and possibly the north also, had originally a steep gabled roof, but this has now been replaced by carrying up the wall and putting on a square roof. Over the south arm of the moat is a small foot-bridge of stone of pleasing design. The interior of the house was not visited, but is understood to have been completely modernised. The house was besieged in the Civil War (1648), being held for the King by Dr. Hudson, who, when the house was taken, jumped from the round tower and tried to swim the moat, but was killed by the Parliamentarians. He is the original of Scott's Dr. Rocheliff in "Woodstock," and his story is woven into the plot of the novel.

Glinton.

From here a short drive took them to Glinton, where they made a long stop. After visiting the church the party settled down with great unanimity to sketch the manor house. The church is dedicated to St. Benedict, and is mainly of the later XIVth century, with a square Norman font. Here they were received by the clergyman, the Rev. R. C. Faithful, who explained various points, and showed them two curious old chests in the south aisle, one of which, hollowed out of a solid log, was about 8 ft. long by some 14 in. high and wide. The church is of the usual form, a nave and two aisles, with a tower and spire at the west end, and has a series of very grotesque corbels between the clearstory windows, said to represent the World, the Flesh, and the Devil, while the gargoyles outside are done with great vigour, and one at least is more curious than decent. The capitals of the nave have the top member embattled, a feature that also occurs in Market Deeping church. The spire is set directly on the tower, without turrets or other device to hide the transition from the square to the octagon, and is of great height in comparison to its width. It was damaged by lightning about 1860 and rebuilt; but by some mistake the upper part comes in much too sharply, giving the effect from below of an exaggerated entasis, which is by no means happy. In the churchyard are two recumbent figures, said to come from Northborough Church, now much defaced by weather and ill-usage.

A hundred yards away stands the manor, a charming Jacobean building, now in the occupation of Mr. Thirby, who let the party wander all over his yard and garden. The house is an L-shape on plan, with the typical ogee curved gables of the period, terminated by stone balls with iron spikes, and is built, like almost all the buildings of this neighbourhood, of the grey stone of the district, with grey roofing slabs. The porch is the principal feature of one side, carried up all three stories, with the doorway set forward slightly in a rusticated frame, and with the window of the first floor set forward to the same face. The keystone of the porch doorway is carved, but, except for this, the simple finials

* Continued from last week. See page 226.

and string-courses, there is little ornament. The chimneys are good examples of their type, the flues being carried up in groups of two or three, rusticated and connected by base and moulded capping, but otherwise independent. Near by is a farmhouse dependent on the manor, a plainer but still charming example, with a thatched roof instead of the usual stone slabs. Here behind the house are two fine gato piers, now much dilapidated, and leading into a cabbage garden out of a picturesque little back yard.

Peakirk Church.

From here the party drove to Peakirk, stopping by the way to lunch in a gravel pit, from which they were driven by a threat of rain, and reached the church just before a heavy thunder shower broke over the village. The place derives its name from St. Peaga, the sister of St. Guthlac, the founder of Crowland, who came here and founded a hermitage to be near her brother. The church consists of nave and aisles, but has not the usual tower and spire, this being replaced by a triple bell-cote at the west end of transitional or Early English date. The nave arcades are of the same date, the piers inclining to the Norman in style on the north side, with round arches over; the south arcade has pointed arches, and is rather later in date, while in the chancel an arch in the north side has one respond with a typical Norman capital, the other with a typical Early English one. The windows are mainly perpendicular, with the exception of three lancets in the west end, while one of the perpendicular windows in its square label has a curious development of the ball-flower ornament, this being as it were strung on a wavy stem. The south door is a fine Norman example, enclosed by a later porch, while the wooden shaft of the lectern is one of the few surviving specimens of decorated woodwork. The church is one of the smallest the party saw. The hermitage in the village, a survival of St. Peaga, was not visited owing to the rain.

Northborough.

Northborough was the next place visited, the points of interest again being the church and the manor. The church originally consisted of nave and aisles, with no tower, but later a fine chantry was built out at the east end of the south aisle to double the width of that aisle. Beneath this is a small crypt, reached by a narrow passage and stair, and filled with bones, said to be Saxon and Danish. At the east end of the south aisle are a fine piscina and sedilia, with two wide arches in the wall, said once to have contained the figures now in Glinton churchyard. The buttresses at the west end supporting the double bell-cote are said not to be bonded to the wall, and deep putlog holes exist in this wall. The chantry is the chief point of interest, containing the remains of two very fine niches, now much mutilated, parts of which were used up in the poor but pompous Elizabethan tomb of James Claypole. The roof of this chantry is carried up above the choir roof, and a passage runs all round it, carried out above the choir on corbels. The roof is vaulted in two compartments, the west vaulting shaft being divided from the aisle wall by a bit of stone screen, said to come from Peterborough Cathedral. In the chancel is a portrait of "Lady" Elizabeth Claypole, Cromwell's daughter; his wife was also buried here, and tradition says that the burial at Westminster was false, and the body of the Lord Protector himself lies in the churchyard. The Rev. S. G. Short met the party and showed them over the church.

Northborough Castle.

From the church they strolled across to the manor, known as Northborough Castle, once in the possession of the Claypoles, and considerably larger. The castle at present consists mainly of the hall and gatehouse opposite; the latter has lost its upper story, which is replaced by a hayloft, while at one side a range of stabling was built on in Charles I.'s reign, attributed by local tradition to Oliver Cromwell. The gatehouse has a fine double arch, with a third arch set at a slight angle in front, parallel with the road; the space left between this and the gateway proper was once vaulted in stone, though only the springing of the shafts remain. The gateway has a large arch for

carriages and a smaller for foot passengers, with a stone bench beside it. On one of the gables of the stabling is a quaint sundial by way of finial.

The hall was parallel to the gatehouse, though the "screens" entrance was not quite opposite. The interior has been completely gutted, and no trace remains of the screen, unless a great oak beam in the ceiling be part of it. The entrances at each end remain, and three very fine decorated doorways, once leading to the buttery and kitchen, though these again have been modernised. The gable coping at this end of the hall is crocketed very boldly, and terminates in a fine carved chimney, illustrated in Parker and other text-books. The window heads were once filled with flowing tracery, recalling the well-known Venetian type, but these are now bricked up, making a square termination to the two lights, and on the south side later gables have been carried up, making a very pleasing combination. There is no trace of the usual bay window, and the hall seems short in proportion; it may possibly have lost a bay in subsequent alterations. In the later rooms over the site of the kitchens there is some butt-moulded panelling used as partitions, and a good fireplace; the plastering of the ceilings is carried on reeds instead of laths, and the floors in several of the rooms are formed of plaster or cement instead of boards.

Market Deeping.

A heavy thunder shower somewhat delayed the start for Market Deeping, where the party were most hospitably received by the rector, the Dean of Stamford, who gave them tea in his garden (interrupted by a second shower), and showed them over the remarkable rectory and the church. The rectory embodies the remains of a pre-Reformation parsonage, consisting mainly of the hall and dormitory over, now cut up into smaller rooms. The timber roof is very fine, with later figures of angels and monks attached to the principals, and the upper rafters can be well seen from the dormitory, which is reached by an extremely ingenious, if not quite satisfactory, stair. The original doors to the hall remain in position, with their hinges, and form fine specimens of XIVth century ironwork; there is also a good XIVth century window. The house has been illustrated in Parker's "Domestic Architecture" and in Cutts's "Life of a Parish Priest in the Middle Ages." The rectory and church stand on the King's-road, perhaps a Roman road, and certainly of great antiquity, which is mentioned several times by Kingsley in "Hereward the Wake." The church, beside the rectory, is dedicated to St. Guthlac, the founder of Crowland, and is mainly XIIIth century work, the south door having the original door and hinges of Early English work. The north arcade of the nave has round arches on peculiar capitals, which look as if they had only been blocked out, not carved, and on the springing over the first pier from the chancel is a little niche. The south arcade is pointed, on more usual capitals. The church was restored in 1877, and the north aisle carried westwards alongside the tower, to correspond with the south aisle, and the vestry and organ chamber added. The chancel has a pair of mutilated niches in the eastern angles, a piscina, and pair of sedilia, with another niche beside them to the west, larger, and carried down to the ground. These are figured in "Churches of the Nene Valley," though Market Deeping is on the Welland. There is also a XIVth century tomb slab in the chancel, and a pair of old bench ends made up into a chair. The church owns a fine pewter flagon bearing the date 1774, though perhaps earlier, and a silver chalice of good plain design of about 1640. The roof is a flat pitched timber one, and there is a piscina in the north pier of the chancel arch. The square tower contains a peal of bells, rung every night at six o'clock for curfew. In the churchyard are several stone coffin-lids of the XIIIth to XIIIth century, but these are for the most part mutilated.

A momentary halt at Uffington on the road to Stamford gave a delightful glimpse, through lofty iron gates above a semi-circular stair, of a formal garden belonging to Lord Lindsay, whose house here was damaged by fire about a year ago. The church has good

ironwork to the gate; the nave is transitional Norman work, but the chancel and the corbels in the nave, with a peculiar niche or canopy over the pulpit, are modern. Under an arch in the chancel lies the stone figure of a knight in armour that presents several peculiarities, but light and time did not permit a close investigation. Opposite is a Jacobean or Elizabethan monument, with two kneeling figures. The spire is a fine example, with crocketed angles. The party returned to Stamford along the Welland valley, passing St. Leonard's Priory, a fine late Norman building, now used as a cart-shed.

Thursday, August 16.

The programme this day consisted of Lyddington and Rockingham, and an early start by train was necessary. Passing Ketton and its quarries, we came to Rockingham Station, where the brakes awaited us, and drove to Lyddington, a picturesque village, where the prevailing ironstone made a pleasant change after the grey of Stamford. The church, a fine Perpendicular example, is flanked on one side by the beautiful "Bedehouse," once a palace of the Bishops of Lincoln, the garden of which runs down to the main road, and has a curious octagonal tower at the angle, known locally as the "watch tower." The garden is higher than the road, so that, though there is a footway through an arch below, one enters on a level from the garden. Inside there are remains of four windows, three of which are now built up, and three cupboards in the remaining sides, with remains of iron hinges. At one time there are said to have been three other similar towers. Their use is unknown, perhaps garden houses or gazebos; the country people say they were built to watch for Oliver Cromwell, though obviously the only remaining specimen is Perpendicular work. The church has a fine lofty tower, with a curious stumpy spire, in marked contrast with the height of most of those in the neighbourhood. There is a good reticulated east window, and traces of a north and south door in the aisles; the south door had a porch over it. The present entrance is by the west door under the tower. The vestry also shows signs of having once been some 4 ft. higher. Internally the church suffers from the loss of its stained glass, some scraps of which still remain. There are considerable traces of colour decoration over the chancel arch and on each half-bay westwards, while the modern chancel screen has a series of old Perpendicular panels in its lower part, carved and showing remains of colour. The communion table is placed completely clear of the east wall, with the rail running right round it, an arrangement that may also be seen at the Saxon church of Deerhurst, near Gloucester. In the chancel are two brasses, one showing a very graceful figure of a lady, the other to a member of the Watson family, of Rockingham. The font is square and early, with a wooden cover that does not fit it, and is hardly in keeping. A remarkable series of stone coffin lids has just been discovered, hidden under the churchyard hedge, and forming the coping of the wall.

The glory of Lyddington, however, is the Bedehouse, a splendid Perpendicular house of the Bishops of Lincoln, now belonging to Lord Exeter. Running roughly east and west, there is a covered passage on the north side, forming a sort of cloister. The stairs are north of this again, and come over to the house at the first-floor level; on the ground floor is a most picturesque kitchen, with a wide hearth spanned by a carved and moulded arch. Opposite the stair head are two fine doorways in stone, the right-hand one leading to a long room, the hall, with a splendid panellied oak ceiling, having a fine canopied cornice, probably once coloured. Halfway down the south side is a bay window, and opposite a stone fireplace, with a wide flue, in which are iron holdfasts, and a dark opening in one side. No one, however, was found bold enough to brave the soot and find out whether this led to a priest's hiding place or to a more prosaic curing chamber. Leading out of the long room is a smaller room with a similar ceiling, both rooms having small internal porches of later date. The glass in these rooms is fairly complete, and of the period, and bears the mottoes "Delectare in Deo" and "Dis delectatio mea," with roses and coats of

arms. In the bay is the red rose of Lancaster, a most splendid piece of colour. The floor is of cement, and, though it has sagged in places, is still in fair condition. The smaller room has another good fireplace. In the bay of the long room is an old oak chest, and near the door a money-box to hold the fines of those who were late for dinner.

Rockingham Castle.

After luncheon the party drove back past the station, over a mile of flat, straight road in the valley, to where the town of Rockingham straggles in a long street up the steep hill on which the castle stands. In the village is a modern cross on an ancient base, and near the top of the street a gate leads into the park, and the road winds round the gully, which once protected a side of the castle to the gate, flanked by two low round towers. Little remains of the original wall of the castle, though the line of the outer defences, of considerable extent, can be traced by mounds in the garden, and the site of the keep, now terraced and bright with flowers, is fairly clear. The castle stood on a promontory of the escarpment of the valley, flanked by two steep-sided gulleys. The side overlooking the valley and the town is also very steep, and has been carved into terraces some 10 or 15 ft. high at the foot of the wall, to make it still more unpleasant for any attacking force. There was no moat, as the situation made this impossible. The gate is flanked on one side by a charming guesthouse; on the other, the left as one enters, is the long range of the house, with the main door, which Mr. Green has sketched, and opposite a return wing, nearly enclosing the forecourt. The other side of this wing, which runs back a long distance, masking the kitchens and offices, and extending nearly to the keep mound, faces first a large lawn, bounded on two sides by the line of the walls, and on the other by a fine pair of yew hedges, clipped into curious shapes. Above this, on a slight terrace, still fronted on one side by the long low line of the house, with its irregular gables, is a fine garden laid out with turf walks and formal flower beds, and a sundial in the centre. Beyond the house rises the keep mound, now laid out in flowers, from which there is a delightful glimpse of a picturesque kitchen court behind the main buildings. Beyond the mound are more formal gardens, merging gradually in lawns and trees, till the wilder parts of the park are reached. Some distance from the house, just beyond a ridge which marks one of the lines of defence, is the kitchen gardens, two brick-walled squares bordered with flowers, and flanked on one side by the gardeners' cottages. The house itself in its charming setting is very picturesque, though with no pretence to the elaborate stateliness of Kirby or Apethorpe, while the inside has been entirely modernised. Mr. W. A. Watson, the owner, in whose family the house has been for generations, received the party most kindly, providing tea in the dining-room, the floor of which, like all the other rooms in the long wing, is sunk a foot or two below the ground, probably as a defensive precaution, and afterwards showing them over the house. In the hall are various curiosities, amongst them one of King John's treasure chests and some good furniture. The dining-room is a charming panellied room, with a high window at the end. The drawing-room is upstairs, and contains some good pictures, a Vandyck, a Reynolds, and a particularly charming portrait by Lely of the first Lady Rockingham. From the castle the party returned on foot through the village to the station, admiring the huge railway viaduct across the valley.

Friday, August 17.—Harrington.

For this, the last day of excursions to the neighbourhood, the secretaries had reserved perhaps the climax of the whole excursion, Kirby Hall, but the day was a little spoilt by threats of rain, which were unhappily fulfilled in the afternoon by several showers. The party set out by rail to Seaton, on the way to Rockingham, close to the huge viaduct mentioned above, and from there took brakes to Harrington, a picturesque village about a mile away. Here a stop was made to examine the church and village. The former is in the main a Perpendicular church of the usual type, with nave, north and south aisles, and

chancel, but the tower and spire are earlier, the tower having a Norman arch carried on capitals showing the "inverted volute." The south porch is also earlier work, while the mouldings of the north door die on to a most unusual series of steep conical weatherings. The windows to the clearstory are square-headed; there are three sedilia, an ambry, and piscina in the south aisle, and sedilia and piscina in the chancel, now much mutilated. A curious little stair in the south chancel arch with two light holes, which can hardly be called windows, leads up to the roof loft, a modern restoration; but the screen below is genuine Perpendicular work. At the west end of the north aisle is the vestry, separated from the church by a Jacobean screen of fine, simple work, and at the other end a curious erection, some 5 ft. high, and crowned with poor ironwork, blocks all the aisle, and contains the family vault of the Tryons. Several bits of Jacobean and earlier panelling lie about the church. There is a good Early English font, and the buttresses of the east end are crowned by a pair of grotesque monsters. In the village is a graceful cross, the subject of one of Mr. Green's sketches, near which is a cottage with an elaborate decorated chimney as final to its gable. The Swan Inn has a XVth century front and a very picturesque backyard, while between it and the church is a good plain house with clipped yew trees in front. From here the party began to climb the escarpment of the Welland valley, farther along which lies Rockingham, till we came to the village of Greeton, in a commanding position overlooking the valley.

Greeton.

Here, as at Lyddington on Thursday, the party got into a country where ironstone is to some extent used in place of the grey, making a very pleasant variety. The church is perhaps more curious than beautiful; it is mainly Perpendicular, but has an earlier tower and no spire. The nave arcade is curious; of the four arches the two middle ones are Norman, the others being Early English, that to the west very narrow and the eastern one very wide. The passage between the pews widens out with a sweep when it comes to this arch, giving a very good effect. The two aisles have rudimentary transepts at their eastern end, and at the south-eastern angle of the south aisle, against the chancel arch pier, are built in two arches of a very rich Early English arcade with the dog-tooth ornament. The windows to the choir are square-headed, and the choir itself panelled in poor XVIIIth century work. The east window is most unfortunate, being at least a foot narrower at the base than at the springing of the arch, the mullions more or less sloping outwards accordingly. The pulpit is a good plain example, and there is a fine Jacobean balustrade shutting off the vestry in the tower. The church has been restored by Mr. Talbot Brown, and has a timber roof of flat pitch. In the churchyard is a very rude and primitive cross, standing only 2 or 3 ft. high. Opposite the churchyard is the village green, a triangular patch, on which stand the stocks and whipping-post, in very fair preservation, an object of great interest to the party. The village boasts some good XVth century houses, with the typical chimneys of the district, and the occasional use of ironstone gives a touch of colour. The village inn has some elaborate ironwork supporting the sign.

Kirby Hall.

From Greeton the party drove on to Kirby Hall, the most magnificent building they were to see, and also the most derelict. The huge house, designed by Thorp in 1572, and altered by Inigo Jones, is at present inhabited by a caretaker, who occupies one corner. The rest is roofless and ruined, the drives grown up with grass and vanished, the gardens gone back to meadow. So much has been written about Kirby, it has been so often drawn and measured, that a fresh description would be as superfluous as it is impossible. Suffice it to say that the party found ample scope for their energies. Details were sketched and measured; a few of the boldest settled down to attack the great hall, with its elaborate semi-hexagonal ceiling, and gallery by Inigo Jones; some made distant views of the exterior, and some tried to reconstruct the gardens, or speculated on the possibility of again putting the house into

repair. Mr. Green's smaller sketch shows the garden front; the nearer angle is all that is inhabited. The further of the two great bay windows marks the room, once the library, now used as a dining-room for trippers, who write and scratch their names on all the walls. One curious point in the masonry is that the angle quoins and the window jambs, though dressed off to look regular, in reality in many cases extend further back into the rubble masonry of the walls, the superfluous stone being carved to imitate the surrounding rubble. There was some difference of opinion among the older members, some saying that the building was in far worse condition than it had been on previous visits, others that the decay was not so noticeable. It is some consolation to think that the Jews who sold the lead off the roof, and so caused all this ruin, by a fortunate accident never got their money, for the plumber to whom it was sold went bankrupt immediately after removing it. Inigo Jones's work is practically confined to the entrance court and front, to a window over the porch in the inner court, and to the great gallery in the hall. The name of Humphrey Stafford, the original owner, occurs on the parapet of the great hall, and his device and crests occur everywhere in the enrichments of Thorp's work. At the time of Napoleon's threatened invasion the house was selected as a place of refuge for the Royal Family, should London become untenable.

From Kirby the party drove back in a heavy rainstorm to Seaton Station, and so returned to Stamford and the usual festivities of the last evening.

Saturday, August 18.

Saturday morning saw a considerably diminished party, as several members had to leave on Friday night, and others by early morning trains. Of the rest about a dozen accepted the invitation of a local quarry owner to see his brickworks and quarry. The stone is found under a thick bed of clay, from 15 to 20 ft. deep, but this can be utilised at the brickworks, which turns out chiefly fine-brick and adamantine clinker. The machinery seems of the most up-to-date description, and is capable of turning out about 10,000 bricks a day. Close by, over the crest of the hill, is the quarry, producing Casterton stone, resembling Ketton, but rather coarser. Last year, on the top of the stone, in a gully in the clay some 18 ft. from the surface, was found the skull and other remains of a neolithic man, together with a very fine polished green stone celt, and above, some fragments of later pottery, apparently washed down the same cleft in the clay. Near by was found the skeleton of a horse, whether neolithic also or not we cannot say. In the clay pit we were shown the fossilised trunk of a tree, strongly impregnated with iron from the surrounding soil.

This party rejoined the others at half-past ten to see over Burghley House, the home of Lord Exeter, the lodge gates of which stand just outside the town on the London road. These gates were built at the beginning of the last century, and are imposing enough. On each side is a little lodge, carried up two storeys, and ending in an octagonal dome, the final of which forms the chimney. The house is about a mile further on, with no formal avenue, and is an extremely florid example of Elizabethan architecture, built in the form of a square round a courtyard, with extensions on one side towards the stables. Two of the other sides look on to the gardens, while the fourth side faces the forecourt, enclosed in a very graceful iron screen. But the most striking feature of the house is the inner court, with a wonderful clock tower crowned by a pyramid, on each side of which the lions of the Exeter crest ramp up as supporters. A very good effect is given by the later corridor built on round this court for two stories, the third story, with its very open balustrade, being left at its original face behind the others.

The interior of Burghley is too complicated to be described here at any length. The hall has marble capitals and bases to the columns of a very pleasant creamy tint. The upper floor is reached by a fine stone staircase, with intricate patterns and pendants to the stone vaulting, and consists of a great series of State rooms, with ceilings painted by Verrio, tapestried or panelled walls, with carvings

by Grinling Gibbons, hung with numberless pictures, many of them poor enough, but others of the highest beauty and interest. Among these are some Vandycks, a portrait of the great Lord Burleigh, of Queen Elizabeth and her father and sister. The rooms also contain a splendid collection of china and glass, and many very fine steel grates and fenders. They lead at last to the great staircase, with the largest of all the Verrio ceilings, off which opens the great hall, one of the first parts of the house completed. This is very lofty and has a good open timber roof, with an immense window beside the dais, and a huge fireplace. The kitchen is a large groined and vaulted chamber, and in the yard outside is a very attractive little cloister, enclosing a curious building, ornamented with what appear to be representations of beer barrels. The chimneys are noteworthy, in the form of Tuscan columns with connecting entablatures.

The afternoon, for such as remained, was devoted to Stamford itself. The six churches, each with points of interest, and the numberless fine houses, made up a full afternoon; indeed, it would take a week to do anything like justice to the town. There are three almshouses in the town, a modern one in Scotgate, one beside the bridge, with a delightful range of chimneys and dormers, and Browne's Hospital, a most picturesque building in the upper part of the town. This has been largely modernised, but once resembled St. Mary's Hospital at Chichester, in that the cubicles of the bedesmen opened into the chapel. There is some fine stained glass in the chapel, and a good Jacobean table in the antechapel. Of the churches All Saints makes a splendid group, the building mainly Perpendicular, but with an Early English arcade running round most of the outside. It has also perhaps the most satisfactory spire in the town, though St. Mary's, which is also very fortunate in its position, runs it very close in this. St. Mary's also has a fine modern screen by J. D. Sedding, and a good painted roof to the chancel. St. Martin's, across the river, contains the monument of the great Lord Burleigh, a splendid piece of Elizabethan work, and of his descendants of the Exeter line. There is also much good glass in this church, and in the churchyard is buried Daniel Lambert, of prodigious memory. Archbishop Laud was vicar of this church for a couple of years. St. George's is a queer little church, with an oblong tower, and in St. George's-square, surrounding it, may be seen good examples of the typical XVIIth and XVIIIth century houses for which Stamford is famous. Others may be seen in Barn Hill, behind All Saints Church, and, indeed, in every street. The prevalence of round bay windows of small projection is very noticeable; generally only on the ground floor, they are sometimes carried up two or three stories. A very good shop front near St. Mary's has a pair of them, the door between standing in a slightly projecting bay, with a very slight recessing. The effect of this reversed curve between the two projecting ones is very happy. But so much has been written lately about Stamford, and so many drawings and photographs been published, that its principal features must be known to all architects, and to go through them again would be tedious.

During the afternoon all the remaining members of the party left, some for London, some staying over Sunday at Peterborough, and others for various destinations. So ended the thirty-seventh excursion, for the success of which full credit must be given to Messrs. Hennings and Talbot Brown, the indefatigable honorary secretaries.

CARMYLE U. F. CHURCH, GLASGOW.—The memorial stone of Carmyle United Free Church was laid on Saturday last week. The new church is in the Gothic style, and occupies a site adjacent to the present temporary place of worship. When completed it will have accommodation for 400 people in the area and sixty in the gallery. A deep recess has been formed behind the pulpit for the reception of an organ at some future date. A session-house, vestry, and ladies' room are to be provided at the rear. The entrance door faces the main street. The buildings were designed by Mr. Petrie, architect, and the contractors were:—Mr. William McEwan, mason; Mr. George Eaglesham, joiner; Messrs. A. & D. Mackay, platers; Mr. Robert Gardiner, plumber; Messrs. John Struthers & Son, plasterers; Messrs. Knox Bros., glaziers; Mr. George Smart, clerk of works.

ISOLATION IN FEVER HOSPITALS.*

I HAVE ventured to bring before your notice particulars of a new departure which is being made by the managers of the Metropolitan Asylums Board in connexion with the numerous infectious hospitals under their control. This new departure relates to the isolation of patients suffering from, or suspected to be suffering from, scarlet fever, diphtheria, or some other infective disorder.

The principle thus recommended [in reports by Professor Simpson and Dr. Cameron] is, in fact, that of treating every incoming scarlet fever or diphtheria patient as "doubtful," and consequently to isolate such patient for a period long enough to exceed the period of incubation of any other or "secondary" infectious disease, such as measles, which the patient may have contracted before entering the hospital. Now there are several good reasons for adopting this principle. Hitherto the usual practice has been to receive patients direct into general wards containing from eight to twenty-four beds, according to the construction or size of the hospital, cases of obvious concurrent infections, or obviously wrong diagnosis, being placed in isolation wards, having one, two, four, or six beds in a ward, and being in separate buildings called isolation blocks or pavilions.

But although these "obvious" cases are immediately isolated, there must of necessity be a large number of "doubtful" cases sent to fever hospitals, of both scarlet fever and diphtheria, owing to error in diagnosis, and it is a well-known fact that the proportion of these errors in diagnosis is increasing rather than diminishing, and that many of these cases find their way into the general wards.

There are also the cases, already referred to, of patients admitted suffering clearly from scarlet fever or diphtheria, which ultimately develop another infectious disease after having been some time in the general ward, the patient having contracted this disease also before admission to the hospital, but the disease not having developed at the time of admission.

We come, therefore, to this conclusion, that, as it is quite impossible, in receiving a case, to decide that it does not contain the germs of another but undeveloped infectious disease, and that such cases are numerous and frequently cause much mischief, and that as much trouble also arises from errors in diagnosis, the only safe course is to treat every incoming case as "doubtful," and to administer the hospital accordingly.

This means, therefore, that every incoming scarlet fever or diphtheria patient must be isolated for a period varying from a fortnight to three weeks, to be afterwards transferred either to the general wards or to a convalescent hospital; and the question now arises, what shall be the nature of the isolation? Shall the patient be isolated in a separate room, i.e., a room entirely closed in, with walls or partitions reaching closely from floor to ceiling, or will the isolation afforded by cubicles, i.e., rooms or spaces enclosed by partitions about 7 ft. high, be sufficient for our purposes?

At the Infectious Hospital of the Walthamstow Urban District Council at Chingford there has recently been opened a special isolation pavilion for twelve beds, the plans of which are before you. These, again, are isolated rooms, each room containing 2,000 cubic feet, the partitions reaching closely from floor to ceiling. They are in two groups of six, placed back to back, with the nurse's duty room so placed between each group that every one of the twelve rooms can be easily seen into from two observation windows. All the partitions are glazed with plate glass in very large squares, the sight-line of the glass being only 26 in. above the floor, so that patients lying in bed can see each other, and also be easily observed by the nurse. Although the rooms are placed back to back, cross ventilation has been secured by fresh-air ducts under the floor. Each room is entered directly from the open air under a glass verandah.

The Ward "Henri Roger" in the Hospital

for Sick Children, Paris, 98 ft. by 23 ft., and 14 ft. 9 in. high, formerly a general ward for the treatment of non-infectious diseases, has been adapted for the isolation of doubtful cases, and divided into twenty cubicles, ten on each side of a central passage, each cubicle having a large window. The cubicle partitions are 6 ft. 10½ in. high and glazed, and each cubicle has a glazed door. There is a space of 2 in. between the floor and the bottom of the partition, the object being the free circulation of air.

One of the wards in the Hospital for Sick Children at Paris has been fitted up with "partial cubicles," i.e., dividing partitions (glazed), but with no inclosure in front, and consequently no door. These partitions also stand a little clear of the floor. As to the absence of the partition in front of the cubicle, Professor Grancher, who speaks from experience, in advocating such an arrangement, says: "If the nurse is aseptic a door is not required; if the nurse is not aseptic the door will not prevent the entrance of infection."

I will now describe the special isolation arrangements about to be carried out at the fever hospitals of the Metropolitan Asylums Board, premising that we are at present in the experimental stage, and that we shall commence with one or two hospitals only, although the managers have decided that the principle, as exemplified by the plans already prepared, shall eventually be applied to all the hospitals.

It has been decided, after consultation with the medical superintendents of the Board's hospitals, that the cubicle system of isolation of incoming patients is the most suitable, and one likely to prove the most effective in preventing the introduction and spread of secondary infection, and of preventing the trouble arising from errors of diagnosis.

It is considered that the risk of aerial conveyance of infection from one patient to another in a well-ventilated ward, divided up into cubicles, is so slight as to be almost a negligible quantity, in the case of mild attacks, which constitute so large a proportion of doubtful cases, and that it is now generally believed that the infective element in scarlet fever and diphtheria is conveyed almost exclusively by personal contact and not by the air. Therefore one bed isolation rooms, completely enclosed from floor to ceiling, should be unnecessary, as well as undesirable and costly. On the other hand, the partial cubicle, i.e., the cubicle with the open front, could hardly guarantee that it is essential to prevent infection by personal contact. This is especially the case as regards children suffering from scarlet fever (by far the most numerous class in our hospitals), as, the present type of this disease being so mild, the children usually leave their beds at a comparatively early stage, and must therefore be kept within a confined area such as is provided by the cubicle.

The cubicle system, pure and simple, has many advantages. It is economical as regards first cost, it is easily adaptable to an existing ward, and it affords ample facilities for good cross ventilation. As regards the latter, if the ward in which the cubicles are to be placed is already well ventilated, there will be nothing in the cubicles to materially injure that ventilation. This question of adaptability of existing wards for cubicle purposes is a very important one, as it is obviously in the existing wards of fever hospitals where these new arrangements would first be adopted.

I will now draw your attention to the plans of cubicles to be provided in two of the Board's hospitals, the first in order of time being at the South-Western Hospital, Stockwell, to be followed by similar cubicles at the South-Eastern Hospital, New Cross. There is this difference, however, that, whereas the wards at the former hospital are thirty-five years old, those at the latter have only just been completed. The details of the cubicles and of the arrangements for insuring asepsis are, however, practically the same in both cases.

To deal first with the cubicles at the South-Western Hospital: these are arranged on each side of two existing wards, having a corridor in the centre. The central fireplaces and chimney-stacks have presented a difficulty which has been got over in the manner

shown. In most existing wards there will, obviously, be some difficulty or the other to be surmounted. The ward is 100 ft. long, 28 ft. wide, and 14 ft. 6 in. high. The ward originally contained eighteen beds, and as there will be sixteen cubicles, there will be loss of two beds, or 11 per cent. As a rule the loss of beds under the new arrangements will work out at about 15 per cent.

Each cubicle will have a floor area of about 120 ft. The partitions are 7 ft. high, and go close down to the floor. The raising of these partitions a few inches clear of the floor for the purposes of air circulation has this serious disadvantage, that children (who are the majority of patients) might pass articles to each other through this space. The partitions are of 2 in. steel framing, the lower portion filled in with asbestos panels, the upper portion, commencing about 2 ft. from the floor, being glazed with 32oz. sheet glass. Plate glass would be preferable, but we wish to be very economical. The partitions will stand upon hard wood fillets, rounded on both edges so as to avoid a bad angle against the floor. The finish against the walls will be similar. The cubicle partitions are therefore absolutely fire-resisting, a matter of vital importance where patients are individually isolated.

The doors will be dwarf doors, 3 ft. 2 in. high, sufficiently high to prevent a child from getting out of the cubicle, and low enough to admit of a free current of air. Gilmour doors will be used, which, being of hard wood, are practically fire resisting. The doors are so placed that the door of one cubicle is not opposite that of another cubicle. Each cubicle has one large ward window with double-hung sashes, and hopper sash over. As the floors of these wards are of deal, thirty-five years old, we are replacing them with teak floors.

There are hot water heating pipes running round the wards, which will be sufficient to warm the cubicles, while the corridor and the general air space above all will be warmed (in addition) by the central fireplaces, which will also act as exhaust ventilators. There are fresh air inlets in the external wall of each cubicle. There will be ample cross ventilation by means of the windows. This is an illustration of how the existing warming and ventilation of a large ward lend themselves naturally to the cubicle arrangement.

The arrangements for ensuring a condition of perfect asepsis on the part of the doctor and nurse will be upon the same lines as those at the Pasteur Hospital. An overall hanging in the cubicle will be put on upon entering and removed on leaving, when the hands will be washed in a lavatory basin to be afterwards described. All instruments used in the cubicle will be sterilised in an apparatus in the sanitary turret, and all food utensils coming from the cubicle will be sterilised in the ward kitchen after each meal.

As regards the lavatory in the cubicle, which will be used for washing the hands of anyone entering, we propose an arrangement somewhat different from that at the Pasteur Hospital or the Walthamstow Hospital. At these institutions the basin has a plug and chain, and hot and cold water taps. Thus two things occur which we desire to avoid: Firstly, the basin can be filled with water, in which the hands are washed, the basin thus being made septic. Secondly, the nurse has to touch the taps in order to obtain the water, and to touch the chain of the plug, which is in the dirty or septic water, in order to empty the basin. We wish to do away with all this, and for this purpose we provide a basin, standing on brackets, and quite 3 in. or 4 in. clear of wall and partition, which, while having a waste pipe, has no plug, and cannot therefore be filled. Instead of hot and cold water taps which must be handled in order to be used, we provide a pedal action spray to discharge tepid water at a convenient height over the centre of the basin. The nurse can thus wash and rinse her hands in a running spray of perfectly and continuously clean water. The basin has also a flushing rim, so that it cleanses itself each time it is used. Hot and cold water are laid on to a mixing valve, set to produce a tepid temperature, and fitted with a thermometer, there being one mixing valve to each range of four or six basins.

* Part of a paper by Mr. T. W. Aldwinckle, read before the recent Royal Sanitary Institute Congress at Bristol.

In this connexion it should be mentioned that the relative positions of the bed, door, and lavatory should be such that the nurse should not have occasion to go near the bed in passing from the lavatory to the door on leaving the cubicle. As the patients in these cubicles will be mostly in the acute stage of the disease, bed-pans will be mostly in use. One w.c. is, therefore, sufficient for the sixteen cubicles. There are also provided a bed-pan sink, a scalding sink, and a portable bath. For the same reason as last mentioned, few arrangements will be necessary for airing the patients. Such few cases as might be suitable will be taken one at a time into the airing yards, in charge of a nurse. At the Pasteur Hospital balcony verandahs are arranged for the isolated rooms, but I understand that they are seldom used, except for cases of plague, when special isolation is observed by entering from the central corridor. We originally arranged balcony verandahs in connection with the cubicles at the South-Western Hospital, but these have been abandoned, as it was considered that the greatly increased cost would not be justified by any equivalent advantages.

At the South-Eastern Hospital, generally speaking, the arrangements are similar to those at the South-Western Hospital, except that we are not troubled with central fireplaces, and thus obtain cubicles of more uniform size and shape. Here the cubicles have a floor area of 141 ft. Each ward, which as a general ward contained twenty-four beds, will take twenty cubicles, or a loss of four beds or 16 per cent.

The warming and ventilation of these new wards are carried out without fireplaces. The cold fresh air is brought in through the external walls at the floor level, and is warmed by passing over and through radiators inclosed in cases. The vitiated air is removed at the ceiling level by fans capable of removing 5,000 cubic feet per bed per hour, thus also producing a strong intake of fresh air through the radiators and cases. This arrangement, as intended for a general ward, fits in exactly for the cubicles, as there are a window and radiator and case in each cubicle.

I need scarcely point out to you that all these structural arrangements will be valueless unless there is the most careful attention on the part of all who have to do with the patients as to technique of asepsis. No detail of this character can be too insignificant to be neglected. Also that the general cleanliness of the walls, partitions, and floors should have constant attention, and that dust, a most dangerous item in an infectious hospital ward, must never accumulate. For this purpose the floors should be of terrazzo, or of teak, or some other hard wood capable of being readily cleansed by damp cloths, and that the walls and partitions should be covered with a hard enamelled paint to afford the same facility for cleansing, thus avoiding what is called "dusting." I have heard careless dusting described by a high medical authority as "a stirring up of sleeping dogs."

The question of cost is a very important one, as if this principle is to be generally adopted a large number of cubicles will be required. It is estimated that the cost, including the spray lavatory, will not exceed 30l. per cubicle. This is assuming that the ward in which the cubicles are to be placed is in a fair state of repair.

LIGHT IN DARK ROOMS.*

Light is necessary to health; and yet there is no definite provision in the Public Health Acts for ensuring that dwelling and work rooms are properly lighted. The provisions for underground rooms separately occupied require a window of a certain size, and doubtless the Acts had in view daylight as well as ventilation, but light is not mentioned in the Public Health Act or in the Public Health (London) Act. The only way in which dark rooms can be dealt with is by declaring them to be in such a condition as to be a nuisance or injurious to health. The Borough Council of Woolwich has enforced this section, and obtained a conviction in a case where a room was proved to be dark, this being the only nuisance complained of. The room was a front basement, but not separately occupied or used for sleeping; it was lighted by a window looking into a small area, having over it a grating through which alone light could be obtained, and it was proved on the hearing that large print could not be read in the middle of the room on a clear day an hour before sunset. The Medical Officers of Health of Greenwich and of Woolwich gave evidence both as to the fact of the room being dark and as to their opinion that light was essential to health. In other respects the condition of the room was satisfactory. For the defence it was shown that the actual tenants had occupied the room for over twenty years and were still alive. An order was made to abate the nuisance with 23s. costs.

In this case additional light was provided by increasing the width and height of the window and the width of the area, and replacing the area-grating with one in which the bars were set at right angles to the front of the house instead of parallel.

The principal causes of darkness are:—(1) Insufficient size of windows; (2) windows being wrongly placed, e.g. in a corner; (3) room underground with area of insufficient width or covered over; (4) street too narrow to give a sufficient angle of light; (5) existence of back additions; (6) trees obstructing the light.

One very simple and common mode of obtaining light is the use of whitewash for the surface of areas, adjoining and opposite walls, and interior surfaces. The whitewash needs renewing at least once a year. For areas whitewashing is a very temporary expedient; coating with glazed bricks is far preferable and often of great utility, if the area is sloped at the right angle.

One of the simplest and cheapest means of improving light is the use of certain kinds of glass which are highly refractive, such as Muranese, and, better still, prismatic glass. Muranese glass has a raised pattern, and prismatic glass is fluted in straight lines; both have one plain surface. The plain surface should be outside and the ribs of fluted glass horizontal. This kind of glass has the double advantage of refracting the light so that it does not all fall on the floor near the window, and of making curtains and blinds unnecessary for purposes of privacy. The use of such glass for increasing the light of offices and workshops is well known, but it is not likely to be used for dark living-rooms, unless at the instance of the sanitary authority.

When a forecourt exists it has been found possible in some cases to increase the light of basements by sloping off the area at a larger angle and tiling its surface. When there is no forecourt and the area is necessarily covered with a grating the nature of the grating is of prime importance. The bars should be narrow but deep, and they should be set at right angles to the surface of the house wall, and not parallel, as usually found.

But in many dark basements very little light can be obtained unless the window can be raised in height. In most windows the larger part of the light enters near the top, and this is especially the case in underground rooms. Often the height of the window cannot be raised without encroaching on the floor of the room above. In three cases in Woolwich this difficulty has been overcome by cutting away the rafters, fixing a trimmer, and constructing a bulk-head in the

room above. The result was very satisfactory in each case. In other houses when the height of the basement-room was under 7 ft. the floor has been lowered 12 in. or 18 in., and this has increased the lighting of the floor and furniture, where light is most needed.

In certain cases, where a basement has consisted of an underground room in front and a room above ground-level behind, the party-wall between the two rooms has been removed for the greater part, and the two rooms thrown into one. Light has thus been allowed to enter from the opposite side, and a large, fairly well-lit room obtained.

In cases, however, where it was attempted to gain additional light for a dark room by constructing a glazed window in the upper part of the party-wall the result has been unsatisfactory, as might have been foreseen.

For the window to lighten the room to the greatest advantage it needs to reach to the top of the room, and to be placed nearly in the middle of the wall. In one case a room with a good-sized window was badly lighted owing to there being a high wall a few feet off, which almost wholly prevented direct rays of light entering the room. But the window did not reach to within 18 in. of the ceiling, and by raising it 12 in. rays of light were enabled to enter direct from the sky, and the light of the room was doubled. In other cases rooms have been dark owing to the window being in a corner or at one side of the wall; in such cases a small additional window has been constructed.

Where trees appertaining to the house obstruct the light, the remedy is obvious; if, however, the trees are on the property of another owner the matter is more difficult; but I have frequently found that a representation to the owner has had the desired effect. In one case the front rooms of half a street were dark owing to some high ground opposite on which were a number of overhanging trees; the ground appertaining to army barracks. A representation was made to the commandant, and after a little correspondence and delay all the obnoxious trees were cut down, with very marked improvement to the houses.

The use of outside reflectors, as in city offices, has not so far been found practical for living-rooms.

Second in importance to the lighting of living-rooms is the lighting of staircases and passages, though here the primary object of requiring a window is usually the ventilation. A passage and staircase without a window has been held to be a nuisance in London police-courts where the house was occupied by more than one family, but a prosecution would probably fail in any other case. Little difficulty has been found for the most part in Woolwich in making a moderate-sized window on a dark staircase, where this has been practical.

The cost of putting a small window to light a staircase in an external wall is not much, the district surveyor's fees being frequently the most serious part of the cost. When there is no exterior wall a skylight can sometimes be made, but this is less satisfactory, as it is difficult to clean it and to keep out the rain, and the cost of construction is greater. Failing a window, glass panels in bedroom doors are sometimes useful to a small extent, but the chief substitute for a window as regards light is a light-coloured paper or other wall-surface frequently renewed.

What has been said so far refers, of course, only to old houses. It might have been thought that at this hour of the hygienic day it would be an unheard-of thing for a house to be built in which there was any living-room not well lighted. But even the stringent provisions of the London Building Act do not obviate the occurrence of such cases.

One of the commonest means of defeating the spirit of the Act is the erection of back additions of such horizontal and vertical extent as to shut off most of the light from the back rooms of the main part of the house; in addition to shutting off light from these rooms they necessitate the windows being squeezed to one side of the room, so that a large part of it is always in shade. When the yard between two adjoining back additions is covered with a glass roof (allowed in the London Building Act under the euphonic

* Part of a paper by Mr. Sidney Davies, M.A., M.D. Oxon., Medical Officer of Health, Woolwich, read at the recent Royal Sanitary Institute Congress at Bristol.

—DUNDEE ARCHITECTS AND FREE LIBRARY
Plans.—A deputation of Dundee architects intend to wait upon the Town Council at their next meeting, with regard to the plans of the two branch libraries to be built in the north and west ends. Hitherto the City Architect (Mr. James Thomson), who now combines the duties of city architect and borough engineer, has drawn the plans without any extra fee; but at a meeting of local architects the opinion was expressed that on aesthetic grounds, and having regard to the special requirements of library construction, competitive plans open to the architectural profession should be called for. If that step were taken, the meeting suggested that an outstanding member of the profession should be appointed judge. It is further stated that such a course would have the approval of Mr. Andrew Carnegie, the donor of the libraries.
—Scotsman.

title of a conservatory), not only is most of the light, but also the air, excluded from the rooms in question. New houses on old sites may still be built without sufficient provision of light, and further, new houses may be erected so as to shut out the light from existing ones.

The London County Council has been considering and has prepared amendments to the Building Act which will remove some of the difficulties pointed out above; but it appears to me that the only satisfactory way of ensuring that the dwelling-rooms of new houses are sufficiently provided with the means of lighting by daylight is to enact that no new house shall be occupied unless each habitable room is certified to be properly lighted by daylight.

As regards old houses, what is wanted is a further definition of nuisance, as "any dwelling-room not provided with sufficient and proper means of lighting by daylight."

But let not any sanitary reformer wait for legislation. The prospect of obtaining any useful sanitary measures or amendments seems remote indeed, and meanwhile I can only express the hope that all sanitary authorities may make as good use of the existing Public Health Acts as the Woolwich Borough Council has done.

Books.

The Cathedrals and Churches of the Rhine and North Germany. By T. FRANCIS BUMPUS. (London: T. Werner Laurie, 1906.)

BOTH the subject, the number of examples, and the country over which they are scattered are large—too large, in fact, for it to be possible in most cases for more than a comparatively short account of them to be given—and the work is the result of notes taken on more than one extended tour through this district, architecturally the most interesting perhaps in some ways in Europe. The author has wisely devoted the first three chapters to a general description of the architecture as a whole and its gradual growth from the Romanesque to the fully-developed Gothic; to an account of the remarkable series of churches chiefly, if not entirely, in brick, which are such a striking feature of the Baltic provinces; and, thirdly, to some peculiarities of the Rhenish churches and North German ones generally. A very large number of the cathedrals and churches on or near the Rhine and its tributaries are, of course, tolerably well known, and if Germany is entered through Aix-la-Chapelle one of the first buildings seen, the Dom, possesses those features common to many others—the great Gothic choir, with an apsidal termination and windows narrow and of remarkable length attached to a nave, in this case of octagonal form, of Romanesque, or what we should term "transitional character"—a sharp contrast, which is the result of the absence of that gradual growth and development through many centuries that was the rule in our English churches. 'Cologne Cathedral stands alone as the "last word" of German ecclesiastical architecture—a complete church of great size, largely due to the influence of the great churches that were rising in France at about the same time. The great Rhenish Cathedrals at Mainz, Worms, and Speyer are mentioned, but only the first-named is illustrated; an exterior view, however, is given of the Abbey Church at Laach. The frontispiece is a north-west view of the imposingly-situated if small cathedral at Limburg on the Lahn. This, as well as some of the churches in the district of the Lower Rhine—Neuss, Calcar, and Xanten—will be familiar to readers of the *Builder* through the fine drawings of the late Mr. H. W. Brewer. Xanten and Calcar are remarkable, too, for the richness of their altar-pieces and furniture generally, and in themselves provide sufficient material for an architect's tour. Among the photographic reproductions with which the work is almost entirely illustrated are several showing the great brick churches of the Baltic provinces, the tower of St. Mary at Dantzic and its picturesque houses, the imposing interiors of the Cathedral of Havelberg with its roodscreen and choir fittings, and of St. George's Church at Wismar; also a general view of the Dom at Lübeck. The chapter devoted to the furniture and

fittings of the churches is probably the most attractive. Two interiors, one of St. Mary Gelnhäusen (a delightfully picturesque exterior view of which is given earlier in the book) possessing a fine Early Gothic roodscreen, and the remarkable interior of the Dom at Lübeck, which, although a Lutheranised church, still retains its roodscreen, rood, and beam with very elaborate detail, are illustrated and a general description—necessarily concise—of some examples among the many that exist of church furniture of various kinds which have happily survived the changes and vicissitudes through which many of these churches have passed, rendering them for that reason alone worthy of a visit and careful study. The metal font of the Cathedral of Hildesheim, the elaborate example at Limburg, and the rich organ-cases at Lübeck and St. Martin's, Brunswick, are also given.

The author has devoted separate chapters to the description of the churches at Münster, Soest, Paderborn, Hildesheim, Halberstadt, Magdeburg, Naumburg, and Erfurt. At Halberstadt and Magdeburg we again find rich examples of roodscreens, with the altar in the centre of the west face, flanked by doorways leading to the choir. Naumburg boasts of two choirs—east and west—of early date retaining their choir-stalls and two roodscreens, and Erfurt, with its grand apsidal choir and triangular porch approached by a great flight of steps, is perhaps one of the finest groups that Germany has to show.

All these and much more of great interest the author has succeeded in including in the comparatively small space of 350 pages. Some ground plans would have added much to the interest of the work, especially in the cases where the mediæval arrangements are at all perfect; but apart from this the book will be found an interesting one for perusal before, during, and after a tour of any of the districts included in its scope, and of value as a general book of reference to a great many architectural gems of which no other country possesses parallel examples either in form or richness of detail.

Haddon: The Manor, the Hall, Its Lords, and Traditions. By G. DE BLANC SMITH. (London: Elliot Stock, 1906.)

ALTHOUGH the author has drawn a good deal of the material for his letterpress from other sources, including papers published in the *Proceedings* of the local Archeological Society, the story of Haddon Hall and its owners will always be a subject of very general interest, and in this case it is not only concise but is very fully illustrated throughout with reproductions of photographs taken by the author. These show well the various parts of the exterior and interior and also a great many details of the wood-panelling, the stained glass in the windows of the chapel, and the fine series of rain-water pipe-heads that are such a striking feature on the exterior of the buildings. Members of both the Vernon and Mannors family are buried in the neighbouring church of Bakewell, and four illustrations are devoted to their monuments. A sketch plan of the Hall and gardens is also given, and on it are shown the points from which the views have been taken. It would have been in every way better if the illustrations, excellent though they are, could have been placed, as far as possible, opposite that portion of the text to which they refer. For instance, the description of the chapel and its windows is given pp. 55-59, the illustrations are, however, facing pp. 12-20. In future editions a more convenient arrangement would be undoubtedly less irritating to the readers of this otherwise excellent description of one of the most perfect mediæval houses in the country.

Elias de Derham, Rector of Harrow. By Rev. W. DONNE RUSSELL. Cambridge: Macmillan & Bowes, 1906.

IN reading the pages of this pamphlet (a paper recently read before the Harrow Architectural Club) one cannot but regret that, in comparison with the importance of the life and work of Elias de Derham, so little should be known. He was a Rector of Harrow, and the author credits him with some reason with the work in the nave of his parish church. He was for the last twenty-five years of his life (1220-1245) a Canon of Salisbury Cathedral, and is described as "Rector novæ fabricæ

ecclesiæ." The year 1220 was memorable as having seen the completion of his work in the designing, in conjunction with Walter de Colchester, of the shrine of St. Thomas at Canterbury Cathedral, and the commencement of the new Cathedral that was to take the place of the earlier and smaller building, which had been built within the fortified hill at Old Sarum. That he was "architect" of Salisbury Cathedral in anything approaching the modern acceptance of the term may be doubted; that he was master of the fabric seems more probable, and a man of his skill would hardly fail to leave his mark on this beautiful church, although in what way and to what extent we do not know. He was the friend of Bishops Poore of Salisbury, of Joceline of Wells, and Hugh of Lincoln; he accompanied the first-named to Durham; the author traces him at Wells; he was responsible for the design of the great hall in the Castle of Winchester; and some decorative detail common to Wells, St. Albans, and Lincoln is given in support of the possibility of his having been in some way connected with these great churches. Be this as it may, the facts that have been brought together, covering a period of nearly eighty years, make highly interesting reading, and give a suggestive insight into what must have been a very remarkable career.

Plastering: Plain and Decorative. By WILLIAM MILLAR. Third Edition. (London: B. T. Batsford, 1905.)

TO the first edition of this large and monumental work we devoted a long article in our issue of September 18, 1897. The appearance of a third edition shows that the book has met with the success it deserved, for it is a large and somewhat expensive book which would hardly have reached a third edition had it not been recognised as a book without which an architectural library could not be complete. As we said in our former notice, the author has produced a book which will connect his name with plastering as that of Tredgold is connected with carpentry. The artistic element in the book, it is true, would not satisfy artists, but that is hardly what such a book is intended for; it is one of practical information and demonstration by a practical man.

We regret to learn that since our previous article the author is dead. In the present edition all the corrections and additions of which the author left any notes have been made, and the matter relating to Portland cement concrete has been in great part rewritten, with an addition giving some description of reinforced concrete, though we do not see that this necessarily comes into the subject; indeed it is remarked that it cannot be treated fully in a book of this kind. However, perhaps some explanation of the nature of this use of concrete was to be looked for, though it comes more under the subject of construction than of plastering; and the reader is referred in a foot-note to works dealing fully with the subject.

The book as a whole, however, is not materially altered, and we need only refer the reader to the high appreciation of it which we have already expressed in the original review above referred to.

Water Softening and Treatment. By WILLIAM H. BOOTH, M.Am.Soc.C.E. (London: Archibald Constable & Co., Ltd. 1906.)

THIS volume comprises two sharply-divided parts, the first devoted to the treatment of water by softening and filtration, and the second to the description of plant and apparatus used as auxiliaries to steam boilers and engines. In the preface the author admits that he has drawn on many sources, and is indebted to various firms for information to supplement his own experience, two points which are clearly noticeable in the succeeding pages. The chapters dealing with the sources of water and the foreign substances occurring therein contain a useful selection of facts which are generally known, but are too frequently ignored by those who have the selection of sites for manufacturing premises. Although dealing in this work with the treatment of water, the advice of the author is that supplies should be secured, if possible, that do not require to be treated, and he suggests that there are often instances where of two or more available sites one can be shown to offer better prospects of

suitable water than the others, not merely in respect of quantity but also of quality. So far as concerns the softening of boiler feed-water and water for industrial purposes generally, the main thing is to eliminate the carbonates of calcium and magnesium, and very frequently the sulphates of the same metals. The manner in which this result can be attained by the aid of chemical reagents is set forth clearly and correctly, although the nomenclature adopted by the author is popular rather than scientific in the respect that he uses such terms as "calcium" and "lime," "magnesium" and "magnesia" as if they were interchangeable, whereas lime is not calcium but calcium oxide, and magnesia is not magnesium but magnesium oxide. The same applies to other alkaline metals and -metals of the alkaline earths, which ought to be differentiated from their oxides if confusion is to be avoided.

Chapter VII. has the somewhat comprehensive title of "Water Analysis," a department of work requiring an entire volume for adequate treatment. The author touches very briefly upon the tests for hardness practised in the United Kingdom, and fills the bulk of his allotted space with an account of the method adopted in France by M. A. Taveau. Consequently, the chapter is not so helpful as might be desired.

Next, we come to a series of chapters wherein several types of water-softening apparatus, filters, and oil-separators are described and illustrated. It must always be a rather invidious task to select examples of apparatus for description, and however impartial an author may be, as in the present case, the firms whose manufactures are left out in the cold never feel quite happy. Moreover, it is but natural for readers to draw the inference—which may be quite a wrong one—that the chosen examples are the best. An important point for the user of water-softening plant is to see that the nature of the process and the type of apparatus adopted are those best adapted to his individual requirements. For this reason it is impossible to make a choice without complete particulars of all the appliances and processes available, and such particulars are not here given.

In the second part of the book Mr. Booth deals in a comprehensive and generally satisfactory manner with air-pumps, condensers, circulating pumps, feed-water heaters—including economisers and superheaters—water-cooling plant for condensing engines, feed-pumps, and injectors. The information presented appeals exclusively to the steam-user, and taken in conjunction with that in the first part renders the work as a whole a very complete collection of data on the treatment of water and the means of applying it in connexion with steam boilers and engines. Unfortunately, however, passages occur here and there which certainly do not suggest that the text has been very carefully revised. Otherwise we should not find sentences like the following:—On p. 4, "Such impurities will deposit in a large pond just as the muddy river Rhone emerges from the Lake of Geneva as a bright stream"; on p. 12, "An independent water supply will usually be cheaper than a public water supply. But some of the public companies pumping hard water put it through the Porter-Clark process and soften it before passing into their distribution mains"; and on p. 152, "In steam at 100 deg. F., or thereabouts, which is practically the temperature of condensers, there are very approximately 1,000 B.Th.U. of latent heat. This number is thus useful for rapid calculation. One pound of steam will have to lose this amount, and a little more. If 1 lb. of cooling water disappears it must gain the amount and a little more. The round figure will serve very well for our purpose."

However, in addition to examples of dubious composition, the book contains other sentences which may lead to misconception. For instance, on p. 105, it is said, "Absolutely pure water may be assumed to have an effect on a boiler, and roof-collected rain contains acids, especially in manufacturing districts, and also carbonic acid." Here "no effect" was obviously intended instead of "an effect," but there is nothing to show what is the effect of rain-water, nor why carbonic acid should not be classed with other acids. Again, on p. 121, Schomburgk is credited with the paradox, "That a water

may be made chemically pure by adding to each litre of water 0.06 gramme of free bromine in the form of potassium bromide." Further, on p. 172, immediately after Table XV., showing that the solubility of gases (except hydrogen) in water diminishes with the increase of temperature, we have the sentence, "At the boiling-point practically all gas is occluded." This is quite wrong, for when the solvent is boiled, the dissolved gas is entirely evolved, except in the case of very soluble substances, such as hydrochloric acid gas, which cannot be expelled by mere boiling.

Although good literary style may not be necessary in scientific treatises, absolutely lucid diction is most essential, and it is a pity that an otherwise excellent book such as this should be marred by any blemishes of the kind indicated above.

The Manufacture of Concrete Blocks and their Use in Building Construction. By H. H. RICE, W. M. TORRANCE, and others. (London: Archibald Constable & Co., Ltd. 1906.)

WITHOUT intending to disparage the valuable information contained in this book, we must remark it is not a treatise, but simply a compilation. It is, in fact, a reprint of two papers, and of extracts from ten other papers, all submitted in competition for prizes offered jointly by the *Engineering News* and the *Cement Age*, of New York. The result is a consensus of opinion on various points connected with the production and application of concrete building blocks, which can be turned up by the aid of the index for reference and comparison. In the paper by Mr. Rice prominence is given to the theory of concrete, but this and the other parts of the subject are discussed in very general terms. The succeeding paper by Mr. Torrance is addressed to those who contemplate the manufacture and use of concrete blocks. It is full of really practical information, and contains numerous illustrations that are likely to be of service to the architect and builder. Among the extracts from other papers there are notes upon such subjects as the position and design of works for the manufacture of concrete blocks, the various forms of such blocks, the selection of materials, the preparation of concrete, moulding, curing, and facing, ornamental and special blocks, waterproofing, cost, and building construction. A good many helpful suggestions will be found in this section of the book, which concludes with two appendices, one giving the rules and regulations covering the manufacture and use of hollow concrete building blocks in Philadelphia, and the other a list of American firms issuing pamphlets and similar trade literature relative to block-making plant. The heterogeneous character of this book is really an advantage to professional men who desire to pick up practical hints on the subject of concrete blocks.

Electric Wiring. By W. C. CLINTON, B.Sc. Fourth Edition. (London: John Murray. 1906.)

THIS book is written as an introduction to the art of indoor wiring. It is specially intended for those who are preparing for the Preliminary examinations of the City and Guilds of London Institute in this subject. Numerous practical examples are worked out, and the meaning is usually clear. In our opinion, it will prove helpful to beginners. In several places, however, the book could be considerably improved.

The definition of Ohm's Law given in Chapter I. is unnecessarily complicated, considering the class of reader for whom the book is intended. The notions of electromotive force, current and resistance are better left somewhat vague so that the beginner may have little to unlearn if he ever reach advanced theory. At the top of p. 26 we read of a three-wire system, with a pressure of 100 volts between the outers. We never heard of this system before.

In Chapter III. the author gives a clear description of the method of making a joint, and the explanatory diagrams are good. It is a pity that the author does not emphasise the necessity of having plenty of supports for the casing and tubing. This important detail is frequently neglected by wiremen.

Mr. Clinton considers the simpler tube with the open longitudinal seam the best of the plain tube systems (p. 61). This statement needs to be modified considerably. We agree with him in thinking (p. 65) that the thinness of this type of tubing renders it untrustworthy in places where it may corrode or meet with rough usage. We are surprised that no mention is made about earthing the steel tube. The practically universal adoption of high pressures of supply makes it imperative to secure the metallic continuity of the tubes and to earth the whole system efficiently.

The statement on p. 89 that "double-pin" wall-plugs are only used on 100-110 volt circuits is not correct. The "concentric" type of plug mentioned is rarely seen nowadays. It is bad practice to put a fuse in a wall-plug (Fig. 48), and they ought never to be put in ceiling roses in high-tension circuits (p. 88).

Working Hints for Suction Gas Producers. By A. FLURSCHHEIM. (London: The Gas and Oil Engine Record. 1906.)

AS a concise description of the various parts of a suction-gas producer installation, and a convenient book of practical directions for the guidance of the attendant, this little volume deserves every praise. After three descriptive chapters the author deals in succession with such matters as the first starting of the apparatus, ordinary starting after short stoppages, charging the generator, attending to the fire, stopping the operation of the plant, and up-keep of the apparatus. He then suggests probable causes and remedies for various disturbances in the installation, and gives simple hints for the avoidance and treatment of gas poisoning. The subject-matter throughout is conveniently arranged for ready reference, and we feel sure that this book will find wide popularity among users of the plant to which it refers.

Where to Live Round London. Edited by PRESCOTT ROW. (London: The Homeland Association. 1905.)

THIS is one of the "Homeland Reference Books," and deals only with the southern district near London; we gather that another similar book is to be issued dealing with the northern district.

It is a very useful publication, giving under the name of each township or village information as to its general attractions, railway communication and ticket rates, subsoil, death-rate, population, places of worship, etc. There is also a chapter on the geology and subsoils of the district, by Mr. W. H. Shrubsole, F.G.S. The names of places are arranged alphabetically. It is a remarkable book to be issued at the small cost of one shilling.

The Fifty-four Hour Wages Reckoner. By a Retired Banker. (Edinburgh: Johnstone Hunter & Co.)

THIS is a small book giving tables of wages based upon a calculation of fifty-four hours being a working week. It gives in tabular form the amount due for a quarter of an hour, half an hour, three-quarters, and an hour on wages at rates of from 2s. to 50s. a week.

Photography: The Watkins Manual. By ALFRED WATKINS. Third Edition. Hereford: The Watkins Meter Co. 1906. 1s.

THIS is the third edition of a most useful and practical manual for amateur photographers, giving detailed instructions in regard to the whole process of photography and the materials and methods employed in it.

RIPON CATHEDRAL.—The north side of Ripon Cathedral has just been adequately protected from the ravages of damp by work in cement-concrete, carried out under the supervision of Mr. H. Williams. The gargoyles have been made to deliver the water from the roof over a smaller area, and the flooring of cement-concrete at the base of the walls keeps out the moisture, which was finding its way into the interior of the building. It is hoped the work may be extended to the east end of the cathedral. The walls have also been underpinned. In the course of the work Mr. Williams came across what he believes to be the foundation of the old Norman cathedral, as the stone exactly corresponds with the stone in the Norman crypt.

BOOKS RECEIVED.

REPORT ON ERRORS IN WORKMANSHIP, based on Measurements carried out by the Engineering Standards Committee by the National Physical Laboratory. (London: Crosby Lockwood & Son; and at office of the Committee, 28, Victoria-street, Westminster, S.W. 10s. 6d. net.)

REPORT ON BRITISH STANDARD SYSTEMS FOR LIMIT GAUGES (RUNNING FITS), by the Engineering Standards Committee. (London: Crosby Lockwood & Son; and at office of the Committee, 28, Victoria-street, S.W.)

ENCYCLOPEDIA OF PRACTICAL ENGINEERING AND ALLIED TRADES. Illustrated. Vol. IV. Edited by J. G. Horner. A.M.Inst.Mech.E. (London: Virtue & Co.)

THE SYMBOLISM OF CHURCHES AND CHURCH ORNAMENTS: A Translation of the First Book of the Rationale Divinorum Officiorum. Written by W. Durandus. Third Edition. (London: Gibbings & Co., Bury-street. W.C. 6s. net.)

BANGOUR ASYLUM, EDINBURGH.

A RECENT issue of the *Edinburgh Evening News* contains some impressions of a visit to Bangour Asylum for the treatment of pauper lunatics. Alighting from the Edinburgh Lunacy Board's private railway at Bangour Station, the eye, says the writer, is met by what appears to be a series of villa residences, scattered on the sunny southern slope of undulating pasture land. No two houses are alike either in their exterior form or interior arrangement and decoration. Some of the houses are built of white freestone, others of red or yellow, or both combined, some are harked, and a few are made of iron, their plain exterior broken by verandas. In some cases red tiles, in others light or dark blue slates, are used for the roofing. The church, recreation hall, and some of the homes are still non-existent, and will be so when the formal opening ceremony of the asylum takes place at the beginning of October, but there is at present accommodation for about 750 patients, and there are 300 now under treatment. By October the population will be added to by other 200, and the remainder will follow as the internal arrangements of the houses are completed. Grouped round the entrance of the administrative block are the offices of the medical superintendent and the matron, a drug-dispensing room, and telephone exchange. One wing is reserved for female patients and the other for the males, providing accommodation for eighty patients in all. Upstairs there is a dining-room for the Board and medical officers, and private rooms for the administrative staff, while there is also a billiard-room to provide recreation for the staff on a long winter evening.

When a patient is brought to Bangour he is taken to this administration block. He enters a room in which a first examination is made in the presence of the relatives who accompany him. This done, he steps into an adjoining studio with glass roof and sides, where he is photographed, partly to preserve a record of his outward physical condition when received, and partly for identification purposes should he escape. From the studio, which has leading from it a small room for development of the photograph, he walks into a bathroom, where, after having been bathed, he leaves the clothes with which he entered Bangour, and he is then taken to a small bedroom, and put to bed under the care of a special nurse. The doors of these rooms are panelled partly with glass and partly with wood, so that the interior can be seen from the corridor. Afterwards the patient passes into the admission ward in the wing of the building which consists of a general living-room and sleeping-ward. These arrangements are all duplicated in the other end of the building where the female patients are admitted and housed. When, as the result of observation, the medical officer is able to classify the type of patient, he or she is removed to the industrial homes, or to the houses where the acute cases are treated. In some instances the patient may not require removal to another asylum building, the few weeks' residence in the admission house effecting a cure. Quiet and reposeful colours are employed in the rooms, the predominance being given to greens and blues, the warm colours used sparingly. Every apartment is differently treated, and in the whole range of buildings there are no two rooms exactly alike. There are two peculiarities in all the rooms to which patients have access. The sashes on the windows are so arranged that the windows can be opened only about 3 in., either from the top or bottom, so that a patient in a moment of frenzy could not jump out of the window. The other is that all doors open outwards into the corridors and have handles only on the outside. Thus a patient could not go into a bedroom or bathroom and snub or harass himself in. Throughout the whole asylum there are only two padded rooms, one for a male and the other for a female suicidal patient.

Of the other buildings where patients are housed four are for the use of women who can be industrially employed, each of these houses providing for an average of fifty patients, or 200 in all. There are five industrial houses for male patients, similar in size, and which will accommodate 250, while 144 patients will be housed in what are called closed homes, these being for severe cases. A hospital is being erected where ninety patients can be treated, and, as already intimated, there are eighty housed in the administrative block, and twelve are employed at the farm buildings—about 780 altogether.

The provision of food for such a large colony is an essential part of the undertaking, and in that matter the farm occupies an important place. The original buildings have been extended and remodelled till they are now thoroughly well equipped for the housing of cattle and the rearing of pigs, while a large garden is being prepared for raising vegetables and other crops. The estate altogether consists of 900 acres, of which about 150 acres are occupied by the building, 500 acres are under grass, and the remainder is arable land most of which will be used for potatoes and oats.

The arrangements for the cooking and distribution of food are very complete. There is a large kitchen with a lantern-shaped roof, the walls all lined with white bricks. In the centre of the room are two sets of triple 80-gallon steamers, and one quadruple set of 40-gallons for boiling porridge or meat, sufficient to supply 1,000 persons. At one side there is a range of four large iron steam chests with numerous divisions for cooking potatoes, fish, etc., and four smaller chests for use either singly or together. Between the centre steamers and the other side wall are large iron carving tables, steam heated, and into the lower part of this wall are built a series of steam-jacketed chests which slide outwards into a covered way for the conveyance of food to a wagon that distributes it to the different houses. The cooks, after placing the food into dishes in these steam chests, which move on wheels and can be drawn into the kitchen for loading, push them back into position, and there the food can remain, kept warm till it can be removed. The wagon into which the dishes are ultimately conveyed is also heated, so that the cooked dishes are delivered in good condition at the various houses, though the distance covered is considerable, about three-quarters of a mile intervening between the houses furthest to the east and those most westward. The only meal not supplied from the general kitchen is tea, which is provided for the inmates by the staff at each of the houses. Attached to the kitchen are roomy sculleries, and on the other side of the covered way already referred to are the stores. A separate structure is occupied by the bakery, also a roomy building, lined with white enamelled bricks. There are two ovens, one of which—Thomson's patent—is large enough to bake at one time 220 2-lb. loaves. The dough is mixed in a machine driven by an electric motor. In the upper part of the building are commodious flour stores.

The laundry, situated not far from the kitchen, is equipped with every modern appliance. The clothes are delivered at one end to the washers and put into large automatically revolving washing machines; others are cleaned by hand in a row of wash-tubs, and when freed from dirt they are passed into a drying room and from there into the mangle and ironing room. At one end of this latter chamber is the apartment for mending, and then the clothes pass into a dispatch-room, and are sorted out for the different houses. The delivery baskets are passed through an opening in the wall to the carts for conveyance to their destination. The laundry will be carried on by forty-six patients under the direction of a staff of five experienced workers, and these are housed in an adjacent building.

Just within the entrance gate of the estate is situated a large power station, the chimney-stalk of which is 120 ft. high. Here there is machinery for providing electrical energy to the extent of 400 horse-power, a blacksmith's shop, painter's shop, and other workshops necessary in the carrying on of such a large undertaking. The administrative buildings generally are on a scale that will be sufficient without extension for about double the number of patients at present chargeable to the parish, so that when other detached dwellings require to be erected no addition will be needed to the administrative blocks other than an increased equipment. The corrugated iron buildings which were put up partly on the ground of economy and partly because they were needed in a hurry have not proved a great success. Though only two years in occupancy, they have already needed repairs. As the original cost was 80l. per bed as compared with 100l. per bed for stone buildings, it is not likely that the Lunacy Board will venture further in that direction.

The water supply for the asylum has been obtained on the estate, and the reservoir is sufficient for the storage of 16,000,000 gallons of water, quite ample for all requirements. The drainage system is most complete, the sewers leading into septic tanks from which the water, thoroughly purified, is discharged into the Burn Burn Water. The railway and waterworks were made by Messrs.

Leslie & Reid, C.E., but the buildings, water distributing system, and drainage have all been designed by Mr. Hippolyte J. Blanc, R.S.A. architect, Edinburgh, and their execution has been superintended by him and his assistant, Mr. Cairns. There have been altogether about fifty separate contractors employed up to this time.

The institution not being completed yet, its exact cost cannot be stated, but it is expected that it will be within the original estimate of 300,000l., probably by about 10 per cent. The sum stated includes the purchase of the estate and the construction of the railway and water works.

Illustrations.

BIRMINGHAM WAR MEMORIAL.



MEMORIAL to the memory of Birmingham men who fell in the war in South Africa has been erected in Cannon Hill Park, Birmingham, and the monument was unveiled by Lieut.-General Sir Ian Hamilton last June. It is of red granite, standing on granite steps, and is surmounted by a bronze group 11 ft. 6 in. high and 5 ft. at the base, and on a rising base, with emblems and attributes of war, is a gun-carriage flanked on each side by a soldier pushing forward the gun. The men represent Courage and Endurance. Standing on a globe is the figure of Peace. In one hand, extended, she holds the wreath of glory to the honoured dead, and with the other she supports a shield on which are engraved the city arms. In the front is a bronze bas-relief of two figures representing Sympathy and Grief, holding wreaths and supporting a shield upon which is inscribed the dedication:—

TO
THE GLORIOUS MEMORY
OF THE
SONS OF BIRMINGHAM

Who fell in the South African War, 1899-1902, and to perpetuate the example of all who served in the War, this Memorial is erected by their Fellow Citizens.

The total height from the ground level of the monument is about 25 ft., and the total width, including the steps by which it is approached, is 25 ft. The number of names inscribed on the panels is 521. The group was cast in two pieces by Mr. Alexander Parlane by the Cere-perdu process. The granite work was carried out by Macdonald & Co. The whole work was designed and modelled by Mr. Albert Toft.

CHURCH OF S. CHAD, LONGSDON, STAFFORDSHIRE.

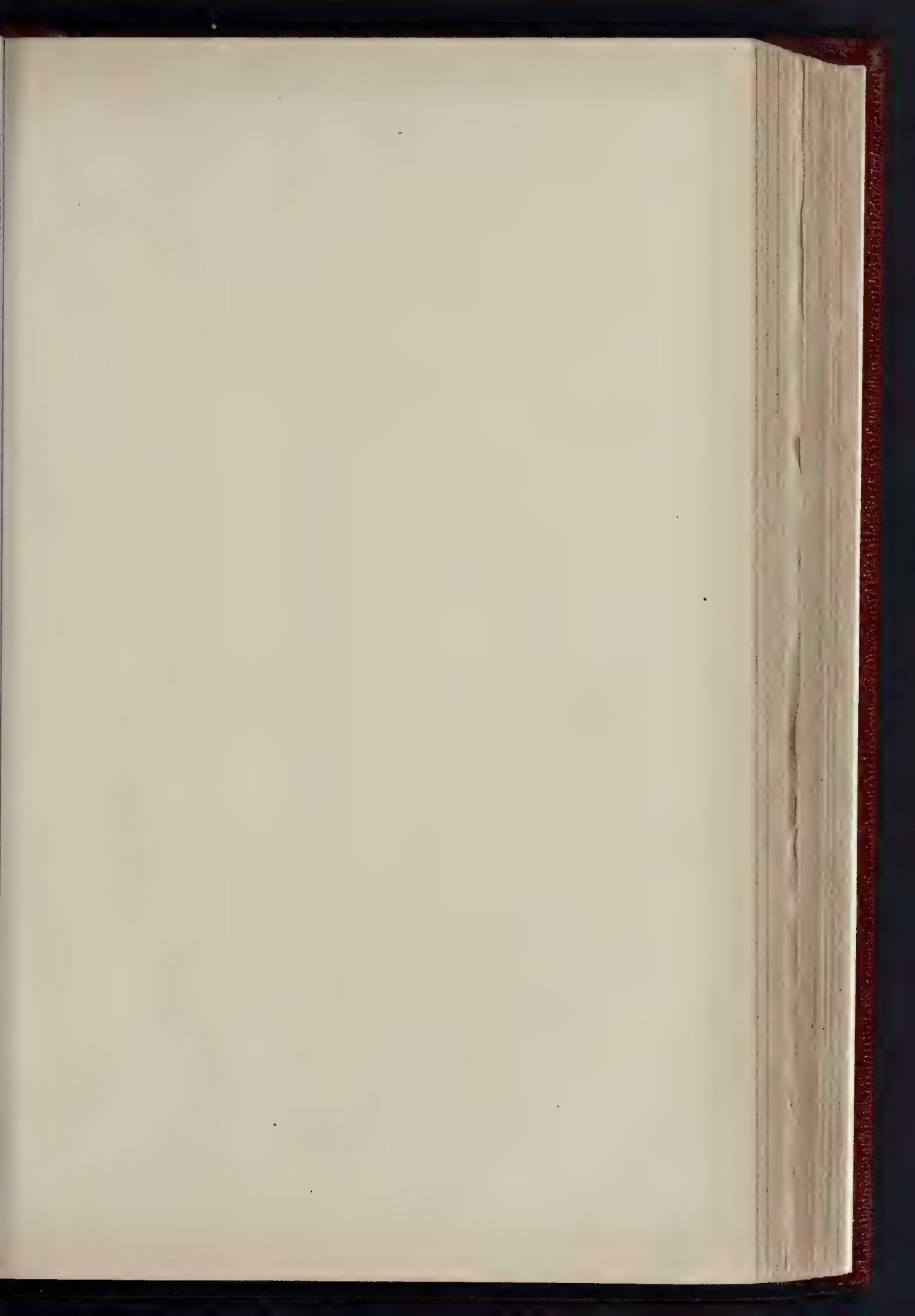
This church consists of a nave, north aisle, chancel, priests' and choir vestries, and it will accommodate about 350 people. Ladderstone is used for the walling, and red Alton and Roches stone for the windows, piers, quoins, and other dressings.

The general contractors were Messrs. Thomas & Henry Grace, of Leek. The architect was Mr. Gerald C. Horsley. An illustration of the exterior appeared in our issue for September 17, 1904.

SKETCHES WITH THE ARCHITECTURAL ASSOCIATION EXCURSION.

THESE sketches are given in connexion with the excursion of the Architectural Association to Stamford, a report of which was commenced in our last issue and is concluded in this.

ROMAN CATHOLIC CHURCH, CLAREMORRIS.—A new Roman Catholic church is being built at Claremorris. It consists of nave (30 ft. wide in the clear), with a lofty pointed arcade; aisles, transepts, chancel, and apsidal termination, two side-chapels, cloister, priests' sacristy, and boys' vestry. The total length of the interior is about 140 ft., and the width across the transepts nearly 100 ft. The height of the apex of the western gable will be over 70 ft. The contractors are Messrs. J. and W. Stewart, of Dublin and Belfast. The materials used throughout were Irish, and, as far as possible, local—the native limestone for the walls, Killinloe slates for the roofs. Wexford cement in the foundations, black marble for the altar steps. Messrs. Dooley, Butler, and Donnelly, of Dublin, are the architects.

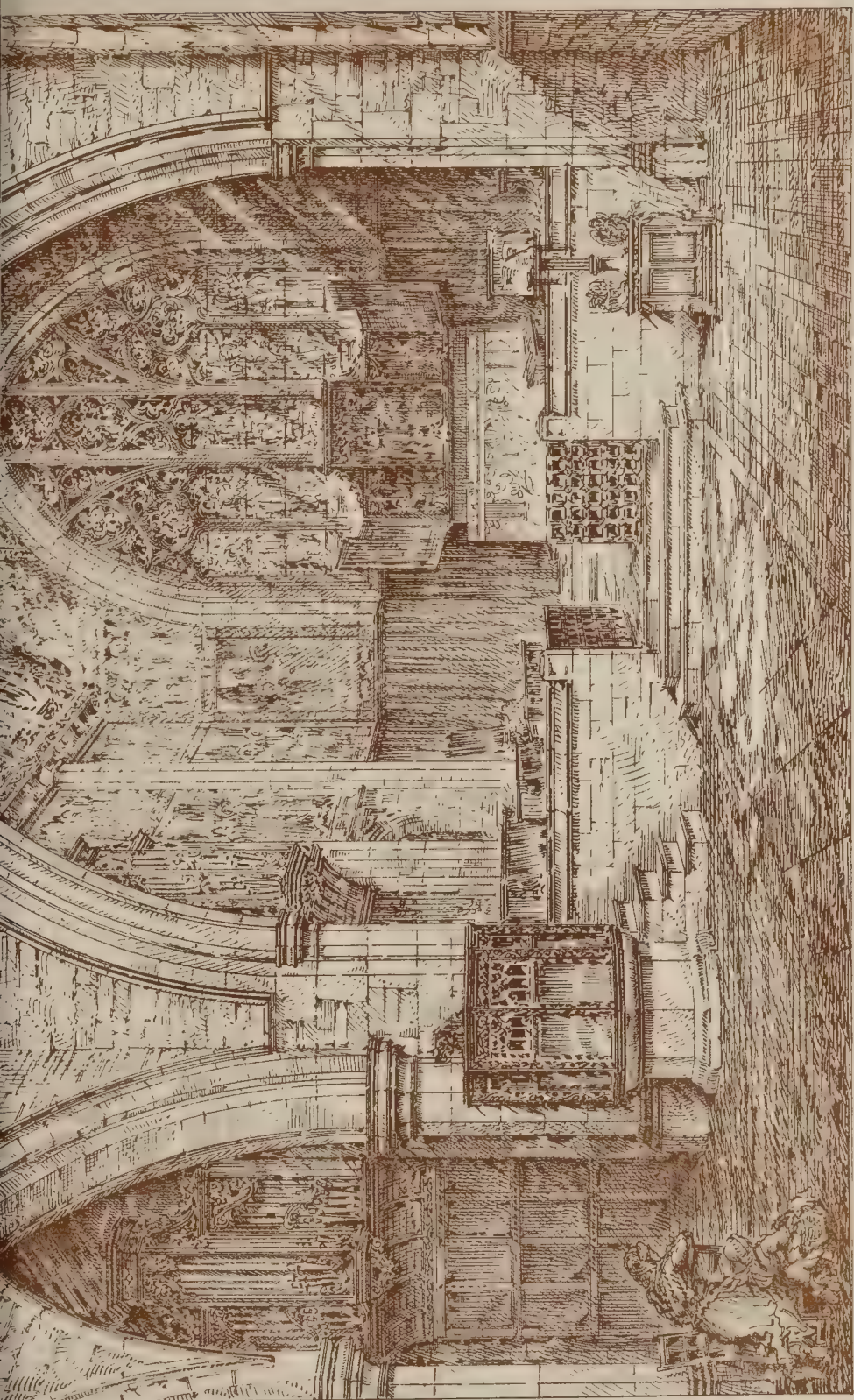


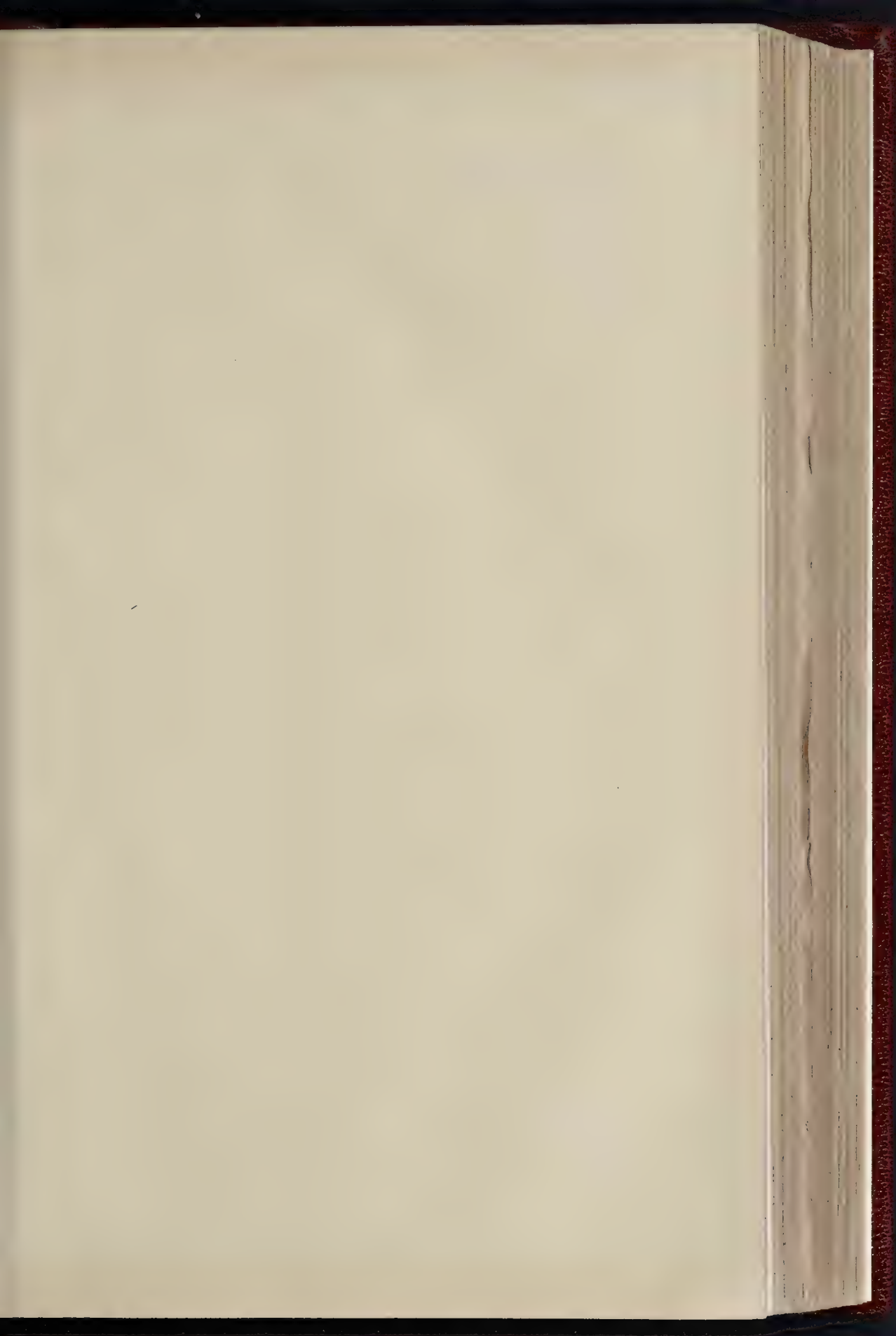
THE BUILDER, AUGUST 29, 1909.

S. Chad, Longsdon: Suggested Decoration in Timber & Painting. Architect.

Gerald C. Horsley

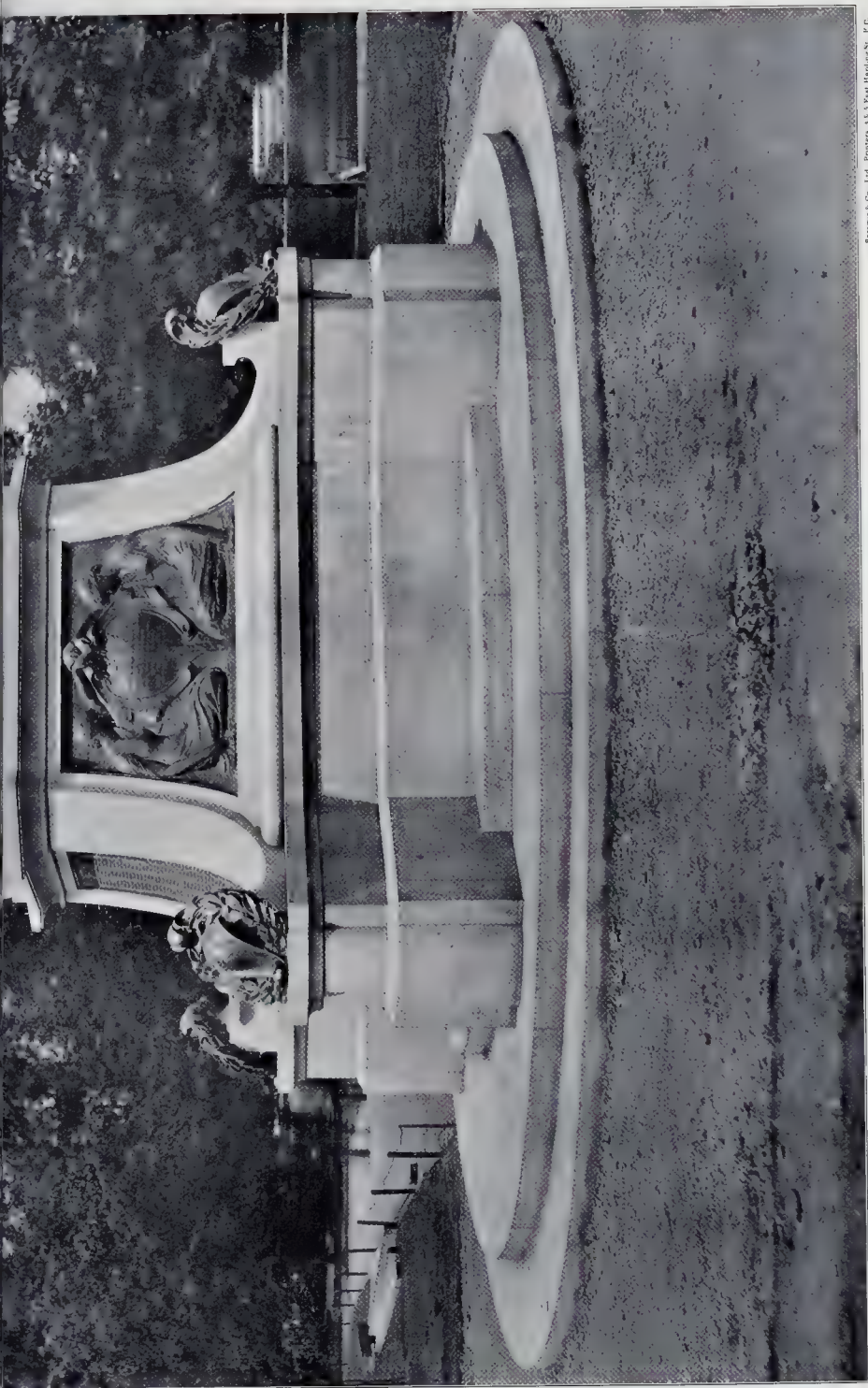






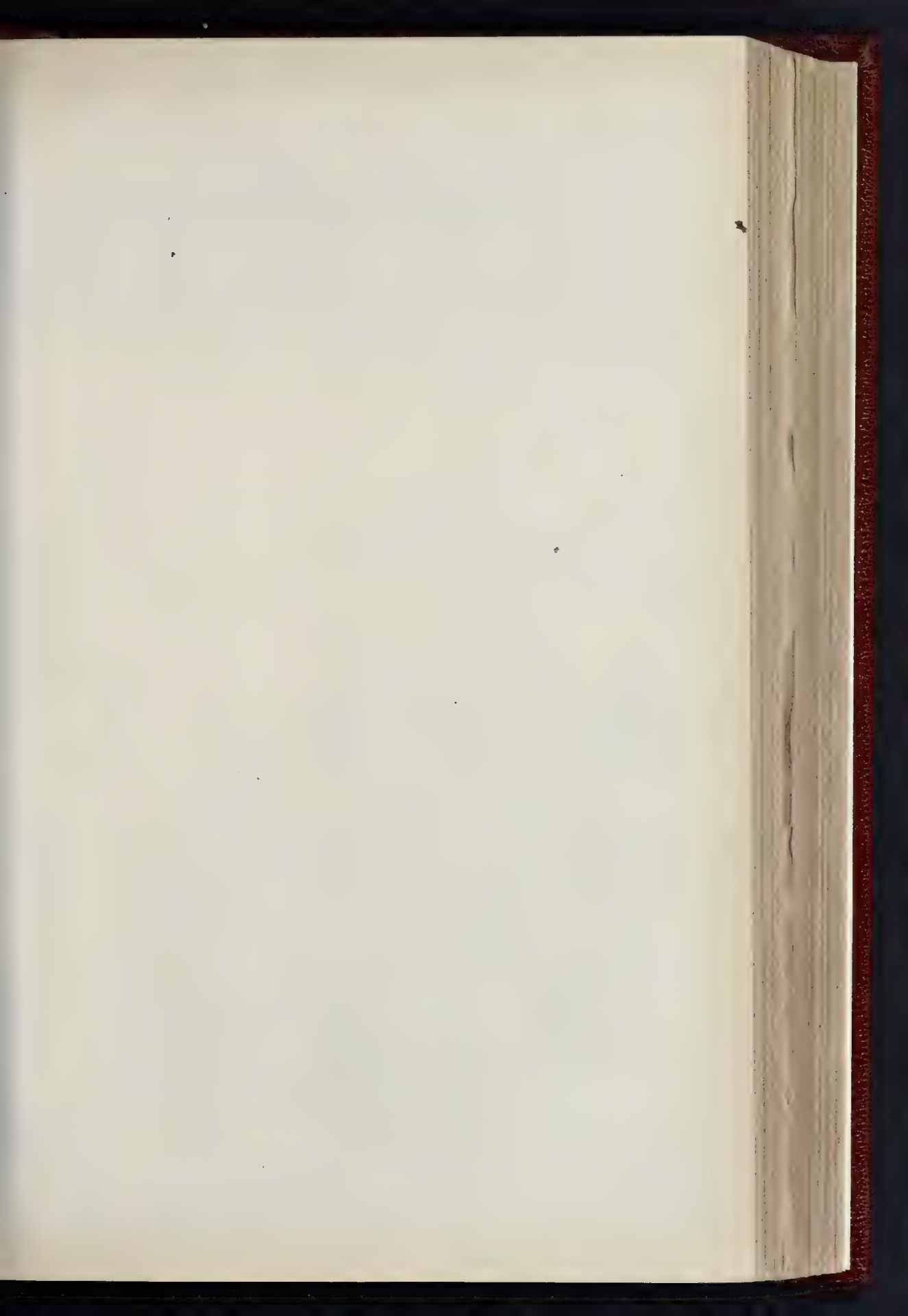
TH- BUILDER, AUGUST 25, 1906.





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SOLDIERS' WAR MEMORIAL, BIRMINGHAM — MR. ALBERT TOTT, SCULPTOR





MILTON.



THE PORCH, GINTON.



ROCK.



KIRBY HALL



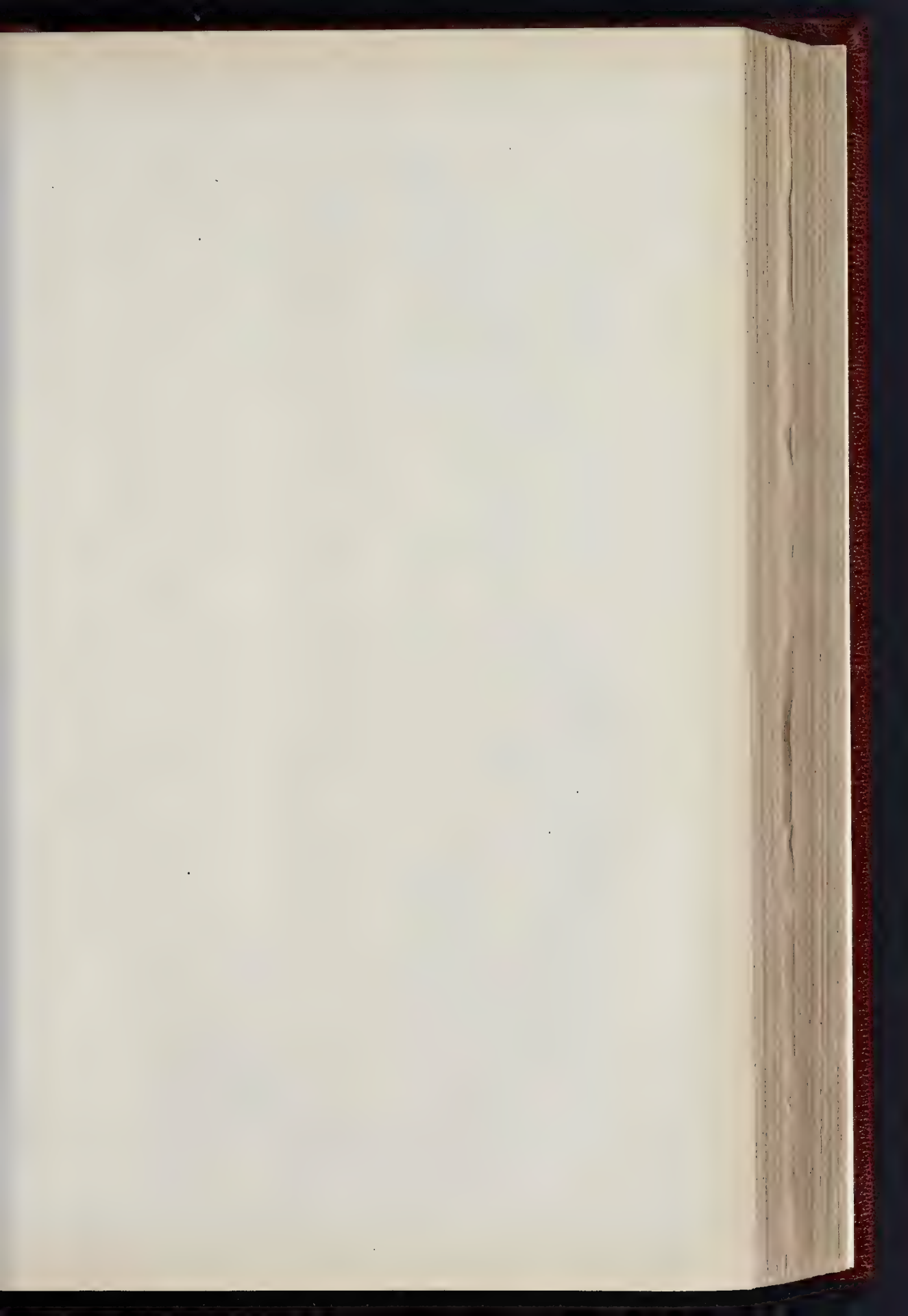
MARHOLM CHURCH

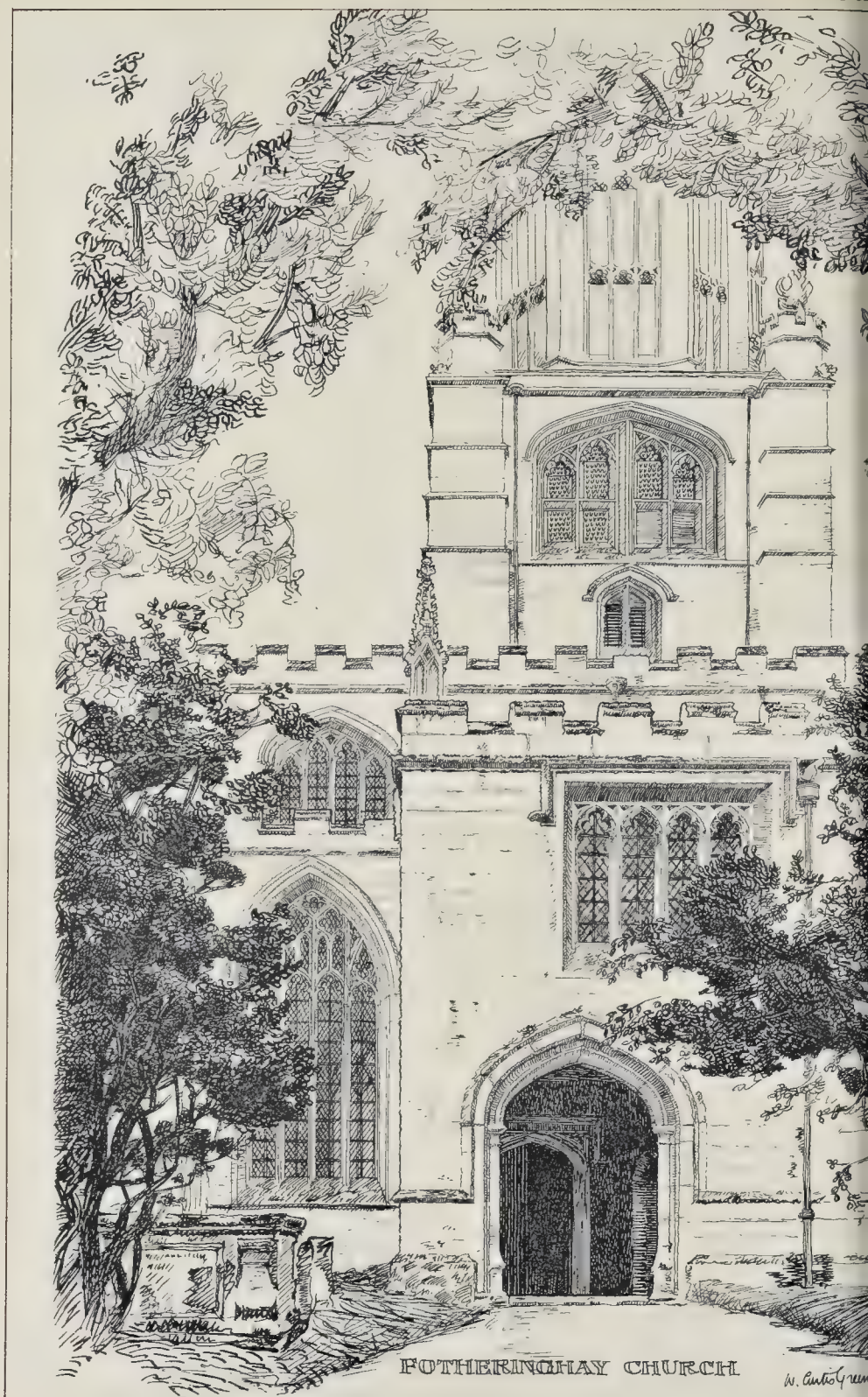


THE OFFICES WING
THORPE HALL

A CASTLE

PHOTO LIND SPRAGUE P.C. 425 EAST HAWKING STREET PETER LANE, E.C.





FOTHERINGHAY CHURCH

W. Anthony



PART OF ST
GEORGE'S
CHURCH,
STAMFORD

PHOTO L. THO. SPRAGUE & CO. LONDON 4-5 EAST HARDING STREET VICTORIA LANE, ZC

Correspondence.

REDNESS OF WATER FROM HOT WATER SERVICE.

Sir,—With reference to your note in the correspondence "column of last week's *Builder*, I am at present dealing with an installation in a mission served by London water from which water came quite red with rust. The piping this instance was ungalvanised, although the signal cause of the trouble was not due to this, but to faulty construction, causing several parts the apparatus to become airlocked from time to time, which it is well known will set up rust rapidly.

Particular mention of the use of galvanised pipes and fenders in domestic hot water service is not an old proof against rust, although it is readily used that for good work it is proper to use a protection to the piping as far as it goes. Considering, however, it is practically impossible having every part of an apparatus thoroughly galvanised (such as interior of sockets), the risk starting rust exists, although the apparatus be so long as to cause temporary air collections in the pipes. In many cases the sets and bends of apparatus are ungalvanised also, having been left in the fitting and not regalvanised afterwards, which adds also to the risk. In the instance to which I am referring even the galvanised tanks and cylinder became rusty and finally yielded rust, the whole of the interior galvanising being eaten away in the course of years. Even the brass and gun-metal fittings become thickly coated with it, and in the case the gun-metal nickel-plated towel dryers, it is necessary to provide new as the nickel-plated surfaces had become so badly coated by the rust of same.

I should have no hesitation in fitting up a hot water service in London with plain red steam tube, necessary, having done so in many cases in the past. Provided an apparatus is properly designed for the conditions, and the piping is of the best material, suitable cold supply pipe, and perfect details requisite to meet the requirements of a perfect system, there should be no difficulties arising from the cause under discussion.

THOMAS POTTERTON.

MONEY DEPOSITS AND MAKING-UP STREETS.

Sir,—A Borough Council are asked to take over a street. Their Surveyor made a plan and prepared an estimate, which was approved by the Council, for "making-up this street, providing a kerb and channel, paving the footpaths, filling street crossings, and reforming the necessary gully work, etc. (when the roadway was first made, previous to the houses being built, the gullies, etc., were put in at the expense of the owner as required by the Council and under their supervision), amounting to 495*l*. 8*s*. 6*d*." This amount, apportioned to various owners, was duly deposited, and the Council advertised tenders, accepting one (the lowest) for *l*. 16*s*. for the work.

The difference between the Council's estimate and the contractor's estimate shows a balance of *l*. 5*s*. 8*d*. due to the various owners. Twelve months have expired since the money was deposited, and the Council's Surveyor now, upon being applied to for balance, it is necessary to reapportion the work, "as other owners have been incurred in connexion with making-up and paving, such as gully openings, etc. (these were included in their original estimate), which increases the cost beyond the amount mentioned in the contract."

On the owners resist any charge for extra work and that included in the Council's original estimate and for which the money was deposited, demand the balance which Council hold in *d*.

OLD SUBSCRIBER.

* It is impossible in these columns definitely reply to a question asked by Old Subscriber "on the facts as stated by him." A considerable number of statutes govern this subject, and different considerations arise in connexion with Metropolitan or extra Metropolitan local authorities. The Local Authorities have power to agree to make up roads, and to provide estimates and to the financial consequences exceed the actual expenses set out in the Metropolitan Management Act, 1855, expressly provides that the balance shall be repaid the owners. Where the local authority acts in its own initiative, the statutes contain no provisions enabling owners to object to provisions estimates and to the financial consequences in certain events, but within certain specified times. Alterations in the specifications, etc., have also to be published, giving the opportunity to consider and object to them. Other acting by agreement or under statutory powers it would appear that the local authority did not appropriate at will or at any time, but Old Subscriber "had better consult his legal advisers.—Ed.

The Student's Column.

ROOFS: STRUCTURALLY CONSIDERED.—VI.

13.—Glazing.



As a general rule the thickness and dimensions of glass sheets used for roof-covering are dictated by custom, and the relation of thickness to dimensions is similarly determined.

This is not a very scientific method of procedure, and it is desirable that the proportions of glass sheets should be calculated as are those of other materials used in the form of beams or slabs.

Unfortunately, as pointed out in Article V., very few data are available with regard to the mechanical properties of glass, and, as roof-frames must be of sufficient strength to withstand sudden shocks and blows, as well as steady and uniformly-distributed loads. It is not possible to rely altogether upon precise mathematical computations.

Nevertheless a very fair idea of the most suitable proportions may be gained by applying beam formulae to the calculation of the stresses due to given loads and to the determination of safe loads for glass sheets of given dimensions.

In cases where the glass is supported along all four edges due allowance should be made for the assistance so afforded.

To illustrate the foregoing method of calculation let us assume that a sheet of plate-glass measuring 72 in. by 19 in. by $\frac{1}{4}$ in. thick is supported by sash-bars spaced so that the clear span of the sheet is 18 in., and that it has to carry a uniformly-distributed load of 20 lb. per square foot.

(a) Considering a portion of the plate 12 in. wide the bending moment in accordance with the usual formula is

$$M = \frac{W l^2}{8} \dots \dots (1).$$

where *M* = maximum bending moment.
W = uniformly-distributed load on the portion considered.
l = length of span in inches.

Then we have

$$M = \frac{30 \times 18^2}{8} = 67.5 \text{ inch-pounds.}$$

(b) To compute the extreme fibre stress we can use the formula

$$p = \frac{M h}{I} \dots \dots (2),$$

where *p* = intensity of stress in the extreme fibres.

M = maximum bending moment.

h = distance of the extreme fibres from the neutral axis, assumed to be midway between the top and bottom of the plate.

I = moment of inertia of the section.

We have already found in (a) the value of *M* to be 67.5 inch-pounds. The value of *h*, on the foregoing assumption, will be $\frac{1}{4}$ in. $\div 2$, say, $0.25 \div 2 = 0.125$ in., and the value of *I* the moment of inertia of the section is

$$I = \frac{b d^3}{12} = \frac{12 \times 0.125^3}{12} = 0.015625.$$

Substituting this and the other values in formula (2) we have

$$p = \frac{67.5 \times 0.125}{0.015625} = \frac{8.4375}{0.015625} = 540 \text{ lb. per sq. in.}$$

Taking the tensile strength of plate-glass as the basis of comparison, at the value of 2,850 lb. per square inch as stated in Table XI., we have a factor of safety equal to $2,850 \div 540 = 5.277$.

(c) If the plate were supported as a plate along all four edges the bending moment would be considerably less than that calculated in (a), for experiments upon concrete justify the assumption that a slab so supported will carry one and a half times the load that it will carry when supported only at the ends.

Consequently, if the bending moment be calculated by the equation $M = \frac{W l^2}{12}$ we obtain

$$M = \frac{30 \times 18^2}{12} = 45 \text{ inch-pounds.}$$

(d) The corresponding extreme fibre stress is

$$p = \frac{45 \times 0.125}{0.015625} = 360 \text{ lb. per sq. in.}$$

Thus, taking the tensile strength of plate-glass as the basis of comparison, as before, we have a factor of safety equal to $2,850 \div 360 = 8$, nearly.

(e) To find the breaking load for the portion of the plate before considered we first find the moment of resistance (*R*) of the section by the usual formula

$$R = \frac{p I}{h} \dots \dots (3)$$

Taking *p* = 2,850 lb. per square inch, as given in Table XI.,
 $I = 0.015625$ as calculated in (b).
 $h = 0.125$

and substituting these values in formula (3) we have

$$R = \frac{2,850 \times 0.015625}{0.125} = 356.25 \text{ inch-pounds.}$$

Next, representing the breaking weight by the symbol *W*, we find by formula (1) that the bending moment is

$$M = \frac{W \times 18^2}{8} = \frac{9}{4} W \text{ inch-pounds.}$$

Then, as *M* = *R*, the value of *W*, the required breaking load is

$$W = \frac{4}{9} 356.25 = 158.33 \text{ lb.}$$

(f) If the plate were supported along all four sides the foregoing calculations would become

$$M = \frac{W \times 18^2}{12} = \frac{3}{2} W \text{ inch-pounds;}$$

and as *R* = 356.25 inch-pounds, as before, the breaking load is

$$W = \frac{2}{3} 356.25 \text{ lb.} = 237.5 \text{ lb.}$$

If the transverse strength of glass, 1,500 lb. per square inch, as given in Table XI., were employed in calculations (a) to (f) the factors of safety would be considerably reduced.

Thus, the factors previously calculated would become

$$(b) 1,500 \div 540 = 2.77.$$

$$(d) 1,500 \div 360 = 4.16.$$

Bearing in mind the liability of glass employed as a roof-covering to be broken by unexpected loads or shocks the factor of safety should always be ample.

The foregoing calculations are intended merely for the purpose of indicating the manner in which the proportions of glass sheets may approximately be determined or verified. More precise computations are scarcely possible owing to the lack of data as to the strength of glass and particularly as to the value of the modulus of transverse rupture.

The student will find it interesting as well as instructive to make similar computations for examples of glazing which have come within his own experience.

When deciding upon the size of the sheets to be employed in roofing it should be remembered that large pieces are always more costly than smaller ones, that the price increases with the thickness, and that the expense involved by accidental breakages is proportionately heavy for large sheets.

On the other hand, so far as first cost is concerned, the unnecessary multiplication of sash-bars may involve as much expense in the form of labour and materials (chiefly the former) as would cover the additional outlay necessitated by glass of slightly larger size and thickness.

As far as possible the arrangement of sash-bars should suit the sizes of glass that can be obtained from stock and without waste in cutting.

Curved sheets are charged at higher rates, and unless otherwise ordered the smooth surface of rough plate-glass will be found on the outside after curving. This is not desirable, for as the rays of light are reflected the slightest undulations or other irregularities are thereby rendered very apparent. When the rough surface is on the outside the rays are absorbed, and the irregularities of the surface are not readily detected by the eye.

A point worth noting is that second-hand plate-glass can always be obtained from the insurance companies at low rates.

Allowance must always be made for the expansion and contraction of glass with temperature variations. The amount of expansion can readily be calculated from the co-efficient given in Par. 12. If sufficient

margin be not allowed the sheets will probably be broken in hot weather.

14.—Glazing with Putty.

The old-fashioned method of glazing with sash-bars and putty is still largely used in roof-work. Timber-bars have been recommended on the ground that it is more easy to make the covering watertight with them than with steel or other metallic bars. The reason given in support of this view is that the metal does not expand and contract equally with the glass, and consequently that the putty is liable to become cracked, thereby allowing water to pass between the glass and the sash-bars.

When considered in connexion with the values of the co-efficient of expansion for glass, timber, and steel this reasoning does not seem to be very convincing. The value of the co-efficient of expansion for deal is 0.0000247, and, taking this as representing timber generally, the linear expansion of the three materials per inch per degree Fahrenheit is as follows:—

Material.	Co-efficient of Expansion.	Differences.
Glass	0.00000479	
Timber	0.0000247	— 0.0000232
Steel	0.0000650	+ 0.0000602

Thus, the fact appears that, so far as expansion and contraction are concerned, glass and steel are more in harmony than glass and timber.

In the case of zinc, which is now largely used for sash-bars, the co-efficients show a difference of (0.000016—0.0000479) = 0.0000112, or nearly five times that between timber and glass.

Skylights are usually designed with the sash-bars parallel to the slope of the roof, and when the length permits the panes of glass are run continuously from top to bottom without cross-bars to interfere with the free discharge of rain-water.

If the length is such that single sheets of glass become inadvisable or impossible the panes are overlapped. Where the panes are large and heavy they should be hung together by zinc or copper clips, as shown in Fig. 29.

The lap of half an inch is generally recommended for roofs of average pitch, but this

lap is frequently insufficient. The overlapping surfaces rarely fit closely, and thus any water retained may be drawn up by the joint by capillary attraction or blown up by the wind, and if the lap is not wide enough it may drip over the head of the lower sheet.

Some difference of opinion exists as to the best direction of the sash bars in roofs that are chiefly covered with glass.

The following quotation is taken from a well-known treatise on roof construction:—

"The ridge-and-furrow system admits of easy access for repairs, but it is evident that where the ridge and furrow follow the curve or pitch of the roof one side of the sash-bars suffers more from the weather than the other, destroying the putty, whereas when the sash-bars are parallel to the main transverse ribs the water will run off the roof more freely."

The sash-bars of large roofs are usually spaced from 12 in. to 20 in. apart, and supported at intervals of from 6 ft. to 8 ft.

Timber bars should be of sufficient stiffness to afford adequate support to the glass, otherwise it may be liable to considerable flexure in the longitudinal direction of the sheets, which will have to be thicker than would otherwise be necessary, in order to avoid undesirable strain.

Steel sash-bars must also be proportioned for the weight to be carried. They usually consist of tee-bars from 1½ in. to 2 in. wide across the flange, and from 1 in. to 2 in. deep, measured in the direction of the leg. Bulb tee-bars are useful for glazing, as the bulb forms a protection for the putty (see Fig. 30).

Zinc sash-bars, of which a few representative types are illustrated in Fig. 31, are made in great variety of sheet metal, but are only suitable for light work unless fitted with steel tongues, as shown in Fig. 32, to insure the requisite rigidity.

Small panes of glass should be back-puttied, an operation that is performed by spreading a layer of putty over the narrow part of the rebates upon which the glass is bedded. After the glass has been placed in

position the panes are front-puttied by filling in or stopping the rebate with putty to a triangular section. The excess of back putty should not be removed until the front putty has set, a process that occupies from four days to seven days.

When steel sash-bars are employed the glass should be laid on a strip of lead, asbestos, felt, or other packing, so that it does not come into direct contact with the metal. The steelwork should be primed before glazing is commenced. Either lead or thermoplastic putty should be used for metal bars.

Thermoplastic putty is a special preparation containing a proportion of tallow which, although not preventing the material from hardening in a few hours after it has been used, causes it to become plastic when warmed by the sun and to harden again when the temperature falls. The great advantage claimed for this putty is that it does not become loosened by the expansion and contraction of glass under temperature variations.

Obituary.

MR. JAMES DREDGE, C.M.G. —We regret to notice the death, on Wednesday last week, of Mr. James Dredge, who for nearly thirty years was joint editor with Mr. W. H. Mew of our contemporary *Engineering*. Mr. Dredge was born in 1840, and at the age of eighteen he entered the office of the late Mr. David Kinnear Clark. Four years afterwards he obtained an appointment as engineering assistant under the late Sir John Fowler, and in that capacity took part in the construction of the Metropolitan District Railway and other important undertakings carried out by that eminent engineer. Towards the close of the year 1866, Mr. Dredge turned his attention to technical journalism, becoming associated with the late Mr. Zerah Colburn in the establishment of *Engineering*. As joint editor of that journal, Mr. Dredge has done much in an unobtrusive way to forward the progress of mechanical science, and has taken an active part in various international exhibitions held in Great Britain and other countries. He was created Companion of the Order of St. Michael and St. George as an acknowledgment of his services to the Commissioner-General for this country at the Brussels International Exhibition of 1897, and was a member of the Institutions of Civil and Mechanical Engineers and of other scientific associations.

General Building News.

PLYMPTON ST. MAURICE, DEVON.—One of the most interesting of the smaller churches of Devon is the Parish Church of Plympton St. Maurice. A Saxon church stood on the site of the present one, the earliest portion of which is the transition Norman tower arch. The church now consists of nave, north and south aisles, and chapel on the south side, mostly XVth century work, but with some earlier fragments. At the west end is a picturesque granite tower of good proportions. The church with the exception of the nave roof was restored in 1879 under the direction of the late Mr. J. D. Sedding. The work at that time included the beautiful screens between the nave and chancel, and across the aisles. The nave roof was untouched. This had been put up in 1869, replacing one that dated from 1733. Although poor in design and out of harmony with the other roofs, it was not thought desirable to interfere with work that had been so recently completed. During the last few years, however, it became evident that the roof was in a bad and dangerous condition, and the rector (Rev. H. T. Hole), churchwardens, and parishioners resolved on having an entirely new roof of the best construction, in keeping with the architecture of the church. The roof has been erected from the design of Mr. James Hine (Hine & Odgers, Plymouth) and the work—for which Mr. A. Andrew was contractor—is now completed, and the Bishop of Exeter officiated at the dedication on the 16th inst. It is a "waggon" roof, without horizontal ties, of the Devonshire type, and is enriched with carved wall plates and forty-five bosses at the intersection of the moulded oak ribs, illuminated in proper colour. The five nearest the chancel are, in the centre, the B.V.M.; the arms of Redvers, the lord of Plympton Castle and Manor, and the probable founder of the church which succeeded the Saxon church; of St. Thomas of Canterbury, to whom the church was rededicated after his martyrdom; of the Priory of Plympton; and of John Brackley, who at the end of the XIVth century gave the chapel of St. Maurice and endowed it. The chapel remains in constant use. The endowment was appropriated in the time of Edward VI. T.

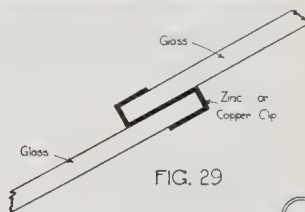


FIG. 29

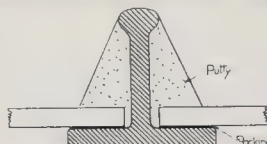


FIG. 30

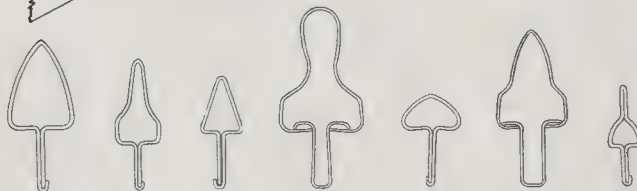


FIG. 31

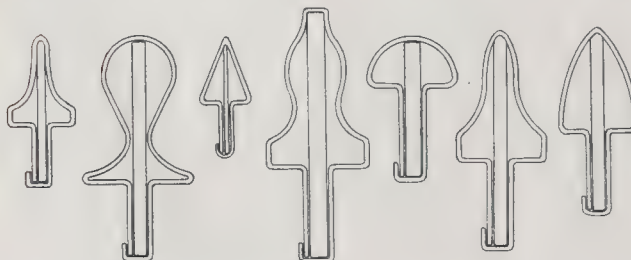


FIG. 32

Illustrations to Student's Column.

church contains several monuments of interest, including a tablet to the memory of the Rev. nuel Reynolds, father of the great painter; a monument to Sir Joshua, erected in 1741; and a medallion portrait in statuary marble by Derwent Wood. Reynolds was baptised the church, July 30, 1723. The grammar school of which his father was the master, and which the son made his first drawing (a dilapidated window in perspective), still stands in a good condition, and very much as it was the boyhood of Reynolds. Sir Chas. Locke (slake, P.R.A., Benjm. Haydon, and Mr. Chas. Eke Eastlake received a portion of their education in this celebrated school. Sir Christopher was member of Parliament for Plympton the reign of Charles II., and was the architect, as believed, of Plympton House, a large and important residence—of Portland stone and brick in this ancient borough.

WESLEYAN CHURCH AND SCHOOL, WREKENTON, WYRESHIRE.—The foundation-stones of the new Wesleyan church and school at Wrekenton were laid on the 8th inst. The new buildings, which are built of stone and which comprise church, school, three classrooms (one to hold 100 children) and a church parson, are estimated to cost £1,500. The architect is Mr. James Orwin, of Newcastle, and the contractor Mr. Robert Davison, of Felling. The chapel, which will stand in a prominent position in the Springfield-road, will have seating accommodation for 230, and the school accommodation will be 250.

GREEK CHURCH, CARDIFF.—The Greek community of Cardiff are about to erect a church on a site at the rear of St. Mary's Church, between North Ch. road and the West. The church is designed in the Byzantine style in the shape of a Greek cross. The church to be built at present includes the nave, rch (with gallery over), and sanctuary, roviding accommodation for 250 worshippers, and provision has been made in the plans for two extensions of the church and the sanctuary, to further accommodation for 100. The entire portion of the nave will be covered by a upper dome, 28 ft. in diameter, from which the will be obtained through sixteen clerestory indows. The roof of the sanctuary is also covered in with a copper dome. The walls of the building will be built with local brickwork, with facing bricks and Bath stone dressings. The floor will be of mosaic and wood blocks, the semicircular arches carrying the dome will be of redressed bricks, and the interior walls for the present partly pressed bricks and plaster, and the hole will be heated by hot-water on the low-pressure system from a chamber in the basement. The present structure will cost slightly under £600. The work has been entrusted to Messrs. nox & Wells, contractors, Cardiff. The architects are Messrs. James & Morgan, Cardiff.

PROPOSED NEW CHURCH, BOLLINGTON CROSS.—It is proposed to erect a new church at Bollington Cross, at a cost of not less than £2,000. Mr. Sidney, architect, is to prepare the plans for the work.

NEW SCHOOL AT SELLY OAK.—A new school in erton-road, Selly Oak, was opened on Saturday at week. The building, which was designed by Mr. Edward James, Birmingham, and built by Mr. Harvey Gibbs, King's Heath, is of two ories, the lower having accommodation for 230 tants, and the upper for 280 senior mixed holars.

CARNEGIE PUBLIC LIBRARY, RUTHERGLEN.—In the 4th inst. the memorial-stone of this institution was laid. The new building, which is situated on Main-street, extends in depth to King-street. he outside walls are built of white stone from annockburn with stone and granite pillars. he accommodation on the ground floor consists of an entrance-hall, lending library, with cases, o, for 20,000 volumes; newspaper-room, ladies' ading-room, with accommodation for forty aders; librarian's room, and general reading-vatories, store-room, etc. A stair leads from he entrance-hall to the first floor of the front ilding, which contains a small hall, retinings, and a large common-room. On the first floor, on a floor is situated the librarian's use, which has a separate stair and entrance on Main-street. A store for books, also a heating chamber, is provided in the basement fronting King-street. Each of the principal apartments ill have decorative plastic ceilings, and the lower alls panelling with wood. The building, which is the gift of the Carnegie, will cost about 7,000. The contractors, etc., are: Mason and brick work, John Park & Son; iron and steel work, John Mundy, Glasgow; joiner work, Warnocks & Horsburgh, Rutherglen; plaster work, John Scott, Rutherglen; plumber work, Robert Bowie, Rutherglen; plaster work, Van, Tonner & Sons, Glasgow; heating, etc., James Combe & Sons, Glasgow. The clerk of works is Wm. V. Muir, Rutherglen; and the treasurer Andrew Stewart, I.M., Glasgow. The architects are Messrs. Geo. Sinclair and John Ballantine, Glasgow.

NANTMOEL WORKMEN'S HALL.—On Saturday last week the extensions recently effected at the

Nantmoel Workmen's Hall were opened. The hall itself has been extended so as to accommodate over a thousand people, and the new splendid room and reading, lecture, and committee rooms have been constructed. The cost of the extensions has amounted to 2,300. The contractor was Mr. D. W. Davies, and the architect Mr. Morris Williams, Blackmill.

ENLARGEMENT OF CONVALESCENT HOME, HORSFORTH.—The Springfield Convalescent Home, near Horsforth, is now being enlarged. Messrs. Walter A. Hobson & Co., of Leeds, are the architects of the work, their designs having been accepted in open competition.

Stained Glass & Decoration.

WINDOW, WADESDON CHURCH, AYLESBURY.—The east window at this church has just been filled with stained glass; it contains three lights and tracery. Our Lord in majesty is represented in the upper part of the centre light, with the figure of S. Michael under, while in the left light at the top is the Virgin Mary, and S. John with David and Faith underneath, the right hand light having S. Joseph and S. Mary Magdalene in the top part and S. Peter and S. Paul below them. Angels are shown in the tracery. This work was designed and executed by Percy Bacon and Brothers, of London and Edinburgh, under the supervision of the architect, Mr. G. H. Fellows F.R.S.

MEMORIAL WINDOWS, HASELEY CHURCH, OXON.—The gift of two stained glass windows has been made to the parish church of Great Haseley, Oxon. That in the south aisle has for its subject the Transfiguration. The other window, in the north aisle, represents the David and the Goliath, the lower part of the window being filled in with our Lord's commission to St. Peter. The designs are by Mr. G. F. Bodley, R.A., and the work by Messrs. Burlison & Grylls.

Sanitary and Engineering News.

WATER SUPPLY FOR CARLISLE.—The new gravitation scheme carried out by Messrs. Mansergh & Westminster, provides a supply from the Galt watershed, the water being conveyed to a service reservoir with a capacity of 5,000,000 gallons at Cunnwhinton.

DRAINAGE WORK IN POPLAR.—The Medical Officer of Health for Poplar in his annual report which has just been issued says that it has been found to work well in practice to enforce a rule that where water-closet pans and traps are fixed without notice being given under clause 14 of the London County Council By-laws, sect. 39 (1) of the Public Health, London, Act, 1891, the builder is written to, asking him to open the ground, otherwise the matter will be reported to the Public Health and Housing Committee in order that legal proceedings may be instituted against him for infringing the by-law. This mode of procedure prevents good work being constructed on to defective work. Whenever drainage work has been found to have been done and covered up without inspection, if the builder will not open the ground, the work is exposed by the sanitary authority, and such a line of action ensures sound work. For fixing in pans and traps without giving the proper notice three builders were threatened with legal proceedings during the year.

Foreign.

FRANCE.—M. Georges Berger, the President of the Union Centrale des Arts Decoratifs, is organising at the Pavillon Marsan a new series of rooms which will allow of the exhibition of numerous objects for which hitherto there has been no space. At the same time the rooms are being arranged which are to receive the collection which M. Moreau Nélaton has presented to the Government, and which will be open to the public on the 1st January next year. The statue of Rude, by M. Frémiet, which was in this year's Salon, has been inaugurated at the Tuileries. The Emery Museum is shortly to be opened to the public. This museum, consisting of a collection of objects of Oriental art brought together by the late M. Emery, will occupy a house in the Avenue du Bois de Boulogne, left by M. Emery for that purpose.

A monument to Gustave Larroumet, the eminent art-critic and former Secretary to the Académie des Beaux-Arts, has been placed under the arcades of the Théâtre Français. It is the joint work of M. Paul Roussel (sculptor) and M. Patouillard (architect). A monument to Fragonard is to be erected in the gardens of the Louvre. Another monument to this eminent painter is to be erected at Grasse, his native town. The Municipality of Paris have opened a competition for tenders for the work necessary for carrying the Metropolitan line No. 8 between

the Pont des Invalides and the Pont de la Concorde. The jury of the Ecole des Beaux-Arts charged with the award in the competition in construction, have given the first medal, as well as the Prix Jay, to M. Plisson, pupil of M. Bernier. A wealthy collector, M. Duhamel, has presented to the town of Mantes the museum which he had built there, as well as his large collection of works of art. The Government has founded a district school of architecture at Lyons. The Municipality of Nancy have opened a competition for the building and fitting up of a tuberculosis hospital in that town. Important works have been carried out at Marseilles for the deepening of the "bassin national," by the side of the moles, at a cost of 1,600,000 francs. The jury in the competition opened by the Municipality of Moulins (Allier) for the construction of barracks for gendarmes, have awarded the first premium to MM. Giraud and Mazon, of Montluçon. The statue of Charles Floquet, former President of the Chamber of Deputies, is to be erected at Paris on the open space adjoining the Avenue de la République and the Quai Volmy.

GERMANY.—Whereas out of 900 members who attended the Architectural Congress in Madrid, sixty were Germans, out of 1,700 who attended the late Congress in London only ninety came from Germany. In order to ensure success, the Royal Institute of British Architects made the most complete arrangements with the most unsparring devotion. Some disappointment, however, was occasioned by meetings being held simultaneously in two separate buildings, so that it was impossible for those who were so disposed to take part in every meeting. The English custom of distributing printed copies of the paper under discussion greatly facilitates matters and should be adopted by future congresses. A strong argument in favour of substituting small paving cubes for macadam lies in the greater durability of the former. One of the most frequented streets of Hamburg, the Alsterkrughaussen, formerly showed its macadam twice in three years. In 1902 this street was paved with small granite cubes and is as perfect to-day as when it was freshly laid, having cost nothing in upkeep. Added to this, in comparison with macadam, paving stones produce neither dust nor mud. As for noiselessness, small paving cubes rank after asphalt pavement. For traffic they are just as safe as any other form of paving adopted and can be used on slopes of 1 in 20. An interesting inquiry reveals the fact that in towns the number of houses occupied by a single family varies in the inverse ratio to the number of inhabitants in the town. Thus in Paris, Vienna, Berlin, these houses average 15 per cent., while in towns of under 2,000 inhabitants they average 63 per cent.

AUSTRIA.—Although Vienna already possesses a far larger proportion of open spaces than does London, Paris, or Berlin, a project is being set on foot to preserve the forests and meadow-land surrounding the town, so that fresh air will be readily supplied and the inhabitants will have open country in their immediate vicinity. By this means the open spaces of Vienna will be increased five-fold. As the XIVth century Town Hall of Görz no longer meets modern requirements, it has been decided to build a new town hall and to leave the ancient palace in its present condition. The conductor of the choir of St. Stephen's, Vienna, left 1½ million kronen for the erection of a children's hospital in Vienna. Herr Josef Schmalzhofen has just completed the plans for the building, which can accommodate from thirty to fifty beds. Engineer Löwit suggests a means for the preservation of telegraph posts at the places where they usually rot, i.e., at the ground level. He proposes surrounding the post for a height of 1 ft. above and 1 ft. below ground with a socket made in two half rings, the space between post and socket to be run with cement, weathered at the top. This method could be easily and cheaply applied to existing posts.

ITALY.—On August 1 express trains began to use the electric engines on the Simplon line. Fifteen trains daily are drawn through the tunnel by electric power, but the two periodical trains de l'azur keep to steam in order to avoid loss of time in changing engines.

Miscellaneous.

BRICKMAKING, ETC., IN GERMANY.—In the course of a memorandum on German ceramic industries, Sir William Ward, British Consul-General, states that the extent of German industry and trade in the various descriptions of ceramic ware, including bricks, etc., has largely increased during the past thirty years, and appears likely to develop further in the near future. One or other branch of ceramic industry is now to be met with in almost every part of Germany. Common clays which can be utilised for brick-making, and also those which can be used for the manufacture of common earthenware goods, are of frequent occurrence. The rather superior kinds, and amongst them those which turn white after burning, are likewise not unfrequent. The

total number of brick-making works in Germany, according to the last official census, was 16,431, and the total number of hands employed therein, 219,860. The brick-making, in view of the widespread presence of clay deposits in all parts of the country which are suitable for this industry, is carried on all over Germany, excepting, of course, in the mountainous regions. Earthenware drain-pipes and other pipes are manufactured chiefly in the district of Bitterfeld, in Saxony, Münsterberg in Silesia, in the Lansitz district, in Rhenish Prussia, in the Palatinate, etc. Stone-ware tiles, etc., are made at Annaberg and other centres; fireproof stoneware in Hesse, Silesia, Posenania, and Saxony; terra-cotta ware in Saxony, Thuringia, and Charlottenburg; and architectural ornaments at Bitterfeld, Charlottenburg, Treves, Offenburg, etc. Besides the well-known porcelain works belonging respectively to the governments of Saxony and Prussia at Meissen and Berlin and Charlottenburg, there are at present about 200 private porcelain factories in the country, in addition to more than 1,000 other establishments occupied in painting, colouring, gilding, and otherwise "finishing" porcelain ware. The principal ceramic products exported to the United Kingdom are unglazed fireproof bricks, glazed roofing tiles and bricks, earthenware stoves, and porcelain and stoneware. On the other hand, Germany imported from England in 1904 some 37,000 cwt. of ordinary bricks and roofing tiles, 253,998 cwt. of fireproof bricks, not glazed, and 14,210 cwt. of earthenware pipes, glazed.

REBUILDING OF SAN FRANCISCO.—In the opinion of the German Trade Export in New York building materials, etc., imported from abroad will not enter very largely into the rebuilding of San Francisco. In the same way as the President of the United States refused the monetary assistance proffered from abroad, Congress will refuse to exempt building material from import duty. The demand for construction material, gardens, angles, etc., will not be so great as was at first estimated. The rebuilding operations will cover several years, and supplies will only be required to be brought forward in instalments, which the iron and steel industry at home will be able to furnish without difficulty. The more immediate needs, viz., for corrugated iron, wire, and nails, etc., for temporary structures, have already been to a large extent satisfied by American concerns. Perhaps a more active demand for fireproof roof and wall coverings and for impregnating material for wood will arise and bring with it a better chance for the importer. Cement is likely to continue to meet with a ready sale. Experience of the after-effects of the Baltimore fire has shown that neither in building materials nor in dry goods is trade likely to become abnormally active.—*Board of Trade Journal.*

SR. MARK'S, VENICE.—Under the superintendence of Signor Manfredi, the architect, and Signor Marangoni, the engineer, the restoration of the Basilica is well advanced. The two vaults of the roof, known as the Apocalypse and Paradise, are securely propped. The Tribune of the Patriarch has also been propped, and the Byzantine mosaics have been carefully detached.

EXHIBITION OF LIVERPOOL ART.—A Committee is formed of members of the Liverpool Academy of Arts and the Corporation for an historical exhibition of Liverpool art in the Walker Art Gallery in the course of next May. The exhibits will consist mainly of works of art by members of the Liverpool Academy and of the former societies of the XVIIIth century and by other Liverpool artists, and will comprise portraits of Liverpool artists. The committee will be glad to be informed as to the ownership of the works in question and to receive copies of old Liverpool Academy catalogues. All communications should be addressed to Mr. E. Rimbault Dibdin, the secretary, at the Walker Art Gallery, Liverpool.

RAILWAY FROM MUNDLESLEY TO CRUMER.—A joint committee of the Great Northern, Midland, and Great Eastern Railway Companies have opened an extension of the North Walsham and Mundesley line, for a distance of nine miles, with stations at Trimmingham and Overstrand, near Crumer. A tunnel 180 ft. long passes beneath the Norwich and Cromer line of the Great Eastern Railway; it was constructed upon the "cut and cover" principle, and without hindrance to the traffic on the line above. Communication by railway is thus made with Sheringham, and a short branch at Runtun extends to the station at Crumer.

Capital and Labour.

CONDITION OF THE BUILDING TRADES.—Employment on the whole continued dull, though it was slightly better than a month ago. Compared with a year ago it showed little change. In London employment was rather better than a month ago, but it was not so good as in July, 1905. Returns received through the Trade Correspondent from 67 London Employers show that in the last week of July, 9,992 workpeople of all classes were paid wages, as compared with

9,556 in June, and 11,441 in July, 1905. Trade Union returns relating to carpenters and joiners show that the percentage of unemployed in July was 7.8, as compared with 9.4 a month ago, and 7.9 a year ago. With plumbers the percentage for July was 14.3, for June 13.7, and for July, 1905, 11.1. In both trades the percentage of unemployed was higher in London than in any other district. With bricklayers and plasterers employment was rather better than in the previous month; with masons a considerable improvement was shown, though employment continued dull, and with painters little change was shown. Returns received from 72 employers' associations in towns outside London show that employment in these towns continued quiet, and on the whole rather worse than a year ago. The following information is based on returns received from the general secretaries of Trade Unions and from Trade Union reports.—Employment with bricklayers and masons was dull on the whole, but somewhat better than a month ago. With carpenters and joiners it continued slack, but was slightly better than a month ago and a year ago. The percentage unemployed of Trade Union carpenters and joiners in the whole country was 8.3, compared with 8.4 in June, and 8.5 in July, 1905. With plumbers it was rather worse than a month ago, but better than a year ago. The percentage of Trade Union plumbers unemployed was 8.9 in July, as compared with 7.9 in June and 10.1 in July, 1905. With slaters, painters, and builders' labourers there was a falling-off in employment as compared with a month ago. With plasterers there was a slight improvement.—*Labour Gazette.*

Patents of the Week.

APPLICATIONS PUBLISHED.*

14,908 of 1905.—A. JOHNSON: *Manufacture of Lavatory Basins and the like made of Earthenware.*

This relates to the manufacture of lavatory basins and other articles of earthenware requiring to be similarly produced, consisting in adding to and mixing with the clay or clay mixture of which the said articles are to be made, of a solution or mixture of soda, water, and glass, then running the combined mixtures into a mould, and allowing them to stand until the clay is set hard.

15,112 of 1905.—C. HELAS: *Valve Attachments for Water Heaters and the like.*

This relates to valve attachments for water heaters and the like, and consists in the construction of two vertical valves, one for gas, and the other for water, connected together by vertical rods, the said rods being jointed, and connected together by a set pin passing through the head of the vertical rod of the gas valve and through slots cut in the terminal end of the vertical rod of the water valve. The water valve is situated at the top and the gas valve at the bottom of the apparatus.

18,324 of 1905.—D. A. REAGAN: *Devices for Automatically Operating Fire Doors.*

This relates to a device for automatically operating fire doors, and consists of a motor comprising a casing, a piston in the casing, an inlet port, an exhaust port, an oscillatory valve adapted to contain live steam and carry from the inlet port to a discharge orifice in the front of the piston, a cut-off rod and tappets controlled by said cut-off rod for returning the valve to its original position, one of the said tappets being moved by the piston, and connexions between the fire door and the motor whereby the fire door is automatically opened at intervals and permitted to close by gravity.

21,832 of 1905.—C. S. JOSEPH: *Fire Grates.*

This relates to a twin grate adapted to be built into the division wall of two rooms and to heat directly by means of a common fire either room separately or both rooms simultaneously. The two fire grates abut rearwardly, a vertically movable central damper or partition being adapted to cut off communication between them, either partially or completely.

24,447 of 1905.—D. CROWTHER: *Domestic Fire Places.*

This relates to domestic fire places and consists of a fire-clay slab or iron plate, supported by means of four link chains attached respectively to the four corners of the slab or plate from a pair of hooks secured to the fire back, so that by lengthening and shortening the chain connexions the slab or plate can be supported at any desired height and at any desired forward inclination against the fire back.

5,551 of 1906.—J. T. STOKES: *Radiators for Heating Places.*

This relates to radiators for heating buildings, and consists of a perforated cap for containing the water evaporating vessel, such cap having

supporting brackets projecting inwards from its interior sides, means by which said cap is fastened in position, said means consisting of inward projections on opposite sides of said cap arranged to engage with the radiator members, or with a pivoted balanced catch attached thereto.

8,863 of 1906.—R. MOSE: *Windows.*

This relates to a window which comprises a casing having a pocket or channel in the top, a screen frame slidable within said pocket, said screen frame resting normally upon and moving with the sash, an elastic latch adapted to engage and lock the screen within its pocket when the upper sash is closed, and a lug or projection carried by the upper rail of the lower sash so as to engage such spring and release the screen when the lower sash is raised for the purpose.

9,074 of 1906.—F. C. SCHWEDTMAN: *Sash and other like Weights.*

This relates to a weight composed of a core of ground barytes, and a bonding agent surrounded by a shell of metal which fills the surface pores of said core.

11,390 of 1906.—F. C. VON BAUCH: *Locks for Doors.*

This relates to a door lock having a latch operated by a forcing arm and a spring acting on two or more lock parts, and is characterised by one arm of the spring which is made of steel wire and is wound round the complete turn. An alignment pin, being formed into a closed loop by bending over and securing the end or extension of the wire in or to the pin, thus obtaining increased resilience.

13,249 of 1906.—W. H. TOSKES: *Emergency Exit Fastenings or Panic Bolts for Doors and Windows.*

This relates to the combination with emergency exit fastenings or panic bolts, of springs or spring mechanisms for ensuring the parts taking up a self-locking position when the bolts are fastened, and for assisting or effecting a positive release of the bolts on the unfastening of the same.

16,011 of 1905.—W. FREWELL: *An Adjustable Junction and Tee Piece for Waste Soil and other Pipes.*

This relates to an adjustable junction and tee piece for waste, soil, and other pipes, whereby the branch or branches may be fixed at any desired angle, at the same time permitting expansion to take place in the branch connexion. An alignment of the waste pipe and junction is attained by forming a rebate in the ends of said junction into which the tubes may be screwed. The rotating branch connexion is made to receive various tubes or fittings as desired, which are screwed, caulked, or soldered, the junction itself being made for screwed sockets and other pipes.

16,254 of 1905.—A. G. GRICE and G. ANDERSON & Co.: *Lathe to Stone Sawing Machinery.*

This relates to stone sawing machinery and consists in the combination of a cross frame which can be raised or lowered by vertical screws operated by a driving shaft, cross shafts, belt, wheels, and pinions with two or more rotating adjustable saws and of two or more reciprocating tables.

19,108 of 1905.—E. MATHIS: *Coatings for Floors, Roads, and the like and in the preparation thereof.*

This relates to a method of preparing floor or road coverings, which consists in mixing shale or its equivalent with an equal or less quantity of tar or tar residues, the whole being boiled and stirred together with or without the addition of lime or other neutralising agent, to form a mass of uniform consistency which when applied to the surface to be covered is rammed hard and smoothed.

21,919 of 1905.—T. E. DEVONSHIRE: *Construction of Floors and Ceilings.*

This relates to the construction of combined floors and ceilings by the use of temporary supports for making the permanent supports *in situ*, and consists in the employment of previously made blocks having undercut projections on the ends such that when the material of the permanent support is introduced and set it will form a keyed connexion with the said blocks.

SOME RECENT SALES OF PROPERTY.

ESTATE EXCHANGE REPORT.

Aug. 3.—By PAXTON & HOLIDAY (at Bicester).

Twynford, Bucks.—The Poundon Estate, 851 a.

31. 15 p. £..... £24,200

Marsh Gibbon, Herts. freehold enclosure, 24 a. 3 f. 11 p. 625

Charndon, Bucks.—Freehold farm and enclosure, 122 a. 0 f. 34 p. 2,855

The Roebuck Inn, L..... 725

Aug. 9.—By WATTS & SON (at Selsey).

Selsey, Sussex.—High-st., freehold business premises and house, 12 a. 1,250

High-st., freehold premises with farm buildings adjoining, area, 1 a. 0 f. 24 p. 260

Aug. 10.—By MADBISON, MILLS & MADBISON (at Duss).

Burston, Norfolk.—Freehold holding, 8 acres 220

Diss, Norfolk.—Mount-st., five freehold houses 245

SALES OF PROPERTY.—Continued on page 268.

* All these applications are in the stage in which opposition to the grant of Patents upon them can be made.

For some Contracts still open, but not included in this List, see previous issues. Those with an asterisk (*) are advertised in this Number: Competitions, —; Contracts, iv. vi. viii. x.; Public Appointments, xvii.; Auction Sales, xxviii. Certain conditions, beyond those given in the following information, are imposed in some cases, such as: the advertisers do not bind themselves to accept the lowest or any tender; that a fair wages clause shall be observed; that no allowance will be made for tenders; and that deposits are returned on receipt of a bona-fide tender unless stated to the contrary.

BUILDING.

AUGUST 30.—**LISSAN, CHURCH**.—A new Catholic church at Lissan, Cocksloven Co. Tyrone, for the Very Rev. B. O'Connor, P.P., according to the plans and specification prepared by Messrs. J. J. Coleman & Coleman, architects, 7, Dawson-street, Dublin. Bills of quantities have been prepared by Mr. D. W. Morris, surveyor, 68, Harcourt-street, Dublin, and can be obtained for £5 on payment of 1*l.* 1*s.* The plans and specification can be inspected at the architect's offices, and at the Presbytery, Lissan. Sealed tenders, addressed to the architects, to be delivered at the architect's offices not later than 12 o'clock noon on August 30.

WORKS.—For the enlargement of Filby School, and for the erection of a teacher's dwelling-house. Plans and specifications to be seen, and bills of quantities obtained, at the office of Mr. T. Inglis Goldie, architect, Bank Plain, Norwich. Also for alterations and improvements at Lessingham School, Winterton School, and at Stalham School. Plans and specifications can be seen, and bills of quantities obtained, at the office of Messrs Olley & Haward, architects, Queen-street, Great Yarmouth. A deposit of 1*l.* 1*s.* will be required in each case. A tender

No DATE. — **Letheringham.** — CHURCH IMPROVEMENTS. — The Vicar is prepared to receive tenders for the improvement of Letheringham Church. For particulars, apply, Vicar, Charsfield.

ENGINEERING, IRON, AND STEEL.

AUGUST 28.—Belfast.—**LAUNDRY.**—MAGNAN & BELFAST Guardians invite proposals for supplying and fitting-up machinery at the new central laundry at this Union Workhouse, in accordance with plan and specification prepared by Messrs. Young & MacKenzie, civil engineers, which can be seen at the office of Mr. Joseph W. Robb, Clerk of the Union Clerk's Office, Union Workhouse. Copies of specification and schedule can be obtained on application at office of Clerk, Tenders, enclosed "Laundry Machinery," to be lodged in the tender-box, board room, before 12 o'clock noon on August 28.

AUGUST 28.—London.—**Fire.**—Lambeth Guardians invite tenders for the providing and fixing of about 170 yds. of 3 in. to 5 in. steam pipe, with valves and accessories, at their Workhouse, Renfrew-road, Lower Kennington-lane, S.E. Specification and form of tender can be obtained from the Consulting Engineer to the Guardians, Mr. George E. Arnold, 195, Kennington-road, S.E., and form of contract can be seen at that address. Tenders must be sent by post not later than August 28 to Mr. W. Thurnall, Clerk to the Guardians, Guardians' Board-room and Offices, Brook-street, Kennington-road, S.E., sealed and superscribed "Tender for Steam Pipes."

AUGUST 30.—Bolton.—**SWITCHBOARDS.**—Bolton Electricity Committee invite tenders for extensions to a three-phase extra high-tension switchboard at the generating station, Spa-road, Bolton. Specification and form of tender may be obtained on application to Mr. Arthur A. Day, A.M.I.C.E., M.I.E.E., Borough Electrical Engineer, Spa-road, Bolton, on payment of 11. 1s. Tender for a three-phase switchboard, must be sent in not later than 12 o'clock noon, August 30, addressed to the Chairman of the Electricity Committee, Town Clerk's Office, Town Hall, Bolton.

AUGUST 30.—Ventnor.—**SEA WALL.**—Ventnor U.D.C. invite tenders for the erection of a sea wall of about 260 ft. in length at Wheeler's Bay, Ventnor. Detailed specification and plans may be seen at the Office of the Town Surveyor, Town Hall, Ventnor, at any time during office hours. Tenders, enclosed "Sea Wall," must be received by Mr. Robert St. Barr, Clerk of the Council, Town Hall, Ventnor, not later than August 30.

AUGUST 31.—Dundee.—**GIRDERS, ETC.**—Dundee Town Council invite tenders for the supply and delivery of about 330 tons of steel girder, tramway rails and fixings, also for steel points and crossings. Specifications, schedules, of quantities, and forms of tender may be obtained on application to Mr. Jas. Thomson, Borough Engineer, Municipal Office, 91, Commercial-street, Dundee, on payment of 21. 2s. Sealed tenders, enclosed "Rails and Fixings, etc.," must be lodged with Mr. Wm. H. Blyth, Martin's Town Clerk, City Chambers, Dundee, not later than August 31.

AUGUST 31.—Epsom.—**EXTENSIONS TO ELECTRIC LIGHT PLANT.**—Epsom U.D.C. Electric Lighting Committee invite tenders for the following plant: Section 1, to supply and erect one 300 K.W. steam dynamo, with accessories, etc.; section 2, to supply and erect, with brickwork setting, one water-tube boiler, etc., together with pipework, etc.; section 3, to supply and erect one surface condenser, capable of dealing with 100,000 lb. of steam; section 4, to supply one induced draught fan, complete with dampers, frames, etc. Plan of the general arrangements can be inspected at the Engineer's Office, at the Electricity Works, on giving formal eight days' notice. Copies of the general conditions, specification, and forms of tender to be obtained from Mr. H. F. Foster, Electrical Engineer to the Council, Electricity Works, Epsom, on payment of 31. 3s. and a charge of 5s. will be made for each additional copy. Tenders are to be upon the printed look forms sealed and marked "Tender for Extensions at the Electricity Works," and are to be addressed to "The Clerk of the U.D.C., Epsom," and to be delivered to him at his office, Duncannon, Church-street, Epsom, on or before 12 o'clock noon on August 31.

AUGUST 31.—Hoeley-Glo.—**BRIDGE.**—The Urban Council for the district of Margam are prepared to receive tenders for the construction of an iron girder bridge, with stone abutments and approaches. Plans and specification may be seen by appointment with the Surveyor to the Council, Mr. John Cox, Port Talbot, on payment of a deposit of 11. 1s. Tenders to be delivered to Mr. D. E. Jones, solicitor, Clerk to the Council, Port Talbot, not later than August 31, sealed and endorsed "Tender for Hoeley-Glo Bridge."

SEPTEMBER 1.—Glasgow.—**BRIDGE.**—Glasgow Corporation invite tenders for (1) the mason work and (2) the structural work on the new bridge, with the widening of Keppochill-road Bridge over the North British Railway. Specifications and forms of tender may be had on application at the Office of Public Works, City Chambers, 24, Cochrane-street. Sealed tenders, marked outside "Tender for Mason Work, Keppochill-road Bridge," must be lodged with Mr. A. W. Miles, Town Clerk, and must be delivered to the City Chambers, Glasgow, on or before September 1.

SEPTEMBER 3.—Southampton.—**RECONSTRUCTION OF PORTON or BISHOP'S WATLING MILL BRIDGE.**—Drawings, specification, and conditions of contract can be seen, and bill of quantities obtained, and all other necessary information, on application at the office of Mr. W. J. Taylor, County Surveyor, The Castle, Winchester, between the hours of 9 a.m. and 5 p.m. (Saturdays, 9 a.m. and 1 p.m.). A deposit of 31. 3s. will be required for a copy of the bill of quantities. Deposits must be made by cheque, payable to Hants C.C., and crossed Bank of England, or particulars will not be sent. Tenders, enclosed "Bishop's Watling Mill Bridge," must be on forms supplied by the County Surveyor, and must be delivered to Mr. H. Barber, Clerk of the C.C., The Castle, Winchester, before 10 o'clock a.m. on September 3.

SEPTEMBER 4.—Walsall.—**RAILS.**—Walsall Corporation invite tenders for the supply of 1170 tons of 60 lb. standard rail, 65 in. 13 1/2 in. of the British Standard Section No. 1, of the weight of 90 lb. to the yard, and in accordance with the specification of the Standardisation Committee. Tenders, enclosed

"Tender for Tramway Rails," are to be forwarded to Mr. John R. Cooper, Town Clerk, Council House, Walsall, on or before September 4.

SEPTEMBER 4.—Widnes.—**BOILERS.**—Widnes Corporation invite tenders for two steel Lancashire boilers, 32 ft. by 8 ft. 6 in., working pressure, 180 lb. Copy of specification and conditions of contract may be had on application to Mr. Isaac D. Jones, C.E., Widnes Tenders, enclosed "Steel Boilers," and addressed to the Chairman of the Gas and Water Committee, to be delivered at the Town Hall, Widnes, on or before noon, September 4.

SEPTEMBER 6.—Bickerstaffe.—**COOLING POND, ETC.**—Southport, Birkdale, and West Lancashire Water Board invite tenders for the construction of a cooling pond, filter beds, and other works, to be situated on land belonging to the Board, at or near Royal Oak, in the Parish of Bickerstaffe, about two and a half miles by road from the Town Green and Angerton Station of the Lancashire and Yorkshire Railway. The drawings may be seen on and after August 25, and the specification, forms of tender, and schedule of quantities may be obtained on payment of 5s. at the offices of Messrs. H. Rife & Son, civil engineers, 8, Victoria-square, West-minster, and Oxford Chambers, Victoria-square, Leeds. Copies of the drawings may also be seen on and after the above date, at the Waterworks Office, Portland-street, Southport. The tenders to be sent in to Mr. Alvey Brown, Clerk to the Board, 28, St. George's-place, Southport, on or before 10 a.m. on September 6, endorsed "Tender for Cooling Pond, Filter Beds, etc."

SEPTEMBER 8.—Warrington.—**REPAIRS TO ENGINE.**—Warrington Water Committee invite tenders for certain repairs to their "Water Lily" pumping engine at Winwick Pumping Station. Particulars may be had from Mr. James Deane, C.E., Water Engineer, Municipal Offices. Tenders to be sent in not later than September 8.

SEPTEMBER 10.—Avonmouth, Bristol.—**DRY DOCK.**—Bristol Docks Committee invite tenders for the construction, fitting, erecting, place, fitting testing, and maintenance for twelve months after erection of a caisson for the dry dock of the Royal Edward Dock, now being constructed by C.E. Avonmouth, in the Port of Bristol. The contract includes electrically-driven pumps and motors in connection therewith. Copies of the specification, form of tender, form of contract, and copy of contract drawings can be obtained from Mr. W. W. Squire, Engineer, Engineer's Office, Cumberland-road, Bristol, on production of a receipt from the Secretary of the Docks Committee showing that 5s. has been paid as deposit. Tenders must be enclosed in a sealed envelope, endorsed "Tender for Dry Dock Caisson," and addressed to the Clerk of the Docks Committee, 19, Queen-square, Bristol, and must be delivered to him, accompanied by the prescribed conditions, not later than 10 a.m. on September 10.

SEPTEMBER 11.—Newcastle-on-Tyne.—**STEEL RAILS, POINTS, AND CROSSINGS.**—The Tramways Committee of the Corporation of Newcastle-upon-Tyne invite tenders for the supply of rails, points, and crossings, together with the necessary fishplates, tie-rods, bolts and nuts, in connection with the renewal and extension of a double junction in Northumberland and L'ackett streets. Alternative offers are asked for, viz.:—(1) In hardened cast-steel points and crossings, and rolled-steel rails; (2) in manganese steel throughout. Plans may be seen, and specifications, schedule of quantities, and form of tender obtained, at the office of the City Engineer, Town Hall, Newcastle-upon-Tyne, on payment of 11. 1s. Tenders, enclosed "Tender for Renewal, etc. of Northumberland-street Junction," and addressed to the Chairman of Tramways Committee, to be delivered at the City Engineer's Office on or before September 11.

SEPTEMBER 17.—Oxford.—**TRAMWAY.**—Oxford Corporation invite tenders for the reconstruction, extension, and electrical equipment of the existing horse tramways in the city and the leasing thereof. Proposals based upon the overhead system of electric tramways will not be considered. Conditions of tender may be obtained from Mr. Richard Gascon, Town Clerk, Town Hall, Oxford, on deposit of Bank of England notes to the value of 1001. Tenders must be addressed to the Town Clerk, in sealed packets, endorsed "Tender of Tramways," and delivered at his office in the Town Hall, Oxford, on or before September 17.

NO DATE.—Knowlnohill.—**RAILWAY.**—The United Collieries Ltd., invite tenders for the construction of a branch railway into pits at Knowlnohill Colliery and sidings therat. Specifications and forms of tender may be had on application to Messrs. The United Collieries Ltd., Engineer's Office, 19, Waterloo-street, Glasgow, where plans of the works may also be seen.

NO DATE.—Swansea.—**SUCKERS AND MACHINERY.**—The Swansea Harbour Trustees invite tenders for five pairs of main suckers, and ten pairs of supplementary sucker, together with a complete hydraulic and hand-power machinery for working them. On and after August 27 drawings may be inspected between 11 a.m. and 4 p.m. at the office of the Trustees' Engineer, Mr. C. Schings, office of the Harbour Offices, Swansea, and copies of the drawings, specification, conditions and forms of tenders for the same may be obtained of Mr. Talford Strick, Clerk, Harbour Offices, Swansea, on payment of 51. 5s.

MISCELLANEOUS.

AUGUST 27.—Southwick.—**REMOVAL OF HOUSE.**—Southwick U.D.C. invite tenders for the removal of a house refuse to the site of their new school for a period of twelve months from October 1 next. Full particulars and form of tender may be obtained on application to the Surveyor to the Council, Mr. Geo. W. Warr, at the Council Offices, Southwick. Sealed tenders, enclosed "House Refuse," must be delivered to Mr. J. E. Dell, Clerk, Council Offices, Southwick, at the Council Offices, on or before August 27.

AUGUST 25.—Crompton.—**FURNITURE.**—Crompton U.D.C. invite tenders for the supply of furniture required for the new Carnegie Library at Crompton.

Drawings, designs, and other information may be had on application to the architect, Mr. Jesse Horsfall, R.A.B.A., 4, Abchurch-lane, Manchester, and on payment of 10s. sealed tenders, enclosed "Tender for Furniture," must be sent to Mr. F. R. Gartside, Clerk to the Council, Town Hall, Salford, not later than August 25.

AUGUST 23.—London.—**PULLING DOWNS.**—Lambeth Guardians invite tenders for pulling down the iron building formerly used as the Guardians' Offices, 8, Newington-road, S.E., and the material therein. Tenders, which will be received only on the printed form, sealed and endorsed "Tender for Old Building," must be delivered at the office of Mr. W. Thurnall, Clerk to the Guardians, Guardians' Board Room and Offices, Brook-street, Kennington-road, S.E., not later than 10 o'clock on August 23.

AUGUST 30.—Wharfedale.—**LEADING STONE.**—Wharfedale R.D.C. invite tenders for the leading of stone. The stone to be placed by the side of the several roads when and where required by the Council's Surveyor, and the quantities to be taken from the invoices at 20 cwt. to the ton. Tenders (printed forms of which may be obtained from the Surveyor) must be sent to Mr. Edgar C. Newstead, Clerk to the Council, Council Offices, Boroughgate, Otley, by sealed letter, not later than August 30, at noon.

SEPTEMBER 1.—Handsworth.—**SCHOOL FURNITURE.**—U.D.C. of Handsworth Education Committee invite tenders for the furnishing of the following new schools: (1) Handsworth, (2) Canterbury-road, Council School, Handsworth. Applications for forms of tender, copies of drawings, and schedules of quantities, may be made on or before September 1, at the offices of the architects, as follows:—Tender No. 1.—Westminster-road School; architect, Mr. J. F. Osborne, 95, Colmore-row, Birm. No. 2.—Handsworth School; architect, Messrs. Wood & Kendrick, High-street, West Bromwich, near Birmingham. A deposit of 11. 1s. must be forwarded with the application. Sealed tenders, enclosed "School Furniture," must be received on the date stated in the tender, and must be sent to Mr. Edgar C. Newstead, Clerk to the Council, Council Offices, Boroughgate, Otley, by sealed letter, not later than August 30, at noon.

SEPTEMBER 1.—New Brompton.—**ELECTRIC LIGHTING.**—Brompton and District U.D.C. invite tenders for the supply and erection of poles, cables, lamps, etc., in connection with electric lighting, and the erection of a new electric lighting section. Particulars from Mr. G. G. Donkin, surveyor, 11, High office, Langley Moor, near Durham. Tenders, to be sealed, and marked "Lighting," to reach Mr. John Bailey, Durham, not later than September 1.

SEPTEMBER 3.—Margate.—**ELECTRIC LIGHTING.**—Margate U.D.C. invite tenders for the installation of a system of electric light at the Wingham Pumping Station, about six miles from Canterbury, and a mile and a half from Ashford Railway Station. Form of tender, specification, and any further particulars may be obtained from the engineer, Mr. J. A. Forde, 15, Victoria-avenue, Northdown, Margate, on a deposit of 11. 1s. being made. Sealed tenders, enclosed "Electric Lighting," are to be sent in to Mr. Edward Brooke, Town Clerk, Town Clerk's Office, Margate, not later than 1 o'clock p.m. on September 3.

SEPTEMBER 3.—Stourton.—**FENCING.**—Rothwell U.D.C. invites tenders for providing and erecting a wood and iron fencing round the new Sewage Disposal Works at Stourton. Plans and specifications can be seen and particulars obtained at the offices of the engineer, Mr. E. J. Silcock, M.I.C.E., 10, Park-street, Leeds. Sealed tenders, enclosed "Stourton Fencing," must be delivered to Mr. W. Dodgson, Clerk to the Council, Council Offices, Rothwell, near Leeds, not later than noon, September 3.

SEPTEMBER 4.—Belfast.—**CHAIRS.**—Belfast Guardians will, at their meeting to be held on September 4, consider tenders for supplying for "The Abbey" Sanatorium, Whiteabbey, the following:—100 sets of bedsteads, 100 sets of washbasin chairs, five couches, 250 lockers, etc. A printed list of the articles required can be had on application to the Surveyor to the Council, Mr. W. J. Taylor, County Surveyor, The Castle, Winchester, between the hours of 9 a.m. and 5 p.m. (Saturdays, 9 a.m. and 1 p.m.). A deposit of 31. 3s. will be required for a copy of the bill of quantities. Deposits must be made by cheque, payable to Hants C.C., and crossed Bank of England, or particulars will not be sent. Tenders, enclosed "Bishop's Watling Mill Bridge," must be on forms supplied by the County Surveyor, and must be delivered to Mr. H. Barber, Clerk of the C.C., The Castle, Winchester, before 10 o'clock a.m. on September 3.

SEPTEMBER 4.—Woodford.—**STRAM ROLLING.**—Woodford U.D.C. invite tenders for the hire of steam rollers and scarifiers. Particulars may be obtained on application to Mr. William Farrington, Surveyor to the Council, Council Offices, Woodford Green. Sealed tenders, endorsed "Tender for Steam Rolling and Scarifying," to be delivered not later than noon on September 4.

SEPTEMBER 8.—Dublin.—**Dublin Lighting Committee** invite tenders for the supply and erection of arc lamps and arc lamp pillars. Specification, with general conditions and form of tender, can be obtained from the City Electrical Engineer, Fleet-street, Dublin, on payment of 11. 1s. for each specification. Tenders, enclosed "Dublin Lighting Committee," must be delivered to Mr. W. Dodgson, Clerk to the Council, Council Offices, Rothwell, near Leeds, not later than noon, September 3.

SEPTEMBER 8.—Stourton.—**STRAM ROLLING.**—Stourton U.D.C. invite tenders for the supply of gas to fourteen lamps to be erected in York-road, between the City boundary and the Hospitals. Tenders, to include the supply of gas, and the extinguishing, cleaning lamps, and renewal of mantles, should be sent on or before September 8, stating price per hour, and terms of tender may be obtained from Mr. James Richard Waller, Clerk, the Stourton Parish Council, Cross Gates, Leeds.

SEPTEMBER 10.—Bishop's Stortford.—**STRAM ROLLER.**—Bishop's Stortford U.D.C. invite tenders for the supply and delivery of a 10-ton steam road roller. Tenders, accompanied by a complete specification of the roller proposed to be supplied, and stating when and where the roller is to be used, must be sent to Mr. Thomas Swatheridge, Clerk, Council Offices, 7, North-street, Bishop's Stortford, by September 10.

SEPTEMBER 10.—Blyton.—**CARTAGE.**—The Blyton U.D.C. invite tenders for the cartage of 100 tons of material from Blaydon Station, Wylam Station, Addison Colliery Siding, or Clara Vale Colliery Siding to the

Recent parts of their district where it may be required during the year ending September 11, 1907. Particulars may be obtained on application to Mr. P. Dalton, Surveyor, Rydon, Tyne, to whom orders must be delivered before noon on September 10.

SEPTEMBER 14.—**Egypt-Rope**.—Tenders are invited by the Egyptian War Department for rope, 11, 95,000 fathoms; rope, hemp, 89,000 fathoms; rope, cotton, 39,600 fathoms; galv. mild steel sheets, 100 ft. long, 12 ft. wide, 1/8 in. thick, to be obtained from Lieut. Col. J. H. Western, Queen Anne's Chambers, Westminster, and are returnable to him on September 14, and to remain open for thirty days on that date.

SEPTEMBER 15.—**Handsworth-ELECTRIC WIRING**.—The U.D.C. of Handsworth invite tenders for the supply and fixing of the following:—Wiring, lamps, etc., for the electric lighting of the new council schools, Canterbury-road, Handsworth; wiring, fittings, etc., for the electric lighting of the new Council schools, Westminster-road, Handsworth. Tenders on the prescribed form must be sealed and forwarded in the endorsed envelope supplied for that purpose, and should be delivered at the Education Office not later than September 15. No that date.

SEPTEMBER 15.—**Handsworth-ELECTRIC WIRING**.—The U.D.C. of Handsworth invite tenders for the supply and fixing of the following:—Wiring, lamps, etc., for the electric lighting of the new council schools, Canterbury-road, Handsworth; wiring, fittings, etc., for the electric lighting of the new Council schools, Westminster-road, Handsworth. Tenders on the prescribed form must be sealed and forwarded in the endorsed envelope supplied for that purpose, and should be delivered at the Education Office not later than September 15. No that date.

PAINTING, etc.

AUGUST 27.—**Glasgow-PAINTING, DECORATING, etc.**—Glasgow Corporation invite tenders for the design, painting, and decorating of Maryhill Public Baths. Specification and forms of tender may be obtained on application at the Office of Public Works, City Chambers, 64, Colclough-street. Sealed tenders, marked outside "Tender for Painting of Maryhill Public Baths," must be lodged with Mr. A. W. Myles, Clerk, City Chambers, Glasgow, on or before August 27.

AUGUST 27.—**Hyde-PAINTING**.—Painting of the Wesleyan Chapel, Norfolk-street, Hyde. Copy of the specification and forms of tender may be obtained from Messrs. Godley, Hyde. All tenders to be sent in on or before August 27, marked "Tender for Painting," to Mr. W. Scott, Thornliea, Gee Road, Hyde.

AUGUST 30.—**Sunderland-PAINTING**.—Sunderland Corporation invite tenders for the painting of 180 railway poles. Specification and form of tender may be obtained on application to the General Manager, at his office, Wheat Sheaf-corner, Monkwearmouth. Tenders, in a sealed envelope, endorsed "Tender for Painting Railway Poles," must be delivered at the office of Mr. Fred. M. Bowyer, Town Clerk, Town Hall, Sunderland, not later than 12 noon on August 30.

AUGUST 30.—**Wedgefield-PAINTING**.—Wolverhampton Guardians invite tenders for certain painting, colour-washing, etc., executing at the Cottage Homes, Wedgefield. Full particulars and forms of tenders may be obtained on application to the Superintendent of the Cottage Homes, Wedgefield. Tenders must be delivered at the office of Mr. Frank Harrison, Clerk to the Guardians, Union Office, Wolverhampton, not later than 10 o'clock on August 30.

SEPTEMBER 1.—**Bournemouth-PAINTING**.—The Bournemouth Municipal Council invite tenders for painting the pavilions, cottages, and fences in parks and pleasure grounds, and other works in connexion therewith. Full particulars, forms of tender, and drawings may be obtained of Mr. E. W. Lacey, M.Inst.C.E., Borough Engineer and Surveyor, Municipal Offices, Bournemouth, provided that the sum of 1s. has been previously deposited. Tenders to be sent in in envelopes marked for the purpose, to the Town Clerk (Mr. Geo. W. Bailey), before 10 a.m., September 1.

SEPTEMBER 12.—**West Ham-PAINTING, etc.**—Tenders invited by the Council of the above borough for painting, cleansing, repairs, etc., of public buildings. Specifications, form of tenders, and further particulars of Mr. John G. Morley, Borough Engineer, Town Hall, West Ham, on payment of 1s. Tenders to be endorsed "Tender for Painting, etc., Works," and sent to Mr. Fred. E. Hileary, Town Hall, West Ham, E., by 4 p.m., September 12.

ROADS, SANITARY, AND WATER WORKS.

AUGUST 27.—**Ardley-Sewer**.—The U.D.C. of Ardley East and West invite tenders for the construction of about 300 yds. of 9-in. pipe sewer at Hey Beck, West Ardley. Full particulars may be obtained from the Council's Surveyor, Mr. E. W. M. Insell, C.E., Borough Engineer and Surveyor, Municipal Offices, Bournemouth, provided that the sum of 1s. has been previously deposited. Tenders to be sent in in envelopes marked for the purpose, to the Town Clerk (Mr. Geo. W. Bailey), before 10 a.m., September 1.

AUGUST 27.—**Felling-PAVING WORKS**.—The U.D.C. of Felling invite tenders for the paving, etc., of certain streets at Felling. Plans and specifications may be obtained of the surveyor any morning between 9.30 and 10.30. Tenders must reach Mr. George Bolam, Clerk to the Council, Council Buildings, Felling, Cumbria, not later than August 27, endorsed "Tender for Paving."

AUGUST 27.—**Manchester-CULVERTING**.—Manchester Corporation Sewerage and Drainage Committee invite tenders for the culverting of the Gore Brook, from Pink Bank-lane to the London and North-Western Railway, Newton Deane. Drawings may be obtained on application, bill of quantities, and form of tender obtained, on application at the City Surveyor's Office, Town Hall, Manchester, on payment to the City Treasurer, Mr. H. Is. All cheques or postal orders are to be made

payable to the order of "The Corporation of Manchester." Tenders enclosed in the official envelope, and addressed to the Chairman of the Paving, etc., Committee, to be delivered at the City Surveyor's Office not later than 10 a.m. on August 27.

AUGUST 27.—**Plymouth-Roads**.—Plymouth Corporation invite tenders for making-up and completing the following streets and lanes:—Eton-place, section 2; Trelawney-road-lane East. Plans and specifications, and conditions upon which the work is to be done, may be seen at the offices of Mr. James Paton, Borough Engineer, Municipal Offices, Plymouth. Sealed tenders must be delivered at the said offices not later than 5 p.m. on August 27.

AUGUST 27.—**Redcar-Roadworks**.—The Redcar U.D.C. invite tenders for levelling, paving, and channelling Hanson street, Redcar, according to plans and specifications to be seen on application to the surveyor, Mr. W. S. Howcroft, 2, West-terrace, Redcar. Tenders, endorsed "Hanson-street," must be sent to Mr. Alfred H. Sill, Clerk to the Council, on or before August 27.

AUGUST 27.—**Leatherhead-Road Improvements**.—Leatherhead U.D.C. invite tenders for widening, re-forming, kerbing, and providing and laying 1,425 yds. of 12-in. and 9-in. stoneware storm-water drain, in connexion with the improvement of a portion of Kingston main road. Also for the providing and laying of about 300 lin. yds. of 9-in. diameter sewer, with all necessary manholes, etc., in the Gosholt-road. The drawings and draft contract may be seen, and copies of the specification, forms of tender, and schedules of work obtained, at the office of Mr. J. E. Smeaton, Engineer and Surveyor, Council Offices, Leatherhead, upon payment of the sum of 3s. Tenders, sealed, and endorsed "Road Improvement," to be sent, addressed to the Clerk of the Leatherhead U.D.C., on or before 4 p.m. on August 28.

AUGUST 30.—**Edinburgh-Road Works**.—Edinburgh Corporation invite estimate for new granite causeway on the carriage-way of Melville Drive (west of Marchmont-road), also for hard Whinstone causeway on carriage-way of London-road (south side), opposite Parson's Green-terrace. Schedules, specifications, and tender forms may be obtained on application to the City Road Surveyor, City Chambers. Tenders, sealed within the official envelope supplied, must be lodged with Mr. Thomas Hunter, Town Clerk, City Chambers, by 5 p.m. on August 30.

SEPTEMBER 1.—**Selby-CLEANING DRAINS**.—Cleaning and siding of drains for a year commencing September 6, 1906. The drains will be let in two sections:—No. 1, Selby Dam and all drains south of the Bishop Dyke; No. 2, Bishop Dyke and all drains north thereof. Specifications may be seen, and forms of tender procured, at the Commissioners' Office, Abbey-yard, Selby. Sealed tenders to be sent in on or before September 1, to Mr. Reginald B. Parkes, Clerk to the Commissioners, Selby.

SEPTEMBER 1.—**Tadcaster-DITCH**.—Tadcaster R.D.C. invite tenders for cleaning out portions of a ditch, approximately 435 yds. in, situate near to the Holston Recreation Ground, near to the Holston, of Crossgates, will give any further information on application. Sealed tenders, endorsed "Tender for Ditch," to reach Mr. Geo. A. Bromet, Clerk to the Council, Tadcaster, by September 1.

SEPTEMBER 3.—**Normanton-Roadworks**.—Normanton U.D.C. invite tenders for the kerbing, channelling, flagging, macadamising, drains, etc., of Cross Queen-street, Normanton. Plans and specifications and full particulars at the Council Offices. Tenders, endorsed "Cross Queen-street," to be sent to Mr. L. E. Norman, Clerk, Council Offices, Normanton, not later than 9 a.m. on September 3.

SEPTEMBER 3.—**Yeovil-Roadworks**.—Yeovil Corporation invite tenders for the construction of Grove-avenue and a portion of West Park. Plans may be seen, and copies of specifications and forms of tender obtained, at the office of Mr. A. Odvy, Borough Surveyor, Municipal Offices, to which tenders, endorsed "Grove-avenue" and "West Park" respectively, must be delivered not later than noon on September 3, addressed to the Chairman of the Improvement Committee.

SEPTEMBER 4.—**Lewisham-Roadworks**.—Lewisham Borough Council invite tenders for kerbing, channelling, and metalling the roadway and paving the footpaths with artificial stone (in separate contracts) of Buckthorne-road, Algiers-road, Eddy-stone-road, and Holdenby-road (part of), Lewisham. The plans and specifications may be seen, and forms of tender obtained, at the Town Hall, Catford (Surveyor's Department). Copies of the specification may also be had on payment of the sum of 5s. in each case, which will not be returned. The tenders must be on forms issued by the Council, enclosed in an envelope, sealed, and endorsed "Tender for" and must be delivered by 4 o'clock on September 4 at the Town Hall, and placed in the box there provided for the purpose.

SEPTEMBER 4.—**Tynemouth-STREET WORKS**.—Tynemouth U.D.C. invite tenders for the following street works:—(1) laying tar macadam, etc., in Beverley Gardens, Cullercoats; (2) laying tar macadam, etc., in Drummond-terrace, North Shields. Plans and specifications may be seen at the office of Mr. John F. Smilie, Borough Surveyor, to whom sealed and endorsed tenders are to be sent not later than 12 noon on September 4.

SEPTEMBER 4.—**Uckfield-PAVING**.—Uckfield U.D.C. invite tenders for about 1,620 sq. yds. of concrete paving, laid in situ at High-street, New Town, and Framfield-road, Uckfield, Sussex, with kerbing and channelling and other works connected therewith. Plans and specifications to be seen and bills of quantities to be obtained, at the Offices of the Council, any day, except Saturday, between the hours of 10 and 4. Tenders to be sent to Mr. Charles Dawson, Clerk to the Council, Office of the Uckfield U.D.C., Town Hall Chambers, Uckfield, on or before September 4, marked "Tenders for Paving."

SEPTEMBER 5.—**Hove-Tar PAVING**.—The Hove Borough Council invite tenders for providing and laying in superior quality tarred macadam, in Sackville-road. Specifications may be seen, and particulars, with forms of tender obtained, at the office of the Borough Surveyor, Mr. H. H. Scott, Tenders, on forms supplied, addressed to the Town

Clerk, Town Hall, Hove, and endorsed "Tender for Tar Paving Works," to be delivered before 6 o'clock on September 5.

SEPTEMBER 5.—**Whiston-Sewerage Works**.—The Whiston R.D.C. invite tenders for about 17,350 lin. yds. of glazed earthenware and cast-iron pipe sewers, varying in diameter from 15 in. to 9 in., together with manholes, lamp-holes, flushing chambers, sewerage tanks, etc. The drawings may be seen, and copies of the specification and quantities obtained, at the office of the engineer, Mr. John T. Wood, 3, Cook-street, Liverpool, on deposit of 5s. Sealed tenders, endorsed "Tender for Sewerage Works," to be delivered to Mr. A. F. Manor, Union Offices, Whiston, Prescot, on or before September 5.

SEPTEMBER 7.—**Southgate-STREET IMPROVEMENTS**.—The Southgate U.D.C. invite tenders for (1) paving, kerbing, and channelling several lengths of footpaths at Winchmore Hill and Southgate; (2) for works of private street improvement in Devonshire-road, Palmer's Green. Plans may be seen on application to Council's Surveyor, Mr. C. G. Lawson, from whom copies of the specifications and forms of tender may be obtained on depositing 2s. Separate sealed tenders, endorsed (1) "Paving Works" and (2) "Private Street Improvements," must be addressed and delivered to Mr. W. M. Eilenor, Clerk to the Council, Council Offices, Palmer's Green, N., by September 7.

SEPTEMBER 7.—**Tadcaster-BORING**.—Tadcaster R.D.C. invite tenders for boring and testing the quantity and quality of water in the section of the Middle Quarry, situate on the Leeds and Tadcaster Road, about two miles from Scholes Station. Further particulars can be obtained on application to Mr. Geo. A. Hirst, Clerk to the Council, Tadcaster. Sealed tenders, marked "Kiddall Water," not later than September 7.

SEPTEMBER 8.—**Burton-Batimer-Kettering-WATERWORKS**.—Kettering R.D.C. invite tenders for the construction of waterworks for the parish of Burton-Contrat, as set forth in the following contracts:—Contract No. 1.—The construction of a service reservoir to hold about 115,000 gallons, the laying and jointing of about 64 miles of cast-iron pipes, from 8 in. to 3 in. diameter; the fixing of manholes and fittings, and alterations and repairs to pumping station. Contract No. 2.—The supply and delivery of about 560 tons of cast-iron pipes and specials, varying in diameter from 8 in. to 3 in. Contract No. 3.—The supply and delivery of about thirty-seven sluice valves, from 8 in. to 3 in. diameter; twenty air valves, two relief valves, fifty-one screw-down hydrants, together with surface boxes, name plates, and other fittings. Contract No. 4.—The supply and erection of two 17 B.H.P. gas engines, two suction gas pumps, and two sets of three-throat pumps, together with all gearing, pipes, valves, tools, and plant in connexion therewith. The drawings may be seen at the offices of the engineers, Messrs. Everard, Son, & Pick, 6, Millstone-lane, Leicester, from whom tenders may be obtained, quantities, and form of tender may be obtained upon payment of 2s. for each contract. Sealed tenders upon the form supplied to be sent to the engineers, 6, Millstone-lane, Leicester, not later than 10 o'clock in the forenoon of September 8.

SEPTEMBER 10.—**Batley-Roadworks**.—Batley T.C. invite tenders for the levelling, paving, flagging, channelling, and completing each of the following streets, namely:—Back Henrietta-street, Ambler-street, Villiers-street, Stralau-street, Prospect-street, Ings-road, and Prince-street, in the said borough. Plans, sections, and specifications of the said works respectively may be seen on application to the Borough Engineer and Surveyor, Mr. Oscar J. Kirby, whose offices are at the Town Hall, Batley. Sealed tenders (on forms which may be obtained from the Borough Surveyor), properly endorsed, to be delivered at the office of Mr. J. H. Craik, Town Clerk, not later than September 10.

SEPTEMBER 11.—**Llanfrecchia-DRAINAGE**.—Llanfrecchia Upper U.D.C. invite tenders for the construction of main sewers and outfall works for their urban district, comprising about 3,368 lin. yds. of 9-in. and 15-in. stoneware pipe sewers, 44 lin. yds. 9-in. and 15-in. cast-iron pipe sewers, with necessary manholes, settling tanks, etc. Plans may be seen, and copy of specification and bill of quantities obtained, on payment of 2s. at the office of Mr. Isaac Jones, Clerk to the Council, Haddon House, Ponlewydd, Newport, Mon., by whom tenders will be received not later than noon on September 11.

SEPTEMBER 17.—**Llandudno-ROAD CONSTRUCTION**.—Llandudno U.D.C. invite tenders for the execution of certain works of road construction on land to be known as "Mostyn Broadway." The works comprise surface water drains, macadam roads, gravelled footpaths, laying of kerbs and channells, fencing, etc. Length, about 800 yds.; width, 20 yds. Plans may be seen and specification, quantities, and form of tender obtained, with all other particulars, upon application to Mr. E. P. Stephenson, Engineer to the Council, Town Hall, Llandudno. A deposit of 1s. (by cash or postal order) is required. Tenders, endorsed "Mostyn Broadway Tenders," to be sent to Mr. Alfred Conolly, Clerk to the Council, Town Hall, Llandudno, on or before 12 noon on September 17.

STONE, MATERIALS, AND STORES.

AUGUST 27.—**Dublin-Whinstone**.—The Corporation of Dublin invite tenders for the supply of broken whinstone to the north side of the city during the period to end on March 31, 1907. Tenders, on forms and the conditions attached to the same may be obtained on application at the Office of the Borough Surveyor, City Hall, on payment of the sum of 1s. Tenders, signed by the tenderer and two solvent sureties, and addressed "To the Chairman of the Supplies Committee," must be delivered to Mr. Henry Campbell, Town Clerk, Town Clerk's Office, City Hall, Dublin, not later than August 27.

AUGUST 27.—**Warrington-GRANITE**.—Warrington Paving and Sewage Committee invite tenders for 400 tons of 4-in. granite or syenite cubes. Any further information may be obtained from the office of the Borough Surveyor, Town Hall, at which place tenders must be delivered before 12 o'clock on August 27.

AUGUST 29.—**Wigan-STORES**.—Wigan Corporation

HEREFORD.—For the erection of a villa residence and stables on the Moor Park Estate, Hereford. Mr. H. Skyrme, architect, Widemarsh-street, Hereford :—
E. T. Davies, Hereford* £525

HAMPTON.—For making up and paving Warfield-road, for the Urban District Council. Mr. S. H. Chambers, Surveyor, Public Offices, Hampton, Middlesex:—
 K. W. Swaker .. £321 7 4 | T. Free & Sons £163 8 3
 J. Mowlem & Co., Ltd. 201 0 0 | M. Thacker & Co. 161 5 6
 T. Watson, jun. .. 197 0 0 | Hardy, Bate, & Co. 152 17 6
 S. Kavanagh & Co. 176 18 6 | S. Gibbons 152 15 4
 W. Shepherd & Sons .. 173 1 9 | S. A. King .. 149 14 4
 T. Adams .. 168 12 0 | Kingston-on-Thames* .. 141 16 2
 W. H. Wheeler 168 10 1

HEREFORD.—For the erection of a pair of semi detached villas at Fownhope, near Hereford, for Mr. H. C. Rowberry, Mr. H. Skyrme, architect, Widemarsh-street, Hereford:—

	Villas.	Rainwater.
J. Hiles	£701 10 0	Tanks, etc.
Stone Bros.	698 14 6	..... 283 2 6
E. Davies	615 0 0	..... 6 0 0
W. Powell, Hereford* ..	63 0 0	..... 76 0 0

HERNE BAY.—For making-up Marine Drive (western portion), for the Urban District Council. Mr. F. W. J. Palmer, Surveyor, Town Hall, Herne Bay:—
 T. Adams .. 15,837 0 0 | C. Castle & Co. £4,444 16 0
 J. Browning .. 5,389 0 0 | C. A. Zadig & Co. 4,168 0 0
 A. & B. Hanson 4,986 0 0 | Hardy, Bate, Ingleton Bros. 4,753 19 0 | & Co., Blough, Bucks* .. 4,093 6 0
 S. H. Head .. 4,933 0 0
 W. Johnson .. 4,450 0 0

HITCHIN.—For erecting new stables at Victoria-road, for Mr. G. Maidment. Mr. J. Shilcock, architect, Hitchin:—
 W. & A. Foster .. £252 10 | F. Abbiss .. £214 10
 F. A. Young & Co. 250 0 | E. J. Bailey .. 214 0
 A. B. N. Briggs .. 242 15 | M. Foster & Co. 183 0
 Evans, McLeod, & Co. 233 0 | J. S. Lauder .. 178 0
 W. Pernal .. 225 0 | C. F. Sherren .. 153 0

INVERKEITHING.—For laying about 200 yds. of 9-in. metal sewer pipe at Inverkeithing Bay to west of Paper Mill, for the Town Council. Mr. J. C. Sim, architect, Inverkeithing:—
 Carlinghouse .. £220 0 0 | J. Martin .. £172 14 8
 D. Stewart .. 174 18 0 | A. Robertson, Hilled, Inverkeithing* .. 164 7 9

KIRTON.—For erecting a villa residence:—
 J. Comer .. £299 10 | S. Parker & Son, Langley & Son .. 275 0
 Wairdick* .. £269 0

LAMPETER PETERWELL.—For improvements and repairs and erecting classroom and cloakroom, etc., to girls' school, for (Lardigan County Education Committee. Mr. G. Dickens-Lewis, County Architect, 12, Terrace-road, Aberystwyth:—
 W. Jones .. £495 | L. Davis, Bryn-road, Lampeter* .. £305
 J. D. Owen .. 387

LECHWORTH.—For proposed house for Mr. F. Francis, at Green-lane, Garden City, Herts. Messrs. Stonebridge & Foll, architects and auctioneers, Woburn Sands:—
 Rahan & Sons .. £545 0 | A. Collins .. £543 0
 F. Newton .. 599 0 | Beckley & Turpie 497 10
 Foster & Co. 586 0

MAIDSTONE.—For erecting a new depot, stables, and foreman's cottage, Mill-street, for the Corporation. Mr. T. E. Bunting, Borough Surveyor, Fair Meadow, Maidstone:—
 E. T. Jeffery £5,227 10 11 | J. H. Goodwin £5,078 12 4
 G. Pearce & Sons .. 5,470 0 0 | Elmore & Son 5,038 0 0
 W. T. Burrows 5,244 10 10 | Cox Bros. 4,898 0 0
 H. J. Smith & Son .. 5,143 0 0 | R. Corbett & Co. 4,867 0 0
 Barden & Head .. 5,098 0 0 | G. E. Wallis & Sons, Ltd. 4,797 0 0
 [All of Maidstone.] R. Avard* .. 4,920 0 0

PONTLOTNYN.—For erecting two houses at Farm-road, for Messrs. Lewis & Morgan. Mr. P. Vivian Jones, architect and surveyor, Henegod, via Cardiff:—
 G. Jones .. £590 8 6 | T. Davies .. £870 0 0
 Francis .. 915 0 0 | D. J. Vaughan, Davies & Francis 881 0 0 | Tredegar, Mon.† 810 0 0
 Heatherly .. 870 0 0

SHERBURN.—For constructing sewage purification works at Sherburn, for Durham Rural District Council. Mr. G. Grosvenor, Surveyor to the Council:—
 R. Oliver .. £1,497 17 9 | J. Carrick, Durham* .. £1,212 4 8
 J. Arrundell's .. 1,347 0 0 | R. G. Birdy 1,129 0 8
 [Surveyor's estimate, £1,300.]

UPPINGHAM.—For 550 yds. of stoneware pipe sewer, etc., at Glaston, for the Rural District Council. Mr. F. R. Chapman, Sanitary Surveyor, Glaston-road, Uppingham:—
 A. F. Mould .. £237 8 8 | J. Chapman & Son .. £153 8 0
 W. Emerson .. 210 0 0 | Cannon Bros. 133 4 10
 J. Woolton .. 205 0 0 | E. M. Dorman, Uppingham* 101 16 9
 Joyce Bros. .. 187 0 0
 E. S. Ireson .. 185 0 0
 J. Dalby & Sons 180 0 0

WHITLEY.—For the extension of farm premises, Lane Top. Messrs. C. H. Marriot, Son, & Shaw, engineers and architects, Church-street-chambers, Dewsbury:—
 W. H. Clegg, Builder, Webster-hill, Dewsbury .. £215 6 1
 [Lowest tender.]

WORKINGTON.—For erecting and completing mason buildings at Westfield, for Messrs. (Chamberlain & others. Mr. J. N. Singleton, architect, 110, Scotch-street, Whitehaven:—
 H. Killip, Harrington* .. £273 17 0
 [Without painting and seating.]

WORKINGTON.—For alterations and additions to the Wesleyan Mission Hall, Westfield. Messrs. W. G. Scott & Co., architects, 2, Park-lane, Workington. Quantities by the architects:—
 Mason .. G. Mann, Workington* .. £54 17 0
 Joiner .. H. Graham, Harrington* .. 144 12 11
 Slater .. J. Lythgoe & Son, Workington* .. 14 7 9
 Plaster .. G. Mann, Workington* .. 34 12 0
 Plumber .. Papo & Co., Workington* .. 29 0 0
 Painter, etc., T. D. Kearns, Workington* .. 49 0 0
 Heating Alterations .. H. Skidmore, Workington* .. 7 15 0

LIST OF TENDERS FOR CWMDD CHURCH.—In printing this list in our last issue the printers mislaid the contract referring to the highest tender, viz., that the value of old timber had not been calculated therein, so as to make it refer to the lowest tender; and the note referring properly to this latter, viz., that it was accepted, was omitted.

ELECTRIC WIRING FOR BRENTFORD UNION, ISLEWORTH.—We are asked to state that the electric light contract in connection with the buildings at Isleworth for the Guardians has been secured by Messrs. Stode & Co., Osnaburgh-street, Regent's Park, N.W. Their tender amounted to £249.

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The Builder.

VOL. XCI.—No. 3317.

SEPTEMBER 1, 1906.

ILLUSTRATIONS.

Palazzo Municipale, Piacenza.....	Drawn by Mr. W. Curtis Green.
New Packing Warehouse and Offices, Manchester.....	Mr. H. S. Fairhurst, A.R.I.B.A., Architect.
Broomholm, Nairn } House at Nairn } Linkside, Nairn }	Mr. W. E. Davidson, Architect.

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Reason and Tradition.—II. Part I.



IN his book on "Reason in Architecture," referred to at length in our last issue, Mr. Jackson, in addition to expounding the "reason" in Gothic architecture,

refers also to its suitability as the architectural expression of an epoch of strife between jarring nationalities. Under the Roman empire the political and social rule was the same everywhere; the theory of life which centred everything in the Imperial city was reflected in the monotony and unchangeableness of the companion architecture. This monotony was no longer suited to be the exponent of a disorderly society in which every man thought for himself and claimed a more or less complete liberty of action. Gothic architecture, he says, corresponds to the social condition of the Middle Ages; "it is the style of Individualism; it is bound by no rigid formula; it can adapt itself to any conditions, however novel." That is true if we speak of the individualism of nations or societies; in any other sense it strikes one rather oddly to find individualism specially connected with an architecture which, in each of its national developments, went so much by habit and custom that to this day we hardly know whether there was any person who could be called the individual or personal architect of a mediæval church or

cathedral; at all events we know of the names of none, for even of the names that are connected with the foundation or rebuilding of some of the cathedrals we do not really know whether the person named was actually a designer of the building, or whether he merely ordered it or furnished the funds. In the usual sense of the word "individual" it was the Renaissance which was the era of individualism; it was then that architecture first became, since the decline of Rome, the work of personal architects, who had each his own style of working, and whose names are historically connected with their works. And it is this very fact of individual personality which Mr. Blomfield puts forward as the motive for his "Studies in Architecture." It is for the want of this, he thinks, that architecture is not popularly interesting to the same extent as sculpture and painting; "the vital interest of architecture is the human interest, the play of personal temperament, which is as clearly traceable in the works of architects as in those of painters and sculptors." As far as Renaissance and post-Renaissance architecture is concerned this is perfectly true; we have many times in these pages maintained that, since the Renaissance, architecture has become a personal and not a national art, and must for the future be so, because the spread of education and inter-communication has rendered for ever impossible that naïve and half-unconscious carrying out of its own practice by each nation, undisturbed by any direct influences from without, which

characterised the Middle Ages: The civilised world has become too self-conscious for that now; and the people who dream that architecture will have a new life if we can once get rid of the personal architect and go back to the unconscious evolution of architecture out of construction, are Utopians who are supposing the impossible. It is right that this should be recognised; but we think the distinction should have been drawn between pre-Renaissance and post-Renaissance architecture. If educated persons cannot find interest in the development of architecture as a national art during the Romanesque and Mediæval period, when the personal element is non-existent or at least unattainable, it is the fault of their own dullness, and they ought not to be encouraged to think that the history of architecture is only interesting when they can trace the influence of the personal architect. To some minds, at all events, the national development of architecture is of wider and deeper interest than the personal.

For the study of the modern epoch, however, it is quite right that the interest and importance of the personal element should be emphasised. So that, for the present and future of architecture, we have to consider not only reason and tradition, but individual choice and taste, which will not now submit to be pushed aside and sacrificed to a purely national development of architecture, even were this not rendered impossible for the present day for the reasons just mentioned. We have to strike a balance between these three influences;

But before attempting to sum up that question, let us give a little attention to some of the details of Mr. Blomfield's very interesting book. The six Essays contained in it—"Byzantium or Lombardy," "Andrea Palladio," "The Architect of Newgate," "A Hundred Years of the French Renaissance," "Philibert de L'Orme," and "The Italians at Fontainebleau"—are connected, as we read in the preface, "rather by the method of treatment attempted than by subject"; the method being that already referred to, of finding the personal equation of the architect, reading his personality in his works, and finding a clue to his works in his personality. On this system it seems rather difficult to connect the subject of the first essay with those which follow, as it is largely concerned with a question raised in Signor Rivoira's recent work, "Le Origini della Architettura Lombarda," whether the buildings at Ravenna in what we regard as Byzantine form were not really the work of Italian architects who accompanied Honorius from Milan; with the corollary that the architecture of S. Sophia itself was borrowed from Italy or carried out by Italians, and all the subsequent domed Romanesque architecture really a continuous Italian development and not Byzantine in the true sense at all. And this of course is a question of national influence and history rather than of personality. But when we come to S. Sophia itself, with which the latter portion of the chapter is concerned, the personal element does enter into the subject, for though we know no more of the architects of S. Sophia than their names, we do know that they had an individual and personal part in the design, and we can recognise (as before observed) that S. Sophia is in its main design a distinct and at the time a new idea in architecture on a great scale: so that in this sense the personal element comes into the subject.

As to Signor Rivoira's historic theory, it appears to us to be a tolerably arbitrary assumption by an Italian who wishes to establish a purely Italian descent, a direct heritage from Rome through Italian builders, for all Western Romanesque architecture; and we should regard it, as we gather that Mr. Blomfield does, as a theory in the highest degree improbable, not to say impossible. As Mr. Blomfield truly says in another portion of the chapter, the vital distinction between styles is to be looked for not so much in details as in planning and construction, which represent the underlying thought in the building. There are decorative carved details in Hindu architecture which are very like Greek, but there is no resemblance in the general architectural idea; nor is there any resemblance between the general architectural idea of S. Apollinare Nuovo and S. Vitale. Signor Rivoira's thesis seems to be that of a patriotic Italian, who would fain claim for Italian genius everything that has been built upon Italian soil. The supposition that S. Vitale was the work of Italian artists educated at Byzantium does not help him much, for in that case it would remain practically Byzantine in its origin. In regard to the mausoleum of Theodoric, with its monolith cupola, Mr. Blomfield

explains it as the outcome of "the strong-willed ignorance of the builders," who had lost all knowledge of Roman concrete vaulting, but wanted a monumental roof which would exercise no thrust, and got one in this manner, so wasteful of material and of labour, and which on a slightly larger scale would have been impossible with any kind of stone. It bears somewhat the same kind of resemblance to scientific vaulting that a "dug-out" canoe does to scientific boat-building; and, like it, implies a low state of knowledge; it is barbaric architecture. Signor Rivoira, we may say, is not the first to have made the suggestion that the projections like *acroteria* on the upper surface of the cupola were intended as handles or means of attachment for lifting this immense piece of stone into its place; we have met with the suggestion many years ago; and we do not think it so improbable as Mr. Blomfield seems to consider it.

It is a huge step from S. Sophia to Palladio. Fifty years ago, indeed, anything like a serious consideration of Palladio would have been thought absurd; his name was a byword with the modern Gothic architecture and the ecclesiastical amateur, who would have greeted any reference to him with a "retro Sathanas!" Nor are we disposed to think that there is any great lesson for modern architecture to be learned from him. Yet no man fills so large a place in the history of a great subject as Palladio for a long time filled in connexion with modern architecture, without some reason, sufficient at least to his contemporaries and immediate successors; and it is worth while to inquire how he arrived at so large a reputation. Mr. Blomfield suggests that there is a good deal of good luck in his as in some other reputations, and that his writings were the principal factor in his success.

"His four books on architecture appeared at the precise psychological moment. Somebody was wanted to sum up the result of the last hundred years of work. The great effort of the Renaissance was over. That whirlwind of energy which had swept through every nook and cranny of the arts was nearly spent, the reaction was setting in, and of that reaction Palladio was the nice exponent. More neat and orderly in his methods than Serlio, more comprehensive than Vignola, with the touch of pedantry that suited the times and invested his writings with a fallacious air of scholarship, he was the very man to summarise and classify, and to save future generations of architects the labour of thinking for themselves. After the days of the intellectual giants came the schoolmaster to put everything in order. What to them had been facts and vital elements of expression were now to be docketed as abstractions. Architecture was to be put into a strait waistcoat in order to keep it respectable and adjust it to the standard of the virtuous."

"As Mr. Blomfield observes, 'the result is rather depressing,' and the Italians soon emancipated themselves from Palladianism, and underwent a reaction in the direction of extravagance. So did Wren also decline to be bound by the conventional rules, but without rushing into extravagance. He was a great and original architect, who used the Palladian materials to express his own ideas. The criticism against Palladio, that he designed on paper without consideration of material—in other words, that he ignored the relation of material to design, it is perhaps hardly fair to apply to him more than to many other Renaissance architects. Wren had the good fortune to be able to build his churches mainly

in Portland stone; but if they had all had to be carried out in cement, would the designs have been different? But Palladio was much more the slave of the Order than ever Wren became. He could do nothing without the Order; he could not even break away from it to make solid angle to a building. In the interior of San Giorgio and Il Redentore, too, it is quite curious to notice how the architectural design seems to stop at the cornice of the entablature; the vault is nothing but an arched space. Classic authority gave no precedent (as far at least as Palladio knew) for the treatment of a vaulted roof; accordingly it was left out of the architectural scheme; it was an unavoidable covering, and nothing more.

The chapter on "The Architect of Newgate" is of interest in regard to the answer which is proposed to the question—one which must have occurred to many students of architecture—how was it that Dance, who produced no other building remarkable for power or originality, should in this instance, and in the apparently unpromising subject of a jail, have produced a piece of architecture so remarkable for gloomy power and characteristic expression, so distinct from anything else that has ever been done in London? Mr. Blomfield contrasts Dance's treatment of Newgate with Soane's treatment of the Bank. Both architects had to make what they could out of a wall. Soane treated the Bank wall with devices which included sham window openings; "in other words, by means of the very architectural feature which the conditions of his problem forbade him to use." As a piece of one-story classical architecture the Bank is very successful, and in contrasting it with Dance's far more severe and massive treatment of the wall at Newgate, it should be borne in mind that, after all, a bank is not a prison. A bank should have the appearance of strength, but at the same time a bank represents wealth and prosperity, a prison represents crime and forcible detention. We see no objection to the introduction of the Order as a decorative treatment of the Bank wall; the mistake is that it is grace and elegance that are expressed in Soane's Bank, rather than strength. The true way would have been to build a strongly rusticated wall with a strongly rusticated order. Dance, in treating Newgate, as Mr. Blomfield says, attacked the problem squarely.

"He had to build a prison wall, and a prison wall he meant it to be; but his mind, stimulated by a very extraordinary influence, so worked on the conditions that he produced what was perhaps the finest abstract expression of wall surface to be found in Western architecture."

And what was the "extraordinary influence"? That is the new point in Mr. Blomfield's essay. Dance's works were curiously unequal, but Newgate was his work when fresh from a visit to Italy made in 1758. In 1751 the first collected edition of Piranesi's works had been published in Rome by Bouchard, and among many inventions in the manner of the ancient buildings of Rome were included "Molti Capricci di Carceri sotteranee." The book made a great sensation, and Dance must have become acquainted with it and most probably

with its author. Fresh from this acquaintance, on returning to England, he put it into his hands the opportunity to design a prison. What wonder, then, he attempted to reproduce in these grim walls something of the spirit of Piranesi's "Carceri" designs? The explanation is certainly a probable as well as a very interesting one. However inspired, Dance made a wonderful success and produced a piece of architecture the destruction of which has been a great loss to London. It has been succeeded by a more grandiose building, crowned by a cupola, and in the lower portion of which there has obviously been the intent to recall something of the character of old Newgate. But it has nothing like the gloomy grandeur and expressiveness of the old building; how indeed could it have? It was the result of an architectural competition; and who, in a modern competition, would have ventured on anything so stern and uncompromising as Dance's Newgate? To have done so would have been to have courted failure as a competitor.

We can only mention briefly the two exceedingly interesting essays on "The French Renaissance" and on "Philibert de L'Orme," and must consider them with reference to the lessons to be drawn from them, and their bearing on our main subject, rather than in following out the history which they contain. The chapter on De L'Orme is the portion of the book which most completely illustrates the author's position as stated in his preface, that the real interest of architectural literature consists in realising the personality of the architect and tracing its effect in his work. This is particularly the case in regard to De L'Orme, who was a man of most decided and defiant personality, and engaged for most of his life in a fight with men and circumstances. Mr. Blomfield thinks he can hardly be called an architect of genius, though he deserves the praise of having been a learned and thoroughly capable artist. But we may say that he to some extent illustrates the union of the influences of reason and tradition. He was in the main a follower of the classic traditions of the Renaissance, yet in his expressed opinion at all events, as set forth in a remarkable passage quoted by Mr. Blomfield from his "Premier Tome de l'Architecture," it was better for an architect to fail in the ornaments of columns and facades, "ou tous qui font profession de bastir s'estudient le plus," than in those natural laws which concern the convenience of the inhabitants, and not the beauty of enrichments "faites seulement pour la contentement des yeux sans apporter aucun fruit à la santé et vie des hommes"; words which Mr. Blomfield characterises as "downright enough for the most hardened Philistine." But surely the real and most prevalent "Philistinism" lies the other way, in the preference of ornament to the sounder qualities of plan and structure. One of De L'Orme's own inventions, on the other hand, seems to illustrate the misapplication of "reason." This was his practice of emphasising, or as he said concealing, the fact of the jointing of the columns by an ornamental band in relief; a device which, as we know, is largely used

in French Renaissance work down to the present day. We quite agree that it was an unfortunate legacy to French architecture; but it was an application of reason hardly so illogical after all. Columns cannot, with our building-stones, be made as monoliths; they must be in separate drums, jointed; *ergo*, let us make the jointing a feature of the column. It really looks perfectly reasonable on paper; unfortunately, as with some other perfectly reasonable proceedings, the result is ugly. Architecture doth not live by reason alone. This is a case in which a stricter tradition would have been a safeguarding influence.

The upshot of the study of the French Renaissance is that French architecture has adhered in the main to the classical tradition, with its sense of scale and dignity. "Versailles led on to the colossal stables of Chantilly, and no architect could have devised the scale of the new Gare d'Orléans who had not, to some extent, inherited the instincts of the author of that stupendous composition." The reference to Versailles, we presume, refers only to the older portion facing the Place d'Armes; Versailles towards the park is an example of a building vast in actual extent but rendered comparatively paltry in effect by the poor scale and style of its detail. One reason for the unbroken survival of the classical tradition in France is that the Gothic revival, which had also its day there, was never so successful as to gain the wide and general acceptance which it gained for the time in England. Its place seems to have been speedily taken by a kind of Byzantine revival, which still goes on, and is evidently generally regarded as the style proper for churches, as we see in the (to an English eye) dreadful church designs which adorn the architectural gallery in the annual Salon—bastard Byzantine, representing heaviness and clumsiness of detail without restraint or refinement. Here also a stricter tradition would have produced a better result; as it is, we have some of the forms (more or less bungled) and none of the spirit of Byzantine architecture. It is satisfactory to reflect how different is the principal effort at Byzantine tradition in England—the cathedral at Westminster; and the reason for its superiority, as Mr. Blomfield puts it, is that Bentley started from within, with a great scheme of construction; not with superficial features collected from other buildings. But this purely structural basis has not entirely influenced the exterior design, which is by no means so simple and inevitable as the interior. A more simple treatment, more entirely expressing the structure, would have made an even grander building of it. The interior is entirely according to "reason"; the exterior is not.

This brings us round to Mr. Blomfield's summary at the close of his Byzantine chapter; to the effect that if architecture is again to become a vital art, "it must dispense with the unessential, and address itself to the root of the matter, namely, to the task of finding the absolutely best expression for the constructive necessities of a building." That is, in other words, Mr. Jackson's "Reason" applied to building; and it tends towards what modern architecture perhaps most

of all requires, the suppression of useless and unmeaning ornament; the regarding of a building as the expression of an idea in plan and structure, not merely as an opportunity for the decorative treatment of a wall. That is where reason operates. Only it need not be supposed that we are to leave our walls bare in all cases; there may be instances, as that of old Newgate, in which the severest treatment of a wall surface is the best and most appropriate; there are others in which a decorative effect is desirable. But neither is it necessary to vitality in architecture that we should attempt some absolutely new form of detail, or that we should scout an old form because it has been used before. That is where tradition comes in. An ancient tradition, like that of the Classic order, is a preservative against unrest and eccentricity, and connects the architecture of the present with the past. And so too with the tradition of domical building which sprung into almost perfect form in S. Sophia, and has never been carried further; is there not something more to be done with that tradition?

We do not need, nor is it desirable, to shake off the traditions of the past; we need only to use them in accordance with reason. They are the materials for our reason to go to work on.

NOTES.

The London County Council have issued a fresh series of by-laws relating to the throwing of litter and rubbish in the streets. The chief offenders in throwing paper in streets and roads are errand-boys from shops, who often have an extra wrapping of newspaper over the articles to be delivered, and dispose of this before or immediately after delivery. The by-laws seem cleverly drawn to leave out this class of offender. By-law (1) provides that no person shall sweep or otherwise remove from any shop, house, or vehicle into any street any waste paper, etc., or being a costermonger, news-vendor, or other street trader, throw down or leave in any street any waste paper, etc. The errand-boy often comes round on foot, and he therefore escapes the provisions of the by-law. The other clauses refer to throwing down paper for advertising purposes, and to fruit rind and dangerous material. So many of our large towns are defiled and rendered unsightly by the litter of paper blowing about that we could wish they would pass or enforce stringent by-laws in the same direction, whilst certain country districts—notably those visited by hoppers—also stand in need of protection from what is a real nuisance.

The Vrynwy Water Main Burst.

ALTHOUGH steel pipes were used in some parts of the original aqueduct from Vrynwy to Liverpool, cast-iron was chiefly adopted in the siphon, 17 miles 5 furlongs long, between Oswestry and Malpas, and the diameter of the pipes was reduced from 42 in. to 39 in. The maximum head of 480 ft., about 208 lb. per square inch, occurs at the Wych Brook, where the water is carried beneath the stream through steel tubes. In the

same siphon the aqueduct passes by cast-iron pipes in subways under the Oswestry branch and the Shrewsbury and Chester lines of the Great Western railway, and at Hindford the pipes are carried beneath the Shropshire Union Canal in a bed of puddled clay. Under the small stream, described as the river Elfee, the cast-iron pipes were encased in mass concrete, and this was the point where the alarming failure took place on Saturday last. Bursting out with an explosion that was heard throughout the valley, a column of water rose to a height of 100 ft., throwing up masses of concrete and pieces of rock, while many tons of earth were washed from the hillside into the river bed. It is stated that subsequent examination revealed the fact that a piece of metal, 2 ft. by 1 ft., had been blown from the side of the pipe. This mishap certainly points to the desirability of steel pipes in the case of all water mains under heavy pressures, and especially in positions where they are inaccessible except by tunnelling operations.

Girder
Wind
Bracing.

In the twenty-two story building erected for the United States Express Company, in New York, a somewhat unusual form of wind bracing was adopted by Colonel Wells, the structural engineer. In this case the building is surrounded by low houses, and no account was taken of the protection which they afford from the wind, the wind pressure being estimated at 30 lb. per square foot over the entire faces of the building down to street level. To provide for resisting the stresses in the framework, double lines of continuous main girders were disposed perpendicular to the street fronts. These twin girders engage the columns on opposite faces, and the connexions between them and the columns are made with deep plates riveted across the faces of the columns, and serving both as connexion-plates and as braces against wind stresses. In addition to providing for wind stresses this type of girder strengthens the building as so to obviate the necessity for knee-braces, diagonal rods, portals, and other systems of bracing which require special members or difficult connexions, and obstruct the interior of the building. The form of wind bracing here applied has the further advantage of avoiding tension in the rivet heads, and of transmitting the stress entirely through direct rivet shear. Consequently, it is economical both in construction and erection. More rivets are certainly required than in some other methods of bracing, but on the other hand they are all in accessible positions, and the columns and girders can be very readily assembled and connected during erection.

The Leeds
Steel
Aqueduct.

FOLLOWING the example set in Bradford, the Leeds Water Committee have decided to lay a double aqueduct in steel pipe, more than 22 miles long, as a part of their project for bringing water from the Ure and Colster valleys. The first instalment of the pipe line will extend from Kettleasing to Kirby Malzeard, a distance of nearly 12 miles. It is stipulated in the contract that all the pipes shall be

made in Leeds, and it is not improbable that the desire to protect local industries has had some influence on the decision to make use of steel instead of cast-iron. The latter metal is certainly less liable to corrosion than steel, although offering less resistance to sudden shocks. The experiment will be watched with interest by water engineers; and if carefully coated it is quite possible that the new pipe line may not suffer much more from corrosive action than one of cast-iron.

The New
Goods Station,
Newcastle-
upon-Tyne.

A BUILDING which has recently been erected for the North-Eastern Railway in Newcastle-upon-Tyne is undoubtedly the finest example of concrete-steel design hitherto realised in the United Kingdom. In expressing this opinion we are not influenced by mere dimensions, but rather by the magnitude of the loads to be carried and the importance of the main members of the structure. Briefly described, the building is a rectangular block about 430 ft. long by 180 ft. wide by 98 ft. high, including a low-level goods station on the ground floor, a high-level goods station on the first floor, and extensive warehouse accommodation on three upper floors. The floor of the high-level station is mainly supported by three rows of concrete-steel columns, of which every member on the central row has to carry the enormous load of 1,100 tons. The main and secondary floor beams are of proportionately massive construction, and some idea of their strength is conveyed by the statement that, in addition to a dead super-load of 3 cwt. per square foot, they are designed to withstand the moving load of six goods trains as well as the vibratory stresses due to the operation of turntables and heavy machinery for handling merchandise. At the height of 38 ft. above the floor of the station arched beams pass from wall to wall with three intermediate columns forming two spans of 37 ft. 6 in. and two of 52 ft. centre to centre, these beams forming the foundation for columns supporting the upper floor systems. A most interesting feature of the construction is to be found in the automatic flour store with a capacity of 16,800 20-stone sacks, and formed by a series of sloping floors, passing diagonally through three stories of the building. These floors are carried by some of the largest latticed girders that have ever been built in concrete-steel. The structure is one that thoroughly deserves inspection by all who are interested in the progress of concrete-steel construction. It was designed in accordance with the Hennebique system by Mr. William Bell, F.R.I.B.A., the architect to the North-Eastern Railway company.

Magnetic
Alloys.

THE discovery by Mr. Heusler two years ago that alloys containing manganese, aluminium or tin, and copper, were, in many cases, strongly magnetic aroused the greatest interest amongst electricians and physicists. The practical applications of these alloys have not as yet been of great value, but the discovery of a new family of magnetic bodies has opened out a new field of research in which important discoveries have already been

made, mainly by Continental workers. M. Guillaume, the Director of the French National Laboratory, in a recent paper to the *Bulletin des Electriciens*, sketches out a theory which partially explains the known phenomena, and is a useful help in research work. He points out that Faraday many years ago had suggested that manganese and chromium might possibly be magnetic as they belong to the same chemical family as the magnetic metals. The apparent lack of magnetic qualities he explained by pointing out that iron at high temperatures lost its magnetism, and hence if the transformation point of manganese or chromium could be raised sufficiently high they would be magnetic at ordinary temperatures. M. Guillaume proves that this is exactly what Heusler has done. It has been customary to assume that the melting-point of alloys is higher than that of their constituents. This, however, is not the case. The alloys of tin and aluminium, the metals which are essential in making the manganese alloys magnetic, are found to be exceptions to the general rule. An alloy of aluminium and gold has a melting-point 17 degrees above the melting-point of gold, and an alloy of tin and sodium melts at a temperature 450 degrees above sodium, and 344 degrees above tin. It is highly probable, therefore, that the effect of the tin and aluminium which make refractory alloys, is to raise the temperature at which the transformation of manganese from the magnetic to the non-magnetic state occurs. It will be seen that this theory of M. Guillaume makes the phenomenon of the Heusler alloys much less mysterious than it appeared to be when first announced. The salts of manganese and chromium also are quite as magnetic as those of iron.

Hatton Garden
District,
and Holborn
Borough.

In October will be resumed an inquiry, held by Mr. F. J. Willis, barrister-at-law, and Dr. L. W. Darra Mair, on behalf of the Local Government Board, into a scheme propounded by the Holborn Borough Council for dealing with the area inhabited by what is known as the Italian Colony. The inquiry relates to a proposed rebuilding of about 130 houses and tenements in Warner, Summers, and Little Bath streets, Fleet-row, Backhill, Eyre-court, and Eyre-street-hill, with a re-arrangement of the streets. It is the outcome of an adverse report made five years ago by Dr. W. A. Bond, medical officer of health for the borough. Dr. Bond ascertained that a population of 1,100 lived in an area of less than 2 acres covered with small houses crowded together and in a dilapidated condition; the cellars served for living-rooms, the houses were damp, the drainage was in a bad state, and the sanitary provisions very imperfect. The inhabitants are mostly Italians having no settled industry, but trading as ice-cream vendors and itinerant barrel-organ players. During the past three months negotiations have been opened with the owners of the property, the greater portion of which belongs to a land society, and it is anticipated that in the result certain improvements will be effected by the demolition of many of the houses.

the erection of business premises on the site, and by the alteration and improvement of the remaining houses. The area was formerly traversed by a street-ditch when it ran as an open sewer, in the hollow at the foot of the hill, the once notorious Hockley-in-the-hole. In his Annual Report for 1905 on the Borough of Holborn, Dr. Bond says that the population of the borough is 59,405; of that total, 5,706 were foreigners—including 2,029 Italians, 1,098 Germans, and 660 Frenchmen. There are 147 inhabitants per acre in the borough, as compared with 61 for all London; 37.5 per cent. of the residents live in tenements of only one or two rooms, and 60.1 per cent. in tenements from one to four rooms. The death-rate in the Warner-street and Kyre-street-hill quarter exceeds that in the remaining part of the borough.

SOME excellent work has been done during the last two winters at Castle Rushen, Isle of Man, with the result that this interesting mediæval structure can now be seen in something like its original condition. The various small modern buildings which encumbered it have been cleared away, plaster has been swept from the walls, and the mediæval work has been restored to its original appearance. The immense fireplace in the kitchen, for example, has been veritably unearthed, for it was hidden away under mounds of rubbish, and the arches and masonry in various parts, which were neglected in the XIVth century, now stand clearly exposed to view. The windows in the keep, which were enlarged when the castle was used as a prison, have now been restored to their original size and shape, so that the front of this part of the castle is probably in exactly the same state to the eye as in the XIVth century. The way in which this ancient building has been safeguarded would well serve as an example to those who have charge of some similar structures in England. The technical advisers of the Governor of the Isle of Man are Mr. Knowles and Mr. Rigby, both Fellows of the Institute of Architects, and it is intended to make further excavations in the moat and outworks.

carried out as follows: The miners first excavate a vertical heading about 4 ft. square upwards on the centre line of the tunnel to the top of the proposed break-up, and carefully secure the clay with poling boards, walings, and props; they then gradually widen out each side of this heading until the whole of the upper half of the circular excavation is completed and timbered and trimmed to the size of the rings, allowing a clearance of 2 in. all round. The lower half of the excavation is then proceeded with, but in this very little timber is necessary.

We now have a circular excavation 4 in. greater in diameter than the outside dimensions of the iron rings forming the chamber and 4 ft. long, which gives room for the erection of two 20 in. rings of castings. The nine segments forming each ring are then fixed and bolted up one at a time, care being taken to carefully adjust them to line, level, and shape; when the two first rings are completed they are well grouted. The remaining four rings are then proceeded with one at a time, the excavation for each being commenced from the top and worked downwards, and the clay is strongly timbered as the work proceeds. As the ground is got out for each ring, the iron segments forming it are bolted up and grouted.

The weight of one ring of castings 16 ft. in diameter and 20 in. long is about 2½ tons. A break-up is necessary every time it is required to vary the size of the tunnel, as a different shield is required for each size, so that one shield has to be taken down and another erected.

The construction of the large break-up chambers for station tunnels or cross-over roads is a much more serious work, and is, indeed, one of the most difficult operations in this system of tunnel. The following example is taken describing the method employed to construct a chamber 26 ft. in internal diameter and 12 ft. long, in which the shield for the construction of a station tunnel 21 ft. 2½ in. in diameter can be erected.

A vertical box heading or shaft is first driven vertically upwards on the centre line of the proposed break-up chamber. The heading is usually about 4 ft. 6 in. by 4 ft., and is excavated in lengths of about 3 ft. 6 in. One miner only can work at a time in this shaft, and he has to work at the clay above his head all the time. The top 6 ft. of the shaft are taken out at one operation, and the roof is supported on "head trees" carried on "side trees" 6 ft. long, which are in turn supported on foot blocks and wedged tight. From the top of the vertical shaft a horizontal heading is driven forwards for the full length of the break-up, and about 6 ft. high by 4 ft. wide; this also is secured with head and side trees. When the heading is complete two heavy steel joists are got into it and fixed in position under the head trees; these joists form the first two crown bars of the break-up, and are supported on heavy pitch-pine props fixed slightly raking; each of these props is fitted with an iron plate of special design, which prevents the prop

being forced forwards by the weight of the ground, and also forms a seating for the end of the joist, thus preventing it from crushing into the prop. The two ends of the heading are timbered with crosscutting poling boards supported by the raking props. The crown bars are chogged apart by seven hard wood chogs about 26 in. long. The head trees are next wedged up from the crown bars, so that the whole weight of the roof is transferred from the side trees to the crown bars, and it is then possible to remove the side trees. These are taken down one at a time, and the heading is widened out each side, the roof being supported by crosscutting poling boards and the sides of the excavation temporarily timbered. When the heading has been sufficiently widened, two more crown bars are got in and fixed parallel with the first two, and propped and chogged in a similar manner. These operations are repeated until ten bars have been fixed, the boards over each pair of bars being securely grouted as they are fixed. The next operation is to transfer the weight of the roof from the props on to two main cills. Owing to the confined space these cills have to be brought in in two pieces and scarfed together, and are composed of 16 in. pitch pine timbers. The top cills are 23 ft. long, the middle cills 28 ft., and the bottom cills 23 ft. The two top cills are laid at each end of the break-up, 12 ft. 6 in. apart, and at right angles to the crown bars. Each bar is next propped off the cill with a 10 in. pitch pine prop, and wedged up tight with large oak wedges. The cills are strutted apart with four heavy pitch pine cill stretchers, and we then have the top lift of the break-up secure. The second lift is proceeded with as follows: A trench 6 ft. deep is excavated along the centre line of the break-up, extending from back to back of the top cills; two props are put under the cills at each end of the trench, which support the cills and also the face timbering. The trench is then gradually widened out both sides to the full width required, additional props (fixed slightly raking as before) being put vertically under every second prop of the first lift. The second pair of cills, viz., the middle cills, are then brought in and scarfed as before, being placed directly under the top cills. The weight of the top cills is then transferred to the middle cills by vertical props as before described, and the cills are stretched apart. The third lift is excavated and timbered in the same manner. In the case of the bottom lift the clay is trimmed to the shape of the iron lining, the ends of the break-up only being timbered. We now have a strongly timbered chamber 28 ft. 4 in. in diameter in the clear, and 12 ft. 6 in. long in the clear between the cills, in which to erect the cast-iron rings forming the permanent chamber. There are eight rings of iron segments used to make one break-up; the flanges are 12 in. deep, and the weight of one ring is about 8½ tons, making 70 tons in all.

The segments forming the lower half of all the eight rings are first placed in position,

Builders' and Contractors' Column.

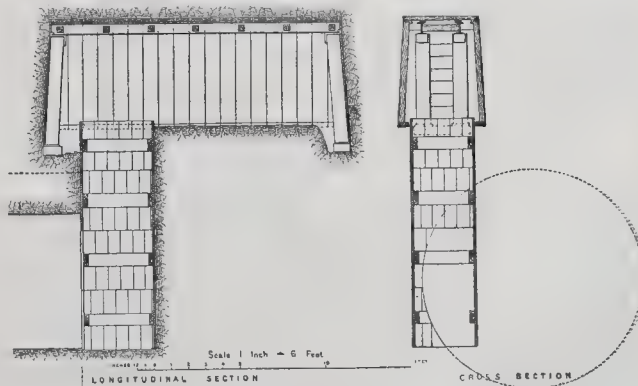
THE CONSTRUCTION OF A TUBE RAILWAY.—II.

Break-up Chambers.

WHEN the shafts have been sunk, as described in the last article under this heading,* the next operation is to construct a break-up or shield chamber, in which to erect the tunnelling shield, and in order to do this a short heading is driven from the shaft on to the centre line of the proposed tunnel at the point at which the break-up is to be built.

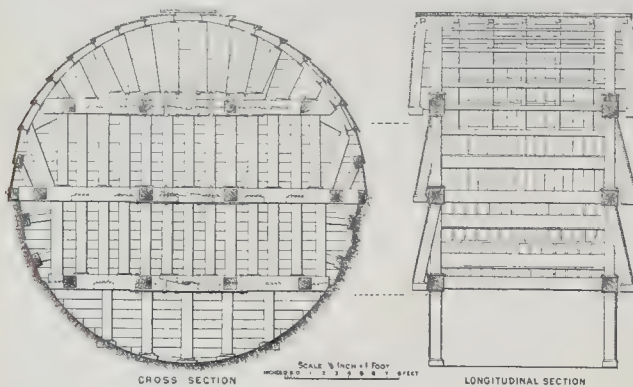
For the purpose of erecting small shields, that is, shields for 11 ft. 8½ in., 12 ft., or 2 ft. 6 in. tunnels, a break-up 15 ft. or 16 ft. in diameter is constructed 10 ft. long; or the large shields for stations and cross-over tunnels the break-ups are 25 ft. and upwards in size and are 12 ft. long.

The construction of the smaller break-ups is a comparatively simple operation, and is



Headings for the Construction of a Break-up Chamber.

* See our issue for August 4.



Timbering of a Break-up Chamber.

the rings being arranged to break joint one with another for the purpose of additional strength. Each segment is carefully adjusted to its exact position, as it is fixed by means of a trammel sliding on a rod fixed on the horizontal axis of the break-up. When the lower half of the iron lining is complete it is well grouted up, crosscoated deal packings being used in the circumferential joints to keep the grout in. Two rings are then carried round and completed, and the space between the outside of the iron and the crown bars and timber is tightly packed with Portland cement concrete, and the whole grouted with cement. The remaining six rings are then completed one at a time, packed with concrete, and grouted.

The segments forming the bottom of the break-up are filled with cement concrete to form a smooth surface, and steel runners are embedded in the concrete to assist in moving the shield when built.

Headwalls.—In order to secure the ground at both ends of the break-up permanently, brick headwalls are constructed, either of blue bricks or flintons in cement. The thickness is 3 ft. 9 in. for a headwall to a large break-up through which only a small tunnel opening is left, and 5 ft. for a headwall through which a station tunnel opening is left. The headwalls are constructed as follows: The bottom cills are strutted with raking struts to the iron lining, so that the vertical struts carrying the cills can be removed leaving the face of the clay exposed up to the cill. The clay is excavated by undercutting to the thickness required for the brickwork, which is immediately proceeded with up to the cill. Pipes are built into the brickwork for the purpose of grouting it when finished. The middle cills are next strutted with raking struts, the vertical struts are removed, and the excavation and brickwork proceeded with as before. These operations are repeated until the whole wall is finished. The forward headwall is constructed with a circular opening in it of sufficient size to give 2 in. clearance round the shield which is to be built in the chamber. The exposed face of clay in this opening is strongly timbered and strutted to the brickwork at the other end of the chamber, care being taken that the struts are placed in such positions as will be clear of the shield when it is erected.

ROMAN CATHOLIC CHURCH, WELLINGTON.—The new Roman Catholic church which has been erected in Wellington was opened a short time ago. The church will accommodate about 350 people, and the whole work will cost about 4,500. The walls are of stone. There are two arcades in the interior of the church (north and south), consisting of alternate columns of granite and red stone. The centre window of the chancel is of stained glass, and represents the Crucifixion. The screen is of pitch pine. Mr. Myles Mosley (late of Wellington) acted as architect, and afterwards Messrs. E. Kirby, Sons, of Liverpool, supervised the operations. Mr. W. Skellern (Stafford) was the builder, and Mr. J. Mahoney (Shrewsbury) the clerk of works.

FACTORY FIRES.

MR. JOHN BURNS has caused a code of model by-laws to be drawn up with the view of enforcing the provision of adequate means of escape from fire in small factories and workshops.

Sec. 15 of the Factories and Workshops Act of 1901 empowers every district council to make such by-laws, and provides that these by-laws must be confirmed by the Local Government Board. In regard to factories in which more than forty persons are employed, special regulations are laid down by sec. 14 of the Act, but in order to encourage the making of such by-laws with regard to smaller factories the series recently issued by the Local Government Board applies only to factories not coming within that section. The more important provisions of the new model by-laws are:—

1. Any factory containing more than one story shall be provided with adequate steps and stairs affording direct and unimpeded access to the ground floor of the premises, and, where possible, such steps and stairs shall be fixed outside the building.

2. Every such building, any floor of which is more than 30 ft. above the ground, and in which more than ten persons are employed, or where inflammable materials are stored, shall be provided with (a) an external staircase of fire-resisting material, or (b) a fire-escape, or (c) a ready means of access to the roof of such building or an adjoining building.

3. At least one window in each room of such factories shall be constructed so as to open easily at the level of the sill, and shall be distinctly marked.

The penalty imposed for the non-observance of the by-laws is 5s. for the first offence, and a daily penalty of 2s. for each day after written notice of the offence from the district council.—*Tribune*.

DESIGN OF WORKS FOR BACTERIAL TREATMENT OF SEWAGE.*

In designing works for the purification of sewage one of the first points to be settled is the volume to be treated at the works. The Local Government Board usually require provision to be made for dealing with at least six times the dry-weather flow apparently on the fairly safe assumption that sewage diluted to a greater extent than this may, as a rule, be discharged into a watercourse without causing serious pollution. It must not be overlooked, however, that when heavy rain occurs between the periods of average and maximum flow the intended degree of dilution will not be reached unless the overflow arrangements are adjusted to the varying flow of sewage. It is therefore important to have a properly designed overflow. The ordinary fixed weir will, with a heavy head of storm water, permit an excessive volume to pass to the works, and the type known as

the "leap-weir" is also unsatisfactory. A type of storm-water overflow not generally known, but far in advance of the usual form adopted, is one having a separating plate fixed horizontally at weir level across the sewer. The quantity to be treated passes underneath this plate, and all in excess is deflected by a vertical plate into the overflow culvert. A description and illustration of this is given in a paper recently read before the Institution of Civil Engineers by Mr. D. E. Lloyd Davies, Assoc. M. Inst. C.E. But no storm-water overflow which does not take into account the fluctuating dry-weather flow of sewage can be considered entirely satisfactory. The overflow should be capable of adjusting itself to the varying flow in the sewer, so that it would always come into operation when the proper degree of dilution was reached. Not infrequently paper and other floating matter pass over the storm overflow weir, and some means should be adopted for preventing such objectionable matter from entering the watercourse.

The works of purification may be conveniently described under the following heads:—Screens, detritus tanks, sedimentation or septic tanks, filters, and land.

It is necessary that the sewage should be screened upon entering the works. The design of the screens will depend somewhat upon the character of the sewage and its subsequent treatment. Except in very small works, it is desirable to have the screen in duplicate, so that the sewage may occasionally be diverted from one in order to thoroughly clean it. As a rule, screens having inclined bars placed $\frac{3}{4}$ in. apart will be sufficient. Screens having mechanical rakes may sometimes be adopted in the larger works with advantage, particularly where the outfall sewer is deep, and wide fixed screens would involve a costly chamber, or where motive power is available. Revolving screens may also be found useful in some cases, especially where a head of sewage can be utilised for driving them. But simple hand-raked screens should be provided wherever they can be conveniently applied. Considering the importance of keeping a free discharge of sewage and the desirability of minimising the labour in raking, it is surprising to find screens in many cases only from twice to three times the width of the outfall sewer, especially a screens of adequate width and area can always be provided at comparatively trifling cost. The author suggests that where shallow screens to be raked by hand are provided the total width should not be less than 9 in. per 1,000 population dealt with, with a minimum of, say, 5 ft. Thus for the discharge from a population of 20,000 the total width would be 15 ft., and for a population of 60,000 45 ft.

All road detritus and other mineral matter should, as far as practicable, be intercepted in properly designed tanks.

The interception of organic matter in suspension along with the detritus is a decided disadvantage, as this can be better dealt with at a later stage of the treatment. Moreover, it renders the removal of the detritus an offensive operation. To bring about the separation, the sewage in its passage through the tanks should be slightly agitated. It has been found in practice that with a flow of about a million gallons per day it is quite possible to agitate the sewage sufficiently with hand rakes to effect this separation, but it would be preferable to rely upon some mechanical means of agitation where possible.

Having freed the sewage of the greater part of the mineral matter, some form of tank treatment is necessary prior to its application to filter beds. The opinion once freely expressed that the introduction of the septic tank would practically solve the problem of the disposal of sludge is now fully recognised as being erroneous, and a closer acquaintance with the tank has shown that its merits have been somewhat exaggerated. It cannot be denied that a considerable quantity of sludge is liquefied by the use of the septic tank, and its disposal is thus somewhat simplified. The one serious objection to the septic treatment of sewage is the offensive smell which is necessarily produced by a process depending for its success upon the fermentation or putrefaction of the sewage. This objection applies especially to the use of open septic tanks, the treatment in which

* From a Paper by Mr. J. S. Pickering, M. Inst. C.E., Borough Engineer, Cheltenham, read at the recent Bristol Congress of the Royal Sanitary Institute.

not possibly be carried on continuously without a nuisance. The author has visited numerous installations where open septic tanks are adopted, and in no single instance has he found works free from the objectionable odour due to the septic treatment.

It is generally recognised that the expense of covering in large tanks is not justified by the slightly increased liquefaction of the sludge obtained, and this is no doubt the reason why the tanks are left open. But the author is of opinion that if septic treatment is to be carried out with the least possible nuisance the tanks should be covered and thoroughly ventilated, preferably by mechanical means.

Before determining the size of the tanks it is necessary to decide to what extent they will be required to act as septic tanks. If they be taken roughly that tanks of a sufficient capacity to contain a day's dry-weather flow will liquefy about 50 per cent. of the organic solids, and it is questionable whether doubling, or even trebling, their capacity further 25 per cent. will be liquefied. On these grounds the expense of the additional capacity would not be justified by the comparatively small advantage in the results. Indeed, in the author's opinion, it is questionable whether it is either necessary or desirable for sewage to undergo a special septic treatment prior to its application to the septic beds. Possibly some slight septic treatment in the tanks may be helpful in the subsequent treatment, but the practice of allowing the sewage to putrify to such an extent as to cause the surrounding atmosphere to be grossly polluted, whatever may be the advantages of such a treatment as regards liquefaction and preparation for the filter beds, is highly objectionable from a sanitary and aesthetic point of view.

Provided suitable arrangements are made for removing some of the deposited sludge at frequent intervals, tanks of a capacity of one-fourth the dry-weather flow should be ample size to effect the clarification and give any necessary septic action to the sewage, and probably in most cases a much smaller tank capacity would be sufficient.

The means for the removal of sludge from sedimentation or septic tanks call for careful consideration in the design of the tanks. It is now practically agreed that it is necessary to remove sludge from the tanks at shorter intervals. . . . In a scheme about to be carried out by the author, it is proposed to build a cross wall 18 ft. from the inlet end of each tank, and to fix in each of the rectangular spaces so provided two spiral scrapers (actuated from a spindle passing through the roof), which will traverse practically the whole area of the floor, and convey the sludge to an outlet placed immediately under each spindle, whence it will evacuate through a discharge pipe. It is hoped that, by intercepting the bulk of the sludge in these chambers, and removing it from time to time, it may not be necessary to empty the whole contents of the tanks more than two or three times each year.

Before leaving the consideration of septic tanks, mention may here be made of Mr. Hibbin's experiments in substituting slate beds for the usual preliminary tank treatment. By this method of aerobic bacterial treatment, immunity from nuisance is claimed, and if its satisfactory application on a large scale can be demonstrated—which is somewhat doubtful—a decided advance in the sewage problem will have been made.

The question as to whether the tank effluent should be dealt with in contact beds or continuous filters depends largely upon the levels of the site and other local conditions. Broadly speaking, the effluent from a percolation filter bed of 1 ft. deep is equal in its standard of purification to an effluent of the same quality from a double contact system.

The practice of the Local Government Board is to require the same capacity to be provided for percolation filters as for single contact beds, and if a second contact is provided, at least half as much again, and possibly twice as much. Filtering material is required. When the system was first introduced, eminent authorities on the subject expressed the opinion that contact beds after being in use a comparatively brief space of time would acquire a practically constant capacity. Experience has not confirmed this sanguine view, and it is now generally recognised that the material must be sifted or

washed from time to time to restore the liquid capacity.

The life of a percolation filter is undoubtedly much longer than that of a contact bed. Percolation beds which have been in use for several years show no reduction in treating capacity. They are in a measure self-cleaning. The substance which clogs the interstices of a contact bed either passes through a percolation bed with the effluent or may be readily washed through. A system of percolation filters will be, as a rule, much more economical, both in initial outlay and working expenses, than a system of double-contact beds.

Nothing need be said on the design and management of contact beds, as their construction and method of working are comparatively simple; points decidedly in their favour as compared with continuous filters. There are many matters requiring consideration in designing percolation filters, and details of construction are still the subject of controversy.

Although it is customary to build the filters with perforated walls above ground-level, it has not been demonstrated in practice that this method of construction produces better results than in the case of filters having closed walls or merely earth embankments.

The permanent success of a filter depends largely upon the use of a suitable filtering medium, and too much care cannot be exercised in making a selection. Materials liable to disintegration, such as coke, ashes, and burnt ballast, should be avoided. Blast furnace slag requires experience in its selection. It has been found satisfactory in most cases, but in some instances it has not been a success. Hard furnace clinker is generally looked upon as one of the most suitable materials, and, provided it can be obtained of a sufficiently durable character, will no doubt be found satisfactory. Remarkably good results have been obtained by the use of hard coal. Coarse gravel, although generally durable, does not produce so good an effluent as most other material broken to the same size. Fine gravel, however, gives much better results. The author is of opinion that a very hard angular material, such as broken granite, will prove the most advantageous for use, notwithstanding that its initial cost may be somewhat high. It should be remembered that repayment of the loan for the material usually extends to thirty years, and any replacement during this period must be paid for out of revenue; hence the desirability of providing a material likely to last during the period of the loan.

The size of material for the beds is a matter on which a great difference of opinion still exists. Examples may be given of two of the largest installations in the country. In one case the filtering material has been carefully sieved and graded to sizes varying from $\frac{1}{8}$ in. to 1 in., and in the other any size between $\frac{1}{4}$ in. and 6 in. has been used. The probability is that the finer filter will give the greater degree of purification, but there is a tendency to ponding on the surface with so fine a material, and it is questionable whether it will be found entirely satisfactory in practice. The nature of the material must to some extent be considered in deciding upon the size to adopt. For instance, a material not liable to disintegration may be used much finer than one of a friable character. There is unfortunately very little information available on the relative results of various-sized materials, and until this is forthcoming it is difficult to arrive at a satisfactory conclusion.

Several methods have been adopted for distributing the sewage over the filters, but the two most important need only be mentioned, viz., fixed sprinklers and rotary distributors, the others being modifications of these. The system of spraying through fixed jets of suitable design gives perhaps the most even distribution, and consequently the best results, but it is open to the serious objection that it cannot be carried out without great nuisance, particularly where the sewage sprayed is from a septic tank.

Rotary distributors are less objectionable in this respect. They have been much improved of late, and from the several different types now manufactured there should be no difficulty in selecting one which with ordinary attention will be fairly reliable. It is not advisable to adopt rotary distributors

for beds much over 100 ft. in diameter unless electric motors or other motive power is provided.

Dosing tanks become a necessity where the flow of sewage is both small and irregular, but it is questionable whether the additional expense of mechanical arrangements is justifiable, on the grounds that by applying the sewage intermittently better effluents will result.

A considerable quantity of suspended matter is generally contained in the effluent from percolation filters, and where there is no land treatment following it is somewhat difficult to deal with. It is of so light a character that it cannot be readily precipitated in catchpits, and the best method of dealing with it is to pass the effluent through a shallow filter composed of sand or other suitable material. A coating of what appears like a rich soil will be formed on the filter, and this can be easily skimmed off.

The usual streaming filters for the treatment of storm-water at the rate of 500 gals. per cubic yard per day do not effect any great degree of purification, and it is preferable to deal with storm-water on land, where available.

Great hopes were at one time entertained that the Royal Commission appointed eight years ago to deal with the subject of sewage purification would bring forward a final and satisfactory solution, but so far it has not been forthcoming, though some useful information may be obtained from the various reports issued. What appears to be required is a properly-organised State Department, which would collect reliable information from works in operation and conduct trials and experiments at the expense of the nation for the guidance of sanitary authorities, who are now left to their own resources to find a solution of the sewage problem.

THE CONSTRUCTION AND MAINTENANCE OF RURAL ROADS.*

EXPERIENCE has shown that a metalled surface of 18 ft. is required for rural roads (main), and a width of 40 ft. between the fences, and in the neighbourhood of large towns these dimensions should be increased to 30 ft. and 60 ft. respectively. The law allows vehicles 9 ft. in width to travel the highways.

The construction of the road will depend on the material available in the neighbourhood. If hard clinkers or refuse from a destructor is to be used, this will require to be 12 in. in depth, and to be well rolled before the broken top metal is applied. The road bed would be 20 in. below the finished surface of the road, and should be curved to give a fall of 6 in. to 9 in. from the centre to the sides. Where possible, the finished road surface should be kept above the level of the adjoining land.

If any bog, springs, or running sand is found below the road bed, it should be excavated, and 12 in. of clay puddle placed over it. If a troublesome yellow clay, that is sometimes found between the coal measures and the limestone, it should be trenched across every 3 yds., 2 ft. deep, and the trenches filled with ashes.

Where the road is in cutting there should be at least a yard of levelled surface between the metalled surface and the toe of the slope. The top metal should be of hard broken stones not more than 2½ in. in its longest diagonal dimension, spread from the shovel to give an even surface of about 1 in 30 from the centre 4 in. thick. This will require one ton to every 8 yards superficial, and when consolidated the top metal will be 3 in. in thickness. In all cases of thick coating, use a profile mould to obtain a good cross section.

Macadam's Mode of Construction.

Briefly, it is this, 12 in. of broken stone, the largest stone 6oz. in weight. No binding, the road bed to have a curvature of only 3 in. Macadam, following Edgeworth and others, advocated no bottoming, the material to be of the same quality throughout.

His theory that the stones would bind by the interlocking and intersection of their own angles is a very pretty theory, but I am

* Part of a paper by Mr. Robert Phillips, M. Inst. C.E.E. County Surveyor, Gloucestershire, read before the recent Royal Sanitary Institute Congress at Bristol.

afraid when the stones had to be rolled in by the cart wheels the binding material was supplied by abrasion during the process of consolidation. The modern construction of macadam roads is cheaper, but not so good. The bottom 8 in. is of an inferior metal; crop stone from limestone quarries, pennant spalls, slag, any inferior stone is carted and tipped on the road, and broken down with a sledge hammer, and some gravel or ashes spread to fill the interstices. On this is spread 4 in. of the hard top road metal; this is watered, blinded, and steam rolled. There is another variation of macadam plan, known as machine crusher road stone roads. This is to construct the road in three thicknesses, the lower layer to be 6 in. thick of machine broken stone, no stone to be more than 3 in. or less than $\frac{1}{2}$ in., this layer to be watered and steam rolled till consolidated like a finished road; the material for this bottom layer may be inferior limestone. On this a second layer 3 in. thick, no stone in this to exceed $\frac{1}{2}$ in. or less than $\frac{1}{4}$ in., and consolidated as before. The third layer to be 2 in. thick, no stone to be more than 1 in. or less than $\frac{1}{2}$ in. in size. The whole to be watered and consolidated with a steam roller.

Telford's Mode of Construction.

The following is a copy of his specification—

"The metalling is to consist of two beds, or layers—that is to say, a bottom course of stones, each 7 in. in depth, to be carefully set by the hand with broadest and downwards, all cross-banded or jointed, and no stone to be more than 3 in. wide on the top. These stones may be of good whinstone, limestone, or hard freestone, the vacancies between the said stone to be carefully filled up with smaller stones, packed by hand, so as to bring the whole to an even and firm surface.

The top course or bed is to be 7 in. in depth, to consist of properly broken stones, none to exceed 6 oz. in weight, and each to pass through a circular ring 2½ in. in diameter in their largest dimensions. These stones to be of hard whinstone, the quality of both bottom and top metal to be determined by the inspector. In every 100 yds. in length on each side of the road, upon an average, there is to be a small drain from the bed of the bottom layer to the outside ditch, as shall be directed by the inspector.

Over the upper bed or course of metal there is to be a binding of gravel, of 1 in. in thickness on an average. In the cross section of the finished road way there is to be a curvature of 6 in. in the middle 18 ft., and from that on each side a declivity, at the rate of 4 in. in 1 ft., to within 18 in. of the fences. In the remaining space of 18 in. there is to be a curvature of 3 in., making in all about 9 in. on each side below the finished roadway."

The advantages of this system are that, though you want skilled workmen to pitch the bottom, you can use a material that you could not use in the other system for the bottom—even sand-stone, that is unsuitable for road metal—and if the stones are securely wedged with spalls, they will not work up through the top metal. The writer has used this mode of construction with a 6 in. bottoming and 4 in. of 2½ in. broken basalt, rolled and consolidated to 3 in., making a total of 9 in., on roads carrying heavy traffic. If properly done, this is by far the quickest way of making a road, and is less costly in repairs for the first few months after construction.

Drainage.

This is a fresh problem on every chain of road; the contour of the country, the position of streams or ditches for the outfall, must be considered. The use of pipes has become general, but the old square road drains with caver stones and open ditches are preferable, as they are easily repaired by the roadmen.

Side Channels.—No road should be left without a water-table and a raised margin at the side from 4 in. to 6 in. high. This can be formed in rural districts by turf in two thicknesses, the bottom one grass down, the top one grass upwards.

Mode of Maintenance.

Many roads are simply worn tracks that have been covered with macadam, and average a total thickness of about 5½ in. of macadam, often on a clay sub-soil that works through and changes with the weather. The writer's practice is to have the road scraped or swept clean before applying the fresh metal, the new material to be of the hardest attainable, and to be broken by hand (on the roadside where possible), to a 2½ in. ring. Occasionally a 2 in. stone is used, the new metal to be kept as clean as possible, and spread one stone thick, one ton to cover 12 superficial yards; this to be dry steam rolled without any blinding till the stones are fixed,

and then the smallest possible quantity of blinding. The writer stores the road scrapings for this purpose in heaps till vegetation has decayed. Surveyors differ in opinion; some use 10 per cent. of the screenings from the machine as blinding. The writer has tried these, but prefers the road scrapings.

A slurry must be made to fix the top stones, and even with a sticky slurry the hammering of the horses' hoofs causes some stones to work loose, and the roller should be kept in the neighbourhood to dry roll this after a few days.

With a properly constructed road, longitudinal machine scarifying before laying the stone is economical of material, but hand scarifying by picks across the road is very destructive to the road and wasteful. The writer maintains over 1,000 miles of road, and does not scarify any; if the road is hard it is well watered before the stone is spread.

The writer uses 15-ton rollers and two-wheeled water-carts, and a pump, independent of the water-cart, capable of filling the water-cart in ten minutes. Water should not be stinted, though sometimes the distance to be hauled may be six miles. The rollers consolidate about 30 tons of basalt or granite or 40 tons of limestone per day. The difference in pressure per square inch of roller surface between a 10-ton and a 15-ton steam roller is only about 35 lb. per square inch. The drainage of the road should be attended to, grips, ditches, and water-tables cleaned, and the sides of water-tables cut yearly.

The use of mechanical traction, and motor cars with rubber tyres, and the army of bicyclists, have increased the cares of those having charge of the main roads. More attention must be devoted to the surface of the road; 1 in. to 1½ in. chippings must be kept on the roadside to patch holes or depressions. These holes are mostly the result of incompetent men spreading; a good spreader of road stone is invaluable. Motor cars have part of their machinery slung below the body of the car; the pneumatic tyres suck the small grit from the road surface, and the parts below the car blow it up in the air.

The prevention of dust is a difficult problem. At several periods in the history of roads tar has been used to assist in binding the road material, and from various causes has been abandoned. That in urban districts it will save the heavy cost of watering is proved. In rural districts where there is no watering (the writer maintains 1,000 miles of road and does not water one mile) the cost to a county council is prohibitory; to tar the main roads of Gloucestershire would cost \$50,000 per annum, about £50 per mile. The dust is not all caused by the material of the roads. The solution appears to be the use of the hardest and heaviest stone procurable, to use as much blinding as possible, and perhaps to graft it with pitch and tar before applying any blinding, after it has been dry rolled. Limestone and all the softer stones that make mud in winter and dust in summer will cease to be used; the problem of the prevention of dust is too serious a matter.

SEWAGE PURIFICATION WORKS, AND THE HEALTH OF THE COMMUNITY.*

The effect sewage has upon the health of the community can be better understood if I describe the origin and composition of sewage. We know that we have to be supplied with an abundance of pure water; in fact, our very sustenance depends upon this precious liquid, the purity of which has to be above suspicion when delivered to us, and entirely free from solids in suspension. But after supporting life, cleansing the inhabitants, cleaning utensils and materials, supporting and moving industrial operations, it arrives for treatment at the outfall to the sewage purification works. What is known as a domestic sewage contains anywhere from 60 to 100 grs. per gallon of solids in suspension and solution—organic and inorganic. It is these matters which have to be removed at the sewage purification works.

Now, sewage or water weighs 70,000 grs. to the gallon, and an average sewage contains from 80 to 100 grs. of solids per gallon, the remaining 69,900 grs. being water. But the

sewage of a manufacturing town, owing to the amount of trade waste liquors poured into the sewers, contains anywhere from 100 to 150 grs. per gallon of solid matter. These 150 grs. seem, no doubt, to many to be infinitesimal in 69,850 grs. of water, and it certainly is a very small proportion; but when I say that 15 grs. per gallon represent 1 ton per 1,000,000 gallons, you will gather what even this seemingly small amount means.

These 150 grs., however, contain about 75 per cent. of organic putrescible matter, and it is this putrefying matter, both in suspension and solution, which the sewage purification works have to remove at the present day. The bulk of these—namely, those in suspension—are first removed by precipitation or sedimentation, chemically assisted or otherwise; the remaining portions—namely, those in solution, but also some in suspension, the latter being in a very finely divided state which have escaped the first process—are removed by filtration, or what is technically known as oxidation. Such, then, is sewage, but without discussing any principle of treatment we will ask ourselves why have we to purify this liquid refuse of human habitations, and what is its effect upon the health of man? We are citizens of the realm, and therefore, as citizens, must abide by and fulfil the law of the land; and we must remember that the laws are made by the people (ourselves), and the Public Health Act of 1875 says—"That before discharging any liquid refuse into a stream or river the local authority must use the best practicable, reasonably available, means in their power for purifying such refuse before discharging same into a river or streams."

In going through our everyday life we often hear the remark—Is there anything new under the sun? We are told in ancient history that the following rule or custom was strictly observed, and an exceedingly strict penalty was imposed on those persons found disobeying the same—*i.e.*, "Neither make water, nor spit, nor wash your hands in a river, nor defile a stream with urine"—a tremendous violation being paid to all rivers. Now, will all our up-to-date sanitation, what would we say to-day if such a stringent Act of bygone ages was in force?

Our first stage in sanitary progress, which includes sewage disposal, seems to have commenced with the Poor Law Commissioners of 1839-42, who found that the diseases prevailing among the working classes were those due to accumulations of decomposing refuse, damp, close, and overcrowded dwellings, and improper water supply. These commissioners first recommended the construction of sewers, by which means the liquid filth of towns could be transported a distance, and then be applied to the land, in order to prevent the pollution of rivers. But the slow progress made with these recommendations led Parliament, early in 1848, to pass the following resolutions—"That further and more effectual provision ought to be made for improving the sanitary condition of towns and populous places, and the sewerage, drainage, cleansing, and paving thereof should, as far as practicable, be placed under one and the same local management and control, subject to general supervision." This resolution was immediately strengthened by the passing of the Public Health Act of 1848. After the passing of this Act the larger towns carried out sewerage or drainage schemes with greater vigour, discharging such drainage into the nearest river or stream, in face of the fact that the Poor Law Commissioners advised its discharge on to land; therefore, the second state of the rivers became worse than the first, owing to the sewage now being discharged at certain points into the river in bulk, instead of finding its way down this zigzag ditch or the other various points as heretofore and being partly purified on its way. That the country has suffered from such pollution has been evident by the various outbreaks of typhoid epidemics and other diseases from time to time. In 1857 a Royal Commission was appointed to inquire as to the best mode of distributing the sewage of towns; and in 1865, after considering the question for eight years, reported as follows:—"That the right way to dispose of town sewage is to apply it continuously to land, and it is only by such application that the pollution of rivers can be avoided."

* Part of a paper by Mr. J. Ashton, F.C.S., M.B.S.N.L., read at the Manchester meeting in July of the Institute of Sanitary Engineers.

It was after the finding of this commission that our first sewage farms in England were made, and I may point out that the farms then laid out are still working as sewage farms.

However, it appears that something was still wanting, for another Royal Commission on Sewage Disposal was appointed in 1868—it is time to inquire into the best means of preventing the pollution of rivers. This commission made various reports, the last being in 1874, and concluding as follows:—"For moving organic matters, intermittent filtration through land, and irrigation over land, is greatly superior to upward filtration (artificial) and chemical processes." It is therefore not very difficult to understand why the Local Government Board have always insisted that any local authority seeking borrowing powers for the construction of sewage purification works should provide for the application of the sewage or effluent to a suitable area of land before discharging the same into a river or stream.

The Rivers Pollution Prevention Act of 1876 was the result of the sitting of the above commission, which, to a certain extent, consensually, and says that:—"Every person who causes to fall or flow, or knowingly permits to fall or flow or to be carried into any stream, any poisonous, noxious, or polluting liquid proceeding from any factory or manufacturing process, shall be deemed to have committed an offence against this Act."

Now, the Public Health Acts of 1875 and 1876 give to local sanitary authorities power to prosecute offenders against this Pollution Act. But how could they, the local authority, enforce this Act when they were probably the greatest offenders by discharging unfiltered sewage direct to the river? Consequently, no legislative measures were taken, however, to make this Act effective, until the Local Government Act of 1888 (sect. 14) constituted county councils sanitary authorities, which gave to them the power, in addition to the Rivers Pollution Prevention Act in relation to so much of any river or stream as is situate within, or passes through or by, any part of their county.

The Lancashire County Council, therefore, lost no time in forming two committees, one for each watershed—namely, the Ribbles and the Mersey. These committees appointed their officers about the year 1890, and commenced operations forthwith. In this Act, then, we find the first earnest attempt to cope with river pollution since it was first considered by the Poor Law Commissioners in 1839.

After these joint boards were formed by the county council, sixteen years ago, a large amount of work has been done in the way of preventing pollution of the rivers, as is shown by the last report of the Chief Inspector to the Mersey and Irwell Board—Mr. R. A. Tatton, Assoc. M.Inst.C.E.

In this board's report, which includes that portion of Lancashire, Cheshire, and Derbyshire which falls to the Mersey, the report says:—"There are seven county boroughs, fourteen non-county boroughs, sixty-three urban district councils, and eleven rural district councils, totalling ninety-five authorities."

The following table shows the progress made with sewage purification works since 1892:—

	May, 1892.	May, 1904.	Rural authorities, May, 1904.
Authorities with works in operation.....	27	50	10
Works being constructed.....	8	0	0
Schemes sanctioned.....	2	0	3
Schemes submitted to Local Government Board.....	6	1	0
Schemes under consideration.....	7	1	0
No schemes.....	26	2	1

By this we see there were ninety schemes in force in 1904, as against twenty-seven in 1892, or ninety authorities out of the ninety-five.

Speaking of pollution at the present time in his last annual report, Mr. Tatton goes on to say:—"The most serious pollution at the present time is from storm water, as anyone who will inspect one of our rivers

after a thunderstorm following a period of drought can verify, and most of the large boroughs are terrible sinners in this respect; the question of dealing with storm water is one which requires their most serious attention."

Now, returning to the Local Government Board for a short time and the methods of treatment—although there are, and have been for some years, many artificial methods of purifying sewage in a satisfactory manner, the Local Government Board still adhere to their iron rule (and they could not do otherwise from the finding of the before-mentioned commission) by insisting that local authorities should provide a suitable area of land for final purification, but there was so much objection to this rule by local authorities a few years ago (when what is known as the bacterial treatment was born) that another Royal Commission on Sewage Disposal was appointed in 1893. Their appointment was:—"To inquire and report what methods of treating and disposing of sewage (including any liquid from any factory or manufacturing process) may properly be adopted."

This commission has now been sitting eight years—and are likely to continue—but they issued a fourth report in 1904, which report deals fully with land treatment, and concludes, like the other commissions before them:—"That land is the best medium for the purification of sewage, with the proviso, if it is of suitable character."

But they also find (what other commissions have not done): "That artificial processes are capable of effectually purifying sewage according to ordinary chemical standards, so as to be dischargeable into a stream without fear of creating a nuisance." This latter is from their interim report of 1901; and since then local authorities have been able to obtain borrowing powers for sewage disposal works (artificial processes) provided they could show that (1) the land available is unsuitable in quality, or (2) that the area available is inadequate, or (3) that it is prohibitive in cost.

So we see that local authorities have benefited by the sitting of the present commission to a very great extent. We have now seen the progress made, briefly, with the various Acts of Parliament relating to sewage purification and river pollution, owing to the advance of sanitary science in this country, and that we are forced by law to carry out these sewage purification schemes for the benefit of the health of the community. So much so that, if a local authority is found wanting in this respect, and if brought before the court by the proper authority, a penalty not exceeding 5s. per day is imposed until such pollution ceases.

APPLICATIONS UNDER THE LONDON BUILDING ACT, 1894.

The London County Council at their meeting on July 30 dealt with the following applications under the London Building Act, 1894. The names of applicants are given between parentheses:—

- Lines of Frontage and Projections.*
Fulham.—A projecting porch in front of No. 19, Lettice-street, Fulham (Messrs. Lowndes & Drury).—Consent.
Hampstead.—Wood and tile porches to four houses on the west side of Finchley-road, Hampstead, between Ardwick-gardens and Burgess-hill, and to two houses on the south east side of Burgess-hill (Mr. J. D. Hunter for Mr. R. V. Hart).—Consent.
Kensington, North.—A projecting shop front to No. 134, High-street, Notting-hill-gate, Kensington (Messrs. C. Spreckley & Co. for Mr. A. Leber).—Consent.
Kensington, South.—Retention of an addition at the rear of No. 8, Coleherne-road, West Brompton, abutting upon Wharfedale-street (Mr. A. G. Harfield for Mr. G. F. Webb).—Consent.
Lewisham.—A porch in front of a house on the southern side of Oakcroft-road, Lewisham (Mr. E. W. Leeson for Mr. A. B. Bacon).—Consent.
Marylebone, East.—Buildings with shops on the site of Nos. 188 to 188a (even numbers only) inclusive, Great Portland-street, St. Marylebone, so far as regards the frontage of such buildings to Great Portland-street (Mr. D. Brown for Messrs. R. Mickel & Co.).—Consent.
Norwood.—Porches and oriel windows and the fixing of sham half-timber work to fifty-eight houses in Trinity-road, Herne-hill, and to fifty-seven houses in a new street to lead from Trinity-road to Norwood-road (Mr. C. M. Quilter for Mr. T. L. Seaton).—Consent.

Paddington, North.—Temporary buildings on the northern side of Harrow-road, between Ranelagh-road and Westbury-road (Mr. T. J. Bailey for the Education Committee of the Council).—Consent.

Peckham.—Re-erection of the "Duke of Sussex" public-house, abutting upon Commercial-road and Lower-park-road, Peckham, and the erection of four houses adjoining such public-house to the northward in Lower-park-road (Messrs. Hubbard & Moore for Messrs. Barclay, Perkins & Co., Ltd.).—Consent.

Peckham.—Two houses with shops on the north side of Evelina-road, Nunhead, on a site between Kirkwood-road and Grimwade-crescent (for Mr. N. Pellet).—Consent.

St. George, Hanover-square.—A deviation from the plans approved for the erection of a building on the site of Berkeley Chapel, on the north side of Charles-street at the corner of John-street, Mayfair, with an irregular open space at rear and projecting porches, balcony, and an angle turret, so far as relates to the filling in with glass of the sides of the porch in front of the portion of such building known as No. 198, Charles-street (Mr. R. G. Hammond for Mr. J. Garlick).—Consent.

St. George, Hanover-square.—A bay window and a hood to the doorway at the proposed new Guardians' offices, Prince's-row, Buckingham Palace-road (Mr. F. J. Smith for the Guardians of the parish of St. George, Hanover-square).—Consent.

St. Pancras, South.—A projecting iron and glass portico and shelter to the proposed "Hotel Gwalia," on the site of Nos. 11A and 11B, Upper Woburn-place, St. Pancras (Mr. A. Swash for Mr. J. M. Jenkins).—Consent.

Wandsworth.—One-story shops on part of the forecourts of Nos. 291 to 301 (odd numbers only) inclusive, Cavendish-road, Balham (Mr. J. H. Beare).—Consent.

Camdenwell, North.—A one-story building in front of No. 101, New Church-road, Camdenwell (Mr. J. Richards for Messrs. Trier Brothers).—Refused.

Hammer-smith.—Shops and flats on a site of the eastern side of Askew-road, Hammer-smith, to the northward of No. 264, Goldhawk-road (Mr. M. de H. Duval).—Refused.

Strand.—Retention of an illuminated advertisement sign in front of the Palace Theatre, Cambridge-circus, Charing-cross-road (Mr. A. Butt).—Refused.

Wandsworth.—Permission to retain a building on the south-west side of Moyser-road, to abut upon the north-west side of Ribblesdale-road (Mr. H. R. Thorp).—Refused.

Wandsworth.—Nineteen houses on the north-east side of Moyser-road, Streatham, with flanks to abut upon Pendle-road, Ribblesdale-road, and Nimrod-road (Mr. F. Loveley).—Refused.

Width of Way and Lines of Frontage.

Southwark, West.—Erection at the "Duke of Wurtemberg" public-house of a urinal and the retention of a brick wall at less than the prescribed distance from the centre of Brunswick-place, Hatfield-street, Southwark (Mr. H. W. Budd for Mr. J. Bartlett).—Consent.

Camdenwell, North.—A one-story building on the western side of Suden-street, Camdenwell, to abut also upon Depot-street, at less than the prescribed distance from the centres of the roadways of the said streets (Mr. A. E. Biggs for Mr. S. Lamb).—Refused.

Lewisham.—Buildings on the northern side of Sangley-lane, Ctrford, abutting upon Plassey-road (Messrs. Wilson & Wilkinson for Mr. T. Buckland).—Refused.

Peckham.—A four-story building on the site of Nos. 761 and 763, Old Kent-road, Peckham (Messrs. W. Cooper).—Refused.

St. Pancras, West.—An oriel window and iron jib at No. 6, Stanhope-street, St. Pancras (Mr. J. Webster for Miss C. C. Ayres).—Refused.

Width of Way, Frontage, and Space at Rear.

Lewisham.—Twelve houses on the western side of Hither-green-lane, Lewisham, between Brown-hill-road and Sandhurst-road, with irregular open spaces at the rear and porches, half-timber work, and barge boards in front of such buildings (Mr. H. L. Upham for Messrs. A. Wood & Son).—Consent.

St. Pancras, South.—A building on the site of Nos. 11A and 11B, Upper Woburn-place, St. Pancras, at less than the prescribed distance from the centre of Woburn-buildings (Mr. A. Swash for Mr. J. M. Jenkins).—Consent.

Width of Way and Construction.

Poplar.—A deviation from the plans approved for the erection of two temporary iron sheds on the south-east side of Deptford-ferry-road, Mill-wall, near its junction with West-ferry-road, so far as relates to the erection of two iron additions to one of such sheds (The Guelph Patent Cask Company, Ltd.).—Consent.

Lines of Frontage and Construction.

Hammer-smith.—That the application of Mr. E. White for Mr. J. Kiralfy, for an extension of the period within which the erection of a gangway in Wood-lane, Hammer-smith, was required to be commenced, and of the period for which such

gangway was allowed to be retained, be granted.—Consent.

Deviations from Certified Plans.

Islington, East.—Deviation from the plans certified by the district surveyor so far as relates to the proposed erection of a new fire brigade station on the site of No. 1A, Hertslet-road, Nos. 80, 82, and 84, Mayton-street, Holloway, and the existing fire brigade station in that street (Mr. O. Fleming for the Fire Brigade Committee of the Council).—Consent.

Marylebone, East.—Certain deviations from the plan certified by the district surveyor so far as relates to the proposed re-erection of No. 78, Wigmore-street, St. Marylebone (Messrs. Treadwell & Martin).—Refused.

Formation of Streets.

Clapham.—That an order be issued to Mr. T. Young, sanctioning the formation or laying out of a new street for carriage traffic on the Cavendish House estate, Clapham-common, to lead from Cavendish-road to Clapham-common, South-side (for the Cavendish House Estate Company, Ltd.).—Consent.

Lewisham.—A deviation from the plan approved for the formation or laying out of a new street for carriage traffic to lead from Sunderland-road to Church-road, Ferry-vale, Lewisham, so far as relates to a widening of such street by an alteration in the position of its northern boundary (Mr. E. C. Christmas).—Consent.

Lewisham.—A deviation from the plan approved for the formation or laying out of Eddy-stone-road and Buckthorne-road, Brockley, submitted with the applications of Messrs. Tompkins & Gowney so far as relates to a widening of the footway leading from the "Brockley Jack" public-house to Nunhead).—Consent.

St. George, Hanover-square.—Widening of Wallis-yard, Prince's-row, Buckingham-place-road (Mr. F. J. Smith for the guardians of the parish of St. George, Hanover-square).—Consent.

Wandsworth.—That an order be issued to Messrs. Milner, Son, & White, sanctioning the formation or laying out of two new streets for carriage traffic out of the south side of Southcroft-road and a new street for carriage traffic out of the east side of Mitcham-road, Tooting).—Consent.

Space at Rear.

Finbury, East.—A modification of the provisions of sect. 41 with regard to open spaces about buildings, so far as relates to the proposed re-erection of the "White Horse" public-house, at the corner of Central-street and Paton-street, Finbury, with an irregular open space at the rear (Messrs. Hubbard & Moore for Mr. A. E. Ball).—Consent.

Holborn.—A modification of the provisions of sect. 41 with regard to open spaces about buildings, so far as relates to the proposed erection of a boys' home on the north side of Great Wild-street, Holborn, eastward of St. Giles's Christian Mission Chapel, with an irregular open space at the rear (Messrs. E. Runtz & Ford for Mr. W. Wheatley and others).—Consent.

Peckham.—A modification of the provisions of sect. 41 with regard to open spaces about buildings, so far as relates to the proposed erection of two buildings on the north side of Evelina-road, Nunhead, on the open space at the rear of No. 2, Kirkwood-road, and with irregular open spaces at the rear (Mr. N. Pellow).—Consent.

St. George, Hanover-square.—A modification of the provisions of sect. 41 so far as relates to the erection of additional rooms over the stables at the rear of No. 81, Eaton-square, St. George, Hanover-square (Messrs. G. Trollope & Sons & Colls & Sons, Ltd.).—Consent.

Hammersmith and Kensington, North.—A modification of the provisions of sect. 41 with regard to open spaces about buildings, so far as relates to the proposed erection of ten houses on the east side of Lutimer-road, Hammersmith, without the requisite open space at rear (Mr. M. Minkler).—Refused.

Construction of Buildings.

Marylebone, West.—The continued use of the ground floor of the building at No. 34, North-street, St. Marylebone, as a battery-room, the use of the two upper floors of that building as offices and meter stores (Mr. F. A. Wilkinson for St. Marylebone Borough Council).—Consent.

Poplar.—An iron and concrete building at St. David's-wharf, West Ferry-road, Millwall (Mr. T. A. Watkin for the Manganese Bronze & Brass Co.).—Refused.

Buildings for the Supply of Electricity.

Whitechapel.—A timekeeper's office, store, iron gangway across stokers' pit, and wooden folding doors across the western end of the existing drum store at the Osborn-street generating-station, Whitechapel (Mr. M. W. Jameson for Stepney Borough Council).—Consent.

Dwelling-houses on Low-lying Land.

Peckham.—Re-erection of the "Duke of Sussex" public-house on low-lying land situated at the corner of Commercial-road and Lower Park-

road, Peckham (Messrs. Hubbard & Moore for Messrs. Barclay, Perkins, & Co., Ltd.).—Consent.

Rotherhithe.—Three dwelling-houses on low-lying land situated between Claremont-place and Wells-tenements, Lower-road, Rotherhithe (Messrs. Stock, Page, & Stock for the Gomm Estate Trustees, Rotherhithe, and Messrs. Bisley & Sons and their tenants).—Consent.

Architectural Societies.

MANCHESTER SOCIETY OF ARCHITECTS.—The last two sketching excursions of the Manchester Society of Architects have been a great success, although the party in each case was small considering the number of members. Hull was made the headquarters at the Bank Holiday week-end, being a good centre for the fine group of churches in the neighbourhood. Saturday was spent at Beverley in the minster and St. Mary's Church. Sunday morning was quietly spent, and the afternoon given to viewing the principal buildings in the town. Hull has been practically rebuilt within recent years, and is now admirably laid out with wide streets and avenues of trees. The XIVth-century parish church is the most important ecclesiastical building. There are also St. Mary's, by the late G. E. Street, which has a good covered ambulatory from the tower to the door at the west end, and Mr. Temple Moore's Saint Augustine's. This still requires the fine tower at the west which is shown on a drawing inside the church. The Congregational Church of Messrs. Molds & Porritt, octagonal on plan, is in a freer style, and admirably meets its requirements. The new School of Art, by Messrs. Lancaster, Stewart, & Rickards, was very greatly admired. Monday was spent at the beautiful decorated church at Patrington. The nave and choir have circular wooden roofs, and the aisles are groined in stone with pleasing variety. The wide transepts enable delightful cross views to be obtained; the piers and arches are all most beautiful in proportion and detail. The transepts are each arranged for three chapels. The north now contains the organ, but on the south side the altar of the centre chapel is in an octagonal recess groined over, the large boss at the centre over the altar being hollowed out for a reliquary or tabernacle. The south porch has a parvise over, with charming little windows looking into the aisle. So difficult did the party find it to leave Patrington that only half an hour could be spent at Hedon, where the glorious centre tower (Perpendicular) made them regret that sketching on this trip was finished. The north transept here is a very fine specimen of Early English work. On Saturday, the 18th, Bunbury Church, in Cheshire, was visited. Beeston Castle station was reached about 10.30 and Bunbury Church at 11. The present building was commenced about 1380 by Sir Hugh Calveley, who founded a college here, but there are sufficient remains to show that a Norman church once existed. There is a fine dignified tower at the west end, with buttresses on the west face only, and over the south porch is a statue of St. Boniface, the patron saint. Internally the nave has very light and graceful Perpendicular shafts. The Egerton Chapel occupies the east end of the south aisle, being separated from the chancel by a fine stone screen occupying three bays of the arcade. The small oak door to this chapel is made of 1-in. planks beautifully carved with open lattice-work in the upper part and shields below in very low relief. Returning to Beeston, the fine outline of Peckforton Castle rising above the hills could be seen strikingly outlined by the setting sun.

CATTLE MARKET, NEWTON.—The opening of the new cattle market at Newton Abbot took place on the 22nd ult. The market will afford accommodation for 50 cows and calves, 181 bullocks, 72 calves, 1,464 sheep, and 130 pigs. The area of the market is 3,612 yards. The contract price was 2,185*l.*, and the work has been carried out by Mr. Herbert Parker, the contractor. The floor has been laid with cement concrete. There are two entrances, one for bullocks, cows, and calves, and the other for sheep and pigs. A covered shed has been erected for cows and calves, and a partly covered shed for sheep and pigs. Mr. L. Stevens, surveyor, prepared the plans.

THE LONDON COUNTY COUNCIL AND HOUSING.

Dr. G. P. BATE, the Medical Officer of Health for Bethnal Green, has some severe criticisms of the London County Council with reference to housing for the working classes, in his annual report just circulated. He says that no advance has been made during the year towards the clearing of unhealthy areas in Digby-street and Brady-street. The Housing of the Working Classes Committee of the London County Council upon being applied to refused to recommend that council to prepare a scheme, on the ground that the area would probably be re-developed in the near future by private enterprise. "From what I can ascertain," continues Dr. Bate, "the hopes of rebuilding of these areas by the Council of the London County Council are premature, there is no prospect of this area being redeveloped by private enterprise for many years, and in the opinion of the Borough Council it is nothing less than a public scandal that the present condition of things should continue indefinitely. The only real excuse is an old one and does not redound much to the credit of the London County Council and its officers; for recently Mr. Foot, our chief inspector, during a search in the Record Office at Spring-gardens amongst some old plans and drainage applications, came across a bundle of correspondence dated 1854 respecting certain premises in this very area. The then surveyor to the Metropolitan Board of Works (the predecessors of the London County Council) recommended: 'That having regard to the small and fourth class character of the property and its aged and worn-out condition generally, it would only be necessary to make arrangements for its temporary drainage as the premises would soon come down.' This occurred over fifty years ago, yet the temporary system of drainage was only recently remodelled and the houses are standing and inhabited to-day, notwithstanding my repeated representations under the Housing Acts backed up by the action of the Borough Council. As a result of the frequent inspection of the area by the officers of the London County Council and the supposed probability of the early acquisition of the property by that authority, some speculative house jobbers thought they saw their way to make a profit out of the scheme by resale at an advanced price. Upon the abandonment of the scheme these gentlemen found themselves left in the lurch. Moreover, having paid full value for the property, they are naturally indisposed to spend more money upon repairs that they are absolutely compelled to do. As a result, the decay and dilapidation of the houses have increased, many of them are void, and the appearance of the fronts is most forlorn and depressing. Although hundreds of pounds have been spent by the Borough Council upon combined drains (sewers by law), the unhealthiness of the area has intensified. . . . We have followed the advice of the County Council and have attempted to deal with single houses, but the result so far is not encouraging. We appear to have arrived at an absolute impasse. Bethnal Green cannot clear these sites, and the statutory authority under Part I. of the Housing Acts refuses to help. I am afraid that the London County Council is of opinion that Bethnal Green has had its share of public money in Boundary-street. Moreover, the members of this august body form to a certain extent a mutual admiration society. They are not particularly anxious to clear areas in back slums, but prefer public improvement schemes in prominent positions to which they can refer for their own glorification."

Correspondence.

THE "HAYCOCK," WANSFORD.

SIR,—I am much interested in the account of the Architectural Association excursion, as I am well acquainted with the locality. With reference to the legend about the Haycock, I send you some particulars from an old gazetteer, the 7th edition, published in 1822.—"It is noted for the story of a man who was carried down the river at this place by the sudden rise of the water, as he slept on a haycock, supposed to be the famous Barnaby Harrington, better known by the title of 'Drunken Barnaby,' who has given us an account of the adventure in one part of his entertaining journey—

"Thence to Wansford Briggs—a river
And a wife will live for ever;
River broad, an old wife jolly,
Comely, seemly, free from folly;
Gates and gardens neatly gracious,
Ports and parks and pastures spacious.
On a haycock sleeping soundly,
The river rose and took me roundly
Down the current; people cried;
Sleeping down the stream I lied;
Where away, quoth they, from Greenland?
No; 'twas Wansford-Briggs, in England."

This adventurer flourished in the beginning of the XVIIIth century.
Before the advent of the railway Wansford

is a great centre for trade in corn, timber, and al, etc., and I have no doubt at the time of unaby's escapade a considerable trade was carried on, down to the time I can remember, yond the date when the Duchess of Kent and the Princess Victoria stayed a night at the Hay- eld—posting (as was then the only way) when they journey north—which was, I suppose, out two years before King William the Fourth ed—more than seventy years ago.

The bridge had, as reported, thirteen arches, rto being carried away by a heavy flood the latter rt of the eighteenth century, and one wide arch ed at the south end of the bridge. The ater part of the remainder is very old and there e numerous masons' marks, especially at the orth end of the bridge.

With reference to the church, it is wrong to ll the chancel a restoration, as no such structure eted, and if any remains were found they would oubtedly be of a simple early date—the indica- ons, as I remember them, being of an Early nglish character. The tower and spire bear this t and were selected as worthy of record in arker's Glossary. A curious Norman font ould have been noticed.

There is an old farmhouse, Sibberton Lodge, bout ten minutes' walk from Wansford, well orth a visit—at one time the Manor House. his may not be of such interest to you as it is o me, and if any excuse is needed for a wandering en, it is that I am writing about my native ace.

HENRY HALL.

The Student's Column.

ROOFS: STRUCTURALLY CONSIDERED.—VII.

14.—Patent Glazing Systems.

BRABY'S System of Glazed Roofing, with intermediate lap-piece, is illustrated in Fig. 33. The glazing-bar can be obtained either in zinc or in copper, as may be preferred, and, as shown in the section, the glass is supported directly on the metal. One good feature of the system is to be found in the method of apping, whereby drips are rendered quite unnecessary. Braby's "Drop Dry" glazed roofing, with zinc or copper bars, is represented in Fig. 34. It will be seen that the par comprises two essential parts—a sheath for the timber sash-bar providing a bearing for the glass, and a covering-cap attached by screws which pass through the sheath and hold the entire construction in place. Owing to the curved form of the two elements of the metal bar sufficient spring is provided to keep the metal tightly against the glass. The double roll of the lower section affords adequate protection against the penetration of rain or dust, and the channels formed on either side serve the purpose of carrying away any water that may percolate beneath the metal capping or gather as the result of interior condensation.

These bars can be applied in any length without drips by adopting the system of patent lapping illustrated in Fig. 33.

The British Challenge Glazing differs from systems wherein the glass is placed upon the flanges of an inverted steel tee and covered by detachable capping, and from other systems where the capping is formed by lead wings drawn with the sheathing enclosing the steel tee-bar.

The Challenge glazing bar is made in several different sizes and patterns, but the essential principle of the design is as shown in Fig. 35, where it will be seen that the tee-bar, placed with the flanges upwards, is completely covered by a lead sheathing which has three substantial projections, two at the sides forming a yielding bed for the glass, and one in the middle from which the wings spring below glass level. In virtue of the latter feature the junction of the wings with the central lead core is not liable to be weakened when the wings are being dressed down upon the glass. Between the projections from the lead sheathing two channels are formed which can be utilised for carrying away any water that may find its way from the outer surface of the glass.

Seven sizes of Challenge bars, practically as described above, are made of suitable proportions for clear spans of 4 ft. 6 in., 6 ft., 7 ft., 8 ft., 9 ft., 10 ft., 11 ft., and 12 ft., respectively, and the seventh is a bar with extra wide wings to take glass $\frac{1}{2}$ in. thick, the same section being also used for all bent work. Half or side-rail bars are obtainable of the pattern illustrated in Fig. 36.

Any of the foregoing bars can be let into timber moulding if desired, as represented in Fig. 37.

The bars are also made, as in Figs. 38 and 39, so that they may be fitted to timber sash-bars. The sheathing shown in Fig. 38 has two downward projecting strips that are simply tacked on to the timber bar. The bar represented in Fig. 39, termed a *strap-glazing bar*, is fastened by screws for which holes are drilled through the lead and steel in the channels on either side of the central core.

Fig. 40 shows the manner in which strap-glazing bars are applied to steel sash-bars.

The British Luxfer Improved Roof Glazing, with ordinary glass, can be applied to roofs of either timber or steel construction, and takes glass of the usual thicknesses used in roof covering.

The glazing bars are made in four distinctive types, which are illustrated in Figs. 41 to 44. No. 1 section, Fig. 41, for spans up to 6 ft. 6 in. between purlins, comprises a galvanised special rolled steel bar with copper or zinc capping held in place by gun-metal bolts and nuts, and shaped suitably for asbestos packing above the glass. No. 4 section, Fig. 42, for spans up to 10 ft. between purlins, is practically the same as the No. 1 section, except that the steel bar is rolled with a downward projecting leg to increase the resistance of the section to bending moment.

No. 5 section, Fig. 43, for spans up to 8 ft. between purlins, comprises a special rolled tee-bar entirely cased in a lead sheath which is provided with side wings for dressing down upon the glass.

No. 6 section, Fig. 44, for spans up to 8 ft. between purlins, is similar to No. 5 section, except that the special tee-bar is galvanised and provided with lead capping riveted to the upward projecting leg of the steel bar.

Luxfer Prism Roof Glazing can also be applied to timber or steel roof framework, and enables the architect to secure a maximum amount of diffused daylight for the interior of buildings where operations are conducted which necessitate an ample supply of well-distributed light.

Fig. 45 is a section of the glazing bar used

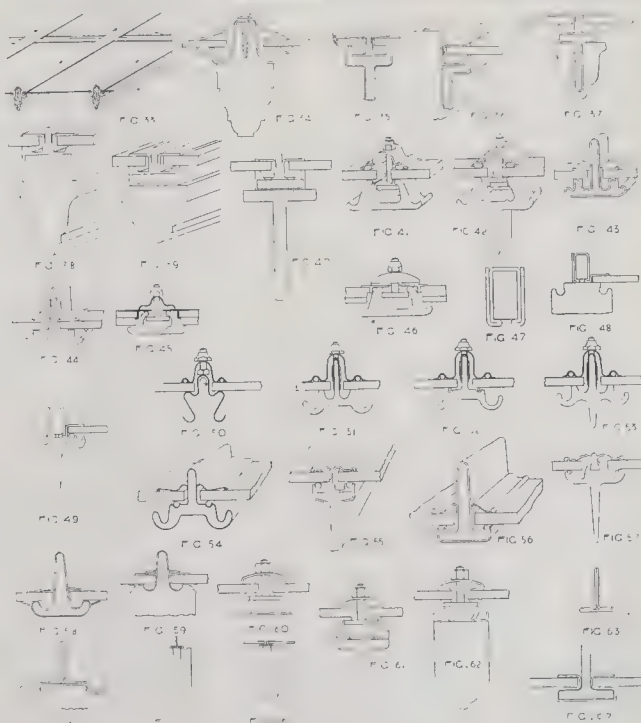
for skylights, and comprises a special rolled-steel galvanised section, and a zinc or copper cap secured by gun-metal bolts and nuts, and providing for asbestos packing on the upper surface of the steel frame in which the Luxfer prisms are carried. The bar shown in Fig. 46 is of stouter construction, and the cap is of galvanised steel, secured by gun-metal bolts and nuts, and packed by flat asbestos strip. This pattern, however, is not now used, unless specially desired, as the bar illustrated in Fig. 45 is found to answer the same purpose quite satisfactorily.

Deacon's Patent Glazing is simple, and suitable either for wood or for steel bars. The characteristic feature of the system is illustrated in Fig. 47, where (a) is a timber core enclosed in a lead casing (b), provided with two wings (cc), which can be opened out and dressed over the sheets of glass. Being cut from sheets the lead is of uniform thickness, which can be varied if necessary. The lead-sheathed strips are made in two sizes, one for 21-oz. glass and the other for glass up to $\frac{1}{4}$ in. thick. They are secured to the sash-bars or rafters, as the case may be, by brass round-headed screws passed through holes bored with a brace and quill bit. One feature specially claimed by the patentee is that when the glass is in position the lead is automatically keyed on, and cannot be disturbed by wind pressure or vibration.

In timber roofs the bars, or rafters, may be of any desired section, but should be provided with semi-circular grooves for carrying away moisture condensed on the interior surface of the glass. It is recommended that the outer edge of these grooves should be about $\frac{1}{4}$ in. below the bearing for the glass.

Fig. 48 shows a lead strip attached to a timber bar with the pane of glass in position on one side and the lead wing turned down over the glass. The timber should be painted before glazing is commenced, and thick white lead paint applied below the glass and between it and the lead cap. As the ends of the cores are not covered by lead they should be protected by paint.

Fig. 49 shows a lead strip applied to a special rolled-steel section, having two grooves for asbestos cord bearings and two



Illustrations to Student's Column.

other grooves serving the purpose of carrying away condensation water.

The Helliwell "Perfection" System of Glazing.—There are several different patterns of Helliwell glazing bars, typical sections of which are given in Figs. 50 to 53.

Fig. 50 illustrates a form of bar suitable for greenhouse and other light roofs; the bar proper, although of slender appearance, can be made of any thickness of zinc or copper, and possesses considerable rigidity owing to its corrugated form. It has sufficient spring to insure a close fit; the cap is shaped so as to hold a strip of asbestos cord under each web, and is held in place by brass tee-bolts and nuts, the tee-head of the bolts being inside the upper curve of the glazing bar.

Fig. 51 shows in section a complete glazing bar consisting of a special form of steel bar with condensation channels and a cap secured by brass tee-bolts and nuts, connected by clips to the upper web of the steel bar. The cap is shaped suitably for asbestos cord packing on the upper surface of the glass. This pattern bar is suitable for 6-ft. 6-in. spans between purlins.

Fig. 52 represents a somewhat similar section, in which provision is made for asbestos packing to receive the lower surface of the glass. This type of bar is recommended for flour mills, and is designed for 6-ft. 6-in. spans between purlins.

Fig. 53 is the section of a heavier bar capable of carrying glass in spans of 9 ft. between purlins. Bars of similar design to this are made suitable for 12-ft. and longer spans.

All the foregoing bars, with the exception of that illustrated in Fig. 50, are simply galvanised or galvanised and also entirely covered with lead as a protection against corrosion, and the caps are furnished in zinc, copper, or lead.

The Helliwell New Patent Glazing System is offered as an alternative to the "Perfection" systems with detachable caps, and, as shown by Fig. 54, the bar consists of a special rolled-steel section completely encased in a lead or tinned-lead sheathing, with wings that can be dressed down over the glass. As usual in other systems where a similar device is employed the sheathing is drawn in one piece without joints.

Heywood's Patent Roof Glazing.—Two types of bars are applied in this system of glazing.

(1) Partly lead-clothed bars, comprising galvanised steel bulb-tee, upon which a lead glazing cap is fitted, as illustrated in Fig. 55, where A is the bulb-tee, B is the lead glazing cap drawn in one piece without joint, and C is packing pieces of soft asbestos cord, rendering the glazing dust-proof.

These bars are most suitable for north light roofs, and are made in three sizes, to carry glass in lengths of 5 ft. 6 in., 7 ft. 6 in., and 11 ft. respectively.

(2) Lead-clothed bars, consisting of a galvanised tee completely encased in a lead sheath and glazing cap, the ends of the sheath being soldered up, thus hermetically sealing the steel bar. This type of glazing bar is shown in Fig. 56, where A is the tee, B the lead sheath and cap, drawn in one piece to avoid jointing, and C is asbestos packing.

These bars are made in three sizes to carry glass in lengths of 6 ft., 8 ft., and 11 ft. respectively.

In the Heywood glazing system the glass has an ample bearing, the asbestos packing reduces risk of breakage, and excludes rain, wind, and dust; the lead caps are dressed down upon the glass, adapting themselves to any slight irregularity of the surface, while leaving the panes free to expand and contract. The panes are prevented from slipping down the roof by means of copper stops riveted to the lower ends of the bars. Interior condensation is dealt with along the eaves of the glazing by a condensation bar with outlets at intervals conveying the condensed moisture to the outside gutters.

Hope's Patent Glazing is a system in which a rolled-steel bar of special section (see Fig. 57) is employed to afford adequate bearing for the glass, which is supported upon oiled asbestos cords laid in grooves. These insure a plastic and imperishable seating which is dust and watertight and compensates for any irregularities in the surface

of the glass. The lead capping is attached by a dovetailed joint which dispenses with fastenings, the form of the capping permits it to be turned up or down without angular bends, and it cannot be cut by the edges of the glass. The glazing bars are fixed by means of angle brackets to the purlins, usually spaced 24 in. apart. These members carry the entire weight of the bars and glass, the screws or bolts merely serving to hold the bars in position.

Lead weathering bars are provided to prevent the ingress of rain, snow, or dust, and a gun-metal stop is fixed at the projecting end of every glazing bar.

The bars are made in two standard sizes to carry spans up to 9 ft. wide without intermediate support.

Mellows' "Eclipse" Glazing possesses distinctive features which, the patentees claim, render it perfectly water-tight and impenetrable by dust. Fig. 58 is a typical section of the "Eclipse" glazing bar, which consists of a special form of tee, covered by tin-lead sheathing soldered at both ends, and having three projecting webs on each side, which are rubbed closely upon the glass, as shown in the section. Special importance is attached by the makers to the inner of the two upper webs.

To prevent snow or rain from drifting in between the glass and the framework, a lead wind-guard is fixed under the bottom end of the pane and between the bars, and provision is made for the escape of moisture arising from interior condensation.

The "Eclipse" bars are manufactured in five different sizes, for which the weights and maximum spans are given in the following table:—

No. of Section.	Weight of Bar per Foot Run.	Maximum Span Between Supports.	Usual Thickness of English Cast Plate.
6	2½ lb.	4 ft. 0 in.	½ in.
7	3 lb.	6 ft. 6 in.	¾ in.
8	7½ lb.	7 ft. 6 in.	1 in.
9	11 lb.	9 ft. 0 in.	1½ in.
10	14 lb.	11 ft. 0 in.	2 in.

In order to provide for the application of the "Eclipse" glazing to roofs having timber sash-bars, a special form of the tin-lead cover is supplied, which is fixed in the manner represented in Fig. 59.

Rendle's "Invincible" System of Glazing has been considerably improved since its introduction, the bars having been made lighter and stronger so that sheets of glass up to 10 ft. and 12 ft. long can now be used. The essential features of the system is a copper or zinc channel bar, drawn in one piece on which the panes of glass are placed and held in position by a cap of the same metal as the bar itself, the cap being secured by bolts and nuts at intervals of 12 in. apart.

Fig. 60 is a section showing the general arrangement of the bar, which has a central channel for dealing with any water that may find its way under the cap, and on either side of the bar condensation channels are provided to carry off condensed moisture.

Where the sheets of glass are longer than 4 ft., steel tees or moulded timber bars are employed, as illustrated in Figs. 61 and 62. In places such as railway stations, where the roof is exposed to sulphurous and other destructive gases, the timber bars are preferable to iron or steel tees, being preserved rather than destroyed by the products of combustion.

"Simplex" Lead Glazing, as the name implies, is of very simple character. No special subcontract need be entered into for its application, as the lead strips which constitute the distinctive feature of the system are sold by the foot run, and can be fitted to existing or new sash-bars by any builder or glazier. A wooden tool, termed the "boat," for dressing down the lead, and a printed sheet of instructions, are supplied free of charge with each consignment of material.

Fig. 63 is a section of lead strip as supplied ready for fixing to timber sash-bars, and Fig. 64 is a section of special strip with channels for condensation water. The strips are made in sizes suitable for glass ranging from 21 oz. up to 3 in. thick.

When applied to small timber roofs, with rafters spaced about 15 in. apart, the rafters should be from 1½ in. to 1¾ in. wide, with

two semi-circular grooves to provide for interior condensation (see Fig. 63). Similar grooves should be formed in the sash-bars employed between the rafters or principal bars. Half-section lead strips are supplied made by cutting an ordinary section longitudinally through the middle, or any special strip can be made to suit flashings and other details.

The lead strips are laid along the rafters or sash-bars and secured by copper nails or 4-in. zig-zag pitch, so that the nails in each flange of the strip are 8 in. apart. When nailed in position the lead should be dressed perfectly flat on the wood. Fig. 65 shows a strip fixed on a sash-bar ready to receive the glass. The panes should be cut so that they fit easily between the vertical webs of the strips, the interior angles of which are coated with thick white lead paint before the glass is laid in place. It is recommended that any sheets of glass which are not quite flat should be laid, contrary to the usual practice, with the hollow side downwards, and that any which will not bed on all four sides should be rejected. When the glass has been put in place, the lead webs are turned down, as in Fig. 66, and dressed over with the tool.

Fig. 67 is a section showing the application of the "Simplex" system to iron sash bars.

Illustrations.

THE PALAZZO DEL COMUNE, PIACENZA.

THE Palazzo del Comune at Piacenza is one of the finest brick and-marble municipal buildings in Northern Italy. It was undertaken so far back as 1281 by the merchants of Piacenza. The ground floor shows the customary spacious arcade supporting the superstructure upon pointed arches. There are five of them on the principal facade, with six semi-circular arched windows over, the immense size of the building is difficult to convey in a drawing, as well as the elaborate and delicate scale of the ornament. The ground story is faced in white and red marble, while the upper part is of red brick with brick and terra-cotta ornament. The equestrian statues of the XVth century are by Francesco Moschi, and represent the Dukes Ranuccio and Alessandro Farnese; unattractive in themselves, they have a pictorial value in the fine Piazza de' Cavalli. The illustration is from a drawing by Mr. W. Curtis Green.

PACKING WAREHOUSE, MANCHESTER.

THIS building is a new packing warehouse and offices, Whitworth-street, Manchester, for Lloyd's Packing Warehouse, Ltd., and has been designed with a view to meet the demands of large shipping merchants, and is equipped with all the latest machinery for dealing with manufactured textiles for shipment in the most efficient and expeditious manner.

The base and entrance doorways are built of pink unpolished granite, supplied and wrought by Messrs. John Fyfe & Sons (Aberdeen). The remainder of the façades are of buff terra-cotta, semi-glazed, from Burnantofts (Leeds), combined with Accington facing bricks.

The main contractors are Messrs. Robert Neill & Sons, of Manchester. Messrs. Richard Moreland & Sons, of London, are supplying and fixing the whole of the steelwork, solid steel columns being used throughout.

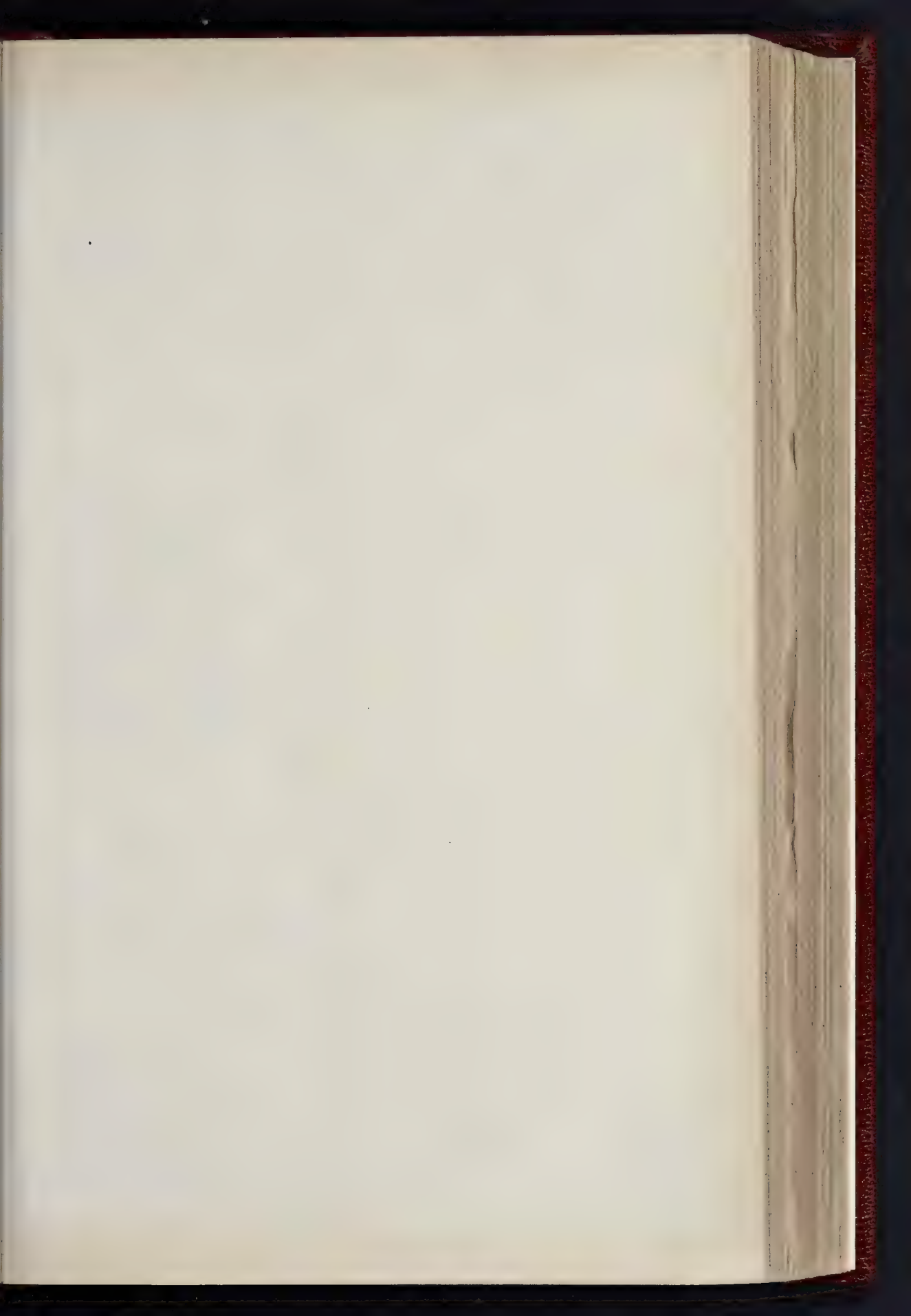
Mr. Harry S. Fairhurst, of Manchester and Blackburn, is the architect.

BROOMHOLM, NAIRN.

THIS house was built in 1903. The walls are of rubble, harled yellow, with very little dressed stone.

The roof is covered with grey Welsh slates, the projection of the eaves, doors, etc., being painted a dark green.

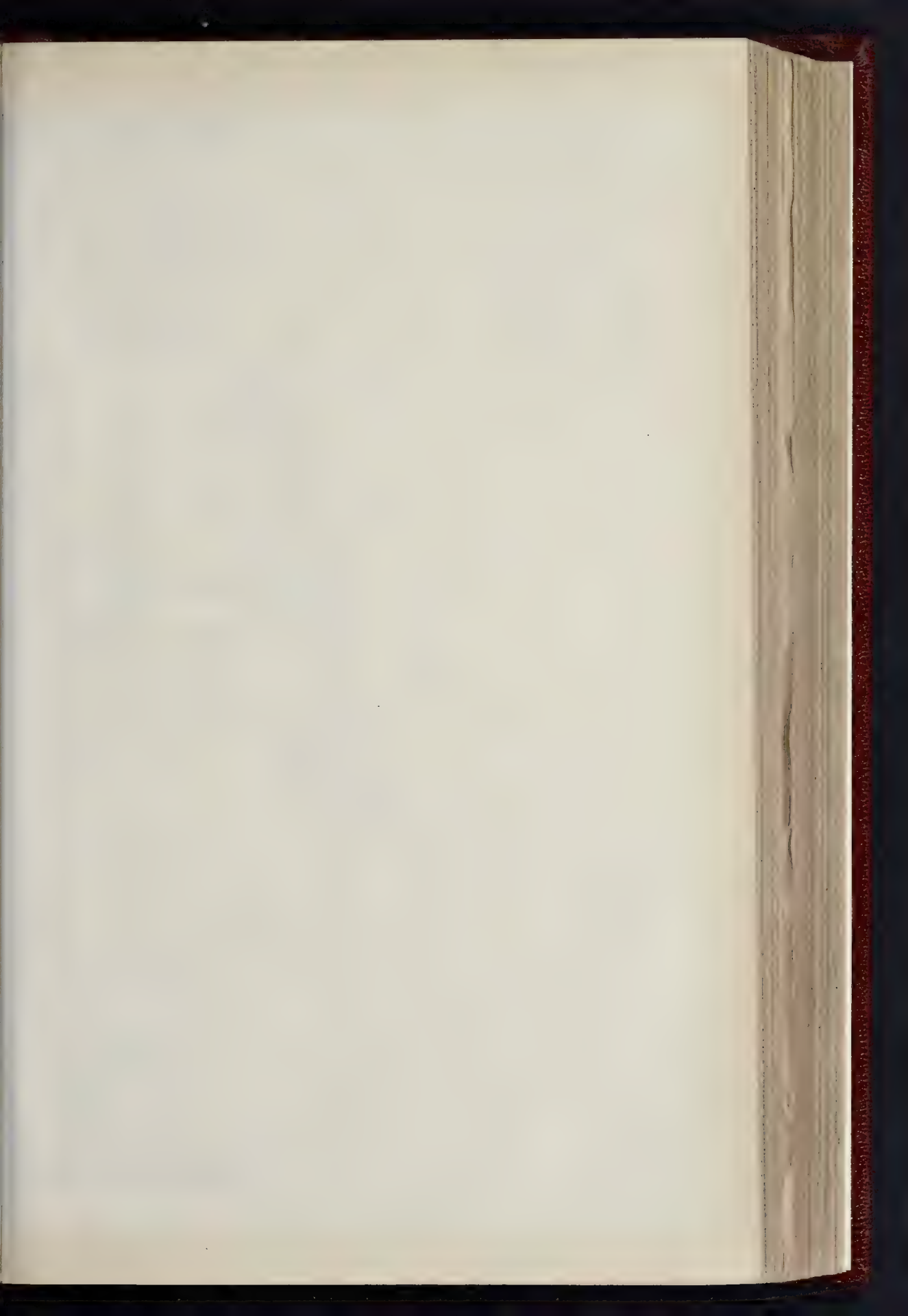
The contractors were:—Mason—Mr. Farquharson (Nairn); carpenters—Messrs. Dunbar (Elgin); plumber—Mr. Brown (Nairn); slater—Mr. Reid (Nairn); plasterer—Mr. Campbell (Nairn); painter—Messrs. Kintrees (Elgin). The architect was Mr. W. R. Davidson.



THE BUILDER, SEPTEMBER 1, 1906

THE LAKESIDE HOUSE:
 W. R. DAVIDSON, ARCHITECT.
 8 NEW SQUARE, LINCOLN, IN. W.C.



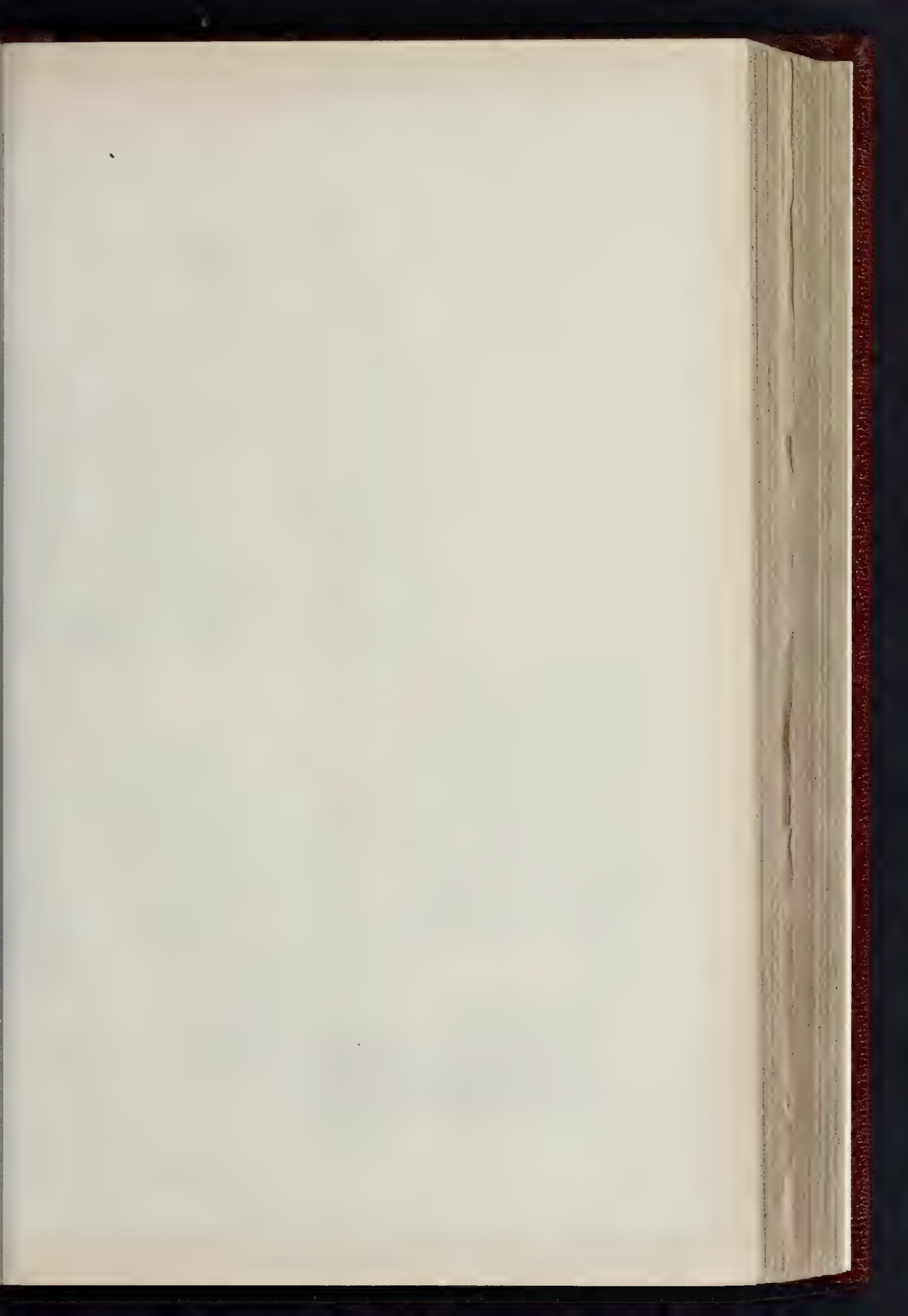


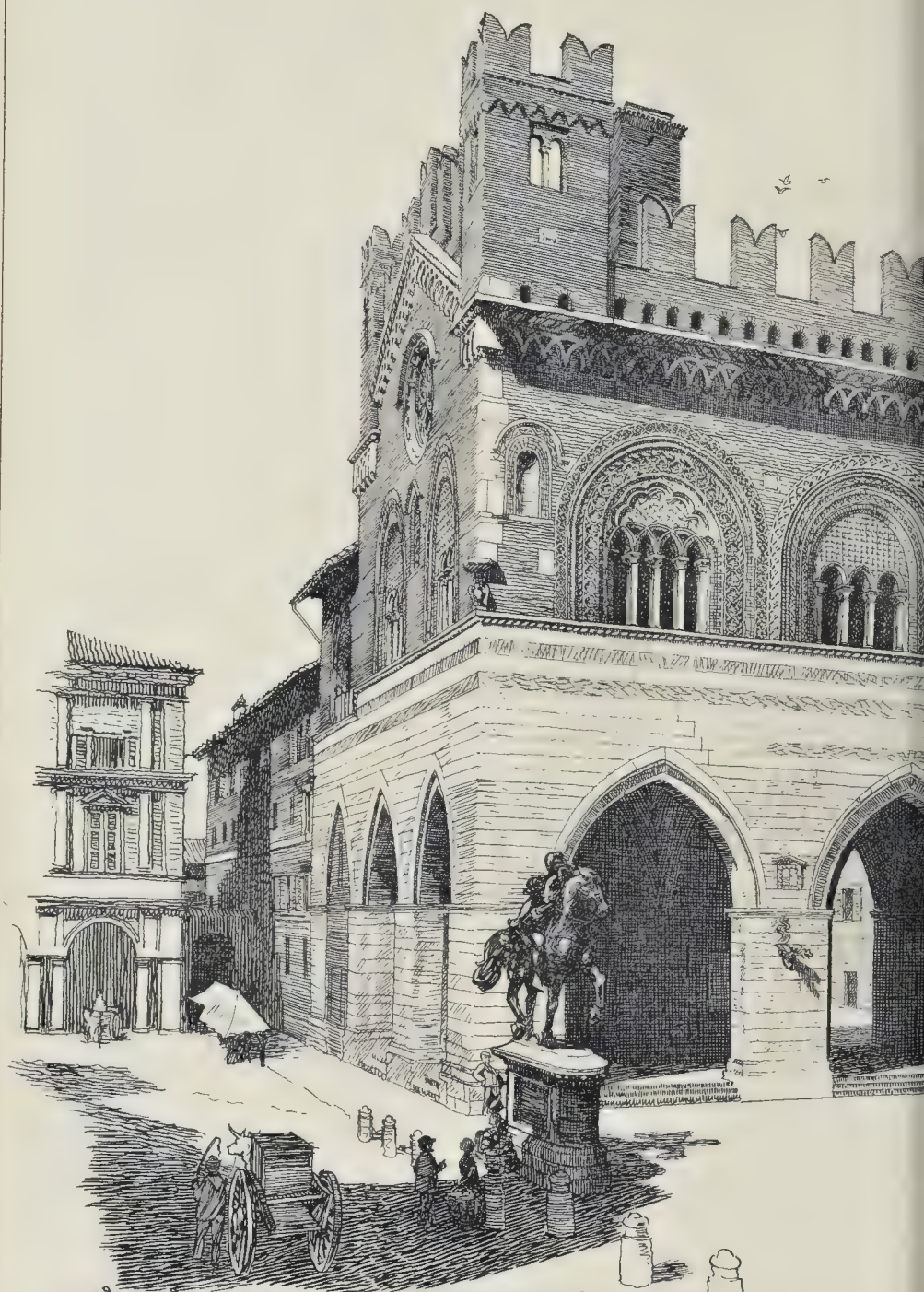
THE BUILDER, SEPTEMBER 1, 1906.

BROOMHOLM INN

W. D. DAVIDSON, ARCHITECT.
8, NEW SQUARE, LINCOLN'S INN, W.C.







PALAZZO MUNICIPALE, PIAZZA



in Piazza del Popolo del 1900

CÀVALLI PIÀCENZÀ

HOUSE AT ARAH

FOR H.O.D. DAVIDSON, ESQ.
 W.D. DAVIDSON, ARCHT.
 8, NEW SQUARE,
 LINCOLN'S INN, LONDON, W.C.
 GARDEN, FRONT.

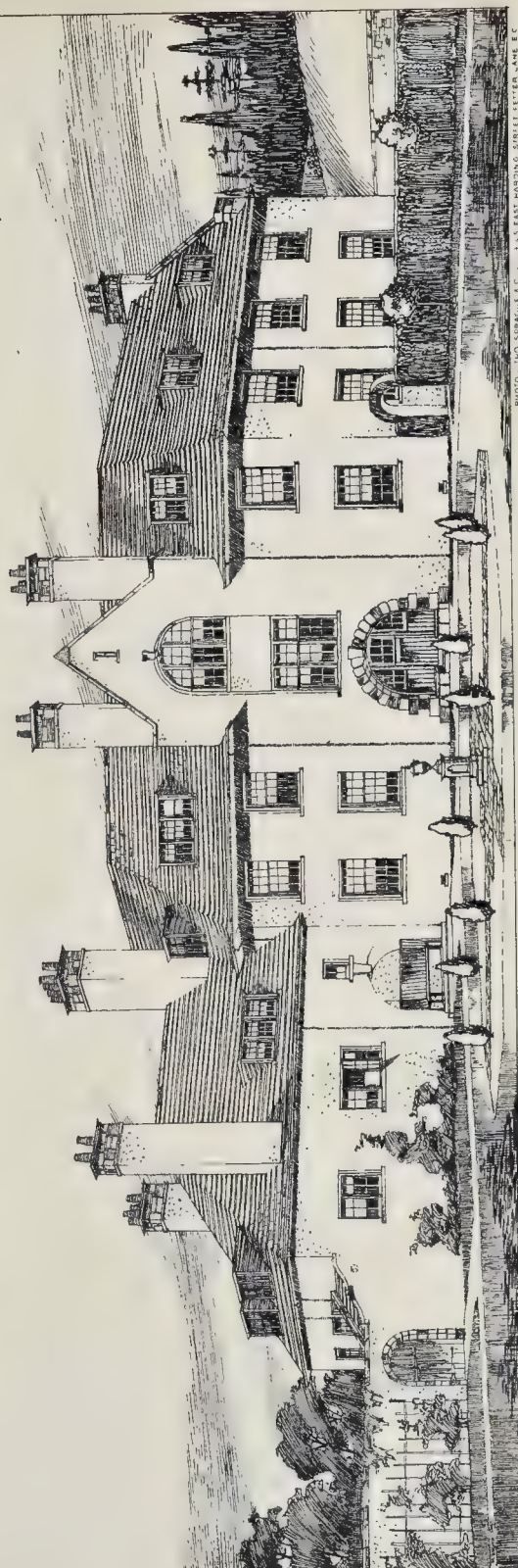
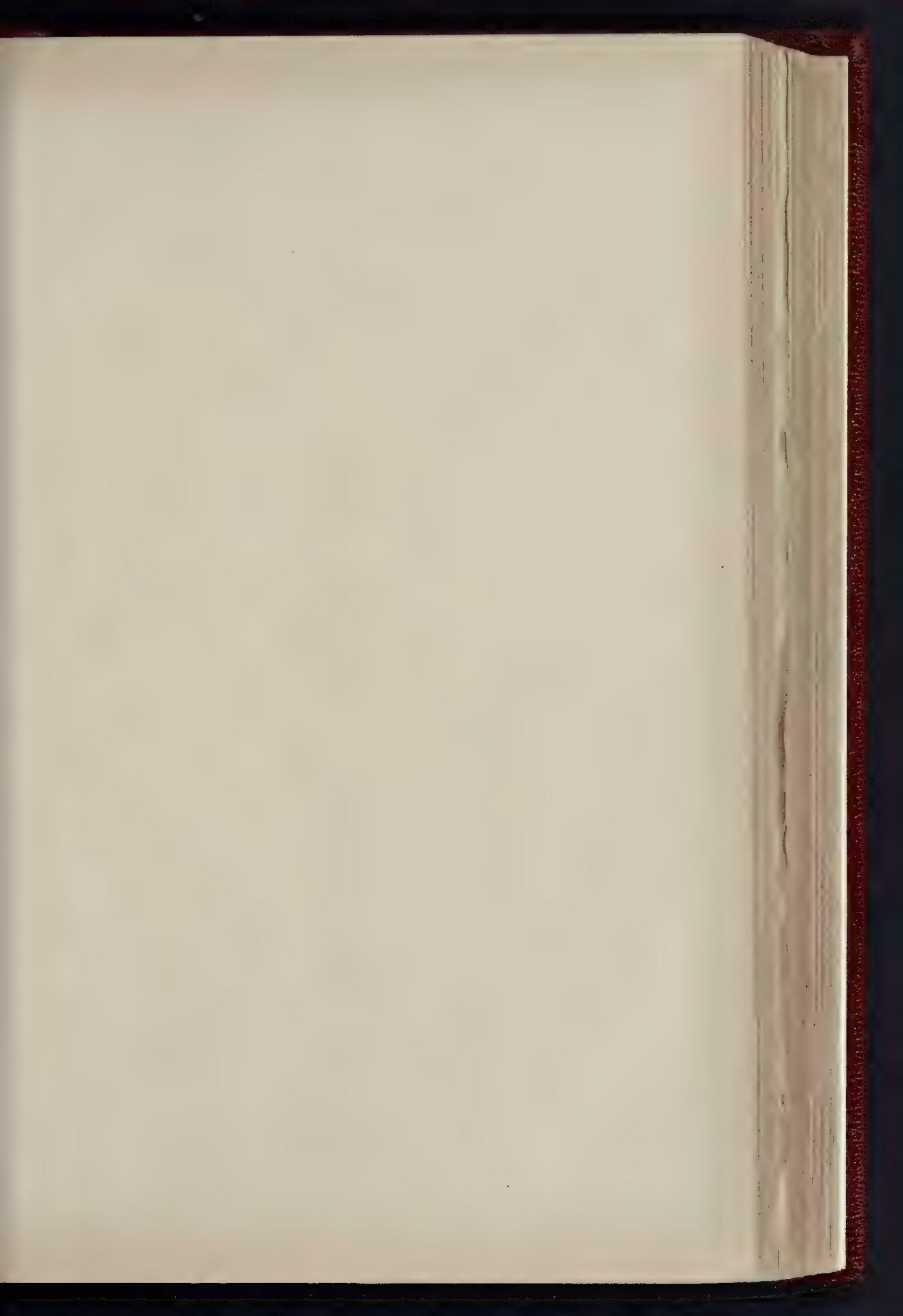


PHOTO BY SPENCER & CO. FOR THE ARCHT. W.D. DAVIDSON, ESQ.

W. Z. DAVIDSON, ARCHITECT,
8 NEW SQUARE,
LINCOLN, ILL. U. S. A.

W & DAVIDSON ARCHITECTS
8 NEW SQUARE
LINCOLN'S INN W.C.







NEW PACKING WAREHOUSE AND OFFICES, 1



THE PHOTOGRAPH BY J. A. S. EAST HARDING STREET FETTER LANE E.C.

LINKSIDE, NAIRN.

This house was built in 1900, and added to in 1905. It is situated beside the golf links and about 200 yds. away from the sea. The walls are of rubble, harled pure white with fine shingle from the beach, the dressed work being of the local stone, which is of a slightly pink colour.

The roof is covered with grey Welsh slates. The vestibule is lined with ash stained green, and the hall is panelled with yellow pine stained green, with an oak floor and stairs and a fireplace of local stone.

The object aimed at was to build a small and unpretending house in the style of architecture peculiar to Scotland.

The contractors were:—Mason—Mr. Squair; carpenters Messrs. McLean; plumber—Mr. Wink (all of Nairn); slaters—Messrs. Grey; plasterers—Messrs. Fowler & Kennedy (both firms of Inverness); and painters—Messrs. Garvie, of Aberdeen. The architect was Mr. W. R. Davidson, London.

BOOK RECEIVED.

THE CATHEDRALS OF ENGLAND AND WALES. Third series. By T. Francis Bumpus. (London: T. Werner Laurie. 6s. net.)

Trade Catalogues.

We have received from the General Electric Company, of Queen Victoria-street, their monthly "progress sheet" and an interesting pamphlet on motor-car and carriage lighting. In the former an appreciable reduction in the price of the well-known Stanley 4-lamp system, and amperes meters is announced. In the latter various novelties connected with the lighting, etc., of motor-cars are shown. We were interested in the electric direction indicator described. It enables the occupant of the motor-car or carriage to give full instructions to the driver by merely pressing a button on a push-board, which can be fitted in any convenient position inside. Approximate estimates are given for wiring a motor-car with head lights, two side lights, tail light, and roof light, and for the necessary accumulator. Adapters are also shown, by means of which it is possible to convert existing oil lanterns into electric lights without interfering in any way with the oil attachments. We notice that "osmium" lamps are recommended for motor-car lighting. The filaments of these lamps are made of the very rare metal osmium. They glow with extreme brilliancy and have a high efficiency. Seeing that they are recommended for carriage lamps we presume that the mechanical strength of the filaments has been found satisfactory.

Obituary.

LIUT.-COL. J. GALE.—We regret to announce the death at Carshalton, on August 6, of Lieut.-Col. Joseph Gale, V.D., one of the oldest Fellows of the Royal Institute of British Architects. Col. Gale became an Associate of the Institute in 1867 and a Fellow four years later, and practised in Bernondsey during the whole of his career as an architect. In 1903 he entered into partnership with Mr. J. Alfred Gotch and Mr. Arthur G. Leighton, under the style of Gale, Gotch, & Leighton, at his offices, 225, Long-lane, S.E. Amongst Col. Gale's works were some of the first schools for the School Board of London, St. Luke's Church and schools at Bernondsey, the Bacon schools at Bernondsey, and many warehouses, factories, and tanneries in and around the district. For many years Col. Gale was Surveyor to the Valuation Committee of Bernondsey and the London Leather Warehouse Company.

Appointment.

BRECHIN, FORFARSHIRE.—The Brechin District Committee of Forfarshire County Council have appointed Mr. Andrew Goodwillie, surveyor, Alford, surveyor for the Brechin district, in place of the present surveyors, who are retiring on being appointed consulting surveyors.

General Building News.

CHURCH IMPROVEMENTS, MOUNT HAWKE, PLYMOUTH.—Restoration work has been carried out at the Wesleyan Church at Mount Hawke. A new roof has been placed on the building, the church has been reseated throughout, while structural alterations have been carried out to the front of the premises. The chapel has been installed with Lift patent gas. The total cost of the work is about \$500, and the architect was Mr. Sampson Hill, of Redruth.

HOLY TRINITY CHURCH, HULL.—The tower of Holy Trinity Church, Hull, is in danger through the loosening of the foundations. The tower is built upon oak trees interlaced with each other, and these have rotted and caused a subsidence. Mr. F. S. Brodric, of Hull, who is architect to the trustees, has had the tower under observation for two years, and recently reported that immediate action must be taken. The cost is estimated at 5,000l. Mr. Francis Fox, of Wimbledon, has made an inspection of the foundations, and has found that it will be necessary to underpin the foundations and substitute brick work and concrete for the timber.

PRIMITIVE METHODIST CHURCH, ASHEY, LEICESTERSHIRE.—The buildings constituting the Primitive Methodist new church and schools, in Burton-road, Ashby, are now practically completed. The style of both church and schools is Gothic. The church is approached by two porches, connected with a corridor running the whole width. The measurements are 53 ft. by 35 ft. 8 in. within, and 40 ft. wide at the transept end. There is accommodation for 400, and the cost will be about 2,500l. The contractors were Messrs. Oton & Son, Ashby, and the architect Mr. Harry Smedley, of Ashby.

PARISH CHURCH, HILLINGDON.—Dr. Tristram, K.C., Chancellor of the Diocese of London, has agreed that a faculty shall issue for some alterations and improvements of Hillingdon church, near Uxbridge. The new work comprises the making of a better exit at the west end instead of the inconvenient doorway in the tower (which was built in 1629); the removal of the western gallery and screen under the tower; and the repair of the stonework of the belfry window and the west window of the tower. The church now contains 500 sittings; the proposed changes will abolish about fifty children's seats, which are not used, in the west gallery and about twenty-four sittings in open benches behind the tower arch. A small wooden staircase gives access to the gallery, for which a convenient oak lobby will be substituted. The estimated cost of the new works amounts to about 800l. The church, dedicated to St. John the Baptist, was enlarged by Sir G. G. Scott. In the graveyard is the tomb of John Rich (1761), comedian, of Covent Garden Theatre.

CHURCH RESTORATION, GLANDFORD.—The work of restoring Glandford Church has now been completed and the building reopened. The architects were Messrs. Hicks & Charlwood, of Newcastle. The whole of the carvings, both in wood and stone, were executed under the direction of Mr. C. W. Brown, of Grapes Hill, Norwich.

PROPOSED CHURCH RESTORATION, WIRKSWORTH.—The Wirksworth vestry have come to a final decision as regards the necessary repairs to the church. It is now about thirty-seven years since the extensive alterations were carried out under the advice of Sir Gilbert Scott, and, although nearly 10,000l. was spent, the sum was not sufficient to place this church in a satisfactory condition. The east end was left in a very unsatisfactory state, and two proposals by Sir Gilbert Scott to lengthen the nave by two bays and raise the chancel roof to a uniform level, have been a standing problem ever since. Last year, Mr. Temple More, of London, was invited by the vestry to inspect the church and give his opinion on its condition, and, in sending his report, the architect recommended three alternative schemes for dealing with the east end. The advice of Mr. Hodgson Fowler, of Durham, was also asked, and the vestry have accepted the advice of the two architects. The east end is to be repaired only as far as is absolutely necessary. The minimum agreed upon is to thoroughly repair the roof, remove all old plaster, panel the walls 6 ft. or 8 ft. high with oak, and place new hangings round the altar.

ROMAN CATHOLIC CHURCH, SEAHAM HARBOUR.—On the 25th ult. the foundation stone of the new St. Mary Magdalene's Catholic church at Seaham Harbour was laid. The church will be built entirely of moulded concrete blocks and to plans prepared by Father Hayes. It will provide seating accommodation for about 500, and is 102 ft. long over all, and 52 ft. wide. The church has a central aisle or nave and two side aisles, the nave arched by formed with six semi-circular arches carried on circular columns, with square moulded bases and carved caps. Twelve pairs of windows light up the choir. There are a priest's sacristy and boys' sacristy, both opening into a corridor which will connect with the presbytery. The heating of the building will be by the low pressure radiator system, and special attention has been given to the ventilation.

The exterior facings are built with rock faced blocks with drafted margins, and with plain faced jambs, arches, mouldings, and plinth courses, representing banker worked stone with rubbed or dragged faces. The interior will be built with blocks having smooth surfaces, and no plastering will be required on either walls or ceiling. The architect is Mr. Thomas Axtell, of Ryhope, and the cost of the new church and sacristies complete will be about 2,700l., but the total expenditure involved, including site and presbytery, is about 6,000l.

FREE METHODIST CHURCH, YARMOUTH.—A new Free Methodist church is to be built on Gaister-road, Yarmouth. The plans have been prepared by Mr. A. S. Hewitt, of Yarmouth; Mr. L. S. Cooper is the contractor; Mr. R. G. Youngs will supply the stone work, and Mr. A. J. Davey is to be responsible for the painting.

COUNCIL SCHOOL, HOVE.—A new school has been erected by the Education Committee of the Hove Council in Portland-road, Hove. The new block provides for 600 children, and all the class-rooms are on the ground floor. There are two entrances (on the east and west), and two exits, all four of these being connected with the large central hall. Entering the school by the east door, which has a bell turret above it, a passage, paved with mosaic, leads direct to the central hall. The central hall is 56 ft. long by 35 ft., and has a wood block floor divided into squares for drill by teak inlays. Surrounding the hall are the eleven class-rooms, each providing for fifty or sixty children. All these rooms have the windows arranged to provide light to the left hand of the pupils. Each has an open fireplace flued with one of Dr. Fridgin Teale's slow-combustion grates, and the walls below the tinted plaster have brown glazed brick dados. Similar dados run round the hall and passages, while white tiling is used in the cloak-rooms and lavatories. Retiring rooms for the masters and mistresses, heating chambers in the basement, and suitably isolated latrines are provided. Messrs. Clayton & Black were the architects, the builders being Messrs. Norman & Burt, of Burgess Hill, and the clerk of works Mr. W. Foster.

GIRLS' SCHOOL, LEEDS.—The new Leeds Girls' Grammar School is now approaching completion. It is a three-story building, and provides accommodation for 300 pupils. The principal feature of the ground floor is a central hall, 60 ft. by 30 ft. A platform is erected at the south end, a paneled and moulded dado skirts the north and east walls, and the south side is divided from a corridor running the length of the building by moulded arches resting on fluted and moulded pilasters. The walls will be tinted green. At either end of the hall are cloak-rooms. At the west end is a reception-hall, 25 ft. by 23 ft.; and along the south front, at the opposite side of the corridor to the large hall, a room for the head mistress, three class-rooms, and a kindergarten room. A hanging stone staircase at each end of the corridor gives access to the first floor. A series of six class-rooms occupy the south front, and there is similar accommodation at the east and west ends. As on the floor below, a corridor runs the length of the building. Opening out with arches, it looks over into the central hall beneath. At each end, too, is a circular balcony also giving outlook on to the hall. There are music rooms at the back. On the north side of the second floor are art studios, besides a chemical laboratory, a physics laboratory, and a cookery laboratory. Designed by the school by a covered way is a gymnasium 84 ft. long and 32 ft. broad. There is a terrace in front of the school, and a carriage drive is being constructed from Headingley-lane to Victoria-road. The school will be lighted by electricity, and heated principally by a low-pressure hot water system. The contractors are Messrs. William Airey & Son, Leeds, Mr. W. J. Swain being the clerk of works, and Messrs. Connor & Chorley, of Leeds, the architects. The cost will be about 17,000l.

BOYS' SCHOOL, BARRY.—On the 24th ult. the opening of the new High-street Boys' School at Barry took place. The contractors were Messrs. Lloyd & Tape, Barry Dock. Mr. G. A. Birkenhead being the architect. The school has been designed to accommodate 398 children. There are nine class-rooms, two being for 36 children each, two for 40, two for 48, and three for 50, all communicating separately with an assembly hall 49 ft. long by 30 ft. wide. The total cost of the buildings, playgrounds, outbuildings, boundary fences, etc., including the furnishing, will be about 6,500l.

COUNCIL OFFICES, PORT TALBOT.—The corner stone of the new offices of the Margam District Council was recently laid. The building, which has been designed by Mr. John Cox, Surveyor of the Council, will cost 2,000l., and will consist of council-chamber, committee-rooms, and offices for surveyor, rate-collector, and sanitary inspector.

IMPROVEMENTS, LOUGHBOURGH.—Mr. R. H. Bicknell, M.Inst.C.E., sat at the Loughborough Town Hall on the 10th ult. to inquire into the Town Council's application to the Local Government Board to borrow sums of 2,700l. for the purchase and laying-out of land situate at the

junction of Great Central-road and Moor-lane as a recreation ground, and 1407. for the purchase of other adjoining land as a site for an open-air swimming bath. In the course of the inquiry Mr. A. H. Walker, the Borough Surveyor, gave evidence.

PROPOSED ASYLUM EXTENSION, WINNICK.—On the 14th ult. Mr. F. H. Tulloch, M.Inst.C.E., held a Local Government Board inquiry at Winnick Asylum into the application of the Lancashire Asylums Board for consent to borrow 21,000l., for the erection of a new block of buildings to accommodate imbecile children. Mr. H. E. Clare (clerk of the County Council and Asylums Board) said that in 1896, when the Board first acquired the estate, they proposed to utilise the old hall for the use of imbecile children. But a certain amount of inconvenience had resulted owing to defects in the building, which rendered it undesirable to continue the use of the hall. The Visiting Committee were then faced with the question of what should be done, and they accordingly asked Mr. H. Littler, the County Architect, to make a report to them, and he presented it in 1904. He reported that the easterly portion of the house contained a number of good rooms and was in a comparatively good state of repair. The westerly portion was evidently the oldest part of the house, and was in a bad state of repair and unsatisfactory. It was not desirable to attempt to extend the existing building; if that was done it would be necessary to pull down the old westerly portion of the house. Even then it would be necessary to spend a considerable sum on the remaining easterly portion. The committee considered the report, and came to the conclusion that accommodation ought to be provided for at least 120 boys with the necessary attendants, that the old building should be pulled down and a entirely new building erected on modern plans. They advertised for an architect, and Mr. Thomas Chidwick, of Manchester, was appointed and asked to prepare plans for the building. He prepared plans, and after consideration they were approved by the Visiting Committee and the Asylums Board. It was proposed to provide accommodation for 120 boys under the age of fifteen, and sixteen of the ordinary paid attendants and twelve of the harmless patients who would be taken out of the Asylum and used as workers in the building. The estimate for the building, including the flooring, engineering, heating, ventilating, fire brigade, bridges, tiling, and sanitary fittings, was 19,007l., and the laying out of grounds, fire hydrants, interior decorations, etc., and other items, made up the 21,000l.

BREAKING-UP OF LONDON STREETS.—The London County Council have addressed a circular letter to the metropolitan city and borough councils pointing out the desirability of making arrangements for the simultaneous execution at certain times of the year, as far as possible, of works carried out by authorities who are empowered to break up the streets. The Council direct attention to the Report of the Royal Commission on London Traffic, and invite the support and co-operation of the district councils in the event of their agreeing to promote legislation in the matter.

ISOLATION HOSPITAL, LLANTIRISANT.—The new isolation hospital erected by the Llantiriant and Llantwit Fardre Rural District Council, a spot about half-way between Llantiriant and Tynnyrfail, was recently opened. The surveyor, Mr. Gomer Morgan, drew the plans. The buildings consist of five blocks, and the cost, including purchase of site, amounted to 9,000l.

ENLARGEMENT OF THE CONVALESCENT HOME, HORSFORTH.—The Springfield Convalescent Home, near Horsforth, is about to be enlarged. Messrs. Walter A. Hobson & Co., of Leeds, are the architects for the work, their designs having been accepted in open competition.

Stained Glass & Decoration.

HOLY TRINITY CHURCH, RIFFEL ALP.—Messrs. Clayton & Bell have executed six stained-glass windows for this church, containing portraits of Dr. Salmon (to be inserted in the west window), and of Dr. Hort, Bishop Westcott, Bishop Lightfoot, and Archbishops Temple and Benson.

Sanitary and Engineering News.

MANCHESTER SHIP CANAL.—In their half-yearly report the directors announced that the canal traffic shows a steady and continuous increase, and that the revenue receipts amount to 233,176l., leaving a credit balance of 99,295l.; the profits in respect of the Bridgewater canal were 18,258l., an increase of 3,557l. during the six months. A balance of 117,553l. is carried to net revenue account making, with 1,477l. for bankers' and general interest, a total profit of 119,030l. for the half-year.

GREAT CENTRAL RAILWAY.—At the recent

half-yearly meeting held under the presidency of Sir Alexander Henderson it was stated that the total receipts, 1,982,863l., show an increase of 147,500l., and render 790,622l. available for interest and dividends. The charges on account of wages, coal, traffic expenses, and maintenance of permanent way have increased by 91,926l., of which 57,402l. represent additional wages. The total expenditure amounted to 1,305,373l., being 65.83 per cent. as compared with 66.11 per cent. of the receipts for the corresponding six months of the previous year.

SEWAGE WORKS, DERBY.—The new scheme, which is now nearly completed, has cost upwards of 266,000l. The system includes outfall and purification works, together with main intercepting sewers for carrying the refuse to six septic tanks at Spondon for bacteriological treatment. The water after having been filtered and purified is conveyed into the Derwent.

NEW BRIDGE ACROSS THE ST. LAWRENCE.—Mr. F. Stewart Williamson, consulting engineer of the Department of Public Works in New York, and the American representative of the English engineering firm of Sir Douglas Fox and partners, responsible for the construction of the new bridge across the St. Lawrence in front of Montreal, has just made statement to a Press representative to the effect that the work will be well under way by Christmas time and will be finished in a couple of years. The surveying operations had been practically completed. Asked as to the design, Mr. Williamson replied: "It will be a cantilever bridge, with a span of about 1,500 ft. length, and a clear height of 150 ft. It will also be of the double-deck pattern, and will afford accommodation for three railway tracks, two trolley tracks, two roadways, and two foot-paths. The railway tracks will occupy the whole upper deck, as the trolleys and vehicles will need a quicker descent to the streets of the city. This part of the bridge will touch land at about St. Catherine's street, while the upper portion will be continued for fully three-quarters of a mile further, where the terminal will be erected. The bridge will probably be the heaviest per foot ever constructed. The actual bridge work from end to end will be about two miles and a half in length." Mr. Williamson added that it is the plan of the Montreal Bridge and Terminal Company, as the promoters of the enterprise are known, to erect a union railway station at the Montreal end of the bridge for the use of the roads using it to get into the city. In connexion with the terminal the company have also decided on the construction of a large hotel equipped with every modern convenience.

PROPOSED EXTENSION OF FRASERBURGH HARBOUR.—The Fraserburgh Harbour Board have resolved to apply for Government grants and loans to the extent of over 100,000l. for the purpose of deepening the South Basin, erecting piers thereon, completing the spur at Balclava breakwater, widening Balclava breakwater, and constructing a graving dock. The new scheme will give 11 acres of additional water space and 1,000 yds. additional quay space.

PROPOSED NEW WATER SUPPLY FOR STOCKPORT.—According to the *Manchester Guardian* the Kinder waterworks scheme of the Stockport Corporation is not to be abandoned. Recently the Corporation decided to determine the contract with the engineer (Mr. E. L. Mansergh) and the contractor (Mr. A. Kellett), and this has led to a false supposition. As far as the stone dam is concerned, the work has been stopped and will not be proceeded with; but at a special meeting of the Stockport Town Council on the 19th ult. the Waterworks Committee brought forward a recommendation that an earthen dam should be constructed, and that fresh contracts should be entered into. A report of Mr. G. H. Hill, the engineer, upon the scheme was before the Council. Mr. Hill did not consider a masonry dam safe or practicable in the position in which the foundations had been prepared, and he strongly advised an earthen dam. The Council eventually decided to adjourn the further consideration of the recommendations until September 5, when the ordinary monthly meeting will be held. The whole scheme consists of the construction of three reservoirs—one at Kinder, one on the river Sett, and the other at Hollingworth. The first part of the scheme was the construction of the reservoir at Kinder, to be completed in seven years. The work was begun at the end of 1902, the contract being let to Mr. Abraham Kellett at 248,000l., and Mr. James Mansergh being the engineer. At the end of January, 1904, the limit of depth provided for in the schedule of extras, viz., 30 ft., had been reached. An extra depth of 20 ft. was then added, and then, owing to the nature of the strata, it was considered advisable to call in fresh advice. The work was stopped for nine months, and the engineers consulted expressed doubts as to the safety of the whole scheme. At the meeting of the Stockport Town Council on August 1 it was decided to terminate the contract with the engineer (Mr. E. L. Mansergh, who had been appointed to succeed his father) and the contractor. A satisfactory arrangement was entered

into with Mr. Mansergh, but the Corporation would not accept the new terms. A sum of between 70,000l. and 80,000l. has already been spent on the foundations of the masonry dam.

Foreign.

FRANCE.—M. Bartholomé, the eminent sculptor, has presented to the City of Paris an interesting collection of designs made by the architect Bartholomé, his grandfather, for the decoration of the chapel of the Invalides. They will be placed among the collection of engravings in the Carnavalet Museum. The ancient church of St. Pierre at Montmartre, the restoration of which is nearly completed, is to be transformed into a museum. The Salon d'Automne is to be opened in October, at the Grand Palais of the Champs Elysées. The Municipality of Nice has opened a competition for a new Lycée for boys, to be erected on the site of the present Lycée. The second "Congrès Préhistorique" of France has been opened at Vannes, under the Presidency of M. Adrien de Mortillet, curator of the museum of antiquities of Saint Germain. The town of Nancy is about to erect an asylum for the aged, a legacy of 600,000 francs having been left to the town with that object. A sum of 368,000 francs has been voted by the Government for the erection of a new post-office establishment at Alençon. The death is announced, at the age of sixty, of M. Charles Suisse, director of the Musée d'Or, and architect-in-chief of Monuments Historiques for the Departments of Côte d'Or, Savoie, and Haute Savoie. He was a pupil of Jules André, and was architect for the restoration of the cathedral of Dijon, and of the churches of Saint-Michel and of Saint Philibert, in the same town. He restored also the châteaux of the Ducs de Savoie, at Annecy. He was the author of some valuable monographs on the ancient monuments of Burgundy. The death is announced, at Dieppe, of the painter Georges Haquette, a pupil of Millet and of Cabanel. His first exhibit at the Salon was in 1875; he obtained medals at the Salons of 1878, 1880, and 1885, and a silver medal at the Universal Exhibition of 1900. Among his principal works are "La Bénédiction de la Mer" and "Le Départ pour Terre Neuve"; and "Le Lendemain d'une Tempête."

GERMANY.—In spite of the wealth of sights and excursions planned for the members of the Architectural Congress in London, foreigners felt that nothing was shown them that they could not have seen for themselves under ordinary circumstances. No opportunity was afforded for studying modern domestic architecture, in which the English excel. Although the invasion of a private house by large numbers certainly presents difficulties, it is thought that some effort might have been made to satisfy the wish entertained by all foreign visitors. It is curious that, whereas the English architect prides himself on his monumental work, it is his domestic work that is most highly appreciated by his foreign confrères. However, taken as a whole, the Congress was a great success. The numerous arrangements made for the instruction and amusement of members were heartily appreciated by those who are acquainted with the native reserve of the English. The competition for the Hohenzollern Fountain, to be erected in Kieve, was won by the architect of the German Reichstag. The sculptural details will be entrusted to the sculptor, Prof. Breuer, of Berlin. The cost of the fountain will be 100,000 marks. On August 6 died Franz Januskowski, in his sixty-fourth year. In him the State of Anhalt has lost its leading architect, and the loss will be the more keenly felt that Januskowski was in full work when he died.

ITALY.—In 1438 the invention of sluices by Philip degli Organi and Fioravante, of Bologna, revolutionised the building of canals which had been in use in Italy since the days of Claudius. After the XVth century canal building was neglected, and in the last hundred years even almost nothing fresh has been built. Italian canals, as opposed to those in France, Germany, Austria, England, and Russia, are not used exclusively for navigation, but for irrigation, for manufacturing purposes, and for land drainage. Navigation often suffers in consequence, the depth of the canals being rarely reaching 10 metres. Legislation attempting to deal leniently with the question by ordering the factories in the valley of the Po to shut off their water supply two days a week. According to Italian law not only is the bed of river or stream State property, but so is all the land watered by these at the normal high-water level, including islands. Thus the government and construction of waterways all falls on the Government. Since the Parliament has lately taken up the subject it is to be hoped that Italy will shortly be on a level with the other civilised countries of Europe, and so increase her commerce and industries. It is owing to Casana, the former Minister of Public Works, that the question was raised, and not too soon for the waterways yearly expenditure on the upkeep of the waterways averaged the paltry sum of 530 lire per kilometre.

AUSTRIA.—It is small wonder if modern buildings often display haste and lack of thought in their design. Two large important buildings are recently been put out to competition, and in one case three weeks was the time limit given, while in the other case four weeks. This extraordinary limitation of time shows either gross ignorance or contempt for the intellectual work of the architect.—It is proposed shortly to begin building the new kursal in Salzburg. A sum of 900,000 krona has been voted, and the work entrusted to Messrs. Fellner & Helmer, architects. The great hall will have an area of 70,000 sq. m., and will be a large stage for orchestral performances. The style adopted will be that of Fischer von Erlachs, who designed many of the beautiful buildings in and around Salzburg. (SERBIA).—The *Monteur des Intérêts Matériels* (Brussels) states that tenders will shortly be invited by the Serbian Government for the construction of the royal palace at the cost of 500,000 fr. (about 180,000*l.*), and new parliamentary buildings at the cost of 1,500,000 fr. (about 60,000*l.*).—Board of Trade Journal.

Miscellaneous.

CHINA CLAY WORKS, DARTMOOR.—A somewhat novel enterprise is undertaken by a syndicate who have arranged to take a lease from the Duchy of Cornwall of about 1,400 acres at Redk. The scheme of their engineer, Mr. R. H. Vorth, provides for the conveyance of the clay-charged water through a 9-in. earthenware pipe from pits at the deposits to Ivybridge, where the water will be treated for the separation of the clay. The clay will then be carried from the Ivy-bridge to the railway. A tramway-line is to be constructed from Ivybridge to the deposits, for the use of the workmen and the transport of plant and materials.

ARTISANS' DWELLINGS AND HEALTH. Dr. F. FRASER BAKER, Medical Officer of Health for Shoreditch, gives some interesting particulars in his annual report which has just been circulated as to the health of the inhabitants, numbering 7,789, in the forty-four blocks of artisans' dwellings which have been specially constructed in the borough for the accommodation of the working classes. He divides the dwellings into two classes, A and B; the former include all those which from the general aspect of the dwellings and the appearance of the dwellers are occupied by persons of the working class in comfortable or fairly comfortable circumstances; in class B the persons are not in comfortable circumstances, and a large proportion of them are extremely poor. The dwellings themselves, he says, are, with a few exceptions, structurally satisfactory, and save in no instance their sanitary condition was generally satisfactory; also in a number of them the standard of sanitation is high and leaves little to be desired. With regard to the rest, although sanitary defects of minor importance were observed, they could not be classed otherwise than satisfactory. The great drawback from a health point of view with respect to artisans' dwellings is the aggregation of population on the areas covered by the buildings. In some cases the density of the population per acre is very great. Dr. Fraser sums up his observations on the sanitary condition as follows:—

During the year the mortality amongst the residents in the artisans' dwellings in Shoreditch was lower than that of the borough as a whole: it was markedly lower amongst the residents in the class A dwellings, but amongst those in the B class it was markedly higher than that of the borough. Taking them as a whole, attacks of notifiable infectious disease were somewhat more frequent in the dwellings than in the borough generally, whilst the attacks were less frequent in the class A dwellings; in the class B they were much more frequent than in the borough as a whole, the incidence being nearly twice as great. "As far as this borough is concerned," says the Medical Officer of Health for Shoreditch in his annual report which has just been circulated, "the Health Committee, after inquiry, were satisfied as to what was being done to secure a proper and sufficient water supply for tenement houses and it may be added that the matter of the water supply to all premises is one which has received a great deal of attention on the part of the sanitary authority in the borough. Shoreditch possesses many tenement houses in which every floor has a water supply of its own, the houses having been specially built or adapted for the purpose of being tenements. There are, however, numbers of small houses of from four to six rooms each which were built to accommodate single families but which have come to be occupied by members of more than one family. To lay water on the floors above the ground floor in many of these houses would involve considerable structural alterations. Sinks and waste pipes would have to be provided, otherwise the necessity would be continually arising of having to deal with houses flooded, owing to taps being left running. Moreover, in many of the houses the only possible situations to be found for the sinks within the dwellings without radical structural alteration

would be within the dwelling-rooms themselves, and sinks in dwelling-rooms are not altogether free from objection on sanitary ground, especially where there are children. The practice in the borough is to require additional water taps where the circumstances appear to render the provision of such necessary in connexion with tenement houses, but there is no hard-and-fast rule on the subject."

BUILDING AND WOOD TRADES OF DANTZIG.—Col. Brookfield, H.M. Consul, reporting on the trade and commerce of the district of Dantzig for the year 1905, mentions that most branches of industry flourished during that period, and an indication of this was to be seen in the great activity that prevailed in the building business, which was in due course communicated to various subsidiary trades. New houses springing up in every direction have been a characteristic feature of the last two years, and there is no present sign that these operations are at all likely to cease. Building materials, such as stone, cement, fire-bricks, tar, pitch, and roofing materials came to Dantzig in 1905 in large quantities, both from the interior and by sea. 2,018 tons of asphalt, 732 tons of fire-brick, 211 tons of fire-clay goods, 182 tons of stone, 605 tons of tar, and 100 tons of pitch were imported from the United Kingdom. Most of the cement for building, brought by sea, came from Pomerania, which sent 15,703 tons; most of the stone came from Sweden and Norway, which sent 50,038 tons; but the United Kingdom was the chief exporter to Dantzig of the fire-bricks and tar used for building purposes. Want of water in the Vistula again caused loss and inconvenience to those engaged in the timber business, which was at the same time injuriously affected by an absence of trucks on the Russian railways. The supply of wood that reached Dantzig was considerably larger than in the preceding year, when there was a more serious drought, but a great proportion of the stock was wood which ought to have arrived the year before. The following shows the number of rafts coming to Dantzig during the years 1903-05 with the amount of wood and its estimated value:—

Year.	No. of Rafts.	Loade of Wood.	Value. £.
1903	486	308,460	700,720
1904	205	130,686	458,839
1905	492	329,416	745,710

The export of wood by sea from Dantzig amounted to 159,833 tons as against 167,110 tons in 1904 and 324,648 tons in 1903, and of these quantities the amount which was sent to the United Kingdom was 87,393 tons as against 78,730 tons in 1904, and 324,000 tons in 1903. With regard to the prices of timber generally, they ruled much the same as in the preceding year, with some small fluctuations. For the staple articles of the wood trade which are sent to the United Kingdom the prices per load were as follows:—Redwood 3*l.* to 3*l.* 5*s.* (f.o.b. Dantzig); crossings, with one cut through the middle, 3*l.* 2*s.* 6*d.* to 3*l.* 7*s.* 6*d.*; redwood crossings blocks, 11*l.* to 12*l.* in. sq., 9 to 17 ft. long, 2*l.* 5*s.* to 2*l.* 10*s.*; crossings, with one cut through the middle, 2*l.* 7*s.* 6*d.* to 2*l.* 12*s.* 6*d.*; redwood sleeper blocks, 10 in. sq., 4 ft. long, 50 per cent. sharp-edged, with 9 in. surface, 40 per cent. not less than 8 in. surface, and 10 per cent. not less than 7 in. surface, 2*l.* 5*s.* 6*d.* (f.o.b. Dantzig).

LEEDS INSTITUTE, DEPARTMENT OF BUILDING.—The results of the May examinations in building construction, just issued by the Board of Education, show that out of 101 students examined in this department no fewer than 87 have passed; 36 of these obtaining first-class certificates and 51 second-class, there being only 14 failures. Successes have been gained in all four stages of the subject. This is the best result yet obtained at the Leeds Institute, the average for the last two years being about 80 per cent., while this year's results are well over 86 per cent. Next session's opening lectures are to be given on September 10 and 12 respectively, at 7.30 p.m., by the head of the department (Mr. James Neill), and are entitled: 1. The Training of the Modern Architect. 2. "The Education of the Builder." Admission to the lectures is free. There were 870 class students in this department last session.

BRITISH MUSEUM.—The annual report sets forth that the excavations begun in 1903 upon the site of ancient Nineveh were completed in February of last year, and the ruins were cleared of the site of the Temple of Nabu, but it had been found impossible to even make a plan in its entirety as the building had been destroyed and burned, it is presumed by the Elamites, when the city was captured. The attendance-returns for the year 1905 evince that the recent steady increase in the number of visitors at Bloomsbury in 1904 amounted to 954,441, had suffered a re-action, the total being reduced to 813,659. The number of visits of students to the Reading-room diminished from 226,323 to 214,940, a daily average of 711, with an average in the room, counted at 4 p.m., of 362. On the other hand the number of visits to the Natural History Museum, South Kensington, was 568,313, a large

increase over all previous totals, and the first excess beyond half a million since the galleries were opened.

PROPERTY SALES.—The Pembridge Castle estate in South Herefordshire, of which some portions were recently sold at auction, included one lot (bought for 3,000*l.*) consisting of Pembridge Castle farm, 270 acres, and the ruins of the castle of which the history is traced during seven centuries past. It was the scene of the ministrations of the Martyr, Father John Kemble, who was buried in the neighbouring church of Welsh Newton; the castle was held by a Royalist garrison in 1644.—The freehold, with goodwill and possession, of the Red Lion Hotel, Hampton, has been sold for 3,620*l.*; the inn was occupied by some of the workmen employed in the building of Hampton Court.—The property in Islington and Lambeth, belonging to the trustees of the Right Hon. T. Milner Gibson, deceased, has been sold in 190 lots, for 100,185*l.*, the rack-rentals amounting to an estimated total of 16,500*l.* per annum. In many instances the purchasers were the present lessees and occupiers, on whose behalf the vendors undertook to allow two-thirds of the market value of any lot to remain on mortgage at 4 per cent. per annum. In respect of Gibson and Milner squares, Islington, the trustees, as the freeholders, agreed that in order to obviate any risk of building upon the gardens of the two squares, the freehold should remain vested in the vendors until after the completion of the sales, and to then consider any scheme formulated by the purchasers for a conveyance of the squares to trustees for maintenance and regulation as open spaces, under the London County Council's London Squares and Enclosures (Preservation) Act.—Hurstmonceux Castle, Sussex, and the Gask estate, Perthshire, are placed in the market. The latter consists of over 4,500 acres, the seat during six hundred years of the Oliphants of Gask; in the grounds of the mansion-house, overlooking Strathearn and the Ochil Hills, are the ruins of "the auld house" of Lady Nairne's father, Hurstmonceux Castle has a fine old walled and terraced garden, a moat, now drained, and 182 acres of park and woodland. It was built of brick with stone dressings by Henry VI's treasurer, Sir Roger de Fienes; most of the interior was dismantled in 1777; the ruins include the ivy-covered flanking towers of the main gateway and of the watch-turrets and courtyards; the castle is rectangular on plan, 208 ft. by 214 ft. Francis Grose, the antiquary, made drawings of the walls before they had fallen into decay.

Patents of the Week.

APPLICATIONS PUBLISHED.*

26,244 of 1905.—EVERED & CO., LTD., and S. BAKER: *Stop for Sliding Window Sashes.*

This relates to a stop for limiting the extent of the opening of the sliding sashes of windows, the said stop consisting essentially of a bolt or rod passing through a plain or screw swivelling eye carried by a horizontal pivot secured to the fixed frame of the window above the meeting rail of the bottom sliding sash and a socket fixed to the top sliding sash above the meeting rail of the bottom sliding sash, and a socket fixed to the top sliding sash above the meeting rail of the same, with which the outer end of the rod or bolt engages in its acting position, the said rod or bolt in its non-acting position depending vertically at the side of the window-frame.

26,432 of 1905.—S. TAYLOR: *Metal-covered Roofs, Walls, and Buildings.*

This relates to metal-covered roofs, walls, and buildings, in which the opposed edges of the metallic sheets are separated a short distance apart, the open joints being covered by guttered covering strips or caps giving to the opposed edges of the metallic sheet and the joint covering strips or caps such a configuration that longitudinal channels are formed between them for carrying away water of condensation or other water and preventing the same from gaining by capillary attraction or otherwise access to the undersides of the metallic sheets.

11,504 of 1905.—E. PACKHAM, A. H. BALL, and F. L. BALL: *Apparatus for Burning Bricks.*

This relates to an apparatus for burning bricks, and consists of a chamber constructed in such a manner that the bricks are burnt first on one side and then on the other, the temperature of the chamber gradually rising and the size of the flames increasing during the burning process.

15,439 of 1905.—R. BOWES: *Fireplaces.*

This relates to fireplaces, and consists in forming them with a heat-retaining fire-brick hearth arranged below the grate bars to form a chamber for heating the air supply before it passes between which in 1904 consisted of a raised metal bed bars, in combination with a fire-brick hearth is mounted to form a safety chamber for insulating

* All these applications are in the stage in which opposition to the grant of Patents upon them can be made.

PATENTS.—Continued on page 289.

List of Competitions, Contracts, etc.

For some Contracts still open, but not included in this List, see previous issues. Those with an asterisk (*) are advertised in this Number: Competitions, —; Contracts, iv. vi. viii. x.; Public Appointments, xix.; Auction Sales, xxxii. Certain conditions, beyond those given in the following information, are imposed in some cases, such as: the advertisers do not bind themselves to accept the lowest or any tender; that a fair wages clause shall be observed; that no allowance will be made for tenders; and that deposits are returned on receipt of a bona-fide tender unless stated to the contrary.

Contracts.

BUILDING.

SEPTEMBER 3. — **Ballycastle.**—COTTAGES.—Tenders are invited by the Ballycastle R.D.C. for the erection of the following cottages upon the several sites shown on the deposited plans in the following townlands: i.e.—Double cottages in the townland of Maghernahar; ditto, Toberkarragh; ditto, Ballycleugh; ditto, Moyraigh Lower; ditto, Ballypatrick; ditto, East Torr; ditto, English; block of three cottages in the townland of Cookenny; block of four cottages in the townland of Capecastle; ditto, Coolnacappoge; ditto, Townparks; block of six cottages in the townland of Drumavilla. The deposited maps and the plans, specifications, and draft contract may be inspected in the office of Mr. Hugh McGill, Clerk of the Ballycastle R.D.C., Board-room, Ballycastle, from 10 o'clock a.m. to 4 o'clock p.m. each day by intending contractors. Tenders must be upon the prescribed form, and must be sealed and addressed to the Presiding Chairman, Ballycastle R.D.C., and marked "Tender for Cottages," and must be received by the Clerk not later than 3 o'clock p.m. on September 3. Messrs. P. & J. Boyle, Solicitors for the Ballycastle R.D.C., Ballycastle.

SEPTEMBER 3. — **Bradford.**—OFFICE.—Manchester Paving, etc., Committee invite tenders for the erection of a small office at Butterworth-street Yard, Bradford. Drawings may be seen, and specification and bill of quantities obtained, at the office of the City Architect, Town Hall, upon payment of 1*l.* 1*s.* Sealed tenders, enclosed in the official envelope, to be delivered at the above office not later than 5 p.m., September 3.

SEPTEMBER 3. — **Canterbury.**—ALTERATIONS.—Canterbury Rate and Finance Committee invite tenders for proposed alterations at the Municipal Offices in Guildhall-street. Particulars of the work may be obtained at the offices of Mr. Arthur C. Turley, A.M.Inst.C.E., City Surveyor, City Surveyor's Office, Canterbury. Sealed tenders for the work must be forwarded to the Town Clerk, Burghle-street, by 5 p.m. on September 3.

SEPTEMBER 4. — **Ballynerry.**—ADDITIONS.—For alteration and additions to Oullands, Ballynerry, according to the plans, specification, and conditions of contract, to be seen at office of Mr. William J. Fennell, architect, Wellington-place, Belfast. Tenders to be sent to architect before 12 o'clock on September 4. Bills of quantities can be had from Messrs. McCarthy & Brookes, surveyors, Scottish Provident Buildings, Belfast.

SEPTEMBER 4. — **Blackrock.**—PLATFORM.—Blackrock U.D.C. invite tenders for the erection of a platform in the Assembly Room, Town Hall. Plans and specifications may be seen at the Surveyor's Office, Town Hall, Blackrock. Tenders (which are to be on prescribed forms and accompanied by schedule of prices) must be lodged with Mr. R. Finlay Heron, Town Clerk, Town Hall, Blackrock, Co. Dublin, on or before 4 o'clock p.m. on September 4.

SEPTEMBER 1. — **Chesterfield.**—SCHOOL WORKS, etc.—Chesterfield Guardians invite tenders for alterations and repairs at their Local Schools. Asphalted road, viz.—(a) Joiners' work; (b) asphalted; (c) resurfacing of glazed-tile dado for corridors. Specifications can be seen, and all information obtained, at the office of Mr. W. H. Waiststaffe, architect and surveyor, 57, Salt-race, Chesterfield, who will supply forms of tender. Sealed tenders, on the prescribed forms, must reach Mr. R. F. Hartwright, Clerk to the Guardians, Union Office, Chesterfield, not later than the first post on September 4.

SEPTEMBER 4. — **Durham.**—SCHOOL WORKS.—Durham County Education Authority invite sole tenders for alterations to the following schools:—Wingate, Wingate Grange, the Station Town. Quantities may be obtained on application to the Architect, Mr. W. Rushworth, F.R.I.B.A., County Education Office, Shire Hall, Durham. Plans, specifications, and conditions of contract may be seen at the respective schools or at office of Architect. Sealed and endorsed tenders can be delivered to the Architect not later than 5 p.m. on September 4.

SEPTEMBER 4. — **Sandown.**—ALTERATIONS, etc., TO TOWN HALL.—The Sandown U.D.C. invite tenders for alterations and additions to the Town Hall. Plan and specification may be seen at the office of the Surveyor, Town Hall, Sandown, between the hours of 10 a.m. and 4 p.m. and 2.30 and 3 p.m. Tenders, endorsed "Town Hall Alterations," must be sent to Mr. William H. Woodbridge, Clerk to the Council, Town Hall, Sandown, not later than 12 noon on September 4.

SEPTEMBER 5. — **Chevington.**—HALL.—Chevington (Northumberland) Parish Hall, etc., Architect, F.R.I.B.A., M.E.San.I., the Diocesan Architect, 15, Grey street, Newcastle-on-Tyne. Names of tenders to be sent in before September 4.

SEPTEMBER 5. — **Gainsborough.**—PULLING DOWN AND REBUILDING PREMISES.—Pulling down and rebuilding premises in Bridge-street, Gainsborough, belonging to the Gainsborough Industrial Co-operative Society, Ltd. Bills of quantities and form of tender may be had on application to Messrs. Scorer & Gamble, architects, Bank-street Chambers, Lincoln, on or before September 5, and on payment of 2*l.* 2*s.*

The drawings and conditions of contract may be inspected at the offices of the architects. Tenders must be delivered to the Manager, Mr. G. Wright, 25, Bridge-street, Gainsborough, at the office of the Society, and in the envelope provided for that purpose, before 10 a.m. on September 17.

SEPTEMBER 5. — **Gladyfring.**—HOUSE.—For building a house at Llanyfog, near Newcastle Emlyn. Plans and specification can be seen, and bills of quantities obtained from either Mr. J. D. Roy Evans, solicitor, Newcastle Emlyn, or from Mr. J. Coates Carter, architect, Bank Buildings, St. Mary-street, Cardiff. Tenders to be in by September 5.

SEPTEMBER 5. — **Lurgan.**—INDUSTRIAL SCHOOL.—New industrial schools' dormitories, etc., in connexion with the Convent of Mercy, Lurgan, for the Rev. Mother Superiores, according to the plans and specification prepared by Messrs. Ashlin & Coleman, architects, 7, Dawson-street, Dublin. Bills of quantities have been prepared by Mr. D. W. Morris, surveyor, 68, Harcourt-street, and can be obtained from him on payment of 1*l.* 1*s.* Plans and specification can be inspected at the architect's office, and at the Convent of Mercy, Lurgan. Sealed tenders, addressed to the architects, to be delivered at their offices not later than 12 o'clock on September 5.

SEPTEMBER 5. — **Newbiggin.**—SCHOOL.—Northumberland Education Committee invite tenders for the work of erecting a new Council school, to accommodate 200 scholars, at Newbiggin-by-the-Sea. Name and address to the Secretary, Secretary to the Education Committee, Pearl Buildings, Newcastle-on-Tyne, not later than September 5, together with a deposit of 2*l.* 2*s.* Plans of the work may be inspected at the Committee's Offices. Tenders endorsed "Tender for Newbiggin New School," must be forwarded not later than September 25.

SEPTEMBER 5. — **New Southgate.**—NEW CHURCH.—The Trustees of the Springfield-road Primitive Methodist Chapel, New Southgate, invite tenders for taking down existing temporary church and re-erecting on another portion of the site; also for the erection of new church premises. Builders to send their names, with references and list of works executed by them, to Mr. Frank Bethell, architect, 25, Queen Anne's place, Rush Hill Park, Enfield, N., on or before September 5.

SEPTEMBER 5. — **Pennhewceber.**—COTTAGES.—For the erection of forty cottages at Pennhewceber for the Cymon Cottage Company, Ltd. Sealed endorsed tenders to be delivered to the Secretary, Mr. J. H. Richards, Miskin-terrace, Mountain Ash, on or before September 5. Plans and specification may be inspected at the office of Mr. T. W. Millar, architect and surveyor, Mountain Ash.

SEPTEMBER 7. — **Stockport.**—STABLES, etc.—The Guardians of the Stockport Union invite tenders for stables and coach-houses, etc., at the St. Stephen's Hospital, Hazel-grove, near Stockport, in accordance with plans and specification, etc., prepared by Mr. W. H. Ward, architect, Paradise street, Birmingham. Plans and specification may be seen at the Union Offices, Stockport, or upon application to Mr. Ward. Forms of tender, with copies of bills of quantities, will be sent to contractors upon application to Mr. G. F. Johnson, Clerk to the Guardians, Union Offices, Stockport, enclosing cheque for 2*l.* 2*s.* Sealed tenders to be sent to Mr. Johnson before 10 a.m. on September 7.

SEPTEMBER 8. — **Belfast.**—FACTORY.—Building factory on Mountpottinger-road, for Mr. William Hume, according to the plans, specification, and conditions of contract, to be seen at offices of Messrs. D. M. Cooper & R. Sharpe Hill, architects, 35, Wellington-place, Belfast. Bills of quantities can be obtained from Messrs. McCarthy & Brookes, surveyors, Scottish Provident Buildings. Tenders to be sent to architects on or before September 8.

SEPTEMBER 8. — **Coventry.**—ELECTRIC LIGHT SUBSTATION.—Coventry Electric Light Committee invite tenders for the works required to be executed and materials supplied in the erection of a substation and boiler supplied at the Electricity Works, Sandyside. Drawings, general conditions, and specification may be inspected, and bills of quantities obtained, on payment of 1*l.* 1*s.* to the City Treasurer, on application at the office of Mr. J. E. Swindhurst, City Engineer and Surveyor, St. Mary's Hall, Coventry. Sealed tenders, endorsed "Tender for Electric Light Substation, etc.," to be delivered to the Office of the Town Clerk, 10, Hay-lane, not later than September 8.

SEPTEMBER 8. — **Glyn-Neath.**—etc.—Police Buildings.—Glamorgan Quarter Sessions and C.C. Standing Joint Committee invite tenders for (1) new police-station at Glyn-Neath; (2) alterations and additions to the existing police-station at Glyn-Neath. Plans and specifications of the respective works may be seen, and copies of the bills of quantities obtained, at the following places:—Work No. 1, at the County Police-station, Glyn-Neath; work No. 2, at the County Police-station, Bridgend; and for each of the works at these offices. Sealed tenders are to be delivered to Mr. T. Mansel, Clerk of the C.C., Glamorgan Quarter Sessions, 6, Westgate-street, Cardiff, together with the full names and addresses of two substantial sureties, not later than September 8, marked outside "Tender for Glyn-Neath Police-station, etc." Tenders for alterations to Bridgend Police-court Buildings.

SEPTEMBER 8. — **Kea.**—STABLE.—The erection of a stable at Calenick Farm, in the Parish of Kea, in

the occupation of the Executors of Mr. Thomas Thomas. Plans, conditions, and specifications are now at the farmhouse at Calenick. Tenders should be sent on or before September 8 to Mr. George Gow, Trezothan Office, Truro.

SEPTEMBER 8. — **Reigate.**—SHEDS, etc.—Reigate Town Council invite tenders for the erection of cart-sheds and a store at the Corporation depots in Brighton-road, Reigate, London-road, and Black-borough-road, Reigate, all in the said borough, in accordance with plans, sections, general conditions, and specification prepared by Mr. F. T. Clayton, C.E., the Borough Surveyor, which may be seen, and full particulars obtained, at his office at the Municipal-buildings, Reigate. Sealed tenders, on forms which will be provided on application, giving the names and addresses of two sureties, are to be delivered at office of Mr. Alfred Smith, Town Clerk, at the Municipal-buildings, Reigate, endorsed "Tender for Cart Sheds," not later than noon of September 8.

SEPTEMBER 10. — **Swick.**—CO-OPERATIVE PREMISES.—The Amble Co-operative Society, Ltd., invite tenders for the erection of branch premises at Alnwick. Quantities can be obtained upon application to Mr. E. G. E. Kino, architect, Co-operative Wholesale Society, West, Blandford-street, Newcastle-on-Tyne. Tenders, endorsed Alnwick New Building, will be received at the Society Office, Queen-street, Alnwick, on or before September 10. Sealed tenders, on forms which will be provided on application, giving the names and addresses of two sureties, are to be delivered at office of Mr. Alfred Smith, Town Clerk, at the Municipal-buildings, Reigate, endorsed "Tender for Cart Sheds," not later than noon of September 8.

SEPTEMBER 10. — **Bury St. Edmund's.**—SCHOOL ALTERATIONS, etc.—The West Suffolk Education Committee invite tenders for alterations and additions to the School, Bury St. Edmund's. Plans and specification can be seen at the Education Offices, 5, Crown-street, Bury St. Edmund's, or at the offices of the County Architect, Mr. A. Ainsworth Hunt, Sudbury and Bury St. Edmund's. Tenders (sealed and endorsed) to be delivered to Mr. Fred. R. Hughes, Secretary to the Education Committee, 5, Crown-street, Bury St. Edmund's, on or before September 10.

SEPTEMBER 10. — **Dublin.**—WORKMEN'S DWELLINGS.—Dublin Improvements Committee invite tenders for the erection of workmen's dwellings in Townsend-street, in accordance with the plans, specification, and conditions of contract prepared by the City Architect, which may be inspected daily (except Saturdays) at Municipal Buildings, City Hall, Dublin, between the hours of 11 a.m. and 4 p.m. Copies of bills of quantities and form of tender may be obtained from the City Treasurer, Municipal Buildings, City Hall, Dublin, on payment of 2*l.* 2*s.* (two pounds). Tenders must be accompanied by the priced bills of quantities (priced in ink), and must also contain the names of two solvent sureties willing to be bound severally with the contractor for the due performance of the contract in a sum of one-fifth of the amount of the contract price. Tenders, under seal addressed to the Chairman Improvements Committee, to be delivered to the City Engineer, Townsend-street, to be opened at the Improvement Committee Office, City Hall, Dublin, not later than 4 o'clock on September 10.

SEPTEMBER 10. — **Stargis.**—CHURCH HOUSE.—A chapel house for the Trustees of the Calvinistic Methodist Church, Senzhenydd. Plans and specifications may be seen with Mr. John Davies, butcher, Senzhenydd. Sealed tenders, endorsed "Chapel House," to be delivered to Mr. John Davies, not later than September 10. Mr. R. 8. Griffiths, architect and surveyor, Tonypandy.

SEPTEMBER 11. — **Upper Edmonton.**—NEW ROOF.—The Guardians of the Strand Union invite tenders for works at their Workhouse, Upper Edmonton, viz.—(1) General exterior repairs, cleaning, painting, etc.; (2) repairs to roof of laundry building, and alternately; (3) construction of new roof altogether. Plans and specifications may be inspected at the offices of the architect, Mr. A. A. Rekvich, 18 and 19, the Outer Temple, Strand, on or before 11 a.m. and 4 (Saturdays excepted), or at the Workhouse at Edmonton. Separate tenders, sealed and endorsed "General Repairs, Edmonton," "Repairs to Laundry Roof," or "New Roof to Laundry," as the case may be, are to be delivered at 15, Henrietta-street, Covent Garden, W.C., by 4 p.m. on September 11.

SEPTEMBER 12. — **York.**—ALTERATIONS TO LIBRARY.—Alterations at the Public Library, and for supplying and fixing of furniture and fittings. Drawings may be seen, and specification, schedules, and form of tender may be obtained at the office of Mr. A. C. Croft, City Engineer, Guildhall, York, on deposit of 7*l.* 1*s.* Tenders, endorsed "Library Additions," to be delivered not later than noon on September 12.

SEPTEMBER 14. — **Halifax.**—DWELLING-HOUSES.—The various works required to be done in erecting eleven dwelling-houses and appurtenances in Lemington-avenue (Clapton Lodge Estate), Halifax, and plans and specifications may be seen, and further particulars obtained, at offices of Mr. Medley Hall, architect, 1, Harrison-road, Halifax, from September 8 to September 14, on which last-named day tenders must be sent to the office of Mr. Medley Hall, architect, and endorsed "Tender for Dwelling-houses."

SEPTEMBER 14. — **Hartthill-with-Woodall.**—CLOAK-ROOM.—The West Riding Education Committee invite tenders for the erection of a new cloak-room at Hartthill-with-Woodall Provided School. Plans may be seen, and quantities obtained, on application to office of Mr. J. Vickers Edwards, County Archi-

SEPTEMBER 1, 1906.]

1. County Hall, Wakefield. A deposit of £1. is required. Cheques to be sent to the West Riding Treasurer, County Hall, Wakefield. Sealed tenders, properly endorsed, to be sent to the Architect, not later than 10.30 on the morning of September 14.

SEPTEMBER 14.—**West Riding.**—SCHOOLS.—The East Riding Education Committee invite whole or part tenders in connexion with the following schools:—Cragg New School; Elsieak School; Cudworth New School; Kirkhamgate New School; Bolton-on-Dearne: Goldthorpe (infants) provided School (enlargement); Joiner, builder, plumber, plasterer, painter, Mitholmroyd; out-road Provided School (sanitary alterations); Mitholmroyd; Burnley-road Provided School (sanitary alterations); builder, Joiner, plaster, painter, Mitholmroyd; Cragg Vale Provided School (sanitary alterations), builder and plumber, Hartill-with-Woodall Provided School (alterations and new cloak-room), builder etc.; Adwick-on-Dearne: school (alterations and repairs), builder and asphalters. Plans may be seen, and quantities obtained, on application to office of Mr. A. Vickers, Town Clerk, County Hall, Wakefield, on deposit of £1. is required. Cheques to be sent to the West Riding Treasurer, County Hall, Wakefield. Sealed tenders, properly endorsed, to be sent to the Architect not later than 10.30 on the morning of September 15.

SEPTEMBER 15.—**Isleworth.**—SCHOOLS.—Heston and Isleworth Urban District Education Committee invite tenders for the erection of a new school building. The plans may be inspected at the office of Mr. A. Lancelotti Lang, Architect, Council House, Hounslow, where also bills of quantities and form of tender, on payment of a deposit of 2s. 2s. Tenders, in the form supplied, to be delivered to Mr. H. J. Baker, Town Clerk, Council House, Hounslow, on or before September 12 noon. Tenders must be delivered before 12 noon on September 15, endorsed "Tender for Spring Grove Infants' School."

SEPTEMBER 19.—**Chapeltown, Leeds.**—ESTABLISHMENTS.—The Leeds Municipal Council invite tenders for the erection of the Branch Post-office, Chapeltown, Leeds. Drawings, specification, and copy of the conditions of contract may be seen at the office of the Postmaster. Bills of quantities and forms of tender may be obtained at H.M. Office of Works, etc., Storey's-gate, S.W., on payment of a deposit of 1s. Tenders to be delivered before 12 noon on September 15, addressed to the Secretary, H.M. Office of Works, etc., Storey's-gate, S.W., and endorsed "Tender for Enlargement, Chapeltown Branch Post-office."

No DATE.—Bristol.—WAREHOUSE.—New warehouses upon the Bath-road, Bristol. Quantities obtained, and plans and specifications inspected, on application to Messrs. John Harding & Son, architects and surveyors, Salisbury.

No DATE.—Cheshirefield.—COTTAGES.—Four new cottages and two shops, Darlaston, Cheshirefield. Bills of quantities and all further information at the offices of Mr. W. Cecil Jackson, M.S.A., architect and surveyor, 20, Knitfield Gate, Cheshirefield.

No DATE.—Chipping Norton.—SHEED.—Weaving shed (part of a larger scheme). Estimate and specification required at once for shed, 110 ft. by 70 ft., five 14 ft. bays, flow to joiner, 12 concrete floor. Address Messrs. Wm. Bliss & Son, Ltd., Woolen Manufacturers, Chipping Norton.

No DATE.—Leeds.—SCULLERY HOUSES.—The various trades in the erection of six scullery houses on the White Horse Estate, York-road. For plans, etc., apply Mr. T. Hall, builder, 3, Hanover-place, Park-lane, Leeds.

No DATE.—Llano.—OFFICES, ETC.—New offices and other work at Llano Council School. Full particulars can be obtained on application to the Headmaster or to Mr. Geo. Dickens Lewis, County Architect, Aberystwyth.

No DATE.—Pannal.—HOUSE.—The erection and completion of a new house, Hill Foot, Pannal, for Mr. A. Rushworth. Names to Mr. Richard Crossland, architect, 10, Harrogate, Harrogate. Quantities will be forwarded when ready.

No DATE.—Swadlincote.—FREE LIBRARY.—Swadlincote U.D.C. invite tenders for the erection of a free library at Swadlincote. Plans and specifications may be seen, and quantities and particulars obtained, at the office of the architect, Mr. A. Macpherson, 16, Tenant-street, Derby, on payment of a deposit of 2s. 2s.

No DATE.—Swansea.—REBUILDING HOTEL.—For the rebuilding of the White Hart Hotel, Oxford-street and Union-street, Swansea. Names for bills of quantities to Mr. John H. Morwood, architect, Welwyn Lodge, Mackworth-terrace, Swansea.

ENGINEERING, IRON, AND STEEL.

SEPTEMBER 4.—**Isleworth.**—BRIDGE.—Heston and Isleworth U.D.C. invite tenders for the following works:—(a) The reconstruction of Oak Bridge, Isleworth; (b) the reconstruction of Queen's Bridge, Isleworth. The drawings and specification can be seen at the office of the Acting Engineer and Surveyor to the Council, Council House, Hounslow, and forms of tender may be obtained on payment of a deposit of 1s. for each contract. Sealed tenders, endorsed "Oak Bridge Reconstruction," or "Queen's Bridge Reconstruction," as the case may be, to be delivered to Mr. C. G. Queney, Clerk to the Council, Council House, Hounslow, W., not later than 12 noon on September 4.

SEPTEMBER 5.—**London.**—PIG IRON.—The East Indian Railway Company invite tenders for the supply and delivery of pig iron, Calder No. 1, Gartsherrie No. 4, Llanfyllbach cold blast No. 2, and Madeley Wood cold blast, as per specification to be seen at the Company's Office of Quantities, London, E.C., marked "Tender for Pig Iron," not later than 12 o'clock noon on September 5. For each specification a fee of 1s. is charged, which cannot, under any circumstances, be returned.

SEPTEMBER 7.—**Newcastle-on-Tyne.**—BOILERS, HEATING, ETC.—Newcastle-upon-Tyne Sanitary Com-

mittee invite tenders for boilers, laundry fittings, heating, etc., required in the extensions to the City Hospital for infectious Diseases, Walker Gate. Plans may be seen, and specifications, bills of quantities, and forms of tender obtained, at the City Property Surveyor's Department, Town Hall, Newcastle-upon-Tyne, on payment of 1s. to the City Treasurer. Sealed tenders, addressed to the "City Property Surveyor," and endorsed "Tender for Boilers, Heating, etc., at City Hospital," must be delivered at his office, Town Hall, before 10 a.m. on September 8.

SEPTEMBER 8.—**London.**—UNDERFRAMES.—The Board of Directors of the Bengal-Nagpur Railway Company, Ltd., invite tenders for underframes for carriages. Specifications and forms of tender can be obtained at the Company's Office, 132, Gresham House, Old Broad-street, E.C. For each specification a fee is charged, which will not be returned. Tenders to be delivered not later than noon on September 8. Mr. Robert Miller, Managing Director.

SEPTEMBER 13.—**Ladywell, S.E.**—IRON BRIDGES.—A Canadian of Bernadine invite tenders for provision and erection of iron bridges connecting A and E Block at the Workhouse, Ladywell, S.E. Specification and form of tender can be obtained from the Clerk to the Guardians, 233, Tooley-street, S.E. between 10 and 12 from September 3 to 6, on deposit of 1s. Tenders, endorsed "Tender for Bridges, Ladywell Workhouse," to be delivered to Mr. E. Pitts, Fenton, as above, not later than 6.30 p.m., September 13.

SEPTEMBER 17.—**Hull.**—SIDINGS.—North Eastern Railway Directors invite tenders for the diversion of the passenger lines for a distance of about one mile, and the construction of a group of marshalling sidings at Dairycoates, Hull. Plans may be seen, and specification, detailed quantities, and form of tender obtained, on personal application at the office of Mr. W. J. Cudworth, the Company's Engineer at York. Sealed tenders, marked "Tender for Dairycoates New Sidings," to be sent to the Secretary at York not later than noon on September 17.

SEPTEMBER 17.—**Oxford.**—TRAMWAYS.—Oxford Corporation invite tenders for the reconstruction, extension, and electrical equipment of the existing horse tramways in the city and the leasing thereof. Proposals based upon the use of the system of electric tramways will not be considered. The conditions of tender may be obtained from Mr. Richard Bacon, Town Clerk, Town Hall, Oxford, on deposit of Bank of England notes to the value of 10s. Tenders must be addressed to the Town Clerk, in sealed packets, endorsed "Tender of Tramways," and delivered at his office in the Town Hall, Oxford, on or before September 17.

SEPTEMBER 19.—**Rotherham.**—MACHINERY FOR BATHS.—Rotherham Corporation invite tenders for laundry machinery and fittings required for the Public Baths, also iron builders for structural alterations. Plans and specifications may be seen, and further particulars obtained, by applying at the offices of Mr. J. Platts, Corporation Architect, Rotherham, endorsed "Laundry Machinery for Baths," to be sent to Mr. W. J. Board, Town Clerk, Town Hall, Rotherham, not later than September 19.

No DATE.—Aldrincham.—BRIDGE.—Videomine. Aldrincham U.D.C. invite tenders from contractors for the widening of the Broadhead Bridge. Copies of quantities may be obtained from the engineers, Messrs. Maxwell & Tuke, 25, Brazey-street, Manchester, and plans may be inspected either at their offices or at the offices of the U.D.C. at Aldrincham.

MISCELLANEOUS.

SEPTEMBER 1.—**Norwich.**—TARRING.—Tenders will be received, not later than September 1, for externally tarring the whole of the galvanised iron roofing, and painting, with two coats of good oil paint, all the outside woodwork in the roof of the works. The tar and paint only will be supplied to the contractors. Inspection may be made on site Messrs. Laurence, Scott, & Co., Ltd., Gothic Works, Norwich.

SEPTEMBER 4.—**Leyton.**—SCAVENGING.—Leyton U.D.C. invite tenders for the collection of house refuse by the pail system from houses within their district for the year ending September 30, 1907, or the six months ending March 31, 1907, at the option of the Council. Forms of tender and further particulars can be obtained of Mr. William Dawson, M.Inst.C.E., the Council's Surveyor, Town Hall, Leyton, between the hours of 10 and 4 (Saturdays, 10 and 12). Tenders, on printed forms in sealed envelopes, endorsed "Tender for Collection of House Refuse," must be delivered at a meeting of the Council, to be held on September 4, at 7 o'clock p.m.

SEPTEMBER 4.—**Maldstone.**—FENCING.—Maldstone Corporation invite tenders for the erection of iron fencing, etc., round the Cattle Market in the Fairmeadow, Maldstone, specification and particulars of which may be obtained at the Office of the Borough Surveyor, Fairmeadow, Maldstone. Tenders, endorsed "Tender for Fencing," to be sent to Mr. T. F. Bunting, Borough Surveyor, Maldstone, not later than September 4.

SEPTEMBER 5.—**Stoke-upon-Trent.**—ELECTRIC WIRING.—Stoke-upon-Trent Guardians invite tenders for the electric wiring of a portion of the Workhouse premises, comprising the new administrative block, etc., in accordance with the specification and schedule prepared by Messrs. Edwards & Co., consulting engineers, including underground mains, fittings, and other appliances necessary to complete the whole of the work to be carried out. A copy of the specification and schedule may be obtained on application at offices of Mr. C. Daniel, Clerk to the Guardians, Union Offices, Stoke-upon-Trent, where the reference plan is deposited and may be inspected. The building at the Workhouse may be seen on application to the Master, on any day but Saturday between 10 and 4 o'clock. Tenders, marked "Electric Wiring," to be sent to Clerk not later than 9 o'clock in the morning of September 5.

SEPTEMBER 6.—**Blaydon.**—SCAVENGING.—Blaydon U.D.C. invite tenders for the removal and disposal of scullie ashes, contents of ashpits, house refuse, and other refuse. Specification, etc., may be obtained from Mr. Robert Biggins, Sanitary In-

spector, at the Offices of the Council, Blaydon-on-Tyne, between the hours of 9 and 10 a.m. Sealed tenders, endorsed "Tender for Scavenging Contract," are to be delivered to Mr. Henry Dalton, Clerk, Blaydon-on-Tyne, before noon on September 6.

SEPTEMBER 6.—**Downpatrick.**—WELL BORING.—For boring a 4-in. diameter hole in a well in the grounds of Down District Lunatic Asylum, Downpatrick. (Quotations in accordance with specification, which may be seen at the Asylum, to be lodged with the Resident Medical Superintendent on or before September 6, at 12 o'clock.

SEPTEMBER 8.—**Manchester.**—CABLES, ETC.—Manchester Electricity Committee invite tenders for the supply of the following, viz.—(a) Three 1,250 k.w. rotary converters; (b) high and low tension cables. Specifications and forms of tender may be obtained on application to Mr. F. E. Hughes, Secretary, Electricity Department, Town Hall, Manchester. Sealed tenders, enclosed in the official envelope, and addressed to the Chairman of the Electricity Committee, Town Hall, must be sent in not later than 10 a.m. on September 8.

SEPTEMBER 8.—**Garnavey.**—CONCRETE WALK.—The Committee of Carnavey Graveyard invite tenders for the making of a concrete walk and edgings. Specification and plan can be seen at the caretaker's house. Tenders will be received up to September 8, 1906, by Mr. W. P. Dickie, Secretary, Daily-scull, Muckamore, Ireland.

SEPTEMBER 10.—**Ryton.**—CARTRIDGE.—The Ryton U.D.C. invite tenders for the cartage of road metal from Blaydon Station, Wylam Station, and Addison Colliery Siding, or Clara Vale Colliery Siding to the different parts of their district, where it may be required during the year ending September 11, 1907. Particulars may be obtained on application to Mr. John P. Dalton, surveyor, Ryton-on-Tyne, to whom tenders must be delivered before noon on September 10.

SEPTEMBER 11.—**Rhonda.**—SCAVENGING.—Rhonda U.D.C. invite tenders for the scavenging of their district, in sections, for the term of one year. Specification and form of tender may be obtained at the Surveyor's Department, Public Offices, Pontre Rhonda. All tenders must be delivered under seal by 10 a.m. on September 11, addressed to the Chairman of the said Council, and endorsed "Tender for Scavenging."

SEPTEMBER 12.—**Rathmines.**—ELECTRICITY SUPPLY.—The Council of the Urban District of Rathmines (Ireland) invite tenders for the following:—Sect. A, electricity supply mains; sect. B, house fuse boxes; sect. C, house meters; sect. D, extension of switch-board; sect. E, extension of accumulators; sect. F, electricity booster. General conditions, specification, drawings, and forms of tender may be inspected at the offices of Messrs. Robert Hammond & Son, the Consulting Engineers to the Council, 64, Victoria-street, Westminster, S.W. and may be obtained from them on making a deposit of 5s. Extra copies of the specification may be obtained by *bona-fide* tenderers at a charge of 5s. per copy, which sum will not be refunded. Tenders (sealed and marked "Tender for Electricity Works") must be addressed to Mr. F. P. Fawcett, Clerk of the Council, Town Hall, Rathmines, Co. Dublin, and be delivered not later than 10 o'clock on September 12.

SEPTEMBER 14.—**Egypt.**—ROPE, ETC.—Tenders are required by the Egyptian War Department for rope, coil, 19,500 fathoms; rope, hemp, 69,100 fathoms; cotton, 39,600 fathoms; galv. mild steel sheets, 300. Tender forms and specifications may be obtained from Lieut. Col. J. H. Western, Queen Anne's Chapel, Westminster, and are returnable to him by September 14, and to remain open for thirty days from that date.

SEPTEMBER 15.—**Aylesbury.**—SCAVENGING.—Aylesbury R.D.C. invite tenders from persons willing to clean out and collect the refuse from the earth closets, privies, ashpits, and cesspools, and other house refuse, for the following parishes: No. 1, Aston Clinton; No. 2, Weston Turville; No. 3, Lower Buckland and Buckland Wharf, for the half-year ending March 31, 1907, such refuse to be collected each week, and to become the property of the contractor. A proper scavenging cart or carts must be provided by the contractor. Tenders must be made for one or more of the above-mentioned parishes, and the price for each parish must be separately mentioned. Persons desirous of tendering must apply to Mr. W. E. Stanley, Inspector of Nuisances, Stocklake, Aylesbury, at whose office the form of contract which will have to be entered into may be inspected. Tenders are to be forwarded to Mr. F. B. Parrott, Clerk, Aylesbury, at office in Bourbon-street, on or before 12 o'clock at noon, on September 15.

No DATE.—Middlesmoor.—HEATING CHURCH.—For heating Middlesmoor Parish Church. For particulars apply Vicar, Middlesmoor, Patley Bridge.

PAINTING, etc.

SEPTEMBER 1.—**Bournemouth.**—PAINTING.—The Bournemouth Town Council invite tenders for painting the pavilions, cottage, and fences in parks and pleasure grounds, and other works in connexion therewith. Full particulars, forms of tender, and specification can be obtained of Mr. F. W. Leacy, M.Inst.C.E., Borough Engineer and Surveyor, Municipal Offices, Bournemouth, provided that the sum of 1s. has been previously deposited. Tenders to be sent in, in envelopes unmarked for the purpose, to the Town Clerk (Mr. Geo. Wm. Bailey), before 10 a.m., September 1.

SEPTEMBER 3.—**Carlisle.**—PAINTING.—Carlisle Guardians invite tenders for the painting of the outside wood and iron work at Harry Hill House. Specification of work required to be done may be seen at 7, Victoria-place, Carlisle between the hours of 10 a.m. and 5 p.m. Tenders, endorsed "Harry Hill Painting," to be left at 7, Victoria-place, not later than noon on September 3. Mr. H. B. Lonsdale, Clerk.

SEPTEMBER 3.—**Sculcoates.**—PAINTING.—Sculcoates Guardians invite tenders for painting, etc., at the relief station, Fern-street, Hull. Forms of tender and all particulars can be obtained, or may be sent, on application, to Mr. J. H. Wild, solicitor, Clerk to the Guardians, Union Offices, Harley-street.

Hall. Tenders must be sent to the Clerk not later than 10 o'clock a.m. on September 3.

SEPTEMBER 4.—Leeds.—WHITEWASHING, ETC.—For whitewashing, distemping, and painting the Kingston Unity Club, Union-street, Leeds. Specifications may be seen any night from 7 to 9 o'clock. Tenders to be in not later than September 4, addressed to the Secretary, Mr. S. Scott.

SEPTEMBER 5.—Cannock.—PAINTING.—Cannock Guardians invite tenders for painting the whole of the outside work of the workhouse, including the workhouse buildings and fences. Specifications and form of tender may be obtained from Mr. Herbert M. Whitehead, Engineer's Office, Penkridge, Stafford. Tenders, endorsed "Painting of Workhouse," must reach Mr. A. W. Carver, Clerk to the Guardians, Union Offices, Cannock, before 4 p.m. on September 5.

SEPTEMBER 6.—Derby.—PAINTING.—Derby Cemeteries Committee invite tenders from local painters for the external cleaning and painting at Nottingham-road and Ulfaxeter New-road Cemeteries. Specification may be seen, and particulars obtained, on application at office of Mr. John Ward, M.Inst.C.E., Borough Surveyor, Borough Surveyor's Office, Babbington, Derbyshire. Tenders, endorsed "Painting at Cemeteries," to be sent to Mr. Ward not later than noon on September 6.

SEPTEMBER 6.—Lee.—PAINTING.—Greenwich Guardians invite sealed tenders for painting the outside of the water tank at Grove Park Waterworks, Lee, S.E. Specification and form of tender can be obtained at the Clerk's Office, Union Workhouse, East Greenwich, and must be returned before September 6.

SEPTEMBER 8.—Cardiff.—PAINTING.—Cardiff Guardians invite tenders for external painting at Headquarters Homes, Ely, according to specification, copy of which, together with forms of tender, may be obtained from Mr. Arthur J. Harris, Clerk, Union Offices, Queen's-chambers, Cardiff. Forms of tender, with specification attached, must be turned to Clerk under cover, endorsed "Tender for External Painting, Ely," not later than 10 a.m. on September 8.

SEPTEMBER 9.—Essex.—FLOOR POLISHING.—Guardians of Poplar Union invite tenders for staining and polishing floors of day-rooms and dormitories in new schools at Hutton, Essex, between 5,000 ft. and 6,000 ft. Tenders, with particulars, must be sent not later than 6.30 p.m. on September 19.

SEPTEMBER 11.—Shrewsbury.—PAINTING.—Shrewsbury Markets Committee invite tenders from persons willing to paint, etc., the exterior iron and wood work, etc., of the general market, corn exchange, arcade tower, and the roofs over Claremont-street, etc. Specification may be seen, and printed form of tender obtained, at the office of Mr. W. Chapple Edwors, Borough Surveyor, Borough Surveyor's Office, The Square, on payment of 1l. Sealed tenders, addressed to the Town Clerk, Guildhall, to be delivered on or before September 12.

SEPTEMBER 14.—Bournemouth.—PAINTING, ETC.—Bournemouth Town Council invite tenders as follows:—(1) Repairing, painting, etc., to cottages at the Sanitary Hospital; (2) for cleaning and painting of the interior of the Bournemouth and Boscombe police stations. Forms of tenders and specifications can be obtained of Mr. F. W. Lacey, M.Inst.C.E., Borough Engineer and Surveyor, Municipal Offices, Bournemouth, provided that the sum of 1l. is has been previously deposited. Tenders to be sent in in envelopes furnished for the purpose, to the Town Clerk, Mr. Geo. Wm. Bailey, before noon of September 14.

SEPTEMBER 23.—Branksome.—PAINTING.—For cleaning and painting police-station. Specification prepared by the County Surveyor, can be seen at the station. Tenders to be sent to Mr. E. Archdall Flocks, Sherborne, on or before September 29.

ROADS, SANITARY, AND WATER WORKS.

SEPTEMBER 3.—Ballyclare.—FOOTPATHS.—Ballyclare T.C.D. invite tenders for the construction of three footpaths in the town of Ballyclare. Specifications can be inspected at office of Mr. Edward Hall, Clerk to the Council, between the hours of 11 o'clock a.m. and 4 o'clock p.m., on payment of a deposit fee of 1l. Tenders on the forms supplied, must be sent by post, addressed to Mr. E. Hall, Ballyclare, marked "Tender," on the outside, and bearing the number of the work tendered for, so as to be received by the Clerk not later than 5 o'clock p.m. on September 5.

SEPTEMBER 5.—Stretford.—STREET WORKS.—Stretford U.D.C. invite tenders for paving, etc., in the following streets and passages, viz.:—(a) Trafford Park-road; (b) Wilson-street; (c) Nansen-street; (d) Passage, 29-31, Jackson-street, and 23-37, Pinnington-lane; (e) Passage, 48-54, Victoria-road. The drawings and specification may be seen, and form of particulars, obtained on application to Mr. Ernest Worrall, the Council's Surveyor, any day during office hours, on payment of a deposit by cheque of 2l. 8s. Sealed tenders, endorsed "Private Streets Works," addressed to the Chairman of Highways, are due at the Council Offices by 12 o'clock noon on September 5.

SEPTEMBER 4.—Beverly.—SEWERAGE WORKS.—The Beverley R.D.C. invite tenders for the construction of a main sewer in Molescroft and along the high water line to Beverley, together with all necessary manholes, flushing apparatus, lamp-eyes, and other incidental works. Plans, sections, and specifications may be seen, and quantities obtained, upon application to the Engineer, Mr. E. P. Packer, at the Council Offices, 12, Newbegin, Beverley, between the hours of 10 a.m. and 1 p.m. Sealed and endorsed tenders, addressed to Mr. E. G. Hobson, Clerk to the Council, Newbegin, Beverley, and delivered not later than 9 a.m. on September 4.

SEPTEMBER 4.—Tynemouth.—STREET WORKS.—Tynemouth Corporation invite tenders for executing the following street works:—(1) Laying tar-macadam, etc., in Beverley-gardens, Cultercotes; (2) laying tar-macadam, etc., in Drummond-terrace, North Shields. Plans and specifications may be seen at

the office of Mr. John F. Smilie, Borough Surveyor, to whom sealed and endorsed tenders are to be sent not later than 12 noon on September 5.

SEPTEMBER 5.—Caerphilly.—ROADS.—The Glamorgan C.C. invite tenders for the widening and improving of the Caerphilly and Nantgarw main road between the Piccadilly Inn, Caerphilly, and Castle Farm, and in forming a stone dept. Plan and specification of the work may be seen, and copies of the quantities obtained, at the Police Station, Caerphilly, and at offices of Mr. T. Mansel Franklin, Clerk of the C.C., Glamorgan C.C. Offices, Westgate-street, Cardiff. Sealed tenders, made out on the bill of quantities supplied, are to be delivered to the clerk, together with two substantial copies, not later than September 5, marked outside "Tender for Caerphilly Improvement."

SEPTEMBER 5.—Fallsouth.—PRIVATE STREET WORKS.—The Fallsouth U.D.C. invite tenders for the private street improvement works required to be executed in Stott-street and William-street, Fallsouth. Plans and specification may be seen, and forms of tender, with quantities obtained, at the Surveyor's office, Town Hall, Fallsouth. Tenders, endorsed "Tender for Private Street Works," must be delivered to Mr. E. C. Broome, Clerk to the Council, Fallsouth, not later than 12 o'clock noon on September 5.

SEPTEMBER 5.—Fallsouth.—SEWERING.—The Fallsouth U.D.C. invite tenders for the works of sewerage, leveling, kerbing, paving, channelling, etc., of the following passages within the district of Fallsouth, namely:—Rear of Nelson-street and Brook-street, rear of 1 to 4, Corn-street, rear of 5 to 14, Peel-street, rear of Peel-street and Nelson-street, rear of 90 to 112, Oldham-road (off Victoria-street). Plans and specifications may be seen, and forms of tender, with quantities obtained, at the Surveyor's office, Town Hall, Fallsouth. Tenders, endorsed "Tender for Private Street Works," must be delivered to Mr. H. C. Brown, Clerk to the Council, Fallsouth, not later than 12 o'clock noon on September 5.

SEPTEMBER 5.—Finner.—SEWERAGE.—The R.D.C. of Hendon invite tenders for the construction of a covered septic tank at the sewage farm, in the parish of Pinner, and other works in connexion therewith. Plans and specification of the work may be seen at the office of Mr. H. C. Brown, Engineer to the Council, Slanmore, during office hours. Sealed tenders, endorsed "Pinner Farm," to be delivered to Mr. H. C. Brown, Clerk to the Council, Union Offices, Edgware, not later than September 5.

SEPTEMBER 6.—Arundel.—STREET IMPROVEMENTS.—For kerbing, channelling, and paving, between 400 sq. yds. of Wood View-road and Ford-road, Arundel, for the Town Council. The works include about 500 yds. of Norwegian granite kerb and brick channelling. Plans and specifications may be seen, and form of tender and quantities obtained, on payment of 10s. 6d., on application to Mr. E. F. Farrington, Borough Surveyor, Town Hall, Arundel. Sealed tenders, endorsed "Tender for Street Works," to be delivered to Mr. Arthur Holmes, Town Clerk, Arundel, not later than 5 p.m. on September 6.

SEPTEMBER 8.—Chorlton, Manchester.—MAKING UP ROADS.—Manchester Corporation (Withington Committee) invite tenders for the several works required in making-up Newburt-road, Chorlton-cum-Hardy; Hartley-road, Chorlton-cum-Hardy; Lynton-road, Chorlton-cum-Hardy; Chepstow-road, Chorlton-cum-Hardy; Crescent-road, Chorlton-cum-Hardy. Plans, sections, and specifications of the work can be seen, and a form of tender, with quantities, and any further information, obtained from the Surveyor to the Committee, Town Hall, West Didsbury. Tenders to be sent to the Chairman of Street Works, and to be addressed to the Chairman of the Withington Committee, Town Hall, West Didsbury, and delivered not later than noon on September 8.

SEPTEMBER 8.—Reigate.—SEWERS.—Reigate Town Council invites tenders for the construction of about 1,330 lin. yds. in all of sewers in Station-road, Reigate, and High-street, Reigate, and in the parish of Somerset-road, Meadvale, in accordance with the plans, sections, and specifications prepared by Mr. F. P. Clayton, C.E., the Borough Engineer and Surveyor. Bills of quantities, and forms of tender, can be obtained on application at the office of the Engineer, Municipal-buildings, Reigate, where the said plans, sections, specifications, and general conditions may also be inspected. Sealed tenders, which must be on the forms supplied, giving the names and addresses of two sureties, are to be sent to Mr. Alfred Smith, Town Clerk, at the Municipal-buildings, endorsed "Tender for Sewers," not later than noon on September 8.

SEPTEMBER 10.—Austwick.—SEWERAGE WORKS.—Settle R.D.C. invite tenders for the providing and laying of about 3,943 lin. yds. of 9-in., 8-in., and 6-in. internal diameter socketed glazed stoneware and cast-iron pipe sewers, the construction of manholes, lamp-eyes, ventilators, and flushing chambers, the laying-out of about 4 acres of land for filtration purposes, with screening chamber, distributing carriers, embankments, fencing, etc., together with other necessary works in connexion with the above sewerage scheme at Austwick. Plans, specification, and conditions may be seen, and quantities and tender forms obtained, on application to the Council's Engineer and Surveyor, Mr. T. A. Foxcroft, Town Hall, Settle, and sealed tenders, marked "Austwick Sewerage," which may be for the whole of the works, or for any part thereof, separately, should be delivered to Mr. T. E. Pearson, Clerk to the Council, Council Offices, Town Hall, Settle, not later than September 10.

SEPTEMBER 10.—Hendon.—MAKING UP ROAD.—The Hendon U.D.C. invite tenders for certain works of kerbing, channelling, metalting, tar paving, gullies, etc., and other works in fully making-up the first portion of Stanley-road, Hendon, between 1 or 2 crossings and specifications may be seen, and form of tender obtained, on application to Mr. S. Slater Grimley, Council's Engineer, Hendon, N.W., on deposit of 10l. Sealed tenders, endorsed "Private

Improvements," addressed to the Chairman of the Council, to be sent to Mr. H. Humphries, Clerk, Council Offices, Hendon, N.W., before 4 p.m. on September 10.

SEPTEMBER 10.—London.—PIPE LAYING.—Metropolitan Water Board invite tenders for the laying and jointing, etc., of 24-in. and other cast-iron pipes, between Child's Hill and Cranley-gardens, and other necessary work in connexion therewith. Forms of tender, with schedule and conditions of contract, may be obtained, and drawings inspected, upon application to the Engineer, at "The Pigs," Southern-road, Fortis Green, East Finchley, N. Tenders, enclosed in sealed envelopes, addressed to the Clerk of the Board, and endorsed "Tender for Pipe Laying, etc., Child's Hill to Cranley-gardens," must be delivered at the office of the Board not later than 10 a.m. on September 10.

SEPTEMBER 10.—Steps.—DRAINAGE.—The District Committee of the Lower Ward of the County of Lanark invite tenders for providing, laying, and jointing about 5,221 lin. yds. of 15-in. to 18-in. diameter, building manholes, etc., and carrying on other relative work. Drawings may be seen at the office of Messrs. Warren & Stuart, civil engineers, 94, Hope-street, Glasgow. Copies of the specification and schedule of quantities may be obtained on payment of 1l. 1s. An assistant engineer, to meet intending tenders at the Station at 10 a.m. on September 4 to point out the line of the pipe tracks. Sealed offers, endorsed "Steps Drainage," to be lodged with Mr. H. Hill, Clerk to the District Committee, Ingram-street, Glasgow, not later than 12 noon on September 10.

SEPTEMBER 10.—Warkworth.—LAYING PIPES.—The B.D.C. of Alnwick invite tenders for providing and laying about 606 yds. of 3-in. cast-iron socket pipes and fittings in the streets of Warkworth. The plan and specification may be seen at the office of the Engineer, Mr. H. W. Walton, Alnwick, to whom sealed and endorsed tenders are to be delivered before 1.30 p.m. on September 10. Mr. M. Temple Wilson, M.Inst.C.E., Inspector and Surveyor, Alnwick.

SEPTEMBER 10.—Whickham.—PHYSEAN.—Whickham U.D.C. invite tenders for the laying of about 550 lin. yds. of 12-in. and about 2,500 lin. yds. of 18-in. gravitating socketed stoneware pipe sewers, and 100 yds. of 18-in. cast-iron socket pipes, etc., and other works in connexion therewith for the sewerage of Marley Hill and Sunnyside. Plans and specification may be seen, and other particulars obtained, upon application to Mr. G. Egan, Surveyor, Council's Surveyor, Mr. J. B. Renton, Council Offices, Whickham. Tenders, in sealed envelope, to be delivered to Mr. Thomas Lambert, Solicitor, Clerk to the Whickham U.D.C., Town Hall, Gateshead, not later than noon on September 10.

SEPTEMBER 11.—Crewe.—BACK PASSAGE MAKING.—The Crewe Town Council invite tenders for the making of the back passages leading from Walshaw-street to Westminster-street, and behind Lewis-street, in accordance with plans, etc., which may be seen at the office of the Engineer, Mr. G. Egan, Borough Surveyor, Earle-street, Crewe. A deposit of 10s. will be required. Sealed tenders and schedule of prices must be obtained from the Borough Surveyor, must be delivered to Mr. Frederick Cooke, Town Clerk, Municipal Offices, Crewe, not later than 9 o'clock a.m. on September 11, endorsed "Tender for Back Passage Making."

SEPTEMBER 11.—Dedham.—DRAINAGE.—Lexden and Westfield R.D.C. invite tenders for Dedham drainage. The contract will comprise stoneware pipe sewers, 9 in. and 6 in. diameter, with manholes, etc., and construction of small pumping station, concrete tanks, and lighting chambers, etc. Plans, conditions, and specification may be seen, and quantities, titles and form of tender obtained, from the engineers, Messrs. Sands & Walker, Milton, Chelmsford, Essex, between the hours of 10 a.m. and 6 p.m., on payment of 3l. 3s. (by cheque). Sealed and endorsed tenders to be sent to Mr. C. M. Tompkins, Clerk to the Council, Victoria-chambers, 11, Northchurch-lane, Chelmsford, Essex, on September 11.

SEPTEMBER 12.—Kington-upon-Thames.—PAVING, ETC.—The Corporation invite tenders for levelling, paving, metalting, ace-flagging, channelling, and lighting Chesham-road, in accordance with plans, etc., by Borough Engineer, where forms of tender can be obtained. Tenders, endorsed "Tenders for Chesham-road," to be delivered to the Town Clerk on September 12.

SEPTEMBER 15.—Chesham.—ROAD WORKS.—The Chesham U.D.C. invite tenders for the completion of certain private street works (including metalting, paving, and relaying, kerbing, and channelling) in Stanley-avenue, situate within the Urban District of Chesham. Plans, sections, and specifications may be seen upon application to Mr. Percy C. Dormer, Surveyor and Waterworks Engineer, Council Offices, Chesham. Tenders, sealed, and endorsed "Stanley-avenue," to be delivered to Surveyor on or before September 15, at 10 a.m.

SEPTEMBER 15.—Northwich.—STREETS.—The U.D.C. of Northwich invite tenders for the making-up of private streets within the district, according to plans and specifications prepared by the Surveyor of the Council. Full particulars may be obtained on application to the Council Offices, on separate tenders, which may be enclosed in an envelope, marked "Tenders for Streets," must be delivered to Mr. F. Arthur Cowley, Clerk of the Council, not later than September 15.

SEPTEMBER 17.—Llandudno.—ROAD CONSTRUCTION.—Llandudno U.D.C. invite tenders for the execution of certain works of road construction on land to be known as "Mostyn Broadway." The works comprise surface water drains, macadam roads, gravelled footpaths, laying of kerbs and channels, fencing, etc. Lengths about 800 yds. Plans and specifications may be seen, and quantities, and form of tender obtained, with all other particulars, upon application to Mr. E. P. Stephenson, Engineer to the Council, Town Hall, Llandudno, on deposit of 1l. 1s. (by cash or postal order) is required. Tenders, endorsed "Mostyn Broadway Tender," to be

ent in to Mr. Alfred Conolly, Clerk to the Council, Town Hall, Llandudno, on or before 12 noon on September 17.

SEPTEMBER 17.—**Notting Hill.**—**DRAINAGE AND SANITARY.**—The Guardians of St. Marylebone invite tenders for redraining and sanitary work at the Nurses' Home, St. Marylebone Infirmary, Rackham-street, Notting Hill, W. Specification and drawing may be inspected, and bills of quantities and form of tender obtained from September 7 to September 11, between 10 a.m. and 4 p.m. (Saturday 10 and 11), upon application to the Guardians' Architect, Mr. A. Saxon Snell, of 22, Southamplon-buildings, Chancery-lane, W.C. and depositing 10s. tenders, endorsed "Tender for Redraining and sanitary work at Nurses' Home," and addressed and delivered to Mr. H. T. Duddman, Clerk to the Guardians, Northumberland-street, Marylebone-road, W., before 10.30 a.m., September 17.

SEPTEMBER 19.—**Leigh-on-Sea.**—**GAS MAINS.**—Leigh-on-Sea U.D.C. invite tenders from competent contractors for the work required to be done in carting, excavating for, laying, jointing, and completing 776 lin. yds. of 4-in. diameter, and 100 lin. yds. of 3-in. diameter, cast-iron gas mains for Hadleigh-road, Station-road, and Victoria-drive. Quantities may be obtained, and plans and specifications seen, on application to Mr. John W. Liversidge, C.E., Surveyor to the Council. Tender to be signed, sealed, and delivered to the Council, Mr. Carlyle Crossland, on or before September 19, endorsed "Tender for Gas Mains."—**Pewsey.**—**WELL.**—**BORHOLE.**—**Pewsey R.D.C.** invite tenders for sinking of a well, 10 ft. internal diameter, and 90 ft. deep, and for sinking from the bottom of such well a borehole, 12 in. internal diameter, and a further 110 ft. deep, together with other work in connexion therewith at Pewsey. The drawing and specification may be obtained of Mr. S. B. Dixon, Clerk to the Council, at Pewsey R.D.C., Pewsey, from 10 a.m. to 5 p.m. each day except Saturdays. Copies of specification and form of tender and schedule may be obtained from the engineers Messrs. Fair and Son, C.E., Lendal-chambers, York, on deposit of 3s. 3d. Sealed tenders, endorsed "Tender for Well and Borehole, Contract A," must reach the Clerk on or before 10 a.m. on September 20.

SEPTEMBER 20.—**Wolsingham.**—**TAR PAVING.**—The Weardale R.D.C. invite tenders for laying down about 798 super. yds. of tar paving for footpaths near Wolsingham. Particulars may be obtained from Mr. Geo. W. Egglestone, Highway Surveyor, Stanhope, R.S.O., Co. Durham.

STONE, MATERIALS, AND STORES.

SEPTEMBER 4.—**East Stonehouse.**—**STORES.**—U.D.C. of East Stonehouse invite tenders for the period ending March 31, 1907.—**Bricks.**—buff paving bricks—

Portland cement; lias lime; stoneware gullies, pipes, bends, etc.; slates (all classes); white lime; building stone; kerbing; channelling and granite setts; bass brooms, wicker maunds; cast-iron gullies; cast-iron hydrants, frames, and covers; cast-iron meter frames and covers; cast-iron valve covers; cast-iron stop cock blocks and covers; cast-iron manhole frames and covers; rain-water guttering; hardware. Form of tender and specifications of the whole of the above may be obtained upon application to Mr. Bernard Townsliend, A.M.Inst.C.E., Surveyor to the Council, Surveyor's Office, Town Hall, East Stonehouse, Devon. Sealed tenders, endorsed "Tender for —," are to be delivered at office of Surveyor on or before 12 o'clock noon, September 4.

SEPTEMBER 5.—**Falkirk.**—**STORES.**—**Cross's Chemical Company, Ltd., Falkirk,** invite tenders for the supply of stores for their Camelon Chemical Works, Falkirk, for twelve months from October 1, 1906. The various requirements comprise bolts, nuts, steam and gas pipes, nails, iron barrows, oils, shovels, picks, rubber, asbestos, etc. Complete schedule can be obtained on application to Mr. Thos. Thornley, Camelon Works, Falkirk, to whom sealed offers must be sent not later than September 5.

SEPTEMBER 5.—**Glasgow.**—**STORES.**—**Alexander Cross & Son, Ltd., Glasgow,** invite tenders for the supply of stores for their Port Dundas Chemical Works, Glasgow, for twelve months from October 1, 1906. The various requirements comprise bolts, nuts, steam and gas pipes, nails, iron barrows, oils, shovels, picks, rubber, asbestos, etc. Complete schedule can be obtained on application to Mr. Thos. Thornley, 19 Hope-street, Glasgow, to whom sealed offers must be sent not later than September 5.

SEPTEMBER 8.—**Stamford.**—**GRANITE.**—**Stamford Town Council** invite tenders for about 700 tons of A and 300 tons of XX broken granite, to be delivered free in trucks at Stamford Station as and when required during the months from September to March inclusive. Tenders, with samples, to be sent to Mr. Fredk. R. Ryman, A.M.Inst.C.E., Borough Surveyor and Engineer, 9 St. Mary's-street, Stamford, on or before September 8.

SEPTEMBER 10.—**Bradford.**—**TIMBER.**—**Bradford Corporation** invite tenders for the supply of timber, as undermentioned, to be delivered in quantities as undermentioned, namely—plain oak, wainscot oak, English oak, American ash, English ash, yellow pine, birch, pitch-pine, mahogany, teak and Kauri pine, American white wood, and red wood. Forms of tender and conditions may be had on application at the General Manager's office, 15, Bridge-street, Bradford. Tenders, endorsed "Tender for Timber," must be sent to Mr. Frederick Stevens, Town Clerk, Town Hall, Bradford, not later than September 10.

SEPTEMBER 11.—**Edmonton.**—**PAVING STONE.**—**The Edmonton U.D.C.** invite tenders for the supply and

delivery at the Lower Edmonton Station of the Great Eastern Railway, of about 1,190 (or thereabouts) sq. yds. of adamant, John Ellis & Son's, Imperial Victoria indurated, or shap granite stone paving for footways. Forms of tender, and full particulars, may be obtained on application to Mr. G. Redes Eachus, the Engineer and Surveyor to the Council, Town Hall, Lower Edmonton. Sealed tenders, which must be upon the forms supplied by the Council, endorsed "Tender for Paving Stone," must be delivered at office of Mr. Wm. Francis Payne, Clerk of the Council, Town Hall, Lower Edmonton, not later than 12 o'clock noon on September 11.

SEPTEMBER 13.—**Gosport.**—**MATERIALS.**—**Gosport and Verstocke U.D.C.** invite tenders for the supply of the following materials, etc., for the year ending September 29, 1907.—**Broken stone** for macadamising; kerb, channel, and setts; artificial paving stone; stoneware drain pipes; cement and lime; castings; ironmongery; disinfectants; brooms; etc.; forage; repairs to picks, etc.; repairs to harness, etc.; shoeing horses; horse hire, etc.; printing; coal; hospital necessities; repairs to firemen's boots. Specifications, forms of tender, etc., may be obtained from the Surveyor to the Council, Mr. H. Frost, Town Hall, Gosport. Tenders, sealed and endorsed "Tender for —," as the case may be, should be delivered, with any necessary samples, at the Offices of the Council, not later than 12 o'clock noon on September 13.

SEPTEMBER 15.—**Hale.**—**SUPPLIES.**—**Hale U.D.C.** invite tenders for the supply of granite, macadam, limestone, kerbs, channels, stoneware, and earthenware pipes, cinders, and other ballast, ironmongery, brushes, and other tools, oils, cement, disinfectants, tar, etc. for a period of twelve months, commencing October 1, 1906. Forms of tender, and further particulars, may be obtained at office of Mr. F. E. Boaz, Surveyor, Council Offices, Hale, Cheshire, between the hours of 9 a.m. and 5 p.m., to which all enquiries should be addressed. Tenders to be forwarded not later than September 15 to Mr. J. G. Whyatt, Clerk to the Council.

SEPTEMBER 18.—**Fleet.**—**MACADAM.**—**Fleet U.D.C.** invite tenders for the supply on rail at Fleet Station (Hants) of 250 tons of Cleo Hill, or similar quality, macadam, broken to 2-in. gauge. Tenders, duly endorsed, must be delivered to Mr. W. H. Wright, Clerk to the Council, Albert-street, Fleet, Hants, not later than 5 p.m. on September 18.

SEPTEMBER 19.—**Leigh-on-Sea.**—**PIPES.**—**Leigh-on-Sea U.D.C.** invite tenders for the supply and delivery of 22 tons, or thereabouts, of 4-in. diameter and 3-in. diameter cast-iron pipes and specials. Particulars may be obtained on application to Mr. John W. Liversidge, C.E., Surveyor to the Council. Tenders to be signed, sealed, and delivered to the Clerk to the Council, Mr. Carlyle Crossland, not later than September 19.

Public Appointments.

Nature of Appointment.	By whom Advertised.	Salary.	Applications to be in
*CLERK OF WORKS	Messrs. W. L. L. & Co., Ltd., 130, Pall Mall, S.W.	£2,000 per annum	Sept. 4
*CLERK OF WORKS	Walthamstow Education Committee	£3,100 per week	Sept. 10
*INSTRUCTOR IN WOODWORK	Boro. Polytechnic Institute	£300	Sept. 12

Auction Sales.

Nature and Place of Sale.	By whom Offered.	Date of Sale.
*50,000 PIECES OF WALL PAPER—3, Redcross-street, E.C.	Freer, Cooper, & Co.	Sept. 4
*BUILDER'S PLANT AND STOCK, ETC., EALING—The Grove, Ealing	Robt. Newman	Sept. 11 & 13
*BUILDER'S PLANT—Abbey Brickfield, Faversham	Jackson & Sons	Sept. 18
*BUILDER'S PLANT AND STOCK, WANDSWORTH—On the Premises	J. T. Skelding	Sept. 19
*BRICK-MAKING PLANT AND MACHINERY, CATFORD—On the Premises	J. T. Skelding	Sept. 27
*FREEHOLD BUILDING LAND, SHREWSBURY—The County Mart, Shrewsbury	Wm. Hall, Wateridge, & Owen	Sept. 28
*JOINERY WORKS, HENRY STREET, GRAY'S-INN-ROAD	May & Rowden	Oct. 3
*FREEHOLD PROPERTIES, GODALMING—King's Arms Hotel, Godalming	Messrs. Mellersh	Oct. 9

PATENTS.—Continued from page 285.

the hot fire-brick hearth from the floor and preventing the firing of the joists, and a movable front for closing the front of the chambers.

17,556 of 1905.—G. A. CHADDOCK: *Windows and Window Sashes.*
This relates to windows and window sashes, which consists in arranging the sashes with grooves, which slide over tongues fitted in the frames, the tongues for the lower and upper sash reaching to approximately the middle point of the frame of the window, and in arranging further guides or lay strips in the side of the groove of the sash extending for the whole height of the frame.

19,926 of 1905.—W. A. MURCOCK: *A Lead Jointless Flush Pipe for a Water-closet Siphon Cistern.*
This relates to a method of fixing a lead flush pipe to a water-closet cistern by placing the ends of various lengths of lead piping in metal moulds or dies, and by heating the said moulds or dies until the lead pipe melts and takes the form of the inside of the moulds or dies, thereby producing a lead pipe with a collar or flange, this collar or flange enabling the lead flush pipe to be screwed up to the cistern direct with the aid of a brass cap.

22,805 of 1905.—R. MACKAY: *Apparatus for Heating Water by Steam.*
This relates to an apparatus for heating water by steam, consisting of an outer casing having a water inlet towards its lower part and a water outlet at some distance below the top of the apparatus, an inner casing closed at its top and bottom having a steam inlet towards its upper end, an inner tube open at both ends and passing through the top of the outer casing to near the bottom of the inner casing.

23,871 of 1905.—J. HOGINBOTHAM: *Access and Test Junction Pipe for Drains.*
This relates to a double access and test junction pipe for drains, consisting of a spigot or socket junction, the open access end directly or partially over the spigot end and capable of being closed by a cap or cover; and a socket or spigot connexion at right angles to the spigot end connecting to the main house drain and located as close as possible to the open access end.

5,438 of 1906.—A. MERILLID: *Portable Heat Radiators for Stoves.*
This relates to a portable heat radiator for room stoves, consisting of a cylindrical or ball-shaped or other suitable shaped hollow body with open bottom and closed top adapted to be placed with

its edge provided at the bottom into a corresponding edge of a room stove with open top.

11,153 of 1906.—R. R. MAIN, J. J. CAMERON, and T. COX: *Wire Fencing.*
This relates to a dropper for use in wire fencing or trellising composed of two or more lengths of metal such as rods or bars or twisted or stranded wires jointed or linked together.

12,488 of 1906.—HERDE UND OFENFABRIK CEMMANN UND SELLGASCH, F. A. C. GUTJAHR & Co.: *Electrically Heated Stoves.*
This relates to a stove adapted for the insulation and storage of heat, comprising an electric heating device located within the internal cavity thereof, the arrangement being such that in consequence of the extending surface of the stove the heat stored up therein is radiated and diffused in a substantially uniform manner, whilst the superheating of the air and too rapid cooling are avoided.

14,796 of 1906.—D. R. POLLARD: *Device for Securing and Fastening Roofing Slates or Tiles.*
This relates to a slating strip, and consists in the combination with a slot for securing the clip and means for adjusting the position of the clip upon the batten or the like of an index or gauge for determining the position of the strip with regard to the slate to be secured.

Galvanised Corrugated Sheets—						
Ordinary sizes 6 ft. to 8 ft.	20 g.	14	0	0	...	—
"	22 g. and 24 g.	14	10	0	...	—
"	26 g.	15	15	0	...	—

METALS (continued).

	Per ton, in London.	£ s. d.	£ s. d.
Best Soft Steel Sheets, 6 ft. by 2 ft.	11 10 0	—	—
to 3 ft. by 20 g. and thicker	12 10 0	—	—
Best Soft Steel Sheets, 22 g. & 24 g. 12 ft. by 2 ft.	14 15 0	—	—
to 3 ft. by 20 g. and thicker	15 10 0	—	—
Cut Nails, 3 in. to 6 in.	9 10 0	—	9 15 0

(Under 3 in., usual trade extras.)

LEAD, &c.

	Per ton, in London.	£ s. d.	£ s. d.
Lead-Sheet, English, 3 lb. and up	20 0 0	—	—
Pipe in coils	20 10 0	—	—
Soil pipe	23 0 0	—	—
Compo pipe	23 0 0	—	—
Vielle Montagne	32 15 0	—	—
Silesian	32 15 0	—	—
COPPER—			
Strong Sheet	0 1 1	—	—
Thin	0 1 2	—	—
Copper nails	0 1 0	—	—
BRASS—			
Strong Sheet	0 1 0	—	—
Thin	0 1 1	—	—
Th—English Ingots	0 1 9	—	—
Solder—Plumbers'	0 0 84	—	—
Tinmen's	0 0 104	—	—
Blowpipe	0 0 112	—	—

* By an oversight the price of lead was not corrected last week. It should have been £19 15s., not £19 7s. 6d.

ENGLISH SHEET GLASS IN CRATES OF STOCK SIZES.

	24d. per ft. delivered.	£ s. d.
15 oz. thirds	24d.	—
fourths	24d.	—
21 oz. thirds	24d.	—
fourths	24d.	—
26 oz. thirds	24d.	—
fourths	24d.	—
32 oz. thirds	24d.	—
fourths	24d.	—
Fluted Sheet, 15 oz.	24d.	—
21 oz.	24d.	—

ENGLISH ROLLED PLATE IN CRATES OF STOCK SIZES.

	24d. per ft. delivered.	£ s. d.
Harley's	24d.	—
Churches	24d.	—
Floured and Glass Boiled	24d.	—
"Oceanic" Glass, white	24d.	—
Do, tinted	24d.	—

OILS, &c.

	Per gallon.	£ s. d.
Raw Linseed Oil in pipes	0 1 11	—
" " in barrels	0 2 1	—
" " in drums	0 2 1	—
Boiled " " in pipes	0 2 0	—
" " in barrels	0 2 3	—
" " in drums	0 3 8	—
Turpentine in barrels	0 3 10	—
" " in drums	0 3 0	—
Genuine Dutch Enchell White Lead per cwt.	22 0 0	—
Best Linseed Oil Putty per cwt.	0 7 0	—
Stockholm Tar per barrel	1 12 0	—

VARNISHES, &c.

	Per gallon.	£ s. d.
Fine Pale Oak Varnish	0 10 6	—
Pale Copal Oak	0 10 6	—
Superfine Pale Elastic Oak	0 12 6	—
Fine Extra Hard Church Oak	0 10 0	—
Superfine Hard-drying Oak, for seats of	0 14 0	—
Fine Elastic Carriage	0 12 6	—
Superfine Pale Elastic Carriage	0 16 0	—
Fine Pale Maple	0 16 0	—
Superfine Pale Durable Copal	0 18 0	—
Extra Pale French Oil	1 1 0	—
Engelshill Flattening Varnish	0 16 0	—
Extra Pale Copal	1 4 0	—
Extra Pale Paper	0 12 0	—
Best Japan Gold Size	0 10 6	—
Best Black Japan	0 9 0	—
Onk and Mahogany Stain	0 8 6	—
Brunswick Black	0 8 6	—
Berlin Black	0 16 0	—
Knottins	0 10 0	—
French and Brush Polish	0 10 0	—

TO CORRESPONDENTS.

NOTE.—The responsibility of signed articles, letters, and papers read at meetings rests, of course, with the authors.

We cannot undertake to return rejected communications, and the Editor cannot be responsible for drawings, photographs, manuscripts, or other documents, or for models or samples, sent to or left at this office, unless he has specifically asked for them.

All communications must be authenticated by the name and address of the sender, whether for publication or not. No notice can be taken of anonymous communications.

We are compelled to decline pointing out books and giving addresses.

Any communication to a contributor to write an article, or to execute or lend a drawing for publication, is given subject to the approval of the article or drawing, when received, by the Editor, who retains the right to reject it if unsatisfactory. The receipt by the author of a proof of an article in type does not necessarily imply its acceptance. The Editor cannot undertake to read and consider articles offered for acceptance unless they are type-written.

All communications regarding literary and artistic matters should be addressed to THE EDITOR; those relating to advertisements and other exclusively business matters should be addressed to THE PUBLISHER, and not to the Editor.

TERMS OF SUBSCRIPTION.

"THE BUILDER" (Published Weekly) is supplied DIRECT from the Office to residents in any part of the United Kingdom at the rate of 12s. per annum (18s. in advance). To all parts of Europe, America, Australia, New Zealand, India, China, Ceylon, etc., 20s. per annum.

Remittances (payable to J. MORGAN) should be addressed to The Publisher of "THE BUILDER," Catherine-street, W.C.

SUBSCRIBERS IN LONDON and the SUBURBS, by prepaying at the Publishing Office 12s. per annum (18s. in advance) or 4s. 6d. per quarter (13 numbers), can ensure receiving "The Builder" by Friday Morning's Post.

TENDERS.

Communications for insertion under this heading should be addressed to "The Editor," and must reach us not later than 10 a.m. on Thursdays. (N.B.—We cannot publish Tenders unless authenticated either by the architect or the building-owner; and we cannot publish announcements of Tenders accepted unless the amount of the Tender is stated, nor any list in which the lowest Tender is under 100s., unless in some exceptional cases and for special reasons.)

* Denotes accepted. † Denotes provisionally accepted.

AUCHTERLESS (N.B.)—Accepted for alterations and additions to Badenoch School. Messrs. J. Duncan & Son, architects, Turf:—

Mason: J. Mitchell, Hantly Carpenter: W. H. Skene, Turf Slater: G. Glenzie, Wisch Plasterers: A. & J. Fordyce, Turf Plumber: C. Duthie & Sons, Turf

BARFORD.—For extension of outfall mains, Barford, etc., and construction of outfall tanks, filters, pump-house, etc., for Walsington United Urban District Council. Mr. W. F. Slater, Engineer and Surveyor, Overhouse-chambers, Barflem. Quantities by the engineer:—

	No. 1 Estimate.	No. 2 Estimate.	Both.
J. Taylor & Son	1,245 5 6	6,051 19 0	7,297 4 6
H. Wardle	—	—	6,588 10 0
F. Barker	387 6 9	5,491 14 3	5,879 0 0
Bennett Bros.	812 0 0	6,496 0 0	6,308 0 0
J. Owen	—	—	6,200 0 0
J. Grant	900 0 0	6,200 0 0	6,100 0 0
S. Heath	1,171 0 0	4,900 0 0	5,920 0 0
W. Williams	820 0 0	5,100 0 0	5,071 0 0
J. Cooke	1,029 10 0	4,595 0 0	5,444 0 0
S. Walton	849 0 0	4,595 0 0	5,444 0 0
F. Mitchell	—	—	5,423 7 6
S. Son	891 16 3	4,561 11 3	5,423 7 6
Sanders & Torrance, Broad-street	845 0 0	4,339 0 0	5,234 0 0
W. Bullock	894 0 0	—	5,500 0 0
W. F. Slater	—	—	5,500 0 0

BECKLES.—For alterations and additions at The Ship Inn, for Messrs. E. & G. Morse, brewers, Lowestoft. Mr. Arthur Pells, F.R.I., architect, Secot:—

H. A. King £292 Hipperston Bros. £263 Hindes & Co. 284 G. Elsey, Lowestoft* 228

BEDALE.—For building new Wesleyan Sunday School, for the Trustees, Mr. A. G. Dalziel, architect and surveyor, Halifax:—

Brackley and Mason: T. Braithwaite, Leeming Bedale* £270 13 J. J. Meeson & Son, Market Place, Bedale* 151 14 Plumber: J. K. Pearson, Market-place, Bedale* 23 15 Painters: Bucknall & Firth, Bedale* 10 0

BRADFORD.—For the enlargement of the head post office, for the Commissioners of H.M. Works and Public Buildings:—

	Credit.
J. Schofield & Son	29,893 0 0
H. Booth & Sons	9,400 0 0
J. Moulson & Son, Ltd.	8,840 0 0
C. Murgatroyd & Son, Ltd.	7,958 0 0
E. Fearnley & Sons	7,500 0 0
W. Farnish	7,390 0 0
J. Arundel	6,380 15 0

BUCKNALL.—For painting the Infectious Diseases Hospital, Bucknall, Stoke-on-Trent, for Hanley, Stoke, Fenton, and Longton Joint Hospital Board. Mr. E. Jones, Architect, 10, Albion-street, Hanley:—

A. Shaw & Co. £124 17 9 T. Buckley & Co. £93 10 0 P. H. Bennett 107 15 0 H. Harland & Co. 91 7 0 F. H. Birchall & Son 94 10 0 E. Peake 79 15 2 W. Walbanks & Son 98 17 0 T. Hughes, Hanley 79 8 3

CATFORD.—For converting No. 3, Brownall road (private residence) into shop and repairs, for Mr. J. Alder, Messrs. Norfolk & Prior, architects and surveyors, Catford Bridge:—

G. Howick £132 15 0 C. Walker* £115 11 J. Watt 125 13 6

CHARFIELD (Gloucestershire).—For the erection of a pair of labourers' cottages at Starveall Farm, Charfield, Glos., for the Governors of Katharine Lady Berkeley's Grammar School. Messrs. T. Scammell, Son, & Perkins, architects and surveyors, Bristol, and Wotton-under-Edge, Glos.:—

E. Clarke £500 A. Jocham £439 S. J. Simmonds 496 J. Brown 430 W. Blaken 453 J. Hawkins & Sons, W. Pitcher 450 Edgeway* 395

CLAYGATE.—For the erection of eight shops, Claygate, Surrey, for Mr. W. Martin, Mr. S. C. Hart, architect, 22, Philipot-lane, London, E.C. 4:—

Sheldall £4,200 Matthew & Co., West 4,078 Entfield Wash* £3,820 Doughty 3,360 Brown & Co. 3,804

COLTON (near Leeds).—For the construction of sewers, etc., for Hunstall Rural District Council. Messrs. Marriott, Son, & Shaw, engineers, Church-street-chambers, Dewsbury:—

G. L. Briggs, Hailton, Leeds* £308 16

DERBY.—For enlargement of Derby Midland-road Branch Post-Office:—

E. Brown & Son £3,237 Credit J. Young 3,190 20 J. Barnsley & Sons 3,148 20 Walker & Slater, Derby* 3,154 35

DESBOROUGH.—For water mains, for the Urban District Council. Mr. D. J. Diver, Surveyor, Desborough:—

Yarrow & Co., Ltd. £167 0 54 Watson, Gow, & Co. 153 0 1 J. & R. Ritchie 144 13 6 Sheppridge Coal & Iron Co. 138 7 7 Holwell Iron Co., Ltd. 186 6 6 Cochrane 136 10 13 Stanton Iron Co., Nottingham* 133 5 7

ENFIELD.—For erecting first portion of new central premises, including grocery warehouse and outbuildings, for the Enfield Highway Co-operative Society, Ltd., Ordnance-road, Enfield Highway. Mr. F. Bethell, architect, 23, Queen Anne's-place, Ench-hill Park, Enfield. Quantities supplied by the architect:—

P. & R. Paul £2,686 Lane & Harvey £2,545 L. & W. Patman 2,684 A. Fairhead & Son, 2,545 W. Lawrence & Son, 2,593 Jennings & Greenfield* 2,500 E. Newman 2,578

HALE.—For making-up Olverbarrow-road, for the Urban District Council. Mr. F. E. Boaz, Surveyor, Ashley-road, Hale, Cheshire:—

W. Clarke £1,273 7 9 Bethell & Sons £766 17 0 Exors. of T. Barber 850 16 6 & Co., Liv- G. Boyson 846 6 7 erpool* 781 16 11 [Surveyor's Estimate, £764 8 9.]

HALESWORTH.—For erection of residence, for Mr. R. K. Haeard. Mr. Arthur Pells, F.R.I., architect, Beccles:—

Bondy & Son £1,027 Howard Bros. £812 A. H. Woodyard 1,020 Halsworth* 812 A. Botwright 930

HALESWORTH.—For altering dwelling house, supplying and fixing new shop front, for Messrs. Roe & Co. Mr. Arthur Pells, F.R.I., architect:—

G. Elsey £275 L. Morris £225 Gibbs & Rodwell 200 S. E. Hassell 200 A. Woodyard 237 J. C. Smith, Ipswich* 200

HAMILTON.—For new dormitory extensions, Hamilton Combination Forthouses. Mr. Alex. Cullen, architect, Brandon-chambers, Hamilton:—

J. & C. Fleming, Strathaven* £277 14 11

HECKINGHAM (Norfolk).—For additions and alterations and repairs at Beacon Hill Farm, for Mr. N. H. Bacon. Mr. Arthur Pells, F.R.I., architect, Beccles:—

Hipperson Bros. £475 0 Grimman & Chasten £390 0 L. Eiden 439 12 C. Ellis* 352 0

HENDON.—For wood and corrugated iron shelter for Hendon Public Park, N.W. for the Urban District Council. Mr. S. Slater Grimley, Engineer and Surveyor, Hendon:—

	Shelter.	Extension of Veranda.
Marchant & Hirst	£298 0 0	£90 0 0
R. L. Scott & Co.	227 0 0	102 0 0
H. Parfett	227 0 0	57 10 0
J. J. Quarterman	225 0 0	65 0 0
J. McManus	223 0 0	53 0 0
R. Smith & Co., Ltd.	199 0 0	145 0 0
Barratt & Bradshaw	195 0 0	50 10 0
Wire Wove Roofing Co.	189 0 0	50 10 0
I. J. Hawkins & Co.	174 0 0	70 0 0
J. Harrison & Co.	160 0 0	84 0 0
Purple Bros.	154 4 3	60 0 0
F. D. King, Hendon*	153 0 0	60 0 0
W. Harrow	—	—

HOCKLEY.—For erecting scattered houses at Hockley, for Roshford Guardians. Messrs. Greenhalgh & Brockbank, architects, Southend:—

G. Burrill, Great Wakering* £625

HOPKINSTOWN.—For 150 lineal yds. of river retaining walls, etc., for Pontypridd Urban District Council. Mr. F. E. A. Barry, Engineer and Surveyor:—

A. G. Collins & Co., Barry* £338 6 2

HULL.—For the erection of the superstructure of the new post office, for H.M. Commissioners of Works and Public Buildings:—

G. L. Scott & Co. £2,997 Wright & Sons £38,150 G. H. Pantou 49,900 G. H. Scorer 37,954 Quibell, Son, & Co. 37,750 Dawson, Townsley, Greenwood, Ltd. 41,654 & Co., Ltd. 37,750 G. Boulton 39,200 Bowman & Sons 36,995 W. G. Padgett 38,720 H. Arnold & Son* 38,275 T. Goates 38,815

LONDON.—For alterations at additional workhouse, Barchinilla-road, Horsey Rise, N., for St. Leonard, Shoreditch, Guardians. Mr. F. J. Smith, F.R.I.B.A., Parliament-mansion, Victoria-street, S.W.:—

J. Ivory, 102, Great Cambridge-street, E. £1,837

LONDON.—For painting, etc., at the relief office and dispensary, Royal Hill, Greenwich, for the Guardians. Mr. Louis Jacob, A.R.I.B.A., Globe-chambers, 403, New Cross-road:—

H. Kent £150 0 A. Townsend £108 0 F. Western 145 0 W. Salley 99 19 W. Pacey 142 0 W. Mills 97 15 H. Ball Bros. 139 0 G. A. Rowley 96 10 F. Smith & Co. 138 5 W. Nash 95 0 W. Quilter 133 0 A. T. Peyton 94 0 Griggs & Son 130 10 W. Bickerton 90 0 W. Martin & Son, 126 0 T. T. Forest 80 10 Runham, Brown, & Brown, E.C. 4 77 0 Oldman Bros. 112 10 Works, West- W. J. Howie 110 0 combe Park* 62 0 E. J. Wallis 104 15

MIDDLEWICH.—For alterations and extension at No. 2 Branch, Lewin-street, for Winsford Industrial Co-operative Society, Ltd. Mr. Thomas Dutton, architect, Diggle-lane, Winsford. Quantities not supplied.—
Burchall Bros. £407 J. Fowler & Sons,
High-st., Winsford. £390

MIDSOMER NORTON (Somerset).—For erecting schools and vestries at Stone's Cross, for the Primitive Methodists. Mr. W. Bevan, architect, Midsomer Norton.—
E. Prece £1,398 W. & A. Edgell,
J. H. Tovey 828 Radstock. £547
W. Tovey 889

NORTH BERWICK.—For erecting a new Post Office, for the Commissioners of H.M. Works and Public Buildings.—

J. Wilson & Sons	£3,999 0 0	Credit.
J. Parkinson & Sons,		£20 0 0
Ltd.	3,628 0 0	
J. Muirhead	3,478 10 10	20 0 0
S. Beattie & Sons	3,265 0 0	10 0 0
Denholm & Murray	3,161 0 0	13 0 0
P. Barton	3,000 0 0	—
A. H. Hunter & Co.	2,994 10 0	—
Scott & Brown	2,878 14 0	10 0 0
J. Elliott	2,801 16 0	3 0 0
J. & R. Stewart	2,795 0 0	10 0 0
A. Culder	2,701 0 0	—
J. & F. Forrest	2,789 3 0	—
N. McLeod & Sons	2,763 0 0	15 0 0
Balkie & Peattie	2,770 8 8	32 8 8
J. Angus*	2,769 10 0	40 0 0

NORTON-SUB-COURSE (Norfolk).—For alterations and additions to farm premises, for Mr. N. H. Bacon, Mr. Arthur Pells, F.S.I., architect, Bencoe.—
Hepperson Bros. £115 0 0 L. Elden,
C. Ellis 98 0 0 Loddon* £89 5 0
Wynes 90 0 0

PETERBOROUGH.—For new elementary school and cookery centre at Brook-street, Peterborough, for the Local Education Authority, according to plans and quantities supplied by Messrs. J. G. Stallebrass & Sons, architects and surveyors, North-street, Peterborough.—
J. Cracknell £5,534 0 D. Gray £4,712 10
E. W. Beach 4,350 0 J. Lucas 4,649 0
H. Watson 4,849 0 J. Bridgefoot 4,631 18
R. Shanks 4,790 0 J. Hicks, Peter-
J. Gutteridge 4,774 0 borough* 4,544 18
G. Heath 4,712 10
[Architects' estimate, £4,900.]

STANLEY (Derbyshire).—For the construction of waterworks at Stanley and West Hallam, for Shardlow Rural District Council. Messrs. Elliott & Brown, engineers, Barton-buildings, Parliament-street, Nottingham.—
S. F. Tomlinson, Derby* £2,185

STANLEY (Derbyshire).—For cast-iron pipes, etc., in connexion with water supply of Stanley and West Hallam, for the Rural District Council of Shardlow, Messrs. Elliott & Brown, engineers, Barton-buildings, Parliament-street, Nottingham.—
Stanton Iron Works Co., Ltd., near
Nottingham* £1,591 2

STANLEY (Durham).—For erecting dwarf walls and palisading, together with cement footpaths, etc., to twenty-four houses, Council-street, for the Urban District Council. Mr. Wm. Forster, architect, Stanley.—
W. Collin £407 R. C. Birley £309
Craven 375 A. Routledge 285
Dyson 310 P. Duffy, Stanley* 280

SUNDERLAND.—For the erection of Board of Trade and Customs offices, for the Commissioners of H.M. Works and Public Buildings.—

S. F. Davidson	£0,499	Credit
H. W. Lowry	5,020	Old
W. B. Cooper	6,559	Material.
C. C. Ferguson	5,389	—
J. B. Stott	5,346	—
D. & J. Ranken	6,224	—
T. Lundsen	4,840	—
J. W. White	4,778	—
Middlemas Bros.	4,584	—
J. Arncliffe	4,450	—
J. M. Wright	4,297	—
J. Huntley	4,285	—
S. Warburton*	4,090	—

WATFORD.—For Hadden-lane sewerage, for Watford Urban District Council. Mr. D. Waterhouse, Engineer and Surveyor.—

Lead surveyor —				
T. C. Starkey	£777	2 2	Wilson, Border,	
T. Bates & Co.	675	7 8	J. Jackson	£580 6 6
G. R. Mann	796	0 0	H. Brown	555 17 9
A. T. Lee	680	14 8	Bower Bros	555 0 6
W. C. French	655	0 0	W. Barwick	550 1 4
J. Adams	653	16 2	W. Shepherd &	525 9 0
Bracey & Clark	640	0 0	Sons	512 17 6
Smith & Co.	608	9 2	H. C. Zadig	509 0 0
Hewitt & Son	607	3 2	W. Wilson	455 15 8
T. Free & Sons	603	8 6	W. Johnson,	
W. H. Worthington & Co.	601	10 4	Minsted,	

WATFORD.—For private street works, for Watford Urban District Council. Mr. D. Waterhouse, Engineer and Surveyor.—

J. Mowlem & Co., Ltd.	Mildred-avenue.	Sussex-road.
	£1,785 0 0	£712 0 0
Fry Bros.	1,738 5 8	717 10 0
G. R. Mann	1,735 0 0	688 0 0
W. Shephers & Sons	1,715 17 6	705 18 4
Wilson, Border, & Co.	1,690 0 0	680 0 0
T. Adams	1,687 11 4	683 7 6
Hardy, Date, & Co.	1,757 1 6	699 14 6
W. & C. French	1,650 0 0	675 0 0
T. Free & Sons	1,646 16 0	660 1 0
A. F. Lee	1,634 0 0	686 0 0
W. & D. Wilson	1,623 0 0	662 0 0
H. & B. Watkins	1,590 0 0	656 0 0
J. Jackson	1,572 10 2	680 14 9
W. Wilson	1,555 0 0	640 0 0
Zadig & Co.	1,549 0 0	662 0 0
Bower Bros.	1,517 0 0	619 0 0
W. H. Worthington	1,508 5 3	614 3 1
J. & J. Johnson	1,508 0 0	588 0 0
W. Johnson	1,470 0 0	604 0 0
H. Brown*	1,389 0 0	596 0 0
T. C. Starkey (incomplete)	598 0 0	244 8 0
Bracey & Clarke*		58 0 0

WHITKIRK (near Leeds).—For the construction of sewers, for Hunslet Rural District Council.—
G. L. Briggs, Hulton, Leeds* £92 1 6

WOTTON-UNDER-EDGE (Gloucestershire).—For repairs and alterations to Dr. Boyce's house The Chipping, Wotton-under-Edge, for the Governors of Katharine Lady Berkeley's Grammar School, Messrs. T. Scammell, Son, & Perkins, architects and surveyors, Bristol, and Wotton-under-Edge, Gloucestershire.—
A. Jotcham £127 0 J. Jotcham £102 10
R. Cook 119 15 W. Richter 98 10
R. Keynton 109 10 J. Hawkins, Ridge-way* 98 10

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The Builder.

VOL. XCI.—No. 3318.

SEPTEMBER 8, 1906.

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Portland Cement.



ONE characteristic of the past twelve months has undoubtedly been the large number of technical books produced by British publishers or placed on the market by the agents of American firms. This flood of literature has brought with it quite an epidemic of treatises dealing in one way or another with Portland cement. The application of this valuable material to concrete-steel construction has attracted so much notice within the last year or two, and has been so little represented in permanent literature, that technical writers have rushed headlong into print, impelled doubtless by the forces somewhat vaguely expressed by the saying, "Nature abhors a vacuum." But we have had also at least three or four good books devoted to cement and concrete in which these materials are considered without special reference to their combination with steel, and the best of these, in one sense, is the new edition of a treatise on the manufacture, testing, and use of Portland cement, by Mr. D. B. Butler,* whose name is familiar to all cement users.

As in the previous issue, the author has confined his attention to the topics mentioned above, and for this reason has been able to give practical descriptions

of manufacturing and testing processes, without feeling impelled to curtail useful matter by an ever-present fear that the limits of space will not permit him to say quite so much as ought to be said for the purpose of really adequate exposition. Mr. Butler has done wisely in not trying to squeeze into a single volume too many branches of the subjects coming under the general head of cement and concrete. Consequently he has been able to do justice to those selected for consideration. It is in this sense that we may regard his work as the best of its kind that has appeared within the last few months. The book possesses a further recommendation owing to the fact that it is written by an English expert for English readers—a merit that does not seem to be quite so obvious to some publishers in this country as it probably will become before long.

When the first edition was issued some six years ago the general method of cement manufacture was radically different from that prevailing in the present day. There was then not a single installation of the rotary continuous kiln in the country, and as this must be regarded as the kiln of the present and the future, the need for revision of the previous text was particularly obvious. Further, sundry types of grinding machinery have become somewhat obsolete, and here again fresh descriptive matter was required, a necessity applying also to methods of testing, especially in view of the Report on Portland cement issued by the Engineering Standards Committee.

Portland cement can be produced from any raw materials containing constituents capable of yielding, by calcination, the silicates and aluminates of lime which form the chief components of that material. Those two familiar substances, chalk and mud, furnish all that is required, and are abundantly found in the lower reaches of the Thames and the Medway, which form the chief seat of the cement industry. The soft marls of Cambridgeshire are capable also of yielding excellent cement, which recent tests by Mr. Butler show to be "equal, if not superior, to the Thames and Medway brands." All such raw materials, being readily reduced to slurry in the wash-mill, are treated by the "wet process" of manufacture. Others, being less easily reduced, require the aid of grinding machinery to enable the maker to secure an intimately blended mixture. These materials require treatment by the "dry process," and are represented by the blue lias formations of Warwickshire and other counties.

We need not refer to details of the wet process or of the modification known as the "semi-wet or Goreham process," both of which are fully described by the author, who also points out and illustrates by photographic views some bad effects resulting from incomplete mixing and faulty washing during this stage of manufacture. When the semi-wet process is adopted the final reduction has to be effected by grinding machinery, and only sufficient water is used in the wash-mill to permit the mixture to be pumped direct to the kiln-drying chamber.

* "Portland Cement: Its Manufacture, Testing, and Use." By D. B. Butler, A.M.Inst.C.E., F.C.S. London: E. & F. N. Spon.

Although effecting considerable saving in labour, this process does not afford the opportunities for correcting the proportions of the raw materials which are characteristic of the wet process. Having experience of both systems, Mr. Butler confesses to "a sneaking fondness for the older method so far as regularity and reliability are concerned," inclining to the opinion that it is particularly advantageous where very variable raw materials have to be dealt with, and where a few pence per ton in the cost of production are not of such paramount importance as the regular and consistent quality of the product. We think, however, that the one objection to the semi-wet process could be eliminated by the employment of auxiliary mixing mills in conjunction with frequent tests and corrections of the slurry before it is pumped to the kilns.

Having discussed in full detail the various methods of drying and calcining the raw material and the means available for grinding the resulting clinker, Mr. Butler gives a short account of the "dry process." This method is necessary where the raw materials are too hard for treatment by water in the wash-mill and have to be ground and mixed in the dry state. Although chiefly employed for limestone and shale, the dry process has also been applied to the soft chalk marls of Cambridgeshire. Calcination of the mixture and subsequent grinding of the clinker are essentially the same as in the wet process, although it is the fact that some special types of grinding mills are not so suitable for reducing the hard clinker produced from the lias formations as for the softer clinker yielded by the materials occurring in the London district.

Very little that is new can be said with regard to the testing of Portland cement. One or two fallacious tests still linger, and the manner in which approved tests are applied by different operators frequently gives rise to contradictory results. Consequently it may be said that the chief need of the present day is for a standard code of tests to be conducted under such conditions as will remove, as far as possible, differences due to the personal equation. Another consummation much to be desired is the formulation of a universal standard for adoption by the chief countries of the world. The realisation of such an ideal will probably be deferred for some considerable time, in spite of the laudable efforts made by the International Association for Testing Materials of Construction, a branch of which exists in this country but is practically unknown, and has done no work so far as we are aware.

Of course, the objects to be attained by testing are not always the same. The scientific chemist conducts investigations that are intended to increase general knowledge as to cementitious substances, the architect or engineer makes tests to ascertain the characteristics likely to be developed by some particular example in practical use, and the manufacturer to satisfy himself that the material complies with the requirements of specifications. But it very often happens that these three classes have to make tests all directed to the same end—that is, to determine the

suitability of a given cement to a given duty. To enable determinations of the kind to be made with substantial accuracy the six simple tests described by Mr. Butler are amply sufficient to enable the operator to form an approximately correct opinion as to the essential properties of a given quality of cement. The tests in question are for soundness, fineness, strength, setting, weight, and chemical composition. If, as the author is careful to point out, too much reliance be placed upon any one test taken by itself, erroneous conclusions may be drawn. For instance, assuming that a sample indicates satisfactory tensile strengths at the end of seven days, it does not follow that the material is sound or that its strength will continue to increase with age. The development of high tensile strength when the specimen is new may indicate excess of lime; and, on the other hand, low tensile strength may suggest a moderate proportion of lime. But both these suggestions may be wrong, and it is only by comparing the results of various tests that a true interpretation can be made.

We should have thought that every intelligent cement user in the present day knew the inconclusive character of tensile tests considered alone; but, judging from some remarks in Mr. Butler's book, a very prevalent opinion seems to be that if a sample of cement when gauged neat develops a good tensile strain at seven days there is nothing more to be desired. Soundness is a far more important quality, for whatever initial strength a cement may possess it cannot be of any value as a material of construction if liable to expand and disintegrate after incorporation in a building or other structure.

As the engineer-chemist upon whom has fallen the mantle of the late Henry Faija, Mr. Butler very naturally believes that the most reliable method of examining cement for soundness is the warm water test introduced by that eminent expert. We know the "Faija" test to be perfectly reliable if employed with ordinary care, and one great advantage it offers is that, in places where testing machines and plant are not available, if used in conjunction with examination of the cement for fineness of grinding, the results may be taken as approximately correct indications of the constructional value of the material.

Mr. Butler briefly describes the "Le Chatelier" test for soundness without adding any remarks of a commendatory character, and in a later chapter he says that this "is unnecessarily severe, and frequently condemns a good sound cement." Of course, everyone is entitled to his own opinion, but as the Standard Specification of the Engineering Standards Committee, reprinted in Appendix III., states, under the head of "Soundness," "the cement shall be tested by the Le Chatelier method and shall in no case show a greater expansion than 12 millimetres after twenty-four hours' aeration and 6 millimetres after seven days' aeration," it is to be regretted that Mr. Butler takes the position of a dissident. This specification was approved by twenty-three engineers and others representing Government departments, important public bodies, scientific institutions, associations of cement manu-

facturers, and including among their number several eminent civil engineers and members of large firms of engineering contractors. Further, a large amount of information collected from engineers, manufacturers, and cement users was carefully collected and considered before the specification received final approval.

The Le Chatelier test is quantitative, enabling the operator, by means of two indicators attached to a split cylinder of brass in which the cement is moulded, to take exact measurements of expansion after the lapse of defined periods, and thus to judge the soundness of the sample under examination. In the Faija test, which is purely qualitative, the results are given in the form of what may be termed safety and danger signals. Mr. Butler thus describes how its indications are to be interpreted:

"If a pat treated therein at the prescribed temperatures shows no signs of cracking or blowing at the end of the twenty-four hours, and adheres firmly to the glass plate on which it was made, the cement may be used with perfect confidence; it will never 'blow.' If, on the other hand, the pat shows slight cracks, or blisters badly on the under surface next the glass, it is a danger signal, so to speak, which should not be disregarded. But before condemning the cement off-hand it is as well to ascertain if these signs of unsoundness are due to the really bad quality of the sample or merely to its being too fresh or hot, consequent on having been recently ground. For this purpose it is necessary to spread the sample out in a thin layer for a day or two in a cool dry place, and then try it again. If on the second trial the obnoxious characteristics hitherto developed have disappeared it may be safely assumed that the cement was merely too fresh, and will be safe to use after judicious aeration and maturing."

This quotation sufficiently shows that the Faija test, reliable as we admit it to be in careful hands, lacks the simplicity and precision of the Le Chatelier method.

Since the late Mr. John Grant first drew attention to the great importance of fine grinding, progressive improvement has been made in this direction, but we are sorry to say that British manufacturers have been far less ready to learn the lesson than their foreign rivals. In self-defence, however, they have now taken up improved methods of grinding. Mr. Butler quotes some interesting records from the testing books of his laboratory, suggesting the improvement that has taken place during the last quarter of a century. Thus, taking ten samples in each of the years 1880, 1890, 1895, and 1900, the percentage of residue on a 50 by 50 sieve averaged about 24.2, 4.7, 1.6, and 0.16 per cent. respectively. In 1900 and 1905 the averages on a 76 by 76 sieve were 2.3 per cent. and 1.2 per cent., and in 1905 the residue for ten samples on a 180 by 180 sieve ranged from 11 per cent. to 26 per cent., the average being about 18.75 per cent.

From some remarks on the thickness of wire of which the gauze for cement sieves is composed we conclude that the revision of the author's book must have been made before the end of 1904. Otherwise he would scarcely say: "Unfortunately, in England we have no agreement upon this matter; each engineer, when he specifies it at all, specifies the thickness of wire which meets his fancy, and the result from a manufacturer's point of view is often very annoying." This lack of a standard gauge for adoption was filled by the British Standard Specification for Portland Cement, issued in December, 1904,

ten months before the date of the face to the second edition of Mr. Butler's work. The requirement now is that the residue shall not exceed 3 per cent. on a 75 by 75 standard sieve, or 5 per cent. on a 150 by 180 standard sieve. It is interesting to note that the weaknesses of wire recommended by the Engineering Standards Committee for these two sieves are virtually the same as those adopted by the author. "In order to bring his results into line with Continental and American practice." We come now to the very familiar test of tensile strength, and while this seems so simple it is one that clearly requires skill and judgment. The proper quantity of water to be used in making briquettes cannot be exactly defined, and we quote from the British Standard Specification, "shall be appropriate to the quality of the cement, and shall be proportioned so that when the cement is pressed it shall form a smooth, easily-worked paste that will leave the trowel cleanly in a compact mass." Here we have an undoubted loophole for variable results. Mr. Butler rightly says that the shape of the briquette has more effect on the result obtained than is generally recognised. He illustrates different forms of briquette, but in the body of his work that of the Engineering Standards Committee is not noticed, an omission which is made good in a somewhat inconspicuous manner by Appendix I., containing the British Standard Specification. On all important details connected with tensile tests Mr. Butler is in line with the demands of this specification.

Further agreement is to be found with regard to determination of the condition known as "set" by the "Vicat needle," an appliance having generally displaced the thumb-nail as an instrument of decision in tests designed to throw light on the setting properties of cement. We have referred on a previous occasion* to Mr. Butler's demonstration of the elusive character of the "marmalade test" temperature test, which, while enabling the operator to insure the use of extremely slow-setting cement, gives no security against unsoundness, as some engineers have supposed. The subject receives somewhat lengthy consideration in the chapter on "Setting Properties," which we hope may have the effect of removing any lingering predilection in favour of the so-called temperature test, apart from its useless and vexatious character the continued employment of this test would certainly tend to encourage the addition of adulterative materials with the object of avoiding the very small increase of temperature during setting.

The remaining tests for Portland cement are those for specific gravity and chemical composition, the former being one that can be performed with accuracy by any of the types of appliances described and illustrated by Mr. Butler, providing all the air entangled by the particles can be removed—a task that is not altogether easy. The specific weight of cement has generally been considered to afford a direct clue to the degree of calcination effected in the kiln, for an under-burned clinker is light as compared with one thoroughly calcined. We note,

however, that the results so far obtained from a series of experiments now being conducted by Mr. Butler appear to throw doubt on the value of the specific gravity as a criterion of calcination. Great as the value of chemical analysis may be for determining the proportions of the useful and deleterious constituents of cement, the process is one that can scarcely be conducted by the ordinary practitioner. Moreover, taken alone it is not of much use, for the reason that it cannot reveal defects caused by the faulty treatment of materials mixed in the correct chemical proportions. At the same time it is very desirable that the professional user should be familiar with the chemistry of Portland cement, and the same remark applies to a knowledge of the foreign substances introduced as adulterants by some cement manufacturers. Both of these subjects are discussed in a helpful manner by Mr. Butler, to whose book we refer readers for full particulars. The only adulterants intentionally employed by English firms are Kentish rag and blast furnace slag. Neither of these substances has the effect of improving the quality of cement, as a few makers wrongly believe. Their presence is not indicated by tensile tests of neat cement, a circumstance which is not surprising in view of the well-known fact that as much as 30 per cent. of sand may be added to cement without causing apparent reduction of strength in the testing machine.

With the object of ascertaining the actual effect of admixture of Kentish rag and slag Mr. Butler instituted a series of experiments a few years ago, the results of which are to be found in the *Transactions* of the Society of Engineers, and are summarised in his present work. From this investigation it became clear that the 3 to 1 sand test "showed a marked diminution in strength when the sample contained an appreciable quantity of such inert material," although, as Mr. Butler says, "this by itself is not sufficient to enable a decided verdict to be given as to whether a cement is pure Portland cement or not." The presence of Kentish rag can be detected by a simple chemical test, but some blast furnace slags cannot be identified in the same way, owing to the similarity of their chemical composition with that of cement. Hence the microscope is a valuable aid in determining the presence of foreign substances in cement, and the reader will find in Mr. Butler's book several very interesting photographic diagrams showing the appearance of Kentish rag, pure cement, cement admixed with ragstone, and cement admixed with slag.

Cement specifications as drawn by some engineers in the past have exhibited various amusing contradictions and impossible demands, but it may be hoped that the revised edition of the British Standard Specification, now in course of preparation, will prevent the recurrence of such inconsistencies as those upon which Mr. Butler comments. His treatise is an eminently satisfactory discussion with a distinctive value of its own, and should be useful alike to those possessing limited knowledge, and to others who are well-informed on the subject of Portland cement.

ARCHITECTURAL CONCEPTIONS AT KNOSSOS AND PHÆSTOS.

By THEODORE FYFE.

THE current "Annual" of the British School at Athens contains an article (to be continued) by Dr. Duncan Mackenzie on "Cretan Palaces and the Aegean Civilisation," which is a most important contribution to the study of (so-called) Mycenaean architecture.

It indeed deserves particular notice as a necessary rejoinder to two recently-expressed foreign opinions on the Cretan remains—by Dr. Dörpfeld, in the periodical *Athenische Mitteilungen* (XXX., pp. 257-297), and by Professor Noack in his pamphlet "Homerische Paläste."

Dr. Mackenzie criticises these opinions in detail, and, as it may safely be said that in the main his views are also those of Dr. Arthur Evans, the article in the "Annual" may be said to represent the English standpoint. That standpoint will no doubt be given more fully to the world when we get Dr. Evans's book; but meanwhile it may be useful to point out the importance of the questions at issue to the student of Early Aegean architecture.

These questions may best be stated by a summary of Dr. Dörpfeld's and Dr. Mackenzie's views as expressed in their respective articles.

The German archaeologist, in his mind full of the stratification at Troy and the typical "Achæan" plan at Tiryns, sees in the west wing at Knossos,* with its pillar rooms and long row of magazines, the remains of an early palace of "Carian" (or, in other words, original Cretan) type, on which were built at a later date, and quite independently, a palace of mainland or "Achæan" type, replete with the large pillared halls which were its chief characteristic; at Phæstos, where he gets the *raison d'être* of his argument, he sees a great step-way leading up to an actual pillared hall or megaron of the "Achæan" type, existing as a late feature amidst architecture which is mostly earlier and has no real connexion with it.

In answer to this Dr. Mackenzie begins by stating the one common ground of agreement, the existence of an earlier and later palace, both at Knossos and Phæstos; but he maintains that Dörpfeld has failed to perceive the essential difference between the two sites; that, whereas at Phæstos the early or "Middle Minoan" palace was for the most part covered up and ignored when the later palace was constructed, at Knossos, in the west wing at least, the early remains were incorporated with the later, in places so subtly blended with them that it is extremely difficult to tell one from the other; so that in this west wing at Knossos we see in effect the ground story of a homogeneous Cretan palace which had an upper story (or storeys) supported directly on the walls and piers below, a palace which is late Cretan in its developed form, but still Cretan, and neither "Achæan" nor anything else. Mackenzie maintains, moreover, that

* As Dr. Mackenzie points out, Dr. Dörpfeld evidently considers the west wing at Knossos as the only part of that palace deserving of his attention, ignoring the much more complete evidence of the "domestic quarter" in the east wing.

Dörpfeld has misread the early and late elements in the Phastos plan, and that a complete "systematic connexion" exists between the so-called megaron and the other leading features of that palace. Nor is this all. He challenges the very existence of the megaron on which Dr. Dörpfeld principally bases his theory, maintaining (and here he is completely on his own ground) that it was a light-well and no megaron at all, from the evidence of similar light-wells in the eastern wing at Knossos.

So far then the question is mainly one of stratification. A further point raised concerns the spacing of columns in these Cretan plans. Dr. Mackenzie agrees that a central column in an opening or system of supports is a very general Cretan feature, and so far endorses the views of Professor Noack. But he takes the (surely sound) view that the use of the central column was a matter of expediency in the first instance, and that as a feature it was in reality no more typically Cretan than the two-column system. He shows that the central column was occasionally met with in the later planning, at a time when Minoan building had reached its zenith, and showed large grasp and ordered architectonic arrangement. That the feature is early he admits is undisputable, but he exposes as a fallacy the view that it was practically universal in typical Cretan work, and that any departure from its use is un-Cretan.

So much for the main outlines of this interesting discussion. It is a bare outline: there is much in the working out that cannot be touched on here, particularly with regard to the question of light-wells. It will be seen, however, that Dr. Mackenzie's argument is a constructive one. It is somewhat lengthy, and cannot easily be followed point by point by one unacquainted with the sites in question; but besides containing the best exposition of the Phastos plan that has yet appeared in English, at any rate, it goes far towards giving us a clear understanding of the essential characteristics of Cretan architecture. That architecture was something quite apart from the Pelasgic work of the mainland, as seen at Tiryns and Mycenæ, and is not to be confused with it nor associated with it. In its finest form it had pillared halls and loggias, winding staircases and great stepways; and, above all, a system of stone-faced light-wells, paved with cement which was turned up on the walls, and drained by channels leading to underground conduits. These light-wells were also pierced with doors and windows, and thus became the nuclei of various systems on a plan.

There can be no doubt at all that the Cretan style of building had a direct influence on the mainland work; but there is very little doubt that there was no grand planning on typical mainland lines above the walls of Knossos and Phastos till after these palaces, as we know them now, had ceased to be inhabited.

A careful comparison of the plan of Tiryns on the one hand, and the plans of Knossos and Phastos on the other, is useful, but an important question must still remain to some extent unanswered—the exact relationship in building tradition between the island

and the mainland work. Dr. Mackenzie's article, however, may be taken as a safe commentary on the former and certain phases of the latter.

The article is illustrated by a nearly complete representation of the very fine plan of Phastos, though it is to be regretted that the figuring on the plan, as reproduced (largely referred to in the text) is so small as to be almost unreadable.

There is also a plan of the "domestic quarter" at Knossos, a plan of the palace at Phylakopi, in Melos, and various photographs.

NOTES.

British Forestry. SINCE the recommendation of the Departmental Committee on British Forestry of 1902, that the Alice Holt Woods in Hampshire should be utilised as a demonstration area, the Commissioners of Woods and Forests have—by no means too soon—requested Professor Schlich to prepare a working scheme for experimental forestry in these Crown woodlands, where nearly 2,000 acres are now under wood. The programme in question has recently been published by the Royal Scottish Arboricultural Society, and shows the manner in which the annual yield of timber may be improved with the prospect of really adequate results in the course of the next sixty years. In this particular case the labour question is a difficult one, but there is no doubt that with the establishment of systematic working permanent occupation would be found for numbers of men trained to outdoor work but unable to find regular employment, largely owing to the general application of labour-saving machinery to agriculture. We are glad to learn also that Professor Schlich has been able to arrange facilities, with the co-operation of several colleges in Oxford, for practical forestry instruction in the vicinity of that city.

The Canadian Pacific Railway. FIRST suggested in 1847 by Major Carmichael Smith, the Canadian Pacific Railway, as we now know it, was not opened to general traffic for nearly forty years later. In 1866, the American Pacific Railroad, growing at the rate of 3 miles a day, was rapidly nearing completion while the British line remained a dream. In 1874, however, a start was made upon railway construction between Lake Superior and British Columbia; in 1878 Mr. Donald Smith (now Lord Strathcona), Mr. George Stephen (now Lord Mount-Stephen), and Mr. James Hill, bought out the Dutch bondholders of the St. Paul and Pacific Railway, thus obtaining control of the line and laying the foundations of the Canadian Pacific and Great Northern railways. In 1880 822 miles of track had been laid, and by vigorous efforts the Inter-Oceanic line was completed in 1886. The history of this great undertaking is briefly set forth for the information of those interested, in a recently-published pamphlet by Mr. D. O. Croal, F.S.S. The effect of the railway has been of the greatest possible value in forwarding the development of the north-west provinces of the Dominion, and it is not surprising that

two kindred projects are in course of realisation at the present time. The fact is that Canada generally, and the north-west provinces in particular, furnish traffic and profits more rapidly than the Canadian Pacific can deal with and gather. The further development of that great country depends very much upon the extension of the railway system in such a way as to bring the more remote regions into closer touch with Great Britain and the world at large.

Engineering Standards Committee.

REPORT No. 24, issued this week by the Engineering Standards Committee, is a somewhat bulky document dealing with sundry materials used in the construction of railway rolling-stock. No branch of British engineering industry has suffered more from the conflicting demands of consulting engineers than that of locomotive building. Apart from the question of general design, which has already been considered by the Committee, the selection of materials is a point upon which very divergent opinions are entertained. Consequently, the present standard specifications have only been settled subject to the proviso that they shall be reconsidered from time to time as occasion may require. Further, to meet the views of Home, Indian, and Colonial authorities, it has been found necessary in many instances to include what are practically duplicate specifications, one with and the other without a chemical analysis, in order that those who do not desire to specify a chemical analysis shall still be able to employ a standard specification. The Report comprises eighteen specifications, exclusive of those duplicated, and for the convenience of users the previously published Report, specifying forms of British Standard tensile test pieces, is printed as an appendix.

Standardisation of Steel Conduits.

WE have received from the Engineering Standards Committee the "British Standard Specification for Steel Conduits for Electrical Wiring." It is most essential that the conduits supplied by the various manufacturers should be standardised, and so we expect that this Report will meet with general approval. We notice that no dimensions are given for $\frac{1}{2}$ -in. or $\frac{3}{4}$ -in. tube; we presume, therefore, that tubes of these sizes will not now be made. Six sizes are given, ranging from $\frac{5}{8}$ to 2 in., and this ought to be sufficient for all ordinary requirements. The length and thickness of couplers and the length of the thread on the ends of conduits are fixed by means of simple empirical formulae, and this ought to prove satisfactory in practice. Conduits and their accessories are to be gauged at the works of the manufacturer, partly before and partly after enamelling or galvanising, and thus disputes can rarely arise. In one or two places we think that the Report might have been worded more carefully. For instance, we are told that the "radius of any bend" measured "from the centre of curvature to the axis of the bend" must not be less than certain given numbers. Now we are not told whether it is the inside, the outside, or the mean radius of curvature of the bent cylindrical pipe that is to be

ken. As this radius is only about twice the diameter of the pipe it makes great difference which line we take, especially when a sharp bend has to be considered. The recommendations as to gauging of the conduits are clear. Mini-gauges are to be used for determining the outside and inside diameter, but the average thickness of the steel conduits is to be determined by weighing at least 100 ft. of the conduit. The Report concludes by defining the various kinds of gauges. There are first the shop gauges, next the reference gauges, and finally the standard gauges, which are deposited in the National Physical Laboratory for purposes of reference. It is recommended that the reference gauges be certified and their accuracy certified by the National Physical Laboratory.

Concrete-steel Reservoir, Nuneaton.
A COVERED service reservoir, now in course of construction for the Nuneaton and Norton Hillmers Urban District Council, demonstrates the striking advantage with which reinforced concrete may be employed under difficult conditions. In consequence of old pit-workings in the vicinity of Nuneaton the ground is apt to subside unexpectedly, as well as to develop sliding movements. Owing to disturbances of this character, the brick and concrete covered reservoir formerly in service was cracked completely across, and as no site could be selected where absolute immunity from earth movements could be guaranteed, the district council decided, on the recommendation of their engineer, to build the new reservoir in concrete-steel. The new work measures about 100 ft. long by 80 ft. wide by 11 ft. deep, the capacity being 500,000 gallons. Being relatively light, the construction imposes far less weight on the ground than brick and plain concrete, and so has a smaller tendency to start earth movements. Moreover, as the whole of the work is monolithic and strongly reinforced, the reservoir may be compared to a shallow, self-contained tank of extreme rigidity, and capable of resisting any tensile or other strains that may be developed by subsidence or shifting of the ground. The confidence of the designer in the strength of the construction is shown by the fact that the reservoir is founded upon a "spoil bank," which, although some forty years old, is not consolidated for more than 18 in. beneath the upper surface.

The Honor Oak Reservoir Accident.
As OUR readers may have noticed in the daily Press, an unfortunate mishap occurred on Tuesday last at the new reservoir works for the Metropolitan Water Board. An aerial cableway for the conveyance of material had been stretched between two steel towers 70 ft. high, and while the erecting engineer was directing a trial trip of the carrier the tower upon which he stood commenced to heel over and fell to the ground. The engineer was picked up dead and several men were injured. From the evidence of the works' manager of the general contractors it appears that the cable was pulled up so taut—to clear the top of the reservoir—that the sag in the span of 700 ft. was only 5 ft. or

6 ft. That an error of judgment was committed by the victim of this fatality is tolerably certain, for it is most probable that the pull of the tightened cable imposed a strain on the anchorage that had not been contemplated by the designer of the structure. The mishap should teach erecting engineers that anxiety to complete their work must be tempered by caution, even at the risk of delay.

A PAPER by Mr. C. G. Darrach, C.E., printed in the last two numbers of the *Journal* of the Franklin Institute, contains a review of the development, design, construction, and mechanical equipment of those large office buildings, which in New York and other great American cities vie in population and importance with many large towns. The subject is a very extensive one, and each branch into which it naturally divides would furnish ample material for more than one paper. Consequently, Mr. Darrach has only been able to touch briefly upon the main features of such buildings, to mention a few historical facts, and to state a few points that may be of service as hints to designers. Although the day of office buildings dawned long ago in Great Britain, it must be confessed that the comfort and convenience of tenants have been very inadequately considered. The paper to which we refer is one that can be read with advantage by British architects, to whom the public have to look for the various improvements in the way of mechanical, sanitary, and domestic equipment that are still so much needed for office buildings in this country.

Sanitary Condition of Haverfordwest. **MR. G. C. HANCOCK'S Report** to the Local Government Board upon the sanitary circumstances and administration of the borough of Haverfordwest, and upon the recent prevalence of enteric fever there, seems to show that the insanitary conditions arise mainly from defects in water supply. In 1880 the public water supply was derived from two main sources—the Fountain Reservoir in the upper portion of the town, and the Scarrowscant Reservoir, then known as the Portfield Reservoir,* situated about half a mile out of the town. The latter was condemned as a source of water for dietetic purposes in consequence of the unwholesomeness of the water as demonstrated by repeated analyses. Therefore in 1888 it became necessary to increase the then existing supply:—

"This supply did not reach the highest levels in the town, and was, moreover, insufficient in amount. A site for a pumping station was chosen at a place called Crowhill, but was opposed at the public inquiry, and finally a site 1,000 yds. higher up the valley was obtained at Barnsley where a well was sunk. A reservoir to hold 180,000 gallons was constructed at Portfield into which the pump at Barnsley delivered. Water from this source was supplied to the town till the summer of 1900, when it was abandoned in consequence of the water being found impregnated with peroxide of iron, which coated the pipes, fouled the reservoir, and rendered the water unsuitable for domestic use. In May, 1904, the present Crowhill supply was established, though the Town Council had used the Crowhill site as a temporary pumping station since the summer of 1900. This site was the one originally chosen, but abandoned at the inquiry."

* This reservoir is not to be confused with the present Portfield Reservoir, which was constructed in 1888, i.e., since Dr. Parsons's report.

The water is derived by means of pumping from a shallow well situated at Crowhill. The Engineer's house is situated some 100 yds. or less from the well, and the sanitary arrangements of this dwelling are bad in the extreme. Seven people, five of them children, reside in this house, which is undrained. A pail closet receives the household excreta and is said to be emptied once a fortnight, the contents being buried in the garden. Circumstances seem to be even more unpromising at the Fountain Reservoir, which is fed by springs within the reservoir itself:—

"The reservoir is enclosed by a 6 ft. stone wall. Abutting on this wall, on the north, is one of a pair of cottages—indeed, the wall forms part of one side of the cottage. This dwelling consists of three rooms and is occupied by ten persons.

"Excrement from this cottage is accumulated in a pail closet on these premises, which pail closet is periodically emptied, together with part of the house refuse, upon an adjoining garden at a spot only four feet from the reservoir. There was a large deposit in this garden of the mixture of human excrement and house refuse at the time of my inspection."

It is noted also that a large number of the houses are not provided with cisterns, but the inmates store their water in pots, pans, and such like receptacles, and that 638 houses are provided only with hand-flushed closets, "which are mostly in a foul and offensive condition," as is always the case with such an arrangement.

Changes in Grosvenor-square, London. IN October will be offered for sale by auction, at the Mart, the lease of No. 40,

which is held from the Duke of Westminster for an unexpired term of thirty-three years from September current at a ground rent of 252*l.* per annum. The property has a frontage of 44 ft., and extends to a total depth of about 210 ft., with extensive stabling in the rear. Having regard to the historical and personal associations which attach to many of the houses in Grosvenor-square, we may mention that No. 40 stands on the south side, and that it was numbered "35" until the re-numbering of the houses eighteen years ago. The present No. 35, formerly "No. 30," on the south side at the corner of South Audley-street, was the home of John Wilkes, whilst the house formerly "No. 40" (and now No. 45), is sometimes, though erroneously, mentioned as being Lord Harrowby's, wherein the Cato-street conspirators intended to murder the King's ministers whilst at dinner, on February 23, 1820. Messrs. Read & Macdonald have been appointed architects for the rebuilding of Nos. 22-3, formerly Nos. 19B and 20, on the west side, at the corner of North Audley and Upper Brook streets.

Getting Church Designs Cheap. A CORRESPONDENT sends us the following delightful advertisement, cut, we are told, from the *Church Times* of August 24:—

"PICTORIAL POSTCARDS of small, artistic, Gothic churches would greatly help a committee to choose a design for a Highland church to hold about 300. Anyone sending these will receive Highland views in return and will greatly oblige."

We suppress the address to which those who are inclined to sell church designs for photographs of Highland scenery are invited to write. Among the various

means that are employed from time to time for getting architectural designs cheaply this strikes us as the most original that we have come across.

THE TRADE UNION CONGRESS.

THE thirty-ninth annual Trade Union Congress opened at Liverpool on Monday, and will continue its deliberations throughout the week, and we must reserve any detailed comment on the proceedings until next week. The Presidential address was couched in moderate terms, especially when the plastic attitude of the present Government towards the trade unions is taken into consideration. Jubilation on this head was somewhat toned down by the fear of splits arising in the ranks of the Labour Party itself. The old cry once again appeared in the Presidential address that trade unionists would only be satisfied with equality in the law regulating associations of employers and employed, but at the present time it is not easy to determine what such observations betoken. If the present Trades Disputes Bill is to become law, it is clear such equality will no longer exist, but that the law will favour the employees' unions to the detriment of the employers. It can hardly have been the intention of the President to raise this objection, and therefore we can only imagine that his remarks were called forth by doubts as to whether this Bill will ever become law.

The Presidential remarks on the problems arising in connexion with the "starving unemployed" harmonised ill with certain expressions contained in the Report of the Parliamentary Committee. The Report states:—"We must no longer be content to fight for a living wage which is measured by the iron-bound law of supply and demand. We want something even beyond. The demand should be for a higher standard of living; something that will enable us to educate our families, to participate in art, literature, and music and half the good things that help to make life bright, happy, and comfortable." How can a body of so-called business men deliberately pretend to ignore every economic law that has ever been known to the civilised world—to claim employment for men for whose labour there is no demand and in the same breath to demand factitious rates of wages and luxuries and amusements for those employed? The unions are fond of such random statements to excite the interest of their least desirable members, but ignore the plain facts so well known to everyone else, that the standard of wages and living has advanced of late years by leaps and bounds; that the comfort and amusement of the people has been the chief study of the local authorities; and that the working people derive much benefit from the rates levied on all classes. It is hard to make bricks without straw, but it is harder still for trade unionist leaders to make statements founded on hard statistics, and allowance must be made for the militant sensationalism with which these leaders have to draw audiences on such occasions as the annual meetings.

TALL CHIMNEY CONSTRUCTION.

By J. E. STAFFORD, C.E.

As much diversity of opinion exists regarding the form, height, and general details connected with the erection of chimney-stacks, and as so many of these are now being constructed in various parts of the country in connexion with electric-lighting stations, new manufacturing premises, etc., it may prove of some interest to our readers if we submit the following detailed particulars, with drawings, of a tall chimney erected some time ago in connexion with the Isis Portland Cement Works at Clitheroe, Lancashire.

The stack was designed by and erected under the superintendence of the writer, after considerable practical experience in work of a similar nature.

In dealing with the question of the erection of a chimney many details have to be considered, some of which are as follows:—

(a) Situation, having regard to convenience of site, with a reasonable length of horizontal flue from boilers, etc., in order to assist the draught.

(b) Height, due consideration being given to the

adjacent surroundings, i.e., other tall buildings, hills, etc.

(c) Suitable ground for foundation.

(d) Shape or form of stack, i.e., square, octagon, or circular.

With regard to the question of situation, it is, in the opinion of the writer, advisable to have a length of horizontal flue beneath the ground level, and between the boilers and the chimney, as this not only materially assists the draught, and thus saves height in the stack, but it also takes the greatest heat from the boiler flues, which is thus somewhat diminished by the time the chimney is reached.

The height of the stack should also be carefully considered, in order to establish good draught, and the local by-laws fix the minimum according to the h.p. of the boilers under the Smoke-Prevention Act, but it is always advisable to allow a fair margin in the question of height, considering the little extra cost entailed in the first instance.

The matter of the foundation requires much care and attention not only for the stability of the structure but in order to avoid an excess in depth or special precautions, such as piling, extra concrete, or footings, etc., and a suitable place can only be decided upon after the usual methods of sinking trial-holes in order to ascertain the existence of rock or other solid substratum.

With regard to the form or shape of the stack, i.e., square, octagon, or round, much depends on the designer's ideas of stability, coupled with appearances; but in the opinion of the writer the circular design is the best, for several reasons, and amongst these are:—

(1) The minimum amount of building material, i.e., bricks or stone, is required, and thus a saving in the cost and time in erection is effected.

(2) Less resistance to wind pressure.

(3) The circular form insures quicker drying of the structure during erection, and this is a very important matter in chimney building, as we shall deal with more fully later on.

Having briefly dealt with the most salient points connected with the designing and construction of chimneys, we will now give the particulars of the design and erection of the stack before referred to.

Fig. 1 of the accompanying drawings shows the half-elevation and half-section of the chimney.

Fig. 2 is an enlarged section in detail of the lower portion of the structure, showing fire-brick chamber, entrance to horizontal flues, mid-feather, flooring, and concrete foundations.

Fig. 3 is a plan of the bottom of the stack.

Fig. 4, enlarged half-elevation and section of top portion of the structure showing cap, principal moulding, neck moulding, etc.

Fig. 5 is the half-plan of the top at the cap and half-plan on mould line, and shows the joints in the terra-cotta moulding.

The situation of the works where the chimney was required was influenced by the fact that it was part and parcel of an extensive limestone quarry, and consequently the foundation was not far to seek, neither was the height (beyond the local by-laws requirements) to be taken into consideration, there being no tall buildings or high lands immediately adjacent, and therefore the design of the stack became a matter of shape only. This being so, the writer had practically no questions at issue, and at once decided that the chimney should be a circular one, of brick, with terra-cotta mountings.

The stack was required not alone for the large Lancashire boiler, but also for the necessary kilns employed in the manufacture of Portland cement, and it was decided to fix upon a site about 50 yds. away from both boiler and kilns, with the two flues entering the chimney at right angles, as shown in Figs. 2 and 5, and the height was fixed at 150 ft. above ground level.

The excavation for the foundation was in shale and clay, and was readily removed, and the solid rock was found at a depth of about 10 ft. to 11 ft., and the excavated material on being removed was burnt near the site and subsequently used as ballast in the concrete.

The surface of the rock was carefully cleaned and left in its jagged condition without any attempt at securing a flat or even surface, and the major portion of the concrete, which was composed of about four-parts of the before mentioned burnt ballast to one-part of fresh burnt lime obtained from the adjacent limeworks, was laid in the bottom of the foundation to a

thickness of about 4 ft. 6 in. and irregular in form or plan, and this was allowed to stand for several days to set, after which another or top layer of concrete of six-parts limestone (a quantity being 2-in. chippings) to one-part of Portland cement was laid and the surface carefully floated over to form a bed for the firebrick flooring of the stack, which was composed of bricks 6 in. thick.

The concrete surface was finished 3 in. higher round the circumference of the chimney in order to take the first course of brickwork of the shell, as shown in Fig. 2, this foundation being brought up to a finished surface 6 ft. below ground level.

It was decided that the inside diameter of the chimney should be 6 ft. in the minimum, and a firebrick chamber 9 in. thick and of this diameter throughout was erected to a height of 30 ft. from the chimney floor (see Fig. 2), with a cavity round it commencing at the bottom at 18 in. wide and tapering upwards with the batter of the structure.

This firebrick chamber was constructed in order to take the extreme heat from the flues, and thus protect the outside shell of the chimney, which was in no way attached to the heat chamber, and, in addition, in order to endeavour to further protect the outside shell from the effects of the great heat, ventilating holes were left at intervals round the circumference in the bottom courses of the brickwork.

In this chamber the flue-openings (3 ft. wide by 4 ft. 6 in. to inside top of arch) were formed at right angles, as before stated, and to prevent back draught by the smoke from both flues coming in direct contact with each other on the horizontal, a firebrick midfeather 10 ft. high and 6 in. thick was erected.

The outside or shell of the chimney was built of radiated red-facing bricks, for which this part of Lancashire is so well known; and the inside with common straight red bricks, and was begun with a thickness of 2 ft. 3 in. (three bricks) at the bottom and continued to a height of 46 ft., with a batter of $\frac{1}{4}$ of an inch to the yard, which was maintained throughout the structure.

At this height of 46 ft. the inside or flue diameter was 8 ft. 8 in., and the brickwork was reduced to a thickness of 1 ft. 10½ in. (two and a half bricks), which was carried up 35 ft., the inside diameter then being 7 ft. 7 in., when it was again reduced to 7 ft. 6 in. (two bricks) and taken up another 30 ft. with the inside diameter of 6 ft. 11 in., being then further reduced to a thickness of 1 ft. 1½ in. (one brick and a half), and this was continued up to the underside of the terra-cotta mould, a height of 35 ft., but a brick neck-mould, consisting of two courses of bricks with an oversailing of 2 in. to each course, then three courses of bricks with one set off of 2 in., and finished with a right angle splayed brick-course of 3 in. thick, was introduced at a height of 135 ft. 6 in. (See Fig. 1 and 4.)

The terra-cotta moulding with an internal diameter of 6 ft., was buff in colour, and in three courses of 1 ft. 3 in., 1 ft. 1 in., and 1 ft. 2 in. respectively, the top course being composed of twelve pieces, the second course ten pieces, and the bottom course eight pieces, and these were all secured to each other by horizontal and vertical dowels of copper, ninety of these being employed.

The total weight of this terra-cotta moulding was about 11 tons.

In the top course of this moulding a hollow space was cast in each piece 4 in. wide by 2 in. deep, and after the moulding was fixed this hollow space formed a complete circular cavity of the dimensions named, into which a solid wrought-iron ring or hoop, 3 in. by 1½ in., and weighing 2½ cwt., was bedded in cement mortar, making one complete cramp, and thus preventing any chance of the pieces having a tendency to bulge outwards.

Above this moulding was the concluding or top-piece of brickwork, with a length of 9 ft. by 9 in. thick, with a uniform inside diameter of 6 ft., and this brickwork was finished at top by a splayed cap of terra-cotta, 12 in. by 12 in., in eight pieces, cramped together with iron cramps.

A conner tape-ribbon lightning conductor, ½ in. wide by ⅞ in. thick, with a suitable five-pronged top, was fixed to the stack.

The mortar throughout for the red brickwork was of lime and ground burnt ballast containing a large percentage of limestone, but the terra-cotta moulding and cap were built in Portland cement mortar, whilst the fire brickwork was bedded in fireclay.

The total weight of the chimney was as follows:—

Red brickwork in shell.....	439½ tons.
Fire brickwork in chamber, flues, mid-feather, and flooring.....	32 "
Terra-cotta moulding and cap, including wrought-iron ring, cramps, and dowels.....	12½ "

Total weight on foundations..... 484 tons.

The cost of the structure was materially reduced by reason of its position with regard

to suitable material, both in ballast and lime, which were obtained, as we have explained, on the spot; but a similar structure, taken at current prices, could be erected for a sum not exceeding 550*l.*, or about 3*l.* 10*s.* 6*d.* per lineal foot of chimney, provided no unforeseen outlay had to be incurred in obtaining a suitable foundation.

Throughout the entire building inside scaffolding was employed, thus affording shelter to the workmen, while being easy of construction and making good on removal, and a considerable saving in cost over outside scaffolding.

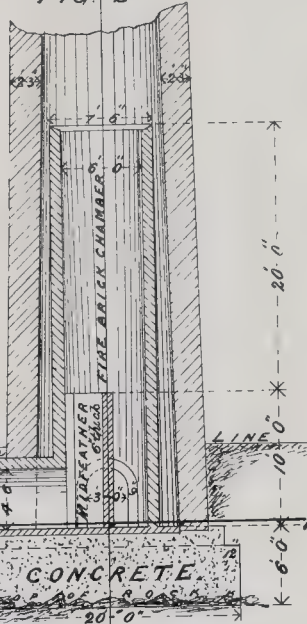
The work was done during the early spring of the year, and great care was taken in protecting the south-east face by covering

the brickwork with tarpaulin-sheets during wet weather, and this is a most essential matter of which the writer has had considerable experience through the accidental falling of a few chimney-stacks, notably those at Cleckheaton, in Yorkshire, and at Burnley, in Lancashire, in both cases several lives being lost, and, as pointed out in the particulars written by the writer hereof, which were published at the time of the accidents, these chimneys fell to the south-east, which was attributed to the fact that during the construction the strength of the mortar on that face had been considerably weakened by exposure to the damp, and thus taking much longer to set than that of the other points of the compass fanned by the dry and

ENLARGED DETAILS.

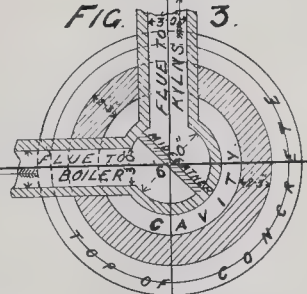
Scale ¼ of an inch = 1 foot

FIG. 2



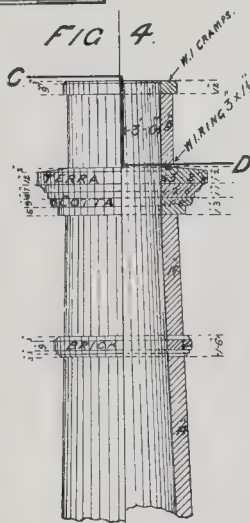
SECTION ON LINE A.B.

FIG. 3.



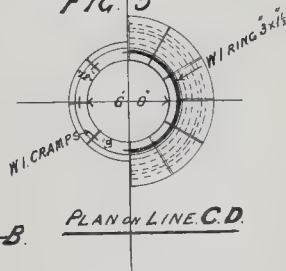
PLAN ON LINE E.F.

FIG. 4.

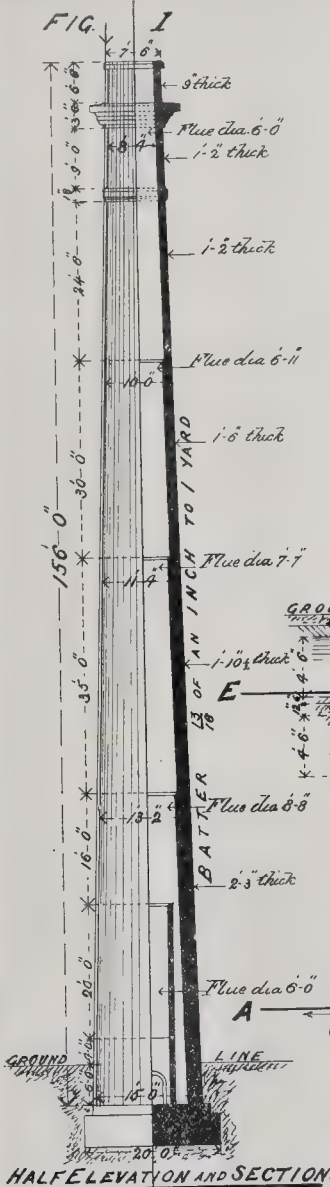


HALF ELEVATION AND SECTION OF TOP Shoring Mould + Cap

FIG. 5.



PLAN ON LINE C.D.



HALF ELEVATION AND SECTION.

Scale ¼ of an inch = 1 foot

0 5 10 20 30 40 50 FEET

Illustrations of Tall Chimney Construction.

stronger winds from the north and western quarters.

In conclusion, I may say the chimney herein described has been in use for several years, and is in every way satisfactory, and has done the work required of it very well.

A NOTE ON HOUSING OF THE WORKING CLASSES.*

This is essentially not a paper dealing with the whole question, but merely a note, or perhaps it would be better described as an appeal for further consideration on the question of the advantages and disadvantages of block dwellings and cottage tenement, more particularly relating to towns.

There are certain places which contain unsanitary, miserable, and dirty areas which, for every reason, it is desirable should be cleared. The only thought given to these cleared sites is that they should again be used for so-called model dwellings. Upon these valuable sites expensive buildings are erected, known as model block dwellings, the cost being about 60l. per person accommodated, and about 84d. to 9d. per foot cube; this is taking a moderate estimate. Every acre takes about 1,100 persons; roadways or playgrounds, 40 ft. wide, are provided between each block of buildings. This is not a great advance for the XXth century, and no doubt these 40-ft. roadways or "playgrounds" were only provided when they were found absolutely necessary to give light for a six-story building. The sanitary accommodation being used in common is most undesirable. The rents charged are 3s. to 4s. 3d. per room, and about 12s. per week for four rooms inclusive; the return on the capital being a fraction under 4 per cent. Taking the plans of a block such as those just mentioned, we find that the single rooms are planned to act as living-room and bedroom, the food cupboard being placed closed to the foot of the bed! The superficial area of this room is 150 ft. In the two-room tenement the plans show living-rooms of about 150 ft. superficial and bedroom of 120 ft. superficial, containing one double bed, one single bed, and a cot, the room containing cubical capacity of just over 1,000 ft., or about 250 ft. cube per person—not so much as they allow in our prisons and workhouses, nor so much as the London County Council demand for a common lodging-house; and please be it always remembered that these premises are designed for constant use, and occupied by working families.

If one of the occupants is ill, can you conceive a more undesirable place to reside with summer temperature and four people sleeping in a room of 120 ft. superficial? It must also be kept in mind that such tenants as occupy these premises can never get away for a holiday; they are kept pent up winter and summer always in the same condition, just a 40-ft. roadway or "playground" surrounding their dwellings. This is a fair description of the usual style of "model" block dwellings.

The cottage tenements usually consist of two floors—ground and first—giving accommodation for two families, separate entrance being provided for each family, and also in some cases, as at those excellent cottages built at Battersea (Letchmere estate), providing also a separate entrance to a back garden for each tenant; the cost being 7d. per ft. cube, and 61l. per room. These premises were built by direct labour, paying full wages, and include cost of artesian wells, roads, sewers, etc.; everything here tended to run up the cost, and yet the scheme pays, with reasonable rents, 10s. per week for four rooms with bath, scullery; and 7s. 6d. per week for three rooms and bath, scullery; the rentals being 2s. 6d. per room, and bath, scullery, added in. The accommodation provided on this estate is for about 200 people per acre, or, if you exclude the recreation ground, the accommodation is about 267 people per acre.

Why have block dwellings when there are hundreds of acres to sell, freehold, at 500l. per acre within eight miles from the Marble Arch (if this is so in London, other large cities must be more fortunate), places served

by at least three railways, with good train service and very cheap workmen's tickets? The Acts allow the authorities to build outside their own district, and yet they will continue to build these "model" block dwellings in the heart of confined and unhealthy districts, providing no gardens (always remembering they do provide the miserable "playgrounds" 40 ft. wide).

What would be the cost of a housing scheme within the distance above-mentioned? For calculating purposes we may take the area as being an estate of 15 acres; allowing 3 acres for recreation ground, we get the following figures:—

Capital Outlay.	£
15 acres of land at 500l. per acre, equals	7,500
300 tenement cottages, each accommodating two families, cost of same being 400l. per house	120,000
Cost of roads, sewers, artesian wells, fences, etc.	9,000
Sundries	3,500
Total cost	£140,000

Income.	£
300 houses (two tenements), each floor consisting of three bedrooms, living-room, and bath, scullery, and separate conveniences, let at 6s. per week per floor of four rooms and scullery, equals 12s. per house per week	£9,360

Expenditure.	£
Repairs, loss of rent, insurance	600
Repayment of loan and interest, calculated at 4 per cent. for loan for sixty years	6,750
Rates, etc., at 6s. in the £	500
Collection, caretakers, and superintendence	£7,850

Income	9,360
Expenditure	7,850
Net profit per year	£1,510

showing a good net profit, which is quite sufficient for municipal enterprise.

In the above figures I have taken the following broad principles, which I consider should govern all buildings for the working classes:—

- 1st. Not more than 250 persons per acre of land.
- 2nd. No building should be more than two floors high.
- 3rd. Every tenement should have a garden adjacent to the house.

As shown above, no financial difficulty need arise, and there is no doubt that the present system of block dwellings is most unsatisfactory both from the physical and mental point of view, and the idea of providing small cottages with a plot of garden attached to each is an excellent one—one which ought to appeal to the mind of everyone.

It is much to be regretted that in these days, notwithstanding the rapid strides science has made, one of the three very essential factors for our existence in health, for some reason or other, is grossly neglected among many people, perhaps for the sake of supposed economy, but which, however, in the long run proves to be otherwise. One of the causes of consumption—the disease which accounts for thousands of deaths annually—is the want of this neglected factor—fresh air. It is true that a certain germ is the direct cause, but the predisposed cause is the lowered vitality of the individual. And yet how many do know that to this state a person must be brought before the disease can attack him? While fresh air is essential for the building of the tissues, and so increase their power of resistance, impure air, on the other hand, acts conversely on the system, lowers the vitality of an individual, and renders him liable to all the various forms of diseases of which this world is so full. The importance of fresh air cannot better be illustrated than the open-air treatment which is now being adopted all over the world in cases of consumption, and it is not much to say that in the treatment of all diseases fresh air is of prime importance. It seems a false economy to erect block dwellings which only serve as a breeding-ground for disease to supply the sanatoriums which are being built at enormous cost. Fresh air is as much a necessity as food, but it cannot be obtained to one's best advantage in a house, no matter however well ventilated that house may be.

In view of the great important part alone

which this climate plays, as already illustrated, the theory of a small garden should receive the unanimous support of all.

Moreover, the garden has some other part to play than wherein we receive the whole some air, for its delightful surface of green mingling with the forms and colours of nature serves a new charm for us in our perception. The influence of the forms and actions in nature is so needful to man that in its lowest functions, it seems to lie on the confines of commodity and beauty. To the body and mind which have been cramped by labour, nature is medicinal and restores their tone. The workman comes out from the confines of impure air, out of the din and craft of the street, into the open garden where he breathes the reviving atmosphere, and sees the sky and works of nature, and is a man again. In their eternal calm he finds rest—refreshing to the body and pleasing to the mind. Again, to those who thirst for knowledge, as nature is the incarnation of a thought and turns to thought again, every moment instructs and every object, for wisdom is infused into every form.

It may be stated that the moral influence of nature upon every individual is that amount of truth that it illustrates to him.

Mr. Rider Haggard, in giving evidence before the Select Committee of the House of Commons on the Housing of Working Classes Act, stated that at a place near Waltham, in Essex, twenty men had only a shed to sleep in, and lived winter and summer under an elm tree. Personally, I would much prefer this system of "housing" to the block dwellings. The men living under the tree were healthy and strong. Pray how many out of twenty men living in block dwellings would be in so good a condition?

It certainly does sound like housing on the lines that cattle are housed, but it is preferable to be thus accommodated than like so many bales of wool and other goods, stacked floor above floor, in every sense similar to a warehouse. No privacy, no home life, nothing to take an interest in, and driving, as it of necessity must, the people to seek diversion in the gin-palaces and other undesirable places. To fully understand and appreciate the pleasures of living in block dwellings, one should spend at least twelve months there; you would find that existence is almost impossible without week-ends in the country and good long holidays.

No parks or public open spaces will ever make up for the lack of pure air and brightness immediately around the dwellings; they are most desirable and necessary. We must not, however, counteract the beneficial results arising from them by building unsuitable dwellings 50 ft. or 65 ft. high, with only 40-ft. roads or "playgrounds."

There are some excellent examples of cottage tenements in addition to those already mentioned; those at Camberwell are provided with a small garden. The Artisans', Labourers', and General Dwellings Company, Ltd., have done some excellent work at Noel Park, Wood Green; the houses have small gardens, and it is pleasing to see that in some cases the elevations have received more consideration than usual. The Peabody Trust have also good examples (the pantries in some cases have no proper ventilation).

The London County Council have erected some good cottages at Tooting; unfortunately the area at back is very small. (I must add here that the London County Council have certainly added to the architectural beauty of London by their model dwellings.) At Southampton cottages have been built at a cost of 67l. per room, whilst their ugly undesirable block dwellings cost over 116l. per room. The cottages have most satisfactory elevations. At Eastleigh the L & S. W. Railway Company are providing houses for their employees; the gardens are most pleasing, but the elevations might have had some further consideration. (The food cupboards have no proper ventilation.) As far as Manchester is concerned, every member here should take the opportunity of seeing the houses at Blackley estate. It is particularly satisfying to observe that the elevations have had consideration; but why no proper ventilation to food cupboards? Port Sunlight should be carefully examined as an excellent model for country housing. No one can realise the excellent work done by Mr. Lever, M.P., without an inspection of his work at Port Sunlight.

* A Paper read by Mr. A. Abul, H. Scott before the Institute of Sanitary Engineers at Manchester July, 1906.

In conclusion, may I express my most sincere hope that block dwellings are a thing of the past! They can be conveniently converted into good warehouses. No money need then be wasted.

THE ARCHITECTURAL ASSOCIATION.

The following are the papers announced for the ensuing session of the Architectural Association:—

- October 5.—Annual General Meeting. President's Address and Distribution of Prizes. Mr. R. S. Relfour, F.R.I.B.A.
- October 19.—The Architecture of the Roman Empire. (Illustrated by lantern views.) Mr. Alan Potter.
- November 2.—Axiology in Architectural Composition. Mr. H. Stannus, F.R.I.B.A.
- November 30.—The Difficulties which beset an Architect in London, with Special Regard to Existing Legislation. Mr. W. Woodward, F.R.I.B.A.
- December 14.—Architecture of Sicily. (Illustrated by lantern views.) Mr. W. Howard Schu-Smith, F.R.I.B.A.
- January 11.—(Subject to be announced.) Mr. Temple Moore, F.R.I.B.A.
- January 25.—(To be announced.)
- February 8.—Recent street. Mr. Mervyn E. Macartney, F.R.I.B.A.
- February 22.—Training and Workmanship. Mr. Gerald C. Horsley, F.R.I.B.A.
- March 8.—Spanish Architecture. (Illustrated by lantern views.) Mr. A. N. Prentice, F.R.I.B.A.
- March 22.—Sanatoria. Mr. Edwin T. Hall, F.R.I.B.A.
- April 12.—Westminster Cathedral. Mr. J. A. Marshall.
- April 24.—Theatres. Mr. Frank T. Verity, F.R.I.B.A.

The Council of the Association intend to try the experiment this year of issuing, at the end of the session, a bound volume containing all the Sessional Papers, provided the scheme receives promise of sufficient support.

Archæological Societies.

EAST RIDING ANTIQUARIAN SOCIETY.—On the 27th ult. the East Riding Antiquarian Society varied their programme by an excursion into Lincolnshire, visiting South Ferry Church and Horkstow Hall. About fifty members attended, the President, Lord Liverpool, being of the party. At South Ferry the vicar, the Rev. J. Spawforth, met the visitors, and conducted them round what is left of the church of St. Nicholas, which having been built on the slope, is presumed to have been ruined by slipping down the ground. The most interesting portion of it remaining is the Tympanum, assumed to be of XIth or early XIIth century date. Mr. Wright Taylor suggested that the Tympanum had come from the east wall of the old church. It illustrated the bishop anointing the Cross, as the Ritual prescribed. The bishop depicted would probably be the bishop of the diocese at the time the stone was erected, which, he should say, would be about the year 1120. Mr. Shepherd described the church, remarking that the foundations extended a good way towards the main road. In the tower were a number of fine old bells, but it was difficult to say what the original church was like by reason of the many alterations from time to time. The tower was worth notice, for by some it was thought to go back to the Saxon period. It was built of local chalkstone, and had been cased with bricks. Subsequently the party proceeded to Horkstow Hall to view the Roman pavement uncovered in 1797, and of which the late proprietor of the hall, Mr. Calthrop, had made a special study. It contains various representations of men and animals. The party subsequently visited Saxby, Bonby, and Worlaby Churches.

COUNCIL SCHOOL, HALIFAX.—The first elementary school erected at Halifax since the Town Council became the education authority was formerly opened on the 3rd inst. The new school is situated at Salter-hebble, near the Huddersfield-road, and is a stone structure. There are five classrooms and a babies' play-room. Entering the building, there are lavatories; an 8-ft. wide corridor gives access to the lavatories, cloak-rooms, and classrooms, and also to an assembly-hall, which is 40 ft. by 24 ft. The building is heated on the low-pressure hot-water system, with radiators, and ventilated by extracting ventilators. In the playground there are two covered play-sheds. The total cost of the buildings and furniture is £370. The buildings have been erected according to the plans of Mr. J. Lord, the Borough Engineer.

ACQUISITIONS BY THE BRITISH MUSEUM.

In his Report on the general progress of the Museum in 1905, Sir E. Maunde Thompson, Director and Principal Librarian, states, *inter alia*, that the excavations which have been in progress since 1903 on the site of ancient Nineveh were brought to a close in February, 1905. The mound of Kouyunjik has now been fully explored, testing trenches having been cut in all directions in order to be sure that no remains have been overlooked. The principal recent discovery is the site of the Temple of Nabu, the War God. The ruins were cleared, but the building had been so utterly destroyed and burnt, presumably by the Elamites at the capture of the city, that it was not possible even to make a complete plan of it. The library of tablets which it probably contained must have been entirely destroyed. So thorough, indeed, was the destruction of the city by the conquerors, that judge from the conditions of the remains, that the preservation of the collection of tablets in the Museum, and forming only a part of the great library of Sennacherib and Ashurbanipal, must be attributed to some accidental falling-in of debris, which thus covered them and saved them from the enemy.

The excavations on the site of the Temple of Artemis at Ephesus were brought to a close on June 17. The result of the two seasons' excavations is as follows:—The remains of four temples, superimposed one on another, have been examined. Taking these temples in order, from the latest to the earliest, they are:—(1) The temple of the middle of the IVth century B.C., which was the main object of Mr. J. F. Wood's exploration. Mr. Wood removed almost every relic of it, and his work proves to have been very thorough. The remains which he discovered are those now in the British Museum. (2) The temple built in the middle of the Vth century B.C., usually associated with the name of Croesus, was the original object of the recent exploration. This temple was only touched by Wood. The whole area of the surviving platform has now been cleared, and, from the numerous fragments recovered, an architectural restoration of all except the architraves will be possible. (3) The third temple, the existence of which has been hitherto unsuspected, was very little below the level of the one above, and was of smaller area. Only small traces of it remain, and its period of existence was probably short. (4) Of the lowest and earliest temple, the structure of what may have been the naos or statue-base alone remains. The lowest blocks of this structure are laid on the virgin sand. It was here that numerous objects of gold, ivory, etc., were found. From the style of these objects it is inferred that the period of this earliest temple was probably not earlier than the VIIIth century B.C.

A list of acquisitions made by the Museum in the department of Egyptian and Assyrian Antiquities has been prepared by Mr. E. A. Wallis Budge, Litt.D., and it includes the following:—The south wall of the chapel of the largest and most important pyramid of the northern group of the pyramids of the Island of Meröe in the Sudan. This pyramid was built for one of the great Queens of Meröe, who bore the title of "Candace," probably during the first or second century of the Christian era, and its chapel and forecourts and propylons were sculptured with elaborate reliefs, representing the Queen's funeral procession, the offerings made in the tomb, etc. The Queen's name is nowhere found on the walls, hieroglyphics, and the cartouches, which are sculptured in high relief, and in a very prominent place, have not been filled up. At one end of the wall the queen is seen seated by her consort, whose name also is unknown. She wears a fringed garment, with ropes and tassels, and on her arms are elaborate ornaments. The reliefs on the other portion of the wall represent a table of offerings, the Hall of Osiris, the Judgment Scene, rows of divine and other figures making offerings and pouring out libations before the Queen, who is also seen leading four bulls for sacrifice. The reliefs on the wall are typical of the best class of funeral sculpture in the Island of Meröe, of which, before the arrival of this object, there was no example in the national collection (presented by the Government of the Sudan, 1905). A handsome rectangular limestone slab from the door of the tomb of Pari, a priest of Ptah and overseer of the estates of the god Amen-Ra of Thebes. The deceased flourished in the reign of Amen-hotep III., about B.C. 1450, and an interesting throne name of this king is inscribed on the slab (presented by Mr. Robert Bond).

In the department of Greek and Roman Antiquities the additions to the collection include three fragments of columns in green limestone, decorated with zigzag bands and

spirals. These fragments form the greater part of the two columns which stood on either side of the entrance to the "Treasury of Atreus" at Mycone (presented by the Marquis of Sligo); three plaster casts of fragments of a column and of the capitals of the two Mycenaean columns (presented by the Greek Government); and plaster cast of a fragment of one of the capitals of the Mycenaean columns (presented by the Karlsruhe Museum).

Mr. C. H. Read's catalogue of the acquisitions to the department of British and Mediæval Antiquities in 1905 includes the following items:—A model of Stonehenge; four late-Keltic cinerary urns, one of the pedestal type, from Rochester, given through the National Art Collections Fund; an alabaster incised preservation of the Resurrection, in exceptional preservation, with gilt and coloured ground, English work, about 1600; four mortuary crosses of lead, found with many others in graves on the site of Christ's Hospital, City of London; ancient Buddhist figures in bronze and inscribed plinth, from Bezvada, given by the Secretary of State for India; wooden screen with inscriptions in Chinese, Tibetan, Mongolian, and Manchu, recording the dedication of a figure from Lhasa in the Great Lama temple at Pekin; a number of brass, copper, wood, and stone figures of deities, many containing manuscripts and charms, temple crosses, pictures, furniture, and book-covers, idol ornaments and charms from Lhasa and monasteries in Tibet collected by Col. H. A. Iggulden during the expedition in 1904; a series of objects illustrating the ethnography of Corea, including temple furniture and ancient bronze bowls from the tombs of the Kury dynasty at Taikou, Corea; an extensive and important series of stoneware carvings in human and animal form, together with iron weapons and ornaments, and a large number of fragments, collected on the site of the ruins at Umtali, Rhodesia, given by the Rhodes Trustees; a collection of great interest representing the contents of a Jui-houise in a mangrove belt near Allaba in the Andoni country, Southern Nigeria, which was destroyed by the Government in consequence of human sacrifices which had taken place there, the collection including a large ivory horn, ornamented with four human skulls, a skull ornamented with goat skulls, ceremonial swords and spears, and figures of cast-bronze, showing considerable skill in workmanship, together with a large series of *manillas* of various sizes, some particularly large and ornamental, given by the Government of Southern Nigeria.

Obituary.

ALFRED STEVENS.—We regret to record the death, on the 24th ult., at Paris, of Mr. Alfred Stevens, a painter who, though a Belgian by birth, may be said to have belonged to the French school, as he came to Paris at an early age, and was a pupil first of Navez and afterwards of Camille Roqueplan. He was a painter of figures, of sea-pieces, and of landscape; but his real reputation rested on his paintings of modern ladies of the Parisian type. Stevens exhibited for the first time in 1850, and since then had sent regularly to the annual exhibitions. A good draughtsman and a brilliant colourist, he became one of the painters most sought after in his time for "scènes d'intérieur," and his pictures of this class, in regard to physiognomy, fashions, and costume, are really authentic documents of the epoch in which he worked most, from 1850 to 1880. For several years he had lived a very retired life, completely apart from the artistic world in which he had formerly been a prominent figure. Stevens obtained a Third Medal in the Salon of 1855, and a Second in that of 1855. He became a member of the Legion of Honour in 1863, and was promoted Officer in 1871, and Commander in 1878. Stevens, who was born at Brussels, was 78 at the time of his death.

MR. CHARLES.—We regret to announce that Mr. James Charles succumbed to a surgical operation on August 27, at an early stage of his highly successful career. Mr. Charles was an Associate of the Société Nationale des Beaux-Arts, and was a frequent exhibitor at the Salon of the Royal Academy, and the New Gallery.

MR. LEDGER.—The death, on September 2, the result of an accident, is announced of Mr. Frederic William Ledger, of Ashton House, Epsom, aged 50 years. Mr. Ledger was elected an Associate of the Royal Institute of British Architects in 1882. He was architect of the Conservative Club-house at Epsom (1898), and of a new factory for Messrs. R. H. & S. Rogers, at Cliftonville, Bolnisi-road, Bermondsey. Eight years ago he prepared the

plans and designs for the rebuilding of No. 24, Brook street, Grosvenor-square; and he was, as we gather, the architect of the Wesleyan church in Parchmore-road, Thornton Heath, designed after the Perpendicular style, for a total of 650 sittings, and with a corridor for connecting the church with the future schools.

Mr. SAMPLE.—The death, on August 27, at his residence, Bothal Castle, Northumberland, is announced of Mr. Thomas Sample, who succeeded his father as land agent to the Duke of Portland, having previously been joint agent with his father in that capacity. Mr. Sample conducted an extensive practice as an arbitrator and in connexion with lauded properties in the locality.

Correspondence.

FOTHERINGHAY CASTLE.

SIR,—In your report on August 18, p. 227, ante, of the Architectural Association annual excursion it is stated that—

"The original plan of the castle is quite undecipherable, and no drawings or plans exist, so far as is known, either in the British Museum or the Record Office."

In the Stewart Exhibition, 1889, were shown three of the whole-length portraits of Mary Queen of Scots, known as the "memorial type," left respectively by Queen Victoria, Blair's College, Aberdeen, and the Earl of Darnley. In the background of each picture is represented the execution of sentence upon Queen Mary with a view of the interior of "Acla Fotheringhami." A similar "memorial" portrait was sold at Christie's many years ago. Sir George Scharf's essay on the pictures is printed in the Society of Antiquaries' *Proceedings*, 1876. I do not know whether the authenticity of that view of the interior of the hall (re-erected at Cunnington) has ever been accepted. A survey of April 3, 1625, describes the castle as a capital house built of stone, having a double moat (the river Nene to the south and the mill brook to the east); a gate and forecourt to the north; a fair court within, with the chapel and lodgings; the hall on the first ascent; the keep, having lower and upper chambers, on the mound or second ascent to the north-west; great dining-room, buttery, kitchen, brew-house, etc.; and specifies the New Inn or Old Stone House. Confer also Bridges's *Northamptonshire*, Wiltshire Hundred, and Cuthbert Bede's (the late Rev. Mr. Bradley's) *Fotheringhay, and Mary Queen of Scots*, 1886. D.M.

THE REFLECTION OF A RAINBOW.

SIR,—Some time ago there was some correspondence in the *Builder*, in which I took part, concerning the effects of light upon water in landscape, and among other points the reflection of a rainbow was discussed, some doubt having been cast upon the possibility of such a reflection. It may be of interest to state that I had the other day a good opportunity of testing this point. I was standing on the north bank of the river here, and a very brilliant rainbow developed to the southward. The river at this point is about 30 yds. in width, the banks at the time rising about 10 ft. above the water level. The conditions were not quite perfect, the surface being slightly disturbed by tide eddies and some scattered rain; but the further bank was distinctly reflected, and the image of the rainbow was very clearly visible beneath it; sufficiently so, in fact, to enable me to distinguish plainly the divisions of the prismatic colours.

This was not, of course, a suitable opportunity of testing the effect when the apparent position of one extremity of the rainbow is actually over the water—a much larger expanse of water is obviously necessary for this purpose; but I see no reason for doubting that, under these circumstances, the reflection would also be seen, as is represented in Mr. Keeley Halsewell's picture of Loch Awe, previously referred to by me.

E. P. STATHAM
Commander R.N.

Arundel, September 4.

**The question arose out of a remark in Sir Montagu Pollock's book, "Light and Water," reviewed under that title in our issue of July 23, 1904. Sir M. Pollock held that a rainbow, not being an actual existence, but only an optical appearance, was not capable of causing a reflection. We said at the time that we could not follow his reasoning, and we thought his conclusion improbable.—Ed.

Illustrations.

ST. MARY'S CHURCH AND PARISH HALL, JOHANNESBURG.



THE work of designing this large and important church, together with the large parish room adjoining, was placed in the hands of Mr. George H. Fellowes Pryne, F.R.I.B.A., of Westminster, in 1903.

It was determined that, while both buildings should be considered and designed as one scheme, it would be best to carry out the parish hall first, so that the hall might be used for services whilst the church was being built. Consequently the parish hall was commenced in May, 1904, the foundation-stone being laid by Lord Milner on September 4, 1904, and the building being completed and opened for service on November 1, 1905.

The hall consists of a large building, having a length of 135 ft. and a breadth of 65 ft. Aisle passages and narrow galleries are formed in the recessed arcades on either side. A large gallery is placed at the west end, under which the various offices, entrance lobbies, committee and cloak rooms are formed. The hall accommodates 1,500 adults. In the two flanking towers at the west end are placed broad staircases leading to the galleries. A platform or stage 41 ft. by 31 ft. is arranged at the east end, with galleries on either side, one for the organ on the north side, and another for a choir on the south side. The roof is of elliptical barrel form, and is found to be excellent from an acoustic point of view. The roof above the boarding is constructed in steel, and the external covering for both the main roof and the western turrets is in copper. The total cost of the hall was about 38,000l., the work being carried out by Messrs. Templar Brothers, contractors, Johannesburg, under the careful personal superintendence of Mr. E. T. Price, who, it may be remembered, acted as clerk of works at Truro Cathedral. The copper roofing was carried out by Messrs. Braby & Co., of London, and the electric fittings were supplied by Messrs. Singer & Son, of Frome.

The church, which it is hoped may be shortly commenced, is placed in the most commanding position, with its west front facing on Hoek street and the north front on De Villiers street. The main entrance (two large double doorways placed under a large central archway) is at the west end, above which is a circular traceried window 18 ft. in diameter and a large carved roof, with attendant figures in the gable, the whole west front being flanked by turrets. A tower with copper spire, rising to a height of 250 ft., is placed at the north-west corner, a second large entrance occupying the base of the tower. A cloister or covered way connects the parish hall with the church at the south-west corner, and over this cloister is formed a chapter-house, also connected with both the hall and church.

Immediately on entering the western doors a narthex is arranged under the western gallery. A baptistry is placed at the west end of the south aisle, and is arranged with an immersion font as well as an ordinary font.

The nave, which is divided into six bays, is 119 ft. long by 40 ft. wide. Broad aisles with double transepts are thrown out on either side, north and south, a small chapel being placed at the east end of the north aisle. Separate entrances are arranged for both transepts. The chancel, which is raised six steps above the nave level, is of the same width as the nave, and is divided into two bays. The choir occupies a central space, leaving a proper space for passages on either side. A lofty arch divides the chancel from the sanctuary. An elaborate reredos is carried high up into the east wall, and a five-light window is placed in the gable above. The length of the chancel and sanctuary is 62 ft., so that ample space is obtained for the twelve steps leading to the altar.

A rood with the usual figures of Christ, the Blessed Virgin, and St. John is designed to hang from the chancel archway, which rises to the whole height of the church.

A spacious organ chamber and vestries and

sacristy are placed on the south side of the chancel, and a second corridor connects this portion of the church with the parish hall.

The total height of the interior of the church from the floor is 70 ft. The roof is of barrel form groined out over the clear-story windows. The nave floor slopes upward 18 in. from the chancel step to the west end. Accommodation is arranged for 2068 adults.

The materials used will be similar to those in the parish hall, i.e., all stone dressings in ashlar of an excellent local stone of warm yellow colour; steel-constructed roof with boarding under, and externally covered with copper. Every possible precaution has been taken in the case of the hall as to thorough ventilation, and so far it has been found to be entirely successful. It may be mentioned that it was by the special request of the committee that the design was made English in character and style, with the view of marking historically English occupation and the connection of the church with the Anglo-Catholic Communion.

PORCH AT SCHOOL, CHIPPING NORTON.

THESE schools were built with rubble oolite stone, dressed and weathered with Tainton freestone. Mr. W. Aumonier did the carving, and Mr. Starkie Gardner the wrought-iron hinges and lock furniture. The architect was Mr. W. H. Seth-Smith.

TOWER FOR A STAFFORDSHIRE VILLAGE CHURCH.

THIS tower was designed to complete the church of St. Paul's, Croxton, near Eccles-hall, Staffordshire. It was to have been built of the local red sandstone to match the rest of the church. As the ground available was very limited and the floor space was required for a baptistry the stair to the ringers' level was arranged outside.

Owing to the death of the vicar of the parish, whose suggestion it was, the scheme has so far not been carried out.

F. FORBES GLENNIE.

THREE CHAPELS.

OF the three small chapels illustrated that at Belclare is a private memorial chapel in a very beautiful situation on the west coast of Ireland. It has lately been completed by Messrs. Alex. White & Sons, of Liverpool. Mr. Hunt being the resident foreman. The material used was local limestone, with Run-corn stone-dressings and Westmorland slating. No timber is used in the building except for doors and furniture, the roof being a concrete barrel vault, to which the slates are nailed. The east window is filled with stained-glass by a brother of the architect, and two side-lights are now in hand. The total inclusive cost was 650l.

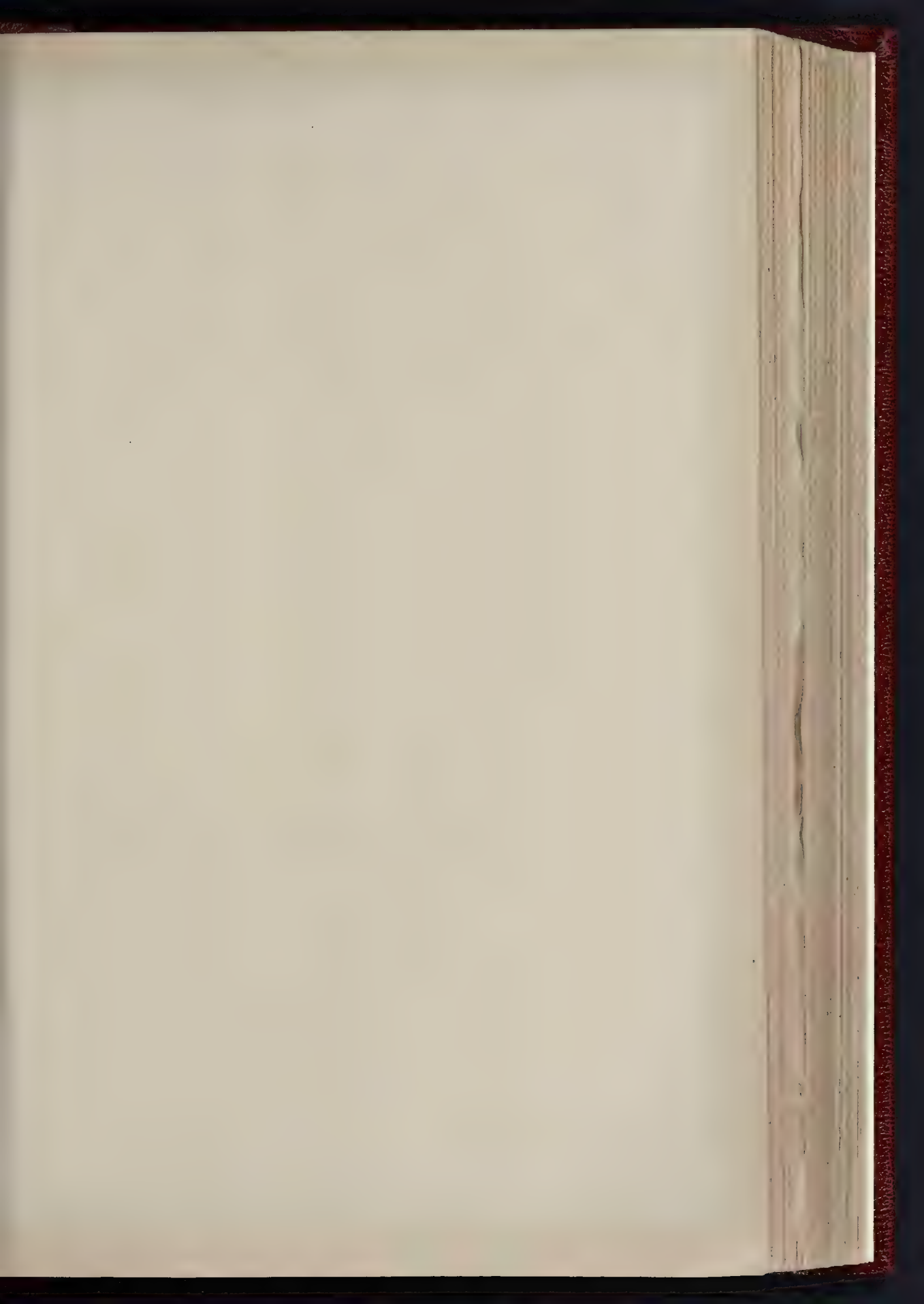
The English chapel at St. Raphaël is approaching completion under the supervision of M. Henri Lacrensette, resident superintending architect, the builder being M. Felix Mantel, of St. Raphaël. The design illustrated shows the scheme originally proposed. The actual building has been carried out on a somewhat different plan, difficulties having arisen as to rights of light and approaches. The chapel is of the simplest possible character, built of local stone stuccoed, with tile-dressings, and hollow brick vaulting to the aisle, the nave having a flat painted ceiling of wood. The chapel seats eighty people, and is costing about 500l.

The chapel at Curbridge (Oxon) is being built of Brisenorton stone with a pantile roof by Messrs. Barnes & Son, of Witney. It replaces a schoolroom-chapel built about eighty years ago, and stands in a pretty churchyard with old yew trees. When completed the chapel will hold eighty people, and will have cost about 600l. inclusive of everything.

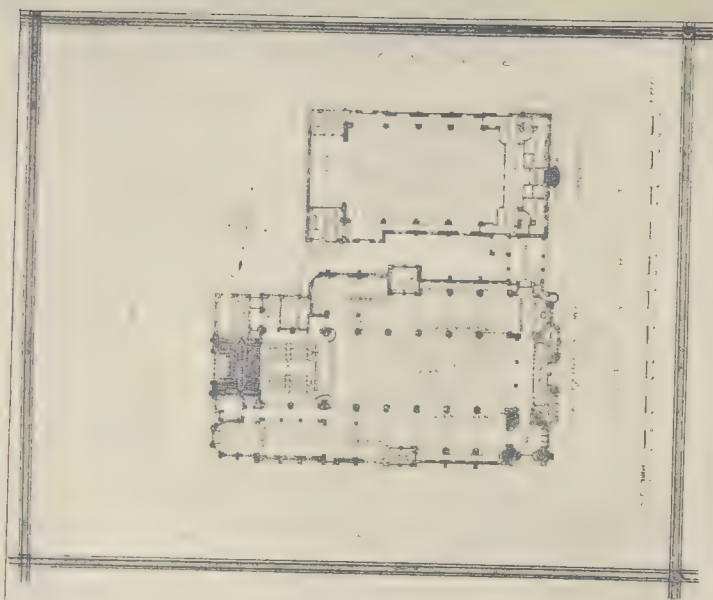
CHARLES A. NICHOLSON.

BOOKS RECEIVED.

BRITISH RAINFALL, 1905. By Hugh Robert Mill. (Edward Stanford, 10s.)
LONDON TOPOGRAPHICAL RECORD. Vol. III. (London Topographical Society.)



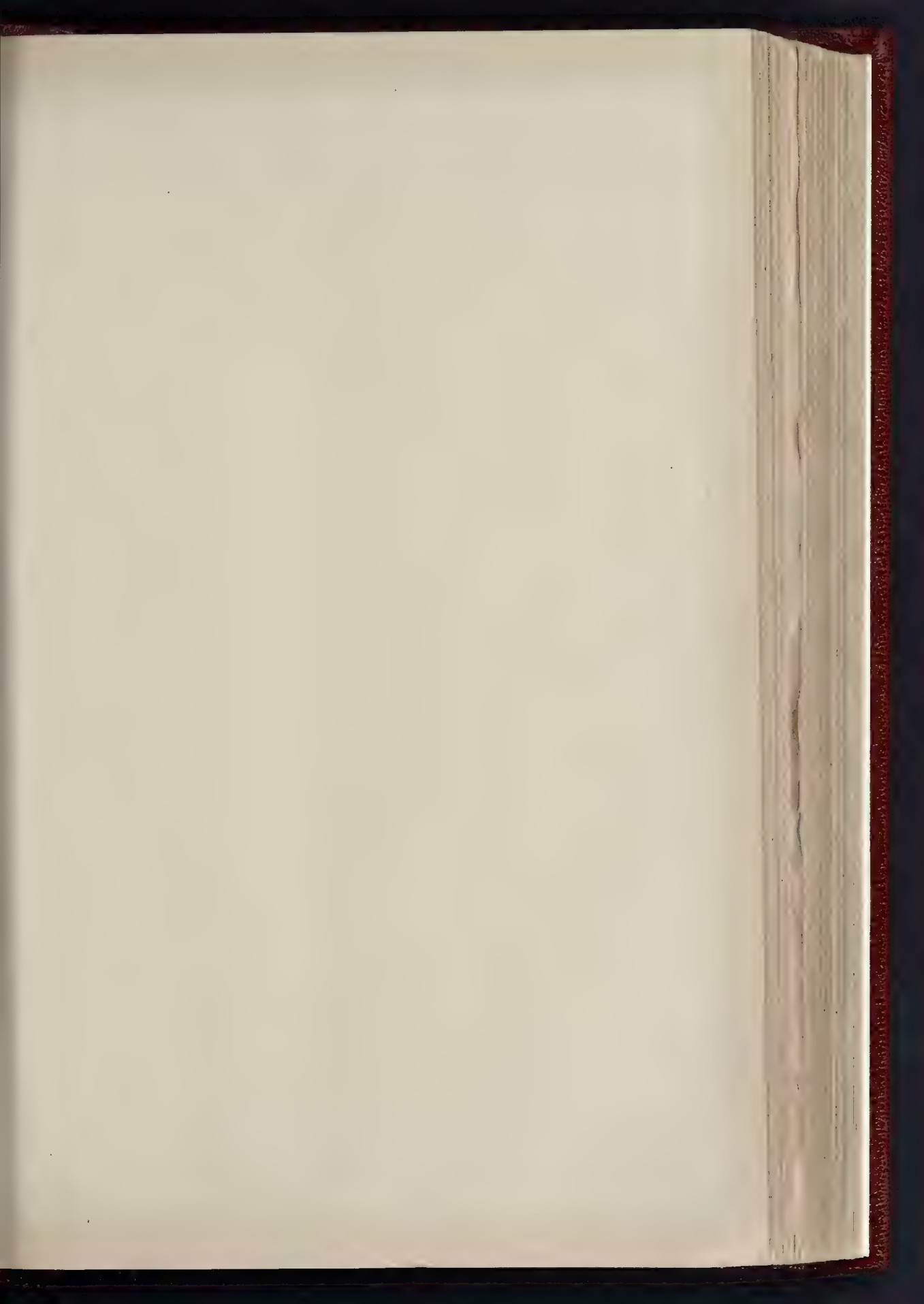
THE BUILDER, SEPTEMBER 8, 1906.



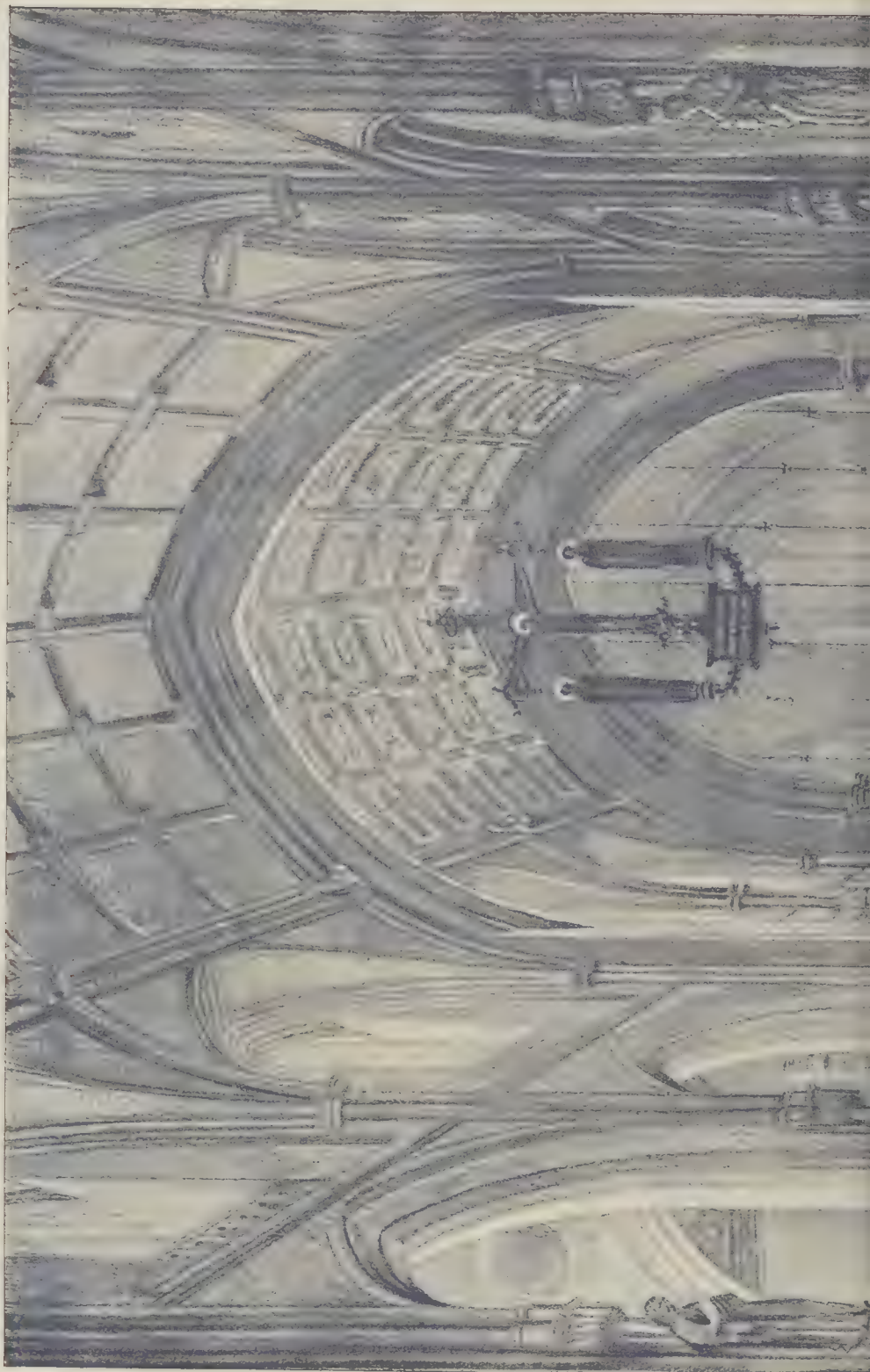


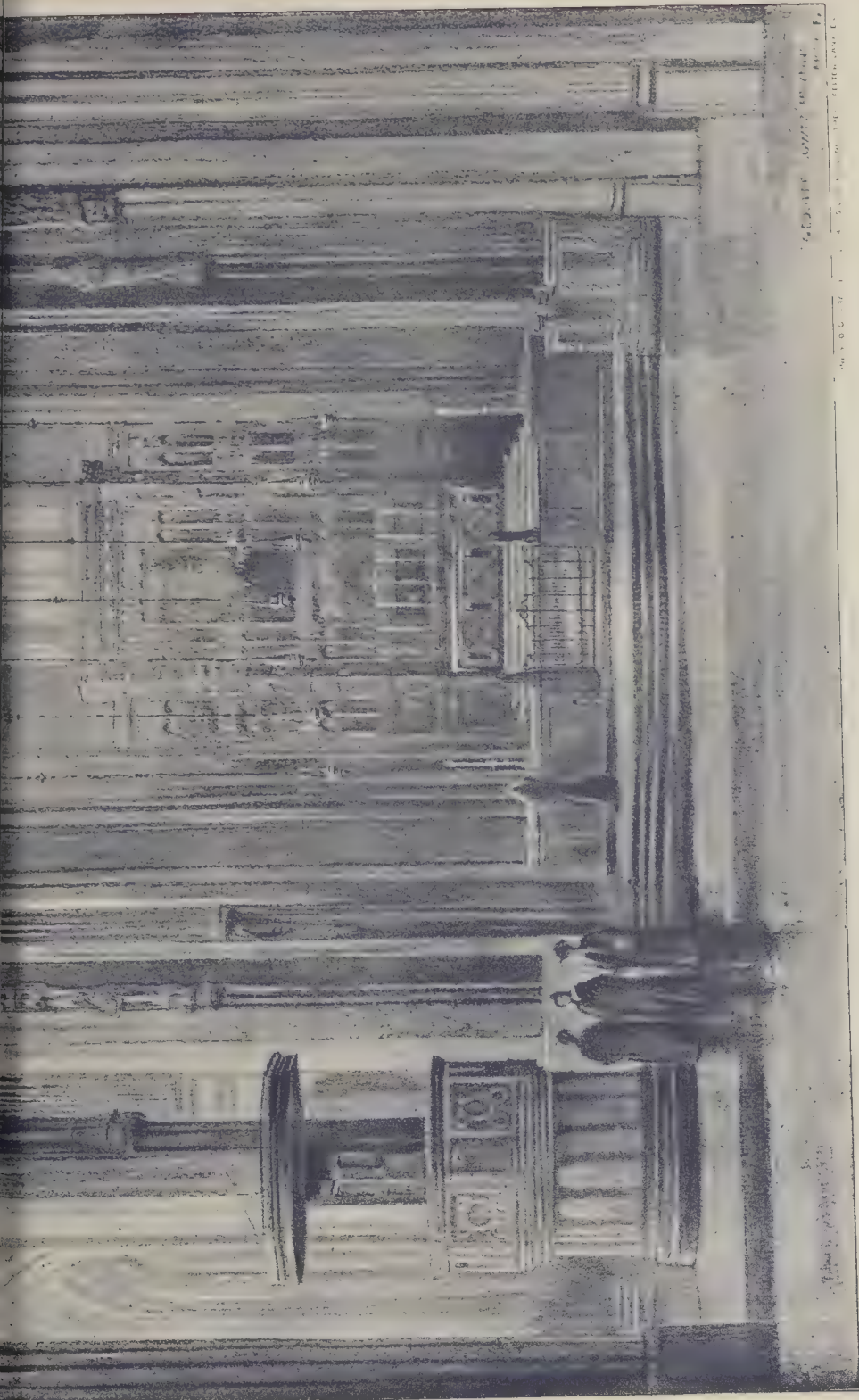
Proposed New Church of St. Mary, Johannesburg with connecting Cloister & Parish Hall.

4-5 EAST WARDING STREET + LITTON LANE EC

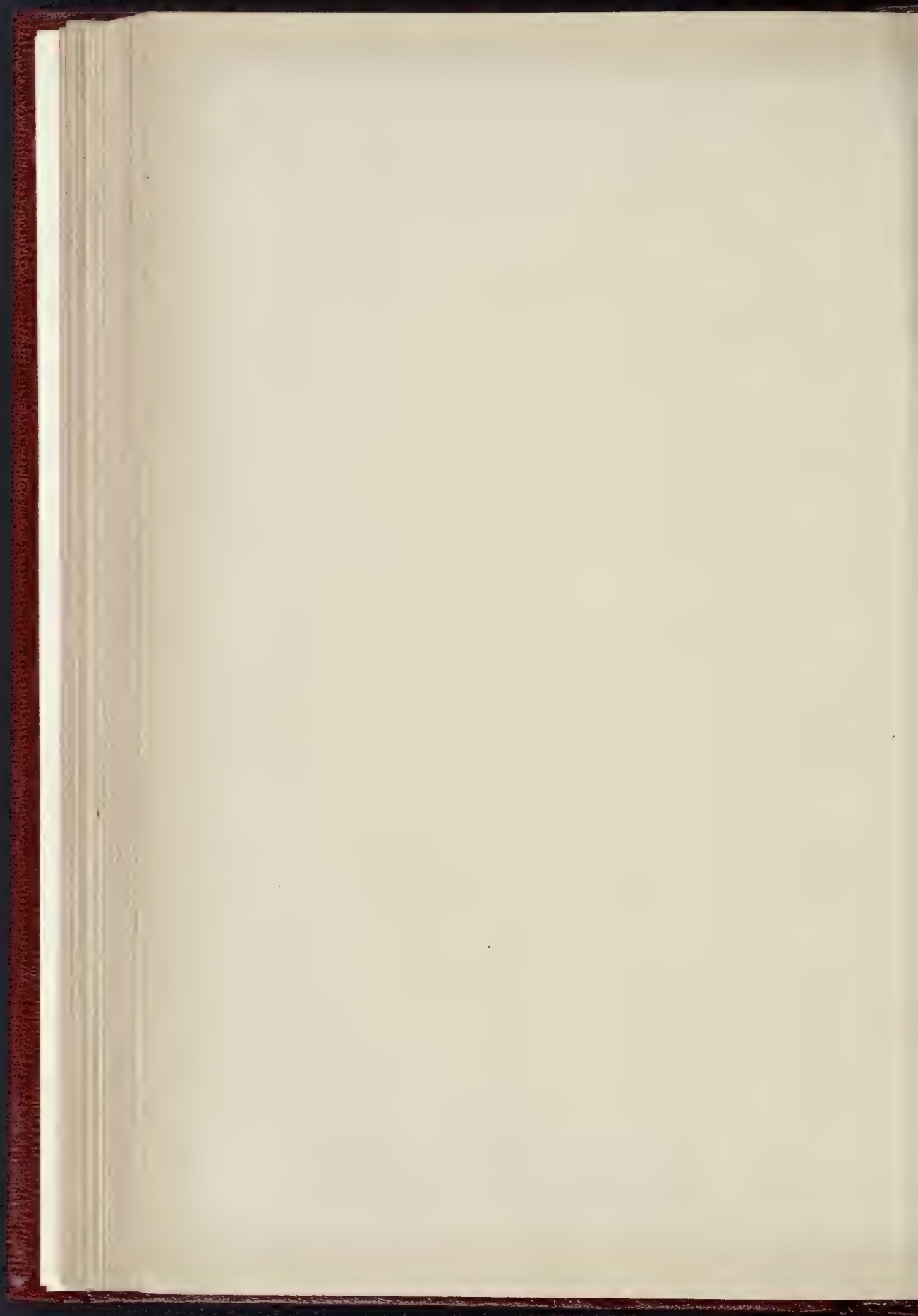


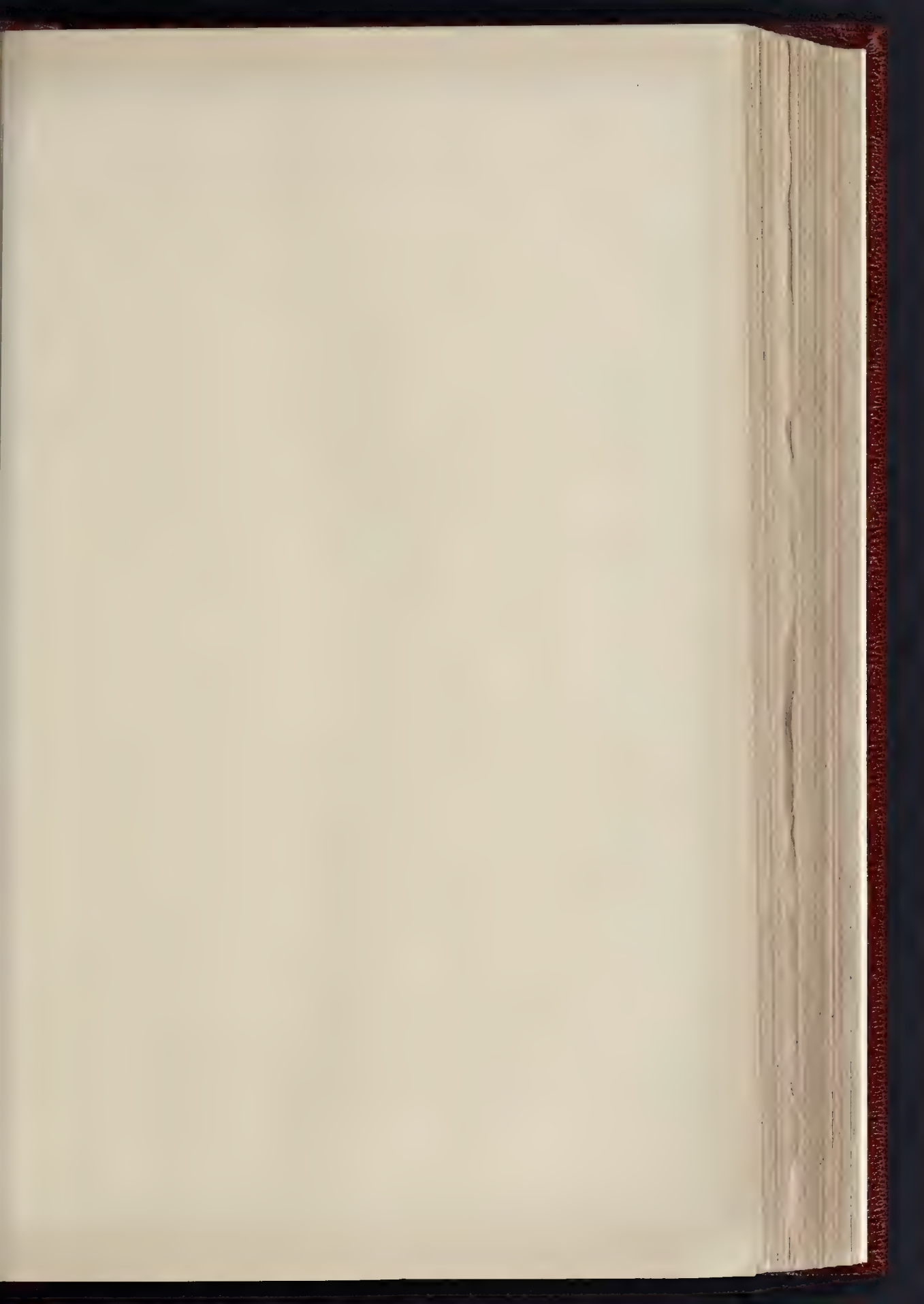
THE BUILDING SEPTEMBER 8, 1906





PROPOSED NEW CHURCH OF ST MARY, JOHANNESBURG.—MR. G. H. FELLOWS PRINCE F.R.I.B.A., ARCHITECT
INTERIOR, LOOKING EAST.



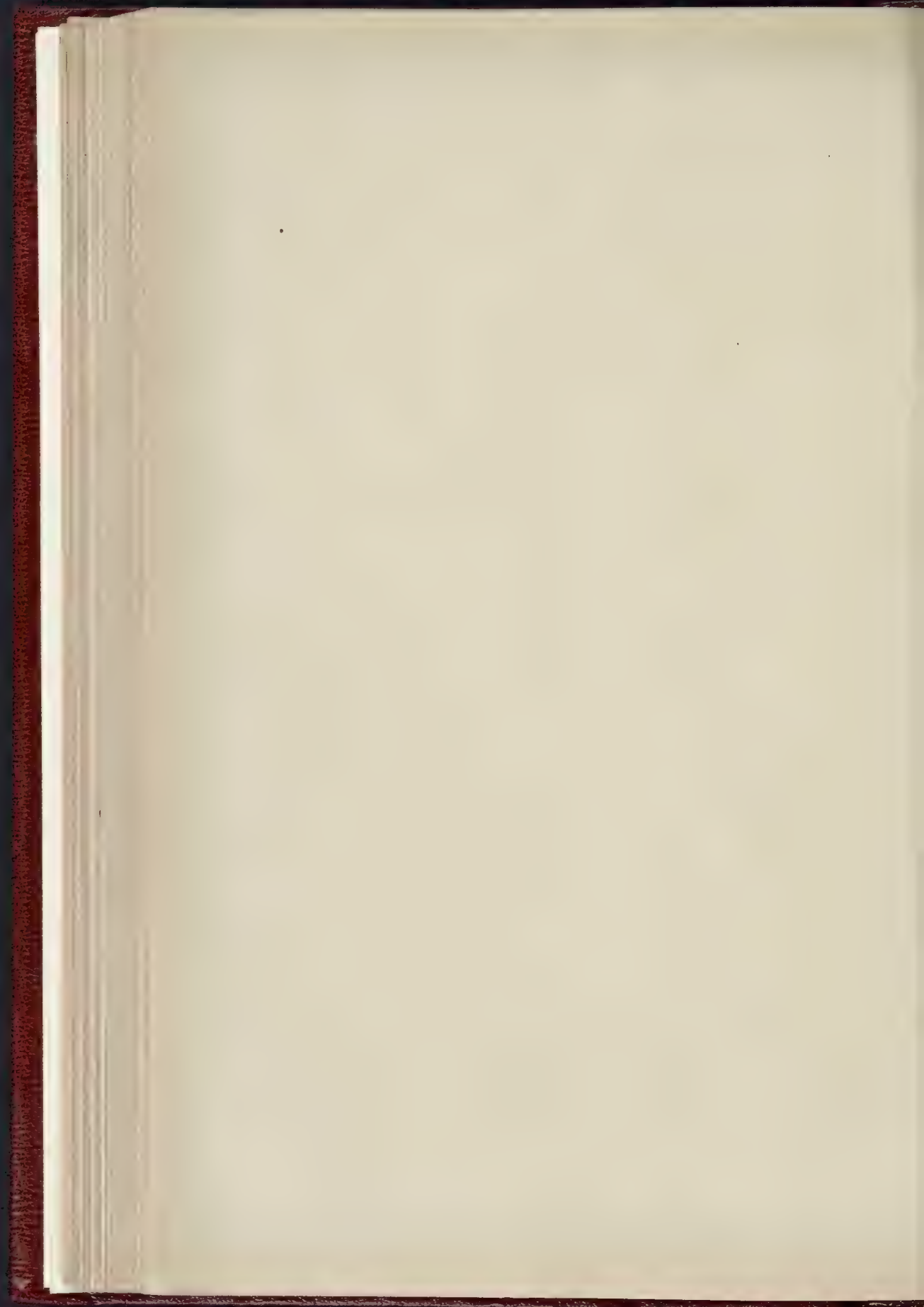


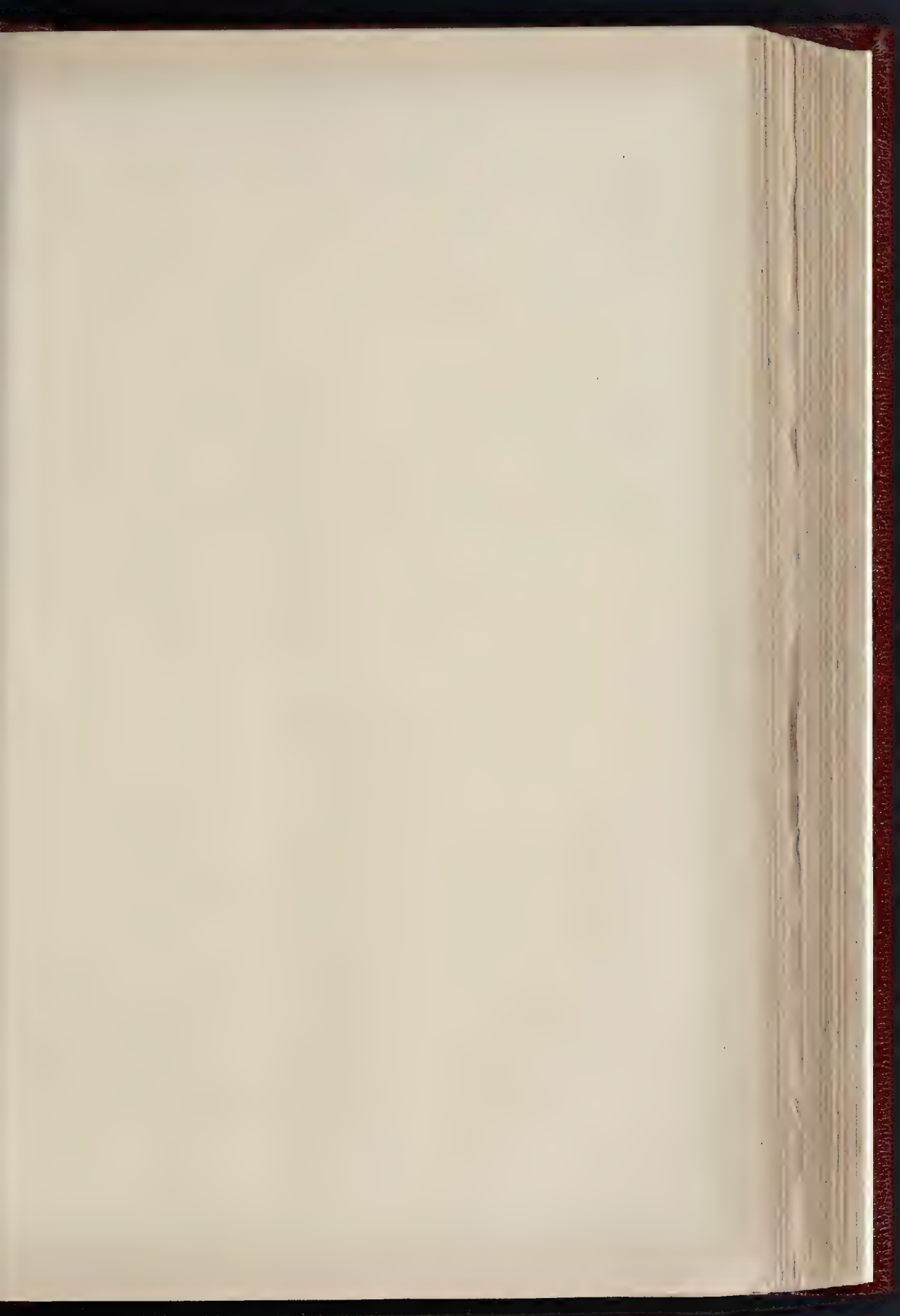


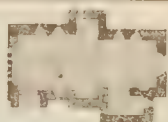
PORCH AT SCHOOL CHIPPING NOTTON MR W H SETH SMITH, F.R.I.B.A., ARCHITECT



TOWER FOR A STAFFORDSHIRE VILLAGE CHURCH.—MR. F. F. GLENNIE, ARCHITECT









English Chapel St. Raphael

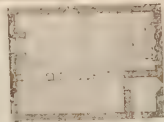


PHOTO BY FRANK C. L. A. S. EAST HAVEN STREET FETTER LANE E.C.

The Student's Column.

ROOFS: STRUCTURALLY CONSIDERED.—VIII.

15. Miscellaneous Roof-covering Materials.

IN this article will be found a series of notes upon various forms of roof-covering material less generally employed than those already mentioned but still of considerable value and fully deserving attention.

Asbestos-Cement.—This composition, consisting mainly of Portland cement and asbestos, is very hard and strong, is a good non-conductor of heat, an efficient fire-resisting material, and absorbs no more water than the best natural slate.

The following figures are taken from the results of tests made at the Austrian Royal Technical Institute upon a variety of the material made in Austria and sold in this country under the title of "Eternit" roofing slate:

Tensile strength	2.55 tons per sq. in.
Compressive strength	3.70 " "
Coefficient of elasticity	2570 " "
Porosity	8.25 per cent.
Heat conductivity (Cork = 1)	13.9.

The weight of asbestos-cement slates is about 13 lb. per square foot 1 in. thick. This is rather more than the weight of earthenware tiles, but owing to the fact that the material is much thinner than tiles the weight of the roof-covering is correspondingly reduced.

Asbestos-cement slates are made in blue, grey, or red, and of the shapes and sizes shown in Fig. 68.

Patterns A and B are used for double-lap straight roofing, patterns C and D for single-lap diamond roofing, and patterns E and F for eaves.

Tables XVI. gives particulars of the two styles of roofing, and it will be seen that considerable economy can be effected by adopting the single-lap diamond system.

TABLE XVI.—ASBESTOS-CEMENT ROOFING SLATES $\frac{1}{2}$ IN. THICK PER SQUARE OF 100.

	System of Roofing.	
	Straight Double Lap.	Diamond Single Lap.
Lap	24 in.	24 in.
Battens	6 in.	9 in.
Number of slates	150	92
Nails 12 in.	320	190
Copper rivets		56
Total weight	3.35 cwt.	2.03 cwt.

Asbestos-cement slates are laid on battens, as illustrated in Fig. 69, which represents the diamond system of covering. As there shown the slates are fixed by nails and copper rivets, the latter being passed between the side corners of the slates and through holes in the top and bottom corners of the slates of each course. Fig. 70 indicates the positions of the triangular and oblong slates in the roof system.

Uralite is a preparation of asbestos manufactured in the form of tiles and sheets for roofing purposes. It is hard and tough, a good conductor of heat, and possesses high fire-resisting properties.

Uralite tiles are made in various sizes, of which particulars are given in Table XVII.

TABLE XVII.—URALITE TILES FOR "DIAMOND" ROOFING ($\frac{1}{2}$ IN. THICK WITH 3-IN. LAP).

Size.	Gauge.	No. per Square.*	Weight per Square.*
15 in. x 15 in.	34 in.	100	150 lb.
18 in. x 18 in.	64 in.	64	195 lb.
21 in. x 21 in.	8 in.	45	130 lb.
24 in. x 24 in.	78 in.	33	124 lb.
27 in. x 27 in.	84 in.	25	120 lb.

* Exclusive of waste.

Fig. 71 represents the arrangement of diamond roofing, in which 15-in. square tiles are laid with a 3-in. lap.

As a general rule a 3-in. lap is sufficient for roofs of ordinary pitch, but a wider lap can be adopted in special cases if necessary. The tiles are fixed by 14-in. clout nails on 2-in. by 3-in. battens.

Uralite tiles are also made in the sizes stated in Table XVIII. for ordinary roofing, with the lap of 2½ in., 3 in., or 3½ in.

TABLE XVIII.—URALITE TILES FOR "SQUARE" ROOFING ($\frac{1}{2}$ IN. THICK).

Size.	2½-in. Lap.			3-in. Lap.		
	Gauge.	Number.	Weight.	Gauge.	Number.	Weight.
16 in. x 9 in.	64	258	212	64	207	29
20 in. x 10 in.	84	166	216	71	171	223
24 in. x 12 in.	104	122	220	104	125	231

Fig. 72 illustrates the arrangement of uralite 20-in. by 10-in. tiles with a 3-in. lap.

For temporary buildings uralite sheeting is usually employed, being nailed upon close boarding, or upon rafters spaced 12 in. or 15 in. apart, centre to centre. The sheets are 3 ft. wide, and vary in length from 5 ft. to 6 ft. They are usually laid with a lap of 4 in., which is sufficient for roofs of ordinary pitch, and is equivalent to about 12½ per cent. of the area covered. All vertical joints are butted on the boarding or rafters, and covered with strips of uralite 3 in. wide, laid in 3-ft. courses with a 4-in. lap, these cover-strips being bedded in white or red lead and secured by copper or galvanised iron nails.

Fig. 73 illustrates the method of laying uralite in the manner described above.

Reinforced concrete is chiefly employed in covering flat roofs, which, from the structural standpoint, are not essentially different from floors. In buildings where reinforced concrete is the chief material of construction inclined roofs are covered by thin slabs of the same material built monolithic with the framework.

The surface of concrete roofs is frequently covered with asphalt as a precaution against the percolation of water.

As reinforced concrete is never employed in the form of separate slabs upon framework of a different material, it cannot appropriately be discussed as a covering material except in connexion with the other elements of roof construction.

The properties of reinforced concrete have been fully dealt with in a previous series of articles,* to which the reader is referred. The details of reinforced concrete roof construction will be illustrated by typical examples in a later article of the present series.

Terra-Cotta.—For flat and inclined roofs terra-cotta blocks are largely used in the United States.

Such blocks are generally made in three patterns:—

(a) **Book tiles**, having two segmental edges, giving the section the form of a book (see Fig. 74).

(b) **Plain roofing tiles** of rectangular section.

(c) **Rebated roofing tiles**, in the form of rectangular blocks, rebated at the bottom so as to provide for seating upon tee-bar supports (see Fig. 75).

Book tiles are usually of porous material, 10 in. to 12 in. wide, from 18 in. to 24 in. long, and varying in thickness from 2½ in. to 4 in. The average weight of book tiles 3 in. thick is about 12 lb. per square foot.

Plain roofing tiles vary from 8 in. to 12 in. wide, from 10 in. to 24 in. long, and from 1 in. to 4 in. thick. They are either of porous or of hard-burned terra-cotta. The average weight of plain roofing tiles 2 in. thick is about 12 lb. per square foot and 3 in. thick about 15 lb. per square foot.

Rebated roofing tiles are made both solid and hollow, and either of porous or of hard-burned terra-cotta. They are usually 12 in. wide, from 10 in. to 24 in. long, and from 2 in. to 4 in. thick. The average weight of rebated tiles 2 in. thick is 12 lb. per square foot, 3 in. thick 15 lb. per square foot, and 4 in. thick 20 lb. per square foot.

When used for flat roofs terra-cotta blocks are supported upon tee-bars, which may be spaced from 14½ in. to 20½ in. apart, centre to centre. Although making a neater job, rebated tiles are not so strong as plain tiles, and are considerably weaker than book tiles, which afford a certain amount of support alone the sides one to another.

In every case hollow tiles are stronger

than the solid variety, and should be used in all positions except where the attachment of flashings makes solid blocks necessary.

Although affording adequate protection against external fire, a terra-cotta and teabur roof-covering gives no security against internal fire.

Terra-cotta tiles for inclined roofs should be of the rebated pattern where applied between purlins. As a general rule the terra-cotta work on inclined roofs is covered with slates, and, in consequence, porous material is preferable so as to provide a suitable nailing surface.

Shingles.—For sheds and temporary buildings of kindred character in positions where the risk of fire is not an important factor, timber boarding is sometimes used as a roof-covering. Timber, applied in the form of what may be termed "wooden tiles" is described as shingling. Pine, larch, oak, or any timber that can be split readily is used. The sizes of the shingles are about 5 in. wide by 9 in. long by 1 in. thick, tapering to a sharp edge in the case of pine, and about 6 in. wide by 12 in. to 18 in. long by ½ in. thick for hard wood. Shingles are laid in horizontal courses, with a 4-in. or 5-in. gauge, nailed or pegged upon boards, and arranged so as to break joint. Oak shingles make a roof of artistic appearance, and have been largely used in church spires in some parts of England.

This form of roof-covering is very common in the United States. The subjoined table, from an American source, gives the number and weight of pine shingles per square of roof surface:—

Gauge.	No. per Square.	Weight per Square.	Remarks
		lb.	
4	900	216	The number of shingles per square is for common gable roofs. For hip roofs add 5 per cent. The weights per square are based on the number per square.
4½	800	192	
5	720	173	
5½	655	157	
6	560	144	

Thatch.—This material is obviously only permissible in districts where stringent building regulations are not in force, and is quite unsuitable in towns. Even in country districts thatch is not a particularly economical material in the present day owing to the increased value of straw, but it can often be used with good effect and advantage for covering small buildings when economy is a secondary consideration.

The advantages and disadvantages of thatch may be briefly stated as follows:—

Advantages.—Picturesque appearance, lightness, warmth in winter, coolness in summer. Owing to the two latter characteristics thatched roofing is specially suitable for ice-houses and dairies.

Disadvantages.—Risk of fire, particularly in new roofs, extra cost of fire insurance, harbourage for birds, insects, and vermin, risk of injury by cattle.

The weight of straw required per square of thatching is about 5 cwt., but the weight per square is far more, according to the amount of water absorbed. The best pitch for a thatched roof is 45 deg.; if less rain will not run off freely, and if more the straw is apt to slip from its fastenings.

Wire-Wave Roofing.—This consists of fine wire-netting treated with a transparent substance so as to fill up the meshes. The material is elastic, strong, and waterproof. It is made in sheets 32 in. by 32 in. and up to 102 in. long by 26 in. wide. It is a suitable covering material for temporary buildings where ample interior light is a desideratum.

Willenden Paper.—This is a strong, durable, and waterproof material for light roofs.

* The Builder, Vol. LXXXV.

and No. 28 gauges, and measuring 3 ft. by 1 ft. 9½ in., centre to centre of flutes, or 1 ft. 11 in. overall.

Zinc and Copper Tiles.—Fig. 77 illustrates various patterns of ornamental embossed tiles, in zinc and copper, which can be used with more or less artistic effect in covering the roofs of towers, mansards, domes, and other architectural features. The maximum dimensions of the tiles are about 20 in. long by 10 in. wide overall.

Owing to their form a very small lap is required, the tiles being fixed by nails through the holes provided at the top and bottom, as shown in the drawings.

Hips, finials, aprons, and lunettes of embossed zinc and copper are supplied of suitable character for each tile design.

General Building News.

ROMAN CATHOLIC CHURCH, BALLYMAHON.—On the 25th ult. the opening of the new church of St. Mathias took place at Ballymahon. The new building, from the back of the chancel to the front wall, measures 120 ft. In width it is 80 ft. across the transepts, and 30 ft. in the nave. The tower in the south-west front is 110 ft. from the ground. The church, which was designed by Mr. T. F. McNamara, of Dublin, is built of grey harnessed stone, and faced with white out-stone from Ross, Tullamore, and Newtowncashel. The roof is supported by seven moulded and wrought pitch-pine principals in carved moulds. The work has been carried out by Mr. Patrick Kelly, of Longford.

WESLEYAN CHURCH, ABERTILLY.—The foundation-stones of the new Wesleyan church at Abertilly were laid recently. The new building will be built of Forest stone. The principal features are a tower at the corner of the building, and a large traceried window facing the main street. The church inside will have galleries all round, and an organ-chamber on one side in the form of a transept. The roof will be an open-timber one, supported on columns, and lined with match-board. The seats, rostrum, and other joinery will be of pitch-pine. The plans have been prepared by Messrs. Habershon, Fawcner & Co., Newport, and Cardiff; and the contractor is Mr. Charles Shopland, Newport. The estimated cost is 5,000l., and the accommodation will be for 750.

CHURCH RESTORATION, BRYNCROES, SOUTH CARNAVONSHIRE.—The parish church of St. Mary, Bryncroes, South Carnarvonshire, has undergone a thorough restoration, and was recently reopened by the Lord Bishop of Bangor. The repairs have been carried out by Mr. Robert Jones, contractor, of Brompton, Bothynog, from designs and under the supervision of Mr. Harold Hughes, architect, of Bangor.

BAPTIST CHAPEL, BARGOE.—A new chapel has been erected, at a cost of between 5,000l. and 6,000l., for the Baptists at Bargoe. The new building is capable of accommodating for over 1,200. The architects were Messrs. James & Morgan, Cardiff; the contractor, Mr. R. Burns; and the decorations have been carried out by Mr. I. Guppy.

SCHOOLS, TWICKENHAM.—The new schools in Trafalgar-road, the first to be erected by the local education authority in the parish of Twickenham, were opened a short time ago. They provide seven classrooms for infants, capable of holding 390, a spacious corridor, head mistress's room, and store-room, with hat and cloak room. The girls' classrooms also number seven, capable of holding 380, with part use of the central hall for drilling, head mistress's room, and store-room, and a large cookery classroom (with fifty-four places), fitted with kitchener and gas cooker. In the joint playground for girls and infants, there was a fountain for drinking water. The boys' department consisted of seven classrooms, capable of holding 380, with part use of the central hall for drilling, head master's room, and store-room, and a drinking fountain in the playground. In all there are 1,150 places (not including the cookery classroom), and the tenders for the buildings with out-buildings, sanitary work, water supply, electric lighting, exhaust fans, etc., ranged from 17,000l. down to 13,500l. The equipment consists of oak-polished desks, cupboards, furniture, and fittings, amounted to 1,685l. The builders were Messrs. Patrick. Mr. Jefferys carried out the heating and ventilation, and the equipment was done by the Bennet Furnishing Company. Mr. H. A. Cheers, of Twickenham, was the architect.

GRAMMAR SCHOOL, NEWCASTLE.—The erection of the new grammar school at Newcastle is now approaching completion. Mr. J. Holden

is acting for Messrs. Russell & Cooper, London, the architects of the work. The chief contract has been carried out by Messrs. Harold & Sons, Doncaster, who have been represented by Mr. W. Smith. The floors are laid with Canadian maple blocks, laid by Messrs. J. B. Burgess & Co., Liverpool. The sanitary fittings are by Mr. Geo. Jennings, London; the electrical wiring has been done by Messrs. Wenham & Waters, Ltd., Croydon; the heating and ventilation apparatus has been supplied by Messrs. Henry Hope & Sons, Ltd., Birmingham; and Mr. Robt. A. Smith, M.Inst.E.E., London, has acted as consulting electrical engineer.

WESLEYAN SUNDAY-SCHOOL AND CHURCH ENLARGEMENT, EASTLEIGH.—The foundation stones were recently laid in connexion with the Wesleyan new Sunday-school and church enlargement scheme. The scheme consists of the enlargement of the present church to afford accommodation for fifty extra sittings, in addition to providing an organ-chamber and choir, etc. The cost is about 2,500l. The builders engaged upon the work are Messrs. Golding & Ansell, and the architects Messrs. John Wills & Sons, of Derby.

JEWISH SCHOOL, STREPSLEY.—In terms of a scheme framed by the Board of Education for verifying the administration of the endowments the trustees will be empowered to sell some stock, valued at about 3,000l., bequeathed by Baroness Charlotte Rothschild. The proceeds, in part, of the sale are to be devoted to the building of the assembly-room for the school upon the land which belongs to the foundation at Strepsey, where Messrs. E. Runtz & Ford have prepared plans and designs for the new premises of the Norwich Union Life Society, to embrace banking offices and residential chambers, at the corner of Piccadilly and St. James's-street.

COUNCIL OFFICES, SWADLINCOTE.—The foundation-stones of the new Swadlincote Council offices were recently laid. The offices are being built from the plans of Mr. C. F. Underhill, and the contract has been let to Messrs. R. Kershaw & Sons, of Burton, 1,770l. The work is being carried out under the supervision of Mr. Underhill and Mr. Mason, the surveyor.

SALTASH RAILWAY STATION.—As part of their scheme for improving their main line in Cornwall, the Great Western Railway Company are making alterations at Saltash Station. A new waiting-room has been erected on the platform, and the bridge which carries the road to Coombe over the line west of the station, and which had a span of 30 ft., has been replaced by a new steel-girder bridge of 41 ft. span. The alterations are being carried out by Messrs. Rolfe & Son, and Mr. W. F. Fox, resident engineer of the railway company, is supervising the work.

TOWN HALL, KIRKINTILLOCH.—The new town hall in Union-street has been built at a cost approaching 9,000l. Competitive plans were invited, and those by Messrs. Walker & Ramsay, Glasgow, were accepted. Accommodation is provided for 1,200 people, with the usual retiring and cloak rooms. A gallery runs round three sides of the hall. The lighting is by patent gas burners, but the hall has also been wired for electric lighting. The adjoining property, fronting the main street, has been secured for the erection of municipal buildings.

A LANCASHIRE COLONY FOR EPILEPTICS, LANGHO.—The first portion of a colony for epileptics which is being established jointly by the Chorlton and Manchester Poor Law Unions at Langho, near Blackburn, was opened on the 3rd inst. by the Earl of Derby. The colony is located on an estate of 156 acres, and the buildings at present erected number sixteen, giving accommodation for 272 patients and the staffs. Six homes have been provided, three for each sex, and they will accommodate forty inmates each. These buildings are alike in plan, but a certain amount of variety has been introduced in the external designs. Apart from the cost of the land, which amounted to 13,267l., an expenditure of 75,500l. has been authorised on the buildings, but the administrative block has been erected on a scale sufficient for the needs of a much larger colony than that at present existing. In the present scheme the Guardians have substituted for the workhouse wards cheerful homes. The architects are Messrs. Giles, Gough, & Trollope.

Stained Glass & Decoration.

St. Cuthbert's Church, Edinburgh.—After being closed for some weeks for cleaning and decoration, St. Cuthbert's Parish Church, Edinburgh, was reopened on the 2nd inst. The designs were by Mr. H. J. Blanc, R.S.A., who was architect for the church; the carved work was done by Bridgeman, Lichfield.

Sanitary and Engineering News.

DRAINS AND SEWERS IN HAMPSHIRE.—"The power given to local authorities by sect. 82 of the Metropolitan Management Act, 1855, to cause ground to be opened for the purpose of making an examination of a drain is an exceedingly important provision," says Dr. F. E. Scrase, the late Acting-Medical Officer of Health for Hampshire, in his annual Report just circulated. "During the year it has been found necessary to exercise this power on seven occasions, and in each case it was found that the drains were in a very defective state. It is sometimes contended that, in exercising the authority to open ground, resort is being had to an old Act which is obsolete; but when it is remembered that the orders and by-laws governing the construction or reconstruction of all drains are made in pursuance of its provisions, it will be seen that this contention cannot be maintained. When the Public Health (London) Act, 1891, was passed, it repealed the greater part of sect. 82, except so far as it related to a drain or sewer. Without this power it would be a comparatively easy matter to defeat the requirements of a sanitary authority regarding defective drains; the smoke test is not sufficiently reliable to demonstrate many serious defects which may exist, and if there is no inspection-chamber the water test cannot be applied. In relation to this last test I would point out that there are cases where the application of such a severe test may not be advisable, and where the actual condition of the drain can only be safely ascertained by direct inspection of the pipes. The most notable instance was in a case where, as a result of the examination, a notice was served on the owners to 'reconstruct the drains.' The owners resisted on the ground that the requirement was in excess of the statute, and that the drains were capable of being repaired. The magistrate dismissed the summons, and the owners did not press for costs, on the understanding that the case should not be taken further, and that all necessary works should be carried out. It is satisfactory to note that the drains were ultimately reconstructed, from which it appears to me to be a fair deduction that the original requirements of the Council were justified. In the other cases it was not found necessary to resort to legal proceedings, as the owners in each instance proceeded to have the necessary works carried out after the actual state of the drains had been demonstrated by opening up the ground. The drainage by-laws which require that plans and written particulars of all drainage, construction, and alteration, shall be deposited in duplicate with the sanitary authority, came into operation on August 20, 1905. Since that date to the end of 1905 no less than 163 plans for the drainage of new buildings, and 1,211 for alterations, amendments, or additions, to drains of existing houses, have been approved by the Council. During the year 671 notices of alteration, or addition to, or the reconstruction of, drains or sanitary fittings in existing houses have been received, 575 of them being for such work as necessitated the deposit of drawings and written particulars. Of the latter 365 were cases of urgency, in which the work could not be delayed, but had to be proceeded with at once, notice being given on the prescribed 'Urgency' form, and the required plans and particulars being sent in at a later date. It is satisfactory to record that with a very few exceptions there has been little difficulty in obtaining the required particulars, but in four cases it became necessary to resort to legal proceedings to enforce compliance with these by-laws."

INSTITUTE OF SANITARY ENGINEERS.—The course of lectures to students on Practical Sanitary Science and Engineering commences at the Lecture Room of the Institute on October 2. The lectures are continued weekly, except for a break at Christmas. Particulars can be obtained from the Secretary, at the offices of the Institute, 19, Bloomsbury square, W.C.

A CURIOUS PIECE OF SANITATION.—A correspondent has sent us a photograph, which we reproduce (see next page), of a building, "recently constructed and now occupied," used, we believe, as a college. We do not know the name of either the architect or the builder, and perhaps it will be kind not to inquire; certainly the sanitary work is no credit to anyone concerned in its design or execution. The soil-pipe S appears to receive the discharges from two water-closets on the third and fourth floors; at any rate, there are two branches which we have marked B1 and B2, and there are also two anti-siphonage pipes, A1 and A2. The anti-siphonage pipe A2 is connected to the soil-pipe below the



A Curious Piece of Sanitation

branch B1, so that some portion of each discharge from the latter must enter A2 and pass into the lower branch B2 inside the building, and probably into the trap of the fitting to which B2 is connected. This is an error of such an astounding character that, without the evidence of the photograph, its commission in a new building would hardly be credited. The hopper-heads and waste-pipes, marked C, are not what one would expect to find in a building of this class, but in comparison with the soil-pipe connexions they are innocuous.

Foreign.

TORONTO.—The Report of the proceeding of the Ontario Association of Architects shows that there is a considerable movement in favour of the improvement and embellishment of Toronto. There is a wide extent of sea front (or lake front) at Toronto, which is in itself an advantageous circumstance for schemes of city improvement. The paper on the subject, read by Mr. Langton, proposes three main lines of improvement: (1) The treatment of the water front; (2) the provision of a surrounding line of parks or park-ways; (3) formation of new direct lines of traffic. For this latter he seems to recommend the now favourite system of running diagonal streets through the existing parallel blocks; a system which is no doubt advantageous as to communication, but (as we recently pointed out) inconvenient in regard to the provision of building sites, leading to a number of awkward corners, difficult to deal with satisfactorily either in regard to the plan or the architectural exterior of buildings. The result of the diagonal streets, however, Mr. Langton thinks, will be to give character to Toronto. The following is the conclusion of his paper on the subject:—

When we leave Toronto, as the Scotchman leaves Edinburgh, can we look back to old Toronto as the

looks back to 'Auld Reekie'? I am afraid not. The reason is that Edinburgh has character, its called the modern Athens I suppose because of its hill. We have none of those natural advantages in Toronto; we have to make them. I do not say we have no advantages, but they are not of such a salient character that you cannot snow them under with cheap houses. There is not anything that we cannot spoil in Toronto. But if we will preserve it and make it a town of some character then we shall feel when we come back as I heard a man on an ocean vessel say he felt in going back to Boston. He said he had seen nothing in his travels that he liked so well as the golden dome of the State House on Beacon Hill. That one can believe. Beacon Hill and Boston have something to which one can attach himself; something to make a man say, 'This is my town; I was born in Boston.' Oliver Wendell Holmes makes one of his characters say, 'I am a Boston boy.' That cannot be said of any town that has not got a strong and definite character. In Toronto that character must be made by planning.

BRUSSELS.—The fourth international congress on the comparative resistance of building materials opened on the 3rd inst. at the Palais des Académies, in the presence of the Belgian Premier, Count de Smet de Naeyer, and over 600 delegates from various countries. The Presidential chair was occupied by M. Berger, Director of Public Buildings in Vienna. The object of the conference is to study the comparative merits of building material, notably of steel and cement.—*Times*.

SOUTH AFRICA.—Recent acceptances of building contracts include the following:—That of Mr. J. M. Coall, for the erection of police barracks and stables at Rooodepoort, Transvaal, at a cost of £2,025; that of Messrs. Lane & Brannin, for alterations in the western wing of the new Government buildings, Pretoria, at a cost of 2,000; that of Messrs. McNery & Band, for the erection of a post-office at Benoni, at a cost of 1,720; and that of Mr. J. Richards, for making approaches to the Rebecca-street (Pretoria) Bridge, at a cost of 3,500.—Tenders are invited for the following:—For the erection of market offices at Kimberley; for new Government schools at Thaba Nchu and Vrededorst; for bridges at Bléskop, Knight's Spruit, Klip River, Heide-

berg, Elsburg, and Vereeniging.—Lord Selborne's new residence in Pretoria is nearly ready for occupation. The architecture is an adaptation of the old Cape Dutch style. The builders were Messrs. Edmanson & Thomas, of Johannesburg, the architect being Mr. Herbert Baker, formerly of London.—The *East African Standard*, of Mombasa, notes the arrival there of Mr. Rand Overy, architect, and expresses the hope that citizens who are proposing to build will take advantage of this opportunity of consulting Mr. Overy, adding, "Really, the architecture of Mombasa needs a little improvement."

Miscellaneous.

NATIVE HANDICRAFTS IN AUSTRIA.—The Austrian Government Service for the Promotion of Handicrafts has recently held an Exhibition in Vienna with the object of helping those who are employed in limited industries in the remote portions of the Empire. Some model workshops were fitted at the Central Institution with modern plant for wood-working, together with a smith's shop, as exemplars to replace antiquated methods; grants in aid are offered to those who will go to Vienna and attend courses of practical instruction, and travelling teachers are sent into the villages to give lectures, with demonstrations, upon the uses of improved hand and machine tools, and upon the more advanced processes of manufacture. The cutlers and smiths of Lower Austria and the Tyrol, for instance, will, it is anticipated, greatly benefit through the display of more modern appliances and materials for tempering and annealing operations. A visit to the arts and crafts side of the Exhibition at Earl's-court will demonstrate what good results have already followed the formation in Austria of some 200 co-operative associations, to foster the existence of the smaller local industries and to develop the manual skill and taste in design of the individual craftsman.

GARDEN CITY, LETCHWORTH.—The Company known as "First Garden City, Ltd.," have issued a guide to the Garden City at Letchworth, which forms a kind of history of the formation of the Garden City and a summary of its attractions, present and possible. The guide is compiled by Mr. Thomas Adams, the Secretary to the Company, and contains a great deal of information, with illustrations and plans, for the small sum of 2d. It is published by the Company at their offices.

COTTAGE MODELS AND DESIGNS COMPETITION, BREXTON'S NORTON.—In the prize competition for Cottage Models and Designs, which were on view at the recent Agricultural Show at Bredon's Norton, the assessor, Mr. C. E. Bateman, F.R.I.B.A., of Birmingham, awarded the prizes as follows:—For designs illustrated by models:—First prize, 15l., to "Cryptonian" (Mr. Henry Weaver, Gloucester); second prize, 10l., to "Pro Bone Publica" (Messrs. Hugo Bird and Robert Browne, Brentwood). For designs illustrated by drawings only:—First prize, 10l., to "Red Lion" (Mr. A. Dennis-Thacker, Birmingham); second prize, 7l., to "Holte" (Messrs. Sam Cooke and Norman Twist, Birmingham). Mr. Bateman considered that the competition had produced some good designs; the work of "Red Lion" he commended especially, because it indicated a character of work more in harmony with the country and the old buildings of the district than any of the others; he further considered that these designs would carry on the old traditions of Cotswold buildings.

A DISCLAIMER.—Messrs. A. White & Co., builders and contractors, of 82, Paradise-street, Rotherhithe, ask us to state, to prevent a misconception, that they have no connexion with any other firm of builders of the same name.

STANDARD NUTS, BOLT-HEADS, AND SPANNERS.—Early in 1905 the disparity in the sizes of lock-nuts manufactured in this country was brought before the main body of the Engineering Standards Committee, and, as the result of discussion, it was decided to refer the matter to the Sectional Committee on Screw Threads and Limit Gauges, of which Mr. H. F. Donaldson is Chairman. Upon the collection of particulars from manufacturers it became evident that recommendations might usefully be made not only with regard to lock-nuts, but also with reference to ordinary nuts, bolt-heads, and spanners. The upshot is the Report now published, wherein particulars are given of British standard nuts, lock-nuts, bolt-heads, spanners, and "castle" nuts. As these recommendations are directly calculated to promote interchangeability it is to be hoped that they will be generally accepted, and end which architects and consulting engineers can do much to forward by the insertion of suitable demands in their specifications.

AUCTIONEERS' INSTITUTE.—The autumn provincial meeting of the Auctioneers' Institute will be held at Windsor on September 12-15, under the presidency of Mr. H. D. Buckland who practises in Windsor. The proceedings will comprise a mayoral reception and a luncheon at the

Patents of the Week.

APPLICATIONS PUBLISHED.*

16,766 of 1905.—R. PANSIN: *Locks.*

This consists in the combination of a lock proper with an auxiliary lock, having a barrel for the insertion of the key, and a number of tumblers presenting teeth adapted to enter the key-slot of such barrel on this being turned by a skeleton key, the said barrel having transverse grooves receiving some of the said tumblers, while the remaining ones lie against the ribs formed between the said grooves.

26,399 of 1905.—J. BOARD & CO., LTD., and W. S. AKERMAN: *Roofing and other Tiles.*

This relates to an interlocking tile for roofing and other purposes, having on its upper face two ridges, and on its lower face three ridges, the ridges on the upper face of each tile being designed to engage with two ridges or surfaces on the underside of the superposed tile, and being so arranged that the tile can be produced by a machine die.

2,305 of 1906.—W. C. FAIRWEATHER (G. Niemeyer): *Sash Windows.*

This relates to a sash window which is capable of movement in its own plane and have independent movement in a plane at an angle thereto, and wherein the pane is caused to move parallel to its plane by means of lateral rails having wedge projections which engage with slots in racks, and consists in the arrangement whereby the pane is guided directly between longitudinal grooves in the side rails and is itself pressed against a packing surface without the need of a frame to enclose it.

4,215 of 1906.—W. H. TAYLOR: *Latch Locks.* This relates to a latch lock having a spring-actuated latch and a deadlocking slide mounted to move in a direction at right angles to the movement of said latch, and consists in the employment of a pivoted cam adapted to be actuated by a key from the outside for retracting the latch, and of means actuated by said cam for moving the deadlocking slide into and out of the latch.

12,402 of 1906.—H. MOOSEHAK: *Extrusion Presses for Making Hollow Bricks, or the like.*

This relates to an extrusion press for manufacturing hollow bricks, artificial stones, or the like, and consists of means for conveying water to lubricate the cores, said means comprising supply pipes supported by bridges, and provided with openings adapted to convey the water to channels in the core from which the water passes through openings formed between the overlapping ends of the jacketing plates of the core to a hole formed in the brick, or the like.

TO CORRESPONDENTS.

NOTE.—The responsibility of signed articles, letters, and papers read at meetings rests, of course, with the authors.

We cannot undertake to return rejected communications, and the Editor cannot be responsible for drawings, photographs, manuscripts, or other documents, or for models or samples sent to or left at this office, unless he has specially asked for them.

Letters or communications (beyond mere news items) which have been duplicated for other journals are NOT DESIRED.

All communications must be authenticated by the name and address of the sender whether for publication or not. No notice can be taken of anonymous communications.

We are compelled to decline pointing out books and giving addresses.

Any communication to a contributor to write an article, or to execute or lend a drawing for publication, is given subject to the approval of the article or drawing, when received, by the Editor, who retains the right to reject it if unsatisfactory. The receipt by the author of a proof of an article in type does not necessarily imply its acceptance. The Editor cannot undertake to read and consider articles offered for acceptance unless they are type-written.

All communications regarding literary and artistic matters should be addressed to THE EDITOR; those relating to advertisements and other exclusively business matters should be addressed to THE PUBLISHER, and not to the Editor.

SOME RECENT SALES OF PROPERTY:

ESTATE EXCHANGE REPORT.		
Aug. 22.—By A. & D. EDWARDS (at Hereford).		
Munsley, Hereford.—Paunderford Court Farm, 276 acres, f.	£6,000	
By A. GODWIN PRATT (at Parkstone).		
Parkstone, Dorset.—Wimbor-rd., f.g. rents 22/2s. reversion in 999 yrs.	619	
Aug. 27.—By DOLMAN & PEARCE (at Camden Town).		
Hamstead.—48, Maitland Park-rd., u.t. 45 yrs., g.t. etc. 74/15s., y.t. 40s.	400	

* All these applications are in the stage in which opposition to the grant of Patents upon them can be made.

By NORMAN & SON (at Stratford).		
Leytonstone.—67, 69, and 71, Crownfield-rd. (s.), u.t. 60 yrs., g.r. 11/1s. 6d., y.t. 89/4s. 2s.	£670	
Aug. 28.—By MAY & PHILPOT.		
Brixton.—6 and 8, Jolly-rd., u.t. 60 yrs., g.r. 13/1s., w.t. 85/1s.	580	
By R. DONKIN & SON (at Newcastle).		
Ingram, Northumberland.—Greensidehill and Hartsdale Farms, 5,051 acres, f., y.t. 606s.	17,000	
By THOMSON & CO. (at Penrith).		
Penrith, Cumberland.—Freehold enclosure, 3 a. 3 r. 9 p.	455	
Aug. 29.—By T. F. DEASON.		
Harlesden.—4, Queen's-rd. (s.), u.t. 85 yrs., g.t. 5/1s., y.t. 30s.	200	

Contracts used in these lists.—F.g.s. for freehold ground-rent; l.g.r. for leasehold ground-rent; i.g.r. for improved ground-rent; g.t. for ground-rent; r. for rent; f. for freehold; c. for copyhold; l. for leasehold; p. for possession; s.t. for estimated rental; w.r. for weekly rental; q.r. for quarterly rental; y.r. for yearly rental; u.t. for unexpired term; p.a. for per annum; yrs. for years; ls. for lane; st. for street; rd. for road; sq. for square; pl. for place; ter. for terrace; cres. for crescent; av. for avenue; gdns. for gardens; yd. for yard; gr. for grove; b.h. for beerhouse; p.h. for public-house; o. for office; s. for shops; ct. for court.

MEETINGS.

MONDAY, SEPTEMBER 10.
Royal Sanitary Institute (Lectures for Sanitary Officers).
—Dr. J. Priestley on "Sanitary Law," I. 7 p.m.
Clerks of Works Association (Carpenters' Hall).—Paper by Mr. J. Redden. 7.30.

WEDNESDAY, SEPTEMBER 12.
Royal Sanitary Institute (Lectures for Sanitary Officers).
—Dr. J. Priestley on "Sanitary Law," II. 7 p.m.

FRIDAY, SEPTEMBER 14.
Royal Sanitary Institute (Lectures for Sanitary Officers).
—Dr. J. Priestley on "Sanitary Law," III. 7 p.m.

SATURDAY, SEPTEMBER 15.
Architectural Association.—Week-end visit to Chichester.

PRICES CURRENT OF MATERIALS.

*. Our aim in this list is to give, as far as possible, the average prices of materials, not necessarily the lowest. Quality and quantity obviously affect prices—a fact which should be remembered by those who make use of this information.

BRICKS, &c.		
£ s. d.		
Hard Stocks.....	1 10 0	per 1000 alongside, in river
High Stocks and Gazettes.....	1 7 0	" " " "
Picked Stocks for Facings.....	2 17 6	" " delivered.
Pleatons.....	18 0	" " at railway dep't.
Red Wire Cuts.....	1 14 0	" " " "
Best Fareham Red	3 12 0	" " " "
Best Red Pressed	5 0 0	" " " "
Best Blue Pressed	3 15 0	" " " "
Staffordshire ..	4 0 0	" " " "
Do. Bullnose ..	4 0 0	" " " "
Best Stourbridge	3 14 0	" " " "
Fire Bricks	3 14 0	" " " "
GLAZED BRICKS.		
Best White and Ivory Glazed		
Stretchers.....	12 0 0	" " " "
Headers.....	11 0 0	" " " "
Quoins, Bullnose, and Flats	16 0 0	" " " "
Double Stretchers	19 0 0	" " " "
Double Headers ..	16 0 0	" " " "
One Side and two Ends	19 0 0	" " " "
Two Sides and one End.....	20 0 0	" " " "
Splays, Chamfered, Squints, ..	20 0 0	" " " "
Best Dipped Salt Glazed Stretchers, and Header.	12 0 0	" " " "
Quoins, Bullnose, and Flats	14 0 0	" " " "
Double Stretchers	35 0 0	" " " "
Double Headers ..	14 0 0	" " " "
One Side and two Ends	15 0 0	" " " "
Two Sides and one End.....	15 0 0	" " " "
Splays, Chamfered, Squints, ..	14 0 0	" " " "
Second Quality White and Dipped Salt Glazed	2 0 0	" " less than best.
Thames and Pit Sand	7 0	per yard, delivered.
Thames Ballast	5 6	" " " "
Best Portland Cement	27	per ton, "
Best Ground Blue Lime	19 0	" " " "

NOTE.—The cement or lime is exclusive of the ordinary charge for sacks.

Grey Stone Lime

Stourbridge Fireclay in sacks 27s. 6d. per ton at rly. dpt.

STONE		
s. d.		
BATH STONE—delivered on road wag-		
gons, Paddington Dep't.	1 6 1/2	per ft. cube.
Do. do. delivered on road wag-		
gons, Nine Elms Dep't.	1 8 1/2	" "
PORTLAND STONE (20 ft. average)—		
Brown Whitch, delivered on road		
wagons, Paddington Dep't. Nine		
Elms Dep't. or Pimlico Wharf... 2 1		" "
White Rushed, delivered on road		
wagons, Paddington Dep't. Nine		
Elms Dep't. or Pimlico Wharf... 2 2 1/2		" "

PRICES CURRENT.—Continued on page 310.

Town Hall on September 13, a council meeting, and a banquet. The King has granted his permission to the members to visit the Royal Gardens and Farm, the State apartments, and portions of the Castle which are not usually opened to the public.

ROCHESTER CATHEDRAL.—The Dean Hole memorial, erected in the south end of the south transept, will be unveiled and dedicated on September 29. The effigy of the late Dean, sculptured in marble, is the work of Mr. F. W. Pomeroy, A.R.A., the altar tomb, of alabaster, has been designed by Mr. C. Hodgson Fowler, architect to the Dean and Chapter.

WILBERFORCE MUSEUM, Hull.—The Elizabethan house in High-street, Hull, wherein William Wilberforce was born on August 24, 1759, has been purchased by the Corporation for the purposes of a museum to illustrate the domestic and commercial history of the Borough. The house has been restored to its pristine state, and was opened a few days ago. Some portraits of Wilberforce, with many objects which belonged to him or his family, have been presented to the museum.

WINEDEN OF HAMPTSTEAD-ROAD.—A prolonged negotiation for the acquisition of the site of the old King's Head Tavern at the corner, east, of Hampstead and Euston roads, is now concluded. The London County Council have agreed to pay 18,000l. to the Metropolitan Railway Company as owners of the freehold, and 29,200l. for the leasehold and trade interests in the property. The two claims made at the outset amounted to 71,000l.

WALL-PAINTINGS, WESTMINSTER PALACE.—A Parliamentary paper has been issued and embodies Professor Church's memorandum, the eighth of a series, upon the condition and treatment of the five wall-paintings executed by W. Dyce, R.A., in 1851-64, in the King's Robing-room, with a detailed description of the repairs and repainting executed in 1904-5, under his directions, and mainly by Mr. Redhead, of the firm of Messrs. Shrigley & Hunt, of Lancaster, who dealt also with Maclellan's water-glass painting, "Wellington," on the south wall of the Royal Gallery. Professor Church, who has devoted much time and labour quite gratuitously to the task, concludes his report thus:—

The advisability of cleaning and repairing these and the other wall-paintings at intervals of three or four years has become more evident to me. The increased and increasing consumption of coal in London, and the greater licence allowed to the gas companies in the matter of freeing their gas from sulphur compounds must result in a serious augmentation of the amount of sulphuric acid in the air of the Metropolis. This acid it is which constitutes the chief destructive agency at work on pictorial and other artistic productions.

Professor Church recommends that the frescoes in the House of Peers should be again cleaned and repaired during the current year under his guidance, ten years having elapsed since they were treated. The Office of Works have made arrangements accordingly in respect of the frescoes under glass in the Peers' and the Commons' corridors.

WAR MEMORIAL, NORTHWICH.—A memorial tablet has been placed in the Northwich Parish Church in memory of the men of the district who fell in South Africa. The tablet, which is of bronze, has been designed and executed by Messrs. George Wragge, Ltd., of the Wardry Works, Salford.

NATIONAL ART MUSEUM, SOUTH KENSINGTON.—We have received a catalogue (564 pages small 8vo) of the modern etchings and aquatints of the British and American schools which are in the National Art Library at the Victoria and Albert Museum. They are grouped under the names of artists, arranged alphabetically, and show what a large and valuable collection of etchings and prints is to be found in the museum.

CHURCH OF ST. STEPHEN, THE GREEN, HAMPTSTEAD.—It is stated that the west front of the church has sunk by several inches, and is being under-pinned. The church was built for 1,200 sittings, at a cost of some 27,000l., in 1868-9, after plans and designs in the Moorish-Gothic style by S. S. Teulon.

Legal.

ACTION AGAINST THE DONCASTER CORPORATION.

The case of Palmer v. the Corporation of Doncaster came before Mr. Justice Sutton, in the Vacation Court, on the 5th inst., on a motion by the plaintiff for an interlocutory injunction to restrain the defendants, until the trial of the further order, from erecting a urinal at the junction of the old Roman road and the Great North road at Doncaster.

In the result, his lordship granted an injunction over Tuesday next, when the motion will be heard in Chambers.

List of Competitions, Contracts, etc.

For some Contracts still open, but not included in this List, see previous issues. Those with an asterisk (*) are advertised in this Number: Competitions, —; Contracts, iv. vi. viii. x.; Public Appointments, xvii.; Auction Sales, xxvi. Certain conditions, beyond those given in the following information, are imposed in some cases, such as: that the advertisers do not bind themselves to accept the lowest or any tender; that a fair wages clause shall be observed; that no allowance will be made for tenders; and that deposits are returned on receipt of a boni-fide tender unless stated to the contrary.

Competitions.

OCTOBER 20. — **Highbridge.** — SEWERING. — Highbridge Urban District invite competitive plans for the sewerage of the northern portion of the district. A premium of 20l. will be paid for the scheme approved and accepted. Particulars may be obtained from Mr. W. C. Shier, Highbridge, Somerset, Surveyor to the Council. Plans and estimates to be deposited with Mr. B. C. Board, Clerk to the Council, Urban Council Office, Highbridge, Somerset, 10, 12 o'clock noon on October 20, endorsed "Proposed Sewer."

OCTOBER 22. — **Gaywood.** — SCHOOL. — Norfolk Education Committee are desirous of obtaining by competition plans, specifications, elevations, and estimates for a new school. A plan of the site and other particulars can be obtained on application to the Secretary at the County Education Office, 57, London-street, Norwich. Plans must be received at that office on or before October 22.

NO DYE. — **Leven.** — CO-OPERATIVE BUILDINGS. — Leven Reform Co-operative Society, Ltd., want competitive plans for new building proposed to be erected in Dunnet-street, Leven. Plans to be sent to Secretary by the last week of September. Further particulars can be had on application to Mr. D. C. Wilson, Secretary, on Wednesdays and Saturdays.

Contracts.

BUILDING.

SEPTEMBER 8. — **Shipley.** — ADDITIONS TO SCHOOLS. — Alterations and additions to the Salt Schools, Shipley. Send in their names to Mr. Sam Braddy, architect, Yorkshire Bank Chambers, Shipley, not later than September 8.

SEPTEMBER 10. — **Ainwick.** — CO-OPERATIVE PREMISES. — The Amble Co-operative Society, Ltd., invite tenders for the erection of branch premises at Ainwick. Quantities can be obtained upon application to Mr. E. G. Ekins, Architect, Co-operative Wholesale Society, West Blandford-street, Newcastle-on-Tyne. Tenders, endorsed "Ainwick New Building," will be received at the Society Office, Queen-street, Amble, up to 12 o'clock noon, September 10. Mr. E. Foreman, Secretary.

SEPTEMBER 10. — **Kull.** — EXTENSION OF WORKS. — For excavator, bricklayer, and concretor's works in extension of The Gunner Works, Slough. Plans to be sent to Mr. John Wilson. Plans may be seen, and particulars obtained, at offices of Messrs. Runtun & Barry, architects, upon depositing 1l. 1s. Sealed tenders to be delivered to the architects on or before 11 a.m., September 10.

SEPTEMBER 10. — **Rhymney.** — ALTERATIONS, ETC. — Alterations and building additions to "Tymawr," Rhymney. Plans and specification can be seen at "Tymawr," or at office of Mr. T. Roderick, architect, Ashbrook House, Aberdare, where bills of quantities can be obtained on application. Endorsed tenders to be sent in to Mr. T. Edwards "Tymawr," Rhymney, not later than September 10.

SEPTEMBER 10. — **Tylorstown.** — VILLA. — For Pastor's villa, Ebenezer (Tylorstown). Plans and specifications can be seen with Mr. John Edward Jones (Chairman), Hendefadog Shop, Tylorstown. The tenders to be sent (sealed and endorsed) to Mr. Thomas Hill (Secretary), 13, Church-terrace, Tylorstown, not later than September 10.

SEPTEMBER 11. — **Coed-Ely.** — BUNGALOWS. — Four bungalows at Coed-Ely, near Llantrisant, for the Welsh Navigation Steam Coal Company. Plans and specifications may be seen at the office of Mr. P. J. Jones, architect, Cilfynydd, Pontypridd, to whom tenders are to be sent on or before September 11.

SEPTEMBER 11. — **Gravesend.** — REGISTRAR'S ROOM. — Gravesend Hospital Committee invite tenders for the erection of a registrar's room at the Hospital. Plan and specification may be seen on application to the Secretary at the Hospital, and all tenders must be sent in not later than 4 p.m. on September 11.

SEPTEMBER 12. — **Greenock.** — SCHOOL. — Greenock Burgh School Board invite tenders for (1) digger, mason, and brick works; (2) carpenter, joiner, and joinery works; (3) cast-iron and steel works; (4) plumber work; (5) slater work; (6) plaster work; (7) granolithic work; (8) the work; (9) electric lighting; (10) painter work, required in connexion with the erection of Greenock Public School, landings according to plans by Messrs. Salmon & Gillespie, F.R.I.B.A., I.A., architects. Schedules of quantities and form of tender can be obtained on application to Mr. A. P. Nixon, Clerk to the Greenock Burgh School Board, Municipal Buildings, Greenock, on payment of a deposit of 1l. for each schedule. Sealed tenders, on the prescribed form, must be delivered to Mr. A. P. Nixon, Clerk to the Greenock Burgh School Board, Municipal Buildings, Greenock, not later than 11 o'clock a.m. on September 12.

SEPTEMBER 12. — **Wainstalls, Halifax.** — SHED. — The erection of a shed at Wainstalls, near Halifax. Plans and specifications can be seen at offices of Messrs. I. & J. Calvert, architects, Halifax. Sealed tenders must be delivered not later than 11 o'clock a.m. on September 12.

SEPTEMBER 12. — **York.** — CLUB HOUSE. — The Committee

of the York Golf Club invite tenders for the erection of a new club house near York. Drawings and specifications may be inspected at the offices of Mr. J. Edmund Jones, solicitor, Market-street, York, between the hours of 10 a.m. and 5 p.m. Tender (on the form supplied) are to be addressed and delivered to the Chairman, York Golf Club Committee, 1, Market-street, York, on or before September 12, sealed and endorsed "Tender for New Golf Club House."

SEPTEMBER 13. — **Lincoln.** — ALTERATIONS. — Alterations to the "Black Goats" Hotel, High-street, Lincoln, belonging to Mr. J. H. Newton. Plans, specifications, and quantities are now ready, and a copy of each may be obtained on application to offices of Messrs. Sheppard & Lockton, architects, Bargate, Newark-on-Trent. Sealed and endorsed tenders to be sent to architects on or before September 13, not later than 10 o'clock a.m.

SEPTEMBER 14. — **Low Bradfield.** — ADDITIONS TO SCHOOLS. — The West Riding Education Committee invite tenders in connexion with the additions, etc., to Low Bradfield Provident School, near Sheffield. Plans may be seen, and quantities obtained, on application to office of Mr. J. Vickers Edwards, County Architect, County Hall, Wakefield. Sealed tenders, endorsed "Tender for School," must be sent not later than 10.30 on the morning of September 14.

SEPTEMBER 15. — **Bargoed.** — VESTRY. — The erection of a vestry at Bargoed for the Welsh Baptist Denominational Tenders to be sent in to Mr. Mark O'D., 29 Henry-street, Bargoed, on or before September 15. Plans and specification may be seen with the above or with Mr. P. Vivian Jones, P.A.S.I., architect and surveyor, Hendre-ferriol, Bargoed.

SEPTEMBER 17. — **Gowerton, Caernau.** — SCHOOL WORKS. — The Glamorgan C.C. invite tenders for: (1) Heating the Gowerton Council School with the low-pressure hot-water system; (2) alterations and additions at the Baccallin Council School, Caernau, near Maesteg; (3) new temporary Cookery and Infant School at the Troedrhafwyl Council School; (4) new classrooms to the mixed department at Ely Council School; (5) minor alterations and additions at Pontyryll Council School. Plans and specification may be seen, and copies of the bills of quantities obtained for works No. 2 at the Caernau Police-station, Maesteg; for works No. 3 at the Pontyryll Police-station; and for work No. 4 at work No. 1 may be obtained at the Gowerton Police-station. Plans of work No. 5 may be seen at the Police-station. The plans and documents for all the works may be seen or obtained at offices of Mr. T. Mansel Franklin, Clerk of the Glamorgan County Council, Westgate-street, Cardiff. Tenders, made out on the form supplied, including the names of two substantial sureties, are to be delivered to the Clerk not later than September 17, marked outside "Tender for Heating Gowerton School," etc., etc., as the case may be.

SEPTEMBER 18. — **Carmarthen.** — SANITARY BLOCK. — For building a sanitary block at the Carmarthen Infirmary, Carmarthen. Plans and specifications may be seen on application to Messrs. George Morgan & Sons, F.R.I.B.A., A.R.I.B.A., architects, the Infirmary, Carmarthen, on or before September 18.

SEPTEMBER 18. — **Eldon Lane and Sedgfield.** — SCHOOLS. — Durham County Education Committee invite tenders for erection of new schools at Eldon Lane and Sedgfield. Plans, specifications, and general conditions of contract, and bills of quantities can be seen as follows: For Eldon Lane, at the office of Messrs. Vaux & Mark, architects, 29, Norfolk-street, Sunderland; for Sedgfield, at the office of the Education Committee's Architect, Shire Hall, Durham. Sealed tenders, endorsed "Tender for Schools," must be sent on or before September 18, addressed to the Secretary for Elementary Education, Shire Hall, Durham.

* SEPTEMBER 18. — **Tottenham.** — LIBRARY EXTENSION. — Plans for the extension of the library at Tottenham. Plans can be seen, and general conditions, specifications, bills of quantities, schedule of prices, and forms of tender can be obtained on application to Buildings, The Green, Tottenham's Engineer, Council, 105, bd. Persons tendering must deposit 5l. when form supplied, endorsed "Tender for Extension to Tottenham Library," to be delivered to Mr. E. Crowne, Clerk of the Council, Tottenham, by 12 noon, September 18.

SEPTEMBER 19. — **Blanchardstown, Dublin.** — WALL. — North Dublin R.D.C. invite tenders for raising and concreting the boundary wall in front of the Council Offices, Blanchardstown, in accordance with the specification for work which can be seen and copied at office of Mr. John O'Neill, Clerk to the Council, North Brunswick-street, Dublin. Sealed tenders will be received in the tender box at 11 o'clock a.m. on September 19.

SEPTEMBER 19. — **Liverpool.** — WASHHOUSE, ETC. — The new washhouse, clothes store, and boundary walls, etc., at the Lower Hospital, Mill-road Infirmary, from

contractors having places of business and workshops and being bond fide contractors carrying on business within the Unions of West Derby, town-ship of Oxton Park, or the Parish of Liverpool, P. Cleaver, Clerk to the Guardians, Brougham-terrace, West Derby-road, Liverpool, on payment of 12 1s. Specifications and drawings can be seen at the office of the architect, Mr. C. H. Lancaster, Brougham-terrace, West Derby-road, Liverpool. Sealed tenders, endorsed "Tender for Additions to Lower Hospital," and addressed to the Clerk, must be delivered not later than 9 o'clock a.m. on September 19.

SEPTEMBER 20. — **Rathmines.** — BUILDERS' WORK. — The U.D.C. of Rathmines invite tenders for sundry builders work at their Electricity Works. Drawings, general conditions, and specification may be inspected at the Rathmines Electricity Works, and a copy of the bill of quantities and conditions, and specification obtained, on making a deposit of 1l. Tenders (sealed and marked "Tender for Builders' Work") must be addressed to Mr. F. P. Fawcett, Clerk to the Council, Town Hall, Rathmines, Dublin, and be delivered not later than 10 o'clock in the forenoon on September 20.

* SEPTEMBER 20. — **Mill Hill.** — NEW SORTING OFFICE. — The Commissioners of H.M. Woods and Forests Buildings invite tenders for a new sorting office at Mill Hill, N. Drawings, specification, and a copy of the conditions and form of contract may be seen on application to Mr. H. M. Water, H.M. Office of Works, Westminster, S.W. Bills of quantities and forms of tenders may be obtained at the undermentioned offices, on payment of 1l. Tenders must be delivered before 12 noon, September 21, addressed to the Secretary, H.M. Office of Works, Mill Hill Sorting Office, and endorsed "Tender for Mill Hill Sorting Office."

* SEPTEMBER 21. — **Poplar.** — REPAIRS, ETC. — The London County Council invite tenders for repairs at the Mansion in The Island Garden, Poplar. Drawings may be inspected, and specifications, bills of quantities, form of tender, etc., obtained at the Architects' Department, 15, Pall Mall East, S.W., on deposit of 10s. Tenders to be delivered at County Hall, addressed to the Clerk, Spring Gardens, S.W., and endorsed "Tender for Repairs, etc., at The Mansion, The Island Gardens," not later than 10 a.m., September 21.

* SEPTEMBER 21. — **Wormwood Scrubs.** — ERECTION OF LODGE. — The London County Council invite tenders for the re-erection of a lodge at Wormwood Scrubs. Bills of quantities may be seen, and specifications, bills of quantities, form of tender, etc., obtained from the Architects' Department, 15, Pall Mall East, S.W., on deposit of 10s. Sealed tenders to be delivered at County Hall, addressed to the Clerk, Spring Gardens, S.W., and endorsed "Tender for the Re-erection of a Lodge at Wormwood Scrubs," not later than 10 a.m. on September 21.

* SEPTEMBER 21. — **Devizes.** — SHEDS. — The Council of the Wiltshire Agricultural Association invite tenders for erection of shedding and the whole of the work necessary works in connexion with the show ground at Devizes, on the site of the old Devizes Yard. Specifications of the work required and forms of tender may be obtained of the Secretary of the Association, Mr. George Lavington, Devizes, on payment of 1l. 1s. Tenders, on the form supplied, must be delivered by 10 a.m., October 3, sealed and endorsed "Tender for Shedding," to the Secretary.

* SEPTEMBER 21. — **Levenshulme.** — TECHNICAL SCHOOL. — The Levenshulme U.D.C. invite tenders for the erection and completion of the new Technical School proposed to be erected at the rear of the Chapel-street Council School, Chapel-street, Levenshulme. Specifications, bills of quantities, and further particulars may be obtained on application to the architect, Mr. Henry Litter, 16, Ribblesdale-place, Preston, on payment of 3l. 3s. Tenders, endorsed "Tender for New Technical School," to be sent to Buildings, Albert-square, Manchester, on or before October 4.

NO DATE. — **Grimston.** — RESIDENCE. — The erection and completion of a double-fronted residence, with outbuildings, at Grimston, Norfolk. Plans, specifications, and quantities, with all particulars and information, can be obtained upon application at the office of the architect, Mr. Louis F. Baggett, King-street, Norwich.

NO DATE. — **Halesworth.** — GASHOLDER TANK. — Halesworth Gas Company invite tenders for the erection of a gasholder tank, with all particulars and information, can be obtained upon application at the office of the architect, Mr. A. Foreman, Manager, 46, Thoroughfare, Halesworth.

* SEPTEMBER 21. — **Raskeil.** — TUNNEL. — The erection of a tunnel at Raskeil, near Farnham, Surrey, for the construction of a new railway line. Plans and specifications can be obtained at the office of the architect, Mr. H. M. Water, H.M. Office of Works, Westminster, S.W.

ENGINEERING, IRON, AND STEEL.

SEPTEMBER 9. — **Leigh.** — GIRDER TRUCKS. — Leigh Gas and Water Committee invite tenders for the supply of two girder trucks, with all particulars and information, can be obtained upon application at the office of the architect, Mr. H. M. Water, H.M. Office of Works, Westminster, S.W.

Hibson, gas and water engineer. Sealed and endorsed tenders to be addressed to Mr. Stanley Wilson, Town Clerk, Town Hall, Leigh, Lancs., and delivered not later than September 9.

SEPTEMBER 10.—London.—RAILS.—The Bengal and North-Western Railway Corporation invite tenders for the supply and delivery of 350 tons of 50-lb. steel rails and 600 tons of steel fishplates for ditto, as per specification to be seen at the Company's Offices. Tenders, addressed to Mr. Alexander Mackenzie, General Manager, Railway House, Old Broad-street, London, E.C.4, and marked "Tender for Rails and Fishplates," are to be lodged not later than noon on September 10. For each specification a fee of 10s. will be charged, which cannot, under any circumstances, be returned.

SEPTEMBER 13.—Portsmouth.—REPAIRING PUMPS.—Portsmouth Corporation invite tenders for repairing the main pumps and engine at the Eastney Pumping Station, in the Borough of Portsmouth. The specification may be seen, and a form of tender obtained, at the Borough Engineer's Office at the Town Hall. The form of tender is to be completely filled in and sent under cover to reach Mr. Alexander Hellard, Town Clerk, Town Hall, Portsmouth, not later than 10 a.m. on September 13.

SEPTEMBER 13.—Tullamore.—SECTIONAL BOILER AND INSTALLATION.—The Finance Committee of the King's C.C. will, at their meeting, to be held on September 13, in the Court-house, Tullamore, will proceed to consider the work in connection with the existing boiler, brickwork and supplying, erecting, and connecting with existing water pipes and smoke flue a cast-iron sectional boiler, including all necessary fittings, in the work in question can be inspected at the office of Mr. James Delany, County Surveyor, the Court-house, Tullamore, any week-day between the hours of 10 and 5 (except Saturdays, Sundays, and public holidays). The form of tender is to be completely filled in and sent under cover to reach Mr. Alexander Hellard, Town Clerk, Town Hall, Portsmouth, not later than 10 a.m. on September 13.

SEPTEMBER 17.—Birmingham.—REPAIR WORK.—Birmingham City Council invite tenders for works in connection with the widening of Lancaster-street, Canal Bridge—Contract No. 1. The drawings and specification may be inspected at the offices of Mr. Henry E. Stigloe, M.Inst.C.E., City Engineer and Surveyor, Council House, Birmingham. Tenders, endorsed "Tender for Repairs," are to be delivered at office of Engineer on or before September 17.

SEPTEMBER 17.—London.—PIPE LAYING.—The Metropolitan Water Board invite tenders for the laying and jointing, etc., of 42-in. and other cast-iron pipes between Child's Hill and Cranley Gardens, and other necessary works in connection therewith. Forms of tender, with schedule and conditions of contract, may be obtained, and drawings inspected, upon application to the engineer, at the Fire's Southern Road, Fortis Green, Brixton, S.W.12. Such payments and applications must be made between the hours of 10 and 4 (except on Saturdays). Tenders, enclosed in sealed envelopes, addressed to the Clerk, London Water Board, to be delivered at the Office of the Engineer, Child's Hill to Cranley Gardens, must be delivered at the Office of the Board not later than 12 o'clock noon on September 17.

SEPTEMBER 17.—Rotherham.—MACHINERY FOR BATHS.—Rotherham Corporation invite tenders for laundry machinery and fittings required at the Public Baths, also from builders for structural alterations. Plans and specifications may be seen, and further particulars obtained, by applying at the offices of Mr. J. Platts, Corporation Architect. Tenders, endorsed "Laundry Machinery for Baths," are to be delivered at the office of the Town Clerk, Rotherham, not later than September 19.

SEPTEMBER 24.—Lambeth.—ECONOMISING WORKS.—Lambeth Board of Guardians invite tenders for utilising the Workhouse in Renfrew-road, Lower Kennington-lane, S.E. Firms making a speciality of this class of work will be shown over the building by appointment made with the Consulting Engineer to the Guardians, Mr. George E. Arnold, 195, Kennington-road, S.E. Sealed estimates must be delivered to the Clerk to the Guardians at the Guardians' Offices, Brook-street, Kennington-road, S.E., not later than September 24, superscribed "Estimate for Economising Works."

SEPTEMBER 25.—Johannesburg.—MOTORS.—The Town Council of Johannesburg invite tenders for the supply and delivery, f.o.b., at a port suitable for shipment to South Africa, of—One phase alternate current motors with accessories. Tenders are to be addressed to the Town Clerk, Municipal Offices, Johannesburg, and must reach him not later than October 15. The general conditions, specification, and forms of tender may be seen at the Offices of the Council's Consulting Engineers, Messrs. Morley & Dawbarn, 82, Victoria-street, Westminster, S.W., and may be obtained from him on payment of 5s.

MISCELLANEOUS.

SEPTEMBER 8.—Dublin.—ELECTRICITY METERS.—Dublin Lighting and Waterworks Board invite tenders for the supply of the following—500 alternating current meters, single-phase and three-phase. Specification, with terms and conditions, and form of tender, may be inspected at the offices of the City Electrical Engineer, Fleet-street, Dublin, and may be obtained on payment of 5s. Tenders (sealed and marked "Tender for Electricity Meters") are to be delivered at the office of the City Electrical Engineer, 3, Cork-lane, Dublin, and be delivered not later than 12 o'clock noon on September 8.

SEPTEMBER 9.—Gressenhall.—WINDOWS.—Mifford and Landisford invite tenders for the supply and fixing at the Workhouse, Gressenhall, of seven new windows and work in connection therewith, in accordance with specifications which may be inspected at any reasonable time at the Workhouse. Tenders, marked "Windows," should be

sent to Mr. Walter M. Barton, Clerk to the Guardians, The Guildhall, East Dereham, on or before September 8.

SEPTEMBER 10.—West Kirby.—BOWLING GREEN.—The U.D.C. of Hoylake and West Kirby invite tenders for excavating, leveling, and turning to a proper chamber a bowling green at the Upper Park, West Kirby, and executing any other work specified in the quantities. Plans, specifications, and quantities may be seen at the Engineer's Office, Town Hall, Hoylake. Sealed tenders, addressed to the Chairman of the Parks Committee, and endorsed "Tender for Bowling Green," are to be delivered at the Town Hall, Hoylake, not later than 12 noon on September 10.

SEPTEMBER 12.—Colchester.—THE REMOVAL OF REFUSE.—The Guardians invite tenders for the refuse of the Workhouse, to be removed weekly or oftener, for one year, from September 30, 1906, to October 5, 1907, inclusive. Tenders to be delivered, sealed up, at the Workhouse, not later than September 12, and marked outside, "Tender for House Refuse." Mr. Charles E. White, Clerk, 57, North-litton, Colchester.

SEPTEMBER 13.—Belfast.—DRY METERS.—Belfast Gas Department invite tenders for the supply of dry meters (ordinary and prepayment) for one year, from October 1, 1906. Tenders, endorsed "Tender for Dry Meters," must be delivered at office of Sir Samuel Black, Town Clerk, not later than September 13.

SEPTEMBER 13.—Watton.—BUILDING MATERIAL.—The Committee of the Northamptonshire County Landau Association, Watton, near Watwick, invite builders and merchants to contract for the supply of building materials for the ensuing twelve months, from October 1, 1906, to September 30, 1907. Forms of tender may be obtained, and samples of materials used can be seen, at the Institution, and must be returned by September 13.

SEPTEMBER 15.—Aylesbury.—SCAVENGING.—Aylesbury R.D.C. invite tenders from persons willing to clean out and collect the refuse from the earth closets, privies, ashpits, and cesspools and other houses, and for cleaning the following parishes: No. 1, Aston Clinton; No. 2, Weston Turville; No. 3, Lower Buckland and Buckland Wharf, for the half-year ending March 31, 1907, and also to be included under one contract and to become the property of the contractor. A proper scavenging cart or carts must be provided by the contractor. Tenders must be made for one or more of the above-named parishes, and the price for each parish must be separately mentioned. Persons desirous of tendering must apply to Mr. W. E. Stanley, Inspector of Nuisances, Stickle, Aylesbury, at whose office the form of contract, which will have to be entered into may be inspected. Tenders are to be forwarded to Mr. F. B. Parrott, Clerk, Aylesbury, at office in Bourton-street, on or before 12 o'clock at noon, on September 15.

SEPTEMBER 15.—Horton.—SCAVENGING.—For scavenging the Parish of Horton. Specification and form of contract may be seen at office of Mr. C. P. Summerhays, Clerk to Parish Council, Horton, Slough. Tenders (endorsed "Scavenging") to reach the Clerk by September 15.

SEPTEMBER 15.—Langley.—SCAVENGING.—Scavenging the Parish of Langley Marsh. Specification and form of contract may be seen at office of Mr. T. H. Jordan, Clerk to the Parish Council, Middle Green, Langley, Bucks. Tenders (endorsed "Scavenging") to reach the Clerk by 10 a.m., September 15.

SEPTEMBER 20.—Belfast.—GAS STOVES, etc.—Belfast Gas Committee invite tenders for the supply of gas cookers, heating stoves, and other appliances, for one year from October 1, 1906. Tenders, endorsed "Tenders for Gas Appliances," addressed to Sir Samuel Black, Town Clerk, Belfast, are to be furnished not later than September 20.

PAINTING, etc.

SEPTEMBER 11.—Halifax.—PAINTING.—The Markets Committee of the Halifax Corporation invite tenders for the (1) painting work required to the exterior of the Borough Markets; (2) painting railings, cottages, toll house, etc., at the Victoria Cattle Market; and (3) the whitewashing work required at the slaughterhouses, Market Hall, and the Borough Markets. The Improvement Committee invite tenders for painting property in West Grove-terrace, Hopwood-lane, Bolton-street, Beacon Hill road, and Bird Gate. Specifications, quantities, and forms of tender may be obtained on application to Mr. James Lord, C.E., Borough Engineer, Town Hall, Halifax. Tenders, properly endorsed, and in separate envelopes for the Markets Committee and the Improvement Committee, must be sent to Mr. Keighley Walton, Town Clerk, not later than 12 o'clock noon on September 11.

SEPTEMBER 12.—Belfast.—PAINTING.—Belfast Cemetery and Parks Committee invite tenders for painting at the various parks. Specification may be seen in the City Surveyor's Office. Sealed tenders, endorsed "Tender for Painting at Park," are to be lodged in office of Sir Samuel Black, Town Clerk, before 11 o'clock a.m. on September 12.

SEPTEMBER 14.—Chelmsford.—PAINTING.—The Town Council of Chelmsford invite tenders for painting the outside of house and premises, No. 10, Duke-street, Chelmsford, belonging to the Corporation. Particulars can be obtained, and specification viewed at the Office of the Borough Surveyor, 16, London-road, Chelmsford. Tenders to reach Mr. Thos. Dixon, Town Clerk, Chelmsford, by September 14.

SEPTEMBER 14.—Preston.—PAINTING.—Preston Corporation invite tenders for painting, etc., the Fire Station, Tithebarn-street. Specification may be seen in the office of the Town Clerk, and all particulars observed at the Office of the Borough Surveyor, Town Hall, Preston, to whom sealed tenders, endorsed "Tender for Painting, etc., Fire Station," must be delivered not later than 12 o'clock at noon on September 14.

SEPTEMBER 17.—Cheshunt.—PAINTING, etc.—Cheshunt U.D.C. invite tenders for cleaning, painting, and decorating the Manor House, Turners-hill, together with various structural alterations, and renovations and the building of a strong room in the present basement. Plans may be seen, together with specification, and forms of tender obtained,

upon application at office of Mr. Reginald H. Jeffes, A.M.I.C.E., Engineer and Surveyor to the Council, Manor House, Cheshunt, during office hours. Tenders, in envelopes supplied, to be delivered not later than 4 p.m. on September 17.

SEPTEMBER 18.—Hull.—PAINTING.—Hull Education Committee invite tenders for the external painting of the Municipal Technical School. Particulars and forms of tender can be obtained at offices of Mr. J. P. Riley, Secretary of Education, Education Office, Albion-street, Hull. Sealed tenders, duly endorsed and addressed to the Secretary of Education, must be delivered not later than 5 p.m. on September 18.

SEPTEMBER 20.—Mitcham.—PAINTING.—Croydon R.D.C. invite tenders for repairs and painting required at the Isolation Hospital, Beddington Corner, Mitcham. Copies of specifications and forms of tender can be obtained at the office of the Council's Surveyor, Mr. E. M. Chart, F.S.I., on payment of a deposit of 11s. Tenders to be delivered to Mr. B. J. Gowen, Clerk of the Council, Town Hall, Croydon, before 12 o'clock noon on September 20.

SEPTEMBER 25.—Branksome.—PAINTING.—For cleaning and painting police-station. Specifications, prepared by the County Surveyor, can be seen at the station. Tenders to be sent to Mr. E. Archdall Fooks, Sherborne, on or before September 25.

NO DRAW.—Castelford.—PAINTING, etc.—The Castelford U.D.C. invite tenders for the works of painting, etc., at the Castelford Market Hall, in accordance with the quantities and specification prepared by Mr. W. Green, Surveyor, at the Council Office, and copies of which may be obtained on a deposit of 12s. Mr. H. H. Broadbent, Clerk to the Council, Council Offices, Castelford.

ROADS, SANITARY, AND WATER WORKS.

★ SEPTEMBER 10.—Hendon.—MAKING-UP ROAD.—The Hendon U.D.C. invite tenders for certain works of kerbing, channelling, paving, flagging, and gullies, etc., and other works in fully making-up the first portion of Stanley-road, West Hendon. Drawings and specifications may be seen, and forms of tender obtained, on application to Mr. S. Slater Grimley, Council's Engineer, Hendon, N.W., on deposit of 10s. Sealed tenders, endorsed "Private Improvements," addressed to the Chairman of the Council, to be sent to Mr. H. Humphries, Clerk, Council Offices, The Burroughs, Hendon, N.W., before 4 p.m., September 10.

SEPTEMBER 10.—Morley.—WIDENING ROAD.—Morley Highways Committee invite tenders for the whole of the work required to be done in the improvement and widening of Wide-lane, within the borough, including excavating, building of a retaining wall, kerbing, flagging, and channelling. Plans and specifications may be seen, and bills of quantities obtained, on application at office of Mr. W. E. Putnam, A.M.I.C.E., Borough Engineer and Surveyor, Town Hall, Morley. Tenders, sealed and endorsed "Wide-lane Improvement," to be delivered at the Town Clerk's Office, Town Hall, Morley, not later than noon on September 10.

SEPTEMBER 11.—Leeds.—PRIVATE STREET WORKS.—Leeds Highways Committee invite tenders for the paving and flagging of the following streets:—Hovingham-terrace, Hovingham Mount, back Hovingham-terrace, back Hovingham Mount, back Dorsel-road, Pasture-road, Shepherd's-place, Darfield-street, Darfield-place, Powell-street, Marley-grove, and Marley View. Drawings may be seen at the City Engineer's Office, Municipal Buildings. Forms of tender and bills of quantities may be obtained, and copies of the documents forming the contract inspected, on application at the Highways Office, 155, Kirkstall-road. Sealed tenders, endorsed "Tender for Private Street Works," and addressed to the Highways Committee, must be delivered at the Town Clerk's Office, Town Hall, Leeds, not later than 10 a.m. on September 11.

SEPTEMBER 12.—Ebbw Vale.—REPAIRING FILTER BED.—Ebbw Vale U.D.C. invite tenders for the work required in repairing one of the filter beds at their Llangynder Waterworks. Plan and specification may be seen, and form of tender, with bill of quantities, obtained by appointment at the office of Mr. T. J. Thomas, Engineer, District Council Office, Ebbw Vale. A deposit of 10s., which must be in postal orders, will be required from each person who obtains a copy of the form of tender and bill of quantities. Tender, enclosed in a sealed envelope, endorsed on the outside "Tender for Repairing Filter Bed," must be delivered at office of Mr. Thomas Hughes, Clerk, Ebbw Vale, not later than September 12.

SEPTEMBER 12.—Roath and Canton.—PRIVATE STREET WORKS.—Cardiff Corporation invite tenders for forming, metalling, paving, kerbing, and channelling the following streets at Roath and Canton:—Shirley-road, Tydfil-place, Monthermer-road, Pen-y-wain-road, Rhymney-lane, Tydfil-lane, Shirley-lane, Nisiam-lane, Monthermer-lane, Orchard-place, and Daisy-street. Separate tenders are required for:—(1) Forming and metalling the carriage-ways; (2) paving, kerbing, and channelling the footways. Drawings and specifications may be seen, and forms of tender obtained, at the Office of Mr. W. Harper, M.Inst.C.E., City Engineer, Cardiff. Sealed tenders, endorsed "Private Street Works," are to be delivered at office of Mr. J. L. Wheatley, Town Clerk, Town Hall, Cardiff, on or before September 12.

SEPTEMBER 12.—Tullibody.—SEWAGE WORKS.—The C.C. of Clackmannanshire invite offers for the work to be done in laying sewers and constructing sewage tank, in the special drainage district of Tullibody. Drawings can be seen in the office of Sir W. K. Copland, C.E., 145, West Regent-street, Glasgow, and copy of specification and duplicate copies of the bills of quantities may be obtained from him on payment of a fee of 10s. 6d. Sealed offers, endorsed "Tender for Sewage Works, Tullibody," to be lodged with Mr. J. W. Moir, County Clerk, Alloa, by 12 noon on September 12.

SEPTEMBER 13.—Cowpen.—FLAGGING.—Cowpen U.D.C. invite tenders for flagging the bottom and slopes of a settling pond at Choppington Colliery

(area of concrete flagging about 1070 sq yds). Plans and specification may be seen, and forms of tender obtained, at the Office of Mr. Robert Grieves, Surveyor to the Council, Scaforth-street, Blyth. Sealed tenders, endorsed "Tender for Flagging," must be delivered not later than 4 p.m. on September 13.

SEPTEMBER 14.—BUCKLE.—WATER SUPPLY.—Buckie Town Council of the Burgh of Buckie invite offers for the work to be done in providing an increased and improved water supply to the Burgh. Copies of the drawings may be seen here, and also in the office of Sir W. R. Copland, C.E., 146, West Regent-street, Glasgow; and copies of specification, and duplicate copies of schedule of quantities, may be obtained on payment of a fee of 21s. An assistant engineer will meet contractors at the Commercial Hotel, Buckie, on September 8, at 11 a.m., and will show them over the ground. Sealed offers, endorsed "Tender for Water Works," to be addressed to Mr. John L. McNaughton, Town Clerk, Burgh Chambers, Buckie, and lodged with him by 12 noon on September 14.

SEPTEMBER 14.—PRESTON.—PAVING, ETC.—Preston Corporation invite tenders for the works required in levelling, paving, flagging, channelling, etc. Salmon-street from Scaforth-street to No. 5, and Fishwick-road, from Salmon-street to Fishwick-parade. Plans, sections, and specifications may be seen, and schedule of quantities and form of tender obtained, at the Office of the Borough Surveyor, Town Hall, Preston, to whom sealed tenders, endorsed "Tender for Paving, etc.," must be delivered not later than 12 o'clock at noon on September 17.

SEPTEMBER 17.—SEAFORD.—SEWER.—The Seaford U.D.C. invite tenders for the construction of about 1,300 yds. of 9-in. pipe sewer, with manholes and other incidental works, in Erie-road and Blatchington-street, within their district. Plan and specification may be seen, and bill of quantities obtained, at the office of the engineers, Messrs Pollard & Tugle, M.M.C.E., 31, Old Queen-street, Westminster, S.W. Sealed tenders, endorsed "Erie-road Drainage," to be sent to Mr. W. H. Pawson, Clerk, Council Offices, 3, Clinton-place, Seaford, Sussex, not later than 4 p.m., September 17.

SEPTEMBER 18.—SPENNYMORE.—FOOTPATH.—The Spennymore U.D.C. invite tenders for the supplying and laying of new concrete flags and kerbs for a portion of High-street, Spennymore. Plans, specifications may be seen, and forms of tender obtained, on application to Mr. C. R. Spencer, Surveyor to the Council, Silver-street, Spennymore. Tenders, marked "High-street Footpath," to be sent to Mr. F. Badcock, Clerk to the Council, Council Offices, Spennymore, not later than September 18.

SEPTEMBER 19.—ELY, LANDAFF.—SEWER.—Llandaff and Dinas Powis R.D.C. invite tenders for the construction of about half a mile of 9-in. cast iron pipe sewer, together with the necessary manholes, etc., etc., at Ely, in the Parish of Llandaff, in accordance with plans and specification, which may be seen, and bills of quantities and forms of tender obtained, at the office of Mr. Baldwin Latham

M.Inst.C.E., Parliament-mansions, Victoria-street, Westminster, S.W., or at the office of Mr. James Holden, A.M.Inst.C.E., the Engineer of the Council, Park House, 20, Park-place, Cardiff. Sealed tenders, on the forms supplied, endorsed "Tender for Sewer," are to be delivered at office of Mr. M. Warren, Clerk to the Council, Park House, Park-place, Cardiff, on or before 12 o'clock noon on September 19.

SEPTEMBER 20.—INVERNESS.—PAVING.—Inverness Town Council invite tenders for the paving of Waterloo Bridge with 3 in. Australian Karry wood blocks. Specification may be seen, and schedule of quantities obtained, at the office of Mr. T. H. Scott, Burgh Surveyor, on payment of 10s. 6d. Offers, marked "Paving Waterloo Bridge," will be received by the Burgh Surveyor, not later than September 20.

SEPTEMBER 27.—HILLINGDON.—SEWER.—Uxbridge R.D.C. invite tenders for the providing, laying, and jointing of a stoneware pipe sewer in the above road, the construction of manholes and erection of ventilating columns. Plan and specification may be seen at the office of Mr. J. Frecknall, Sewer Engineer, Surveyor's Office, Corn Exchange, Uxbridge, on and after September 10. Sealed tenders, endorsed "Long-lane Sewer," must be delivered at office of engineer not later than 4 p.m. on September 27.

SEPTEMBER 28.—PEWSEY.—WELL AND BOREHOLE.—Pewsey R.D.C. invite tenders for sinking of a well, 10 ft. internal diameter, and 90 ft. deep, and for sinking from the bottom of such well a borehole 12 in. internal diameter, and a further 110 ft. deep, together with other work in connexion therewith at Pewsey. The drawing and specification may be seen at the office of Mr. S. B. Dixon, Clerk to the Pewsey R.D.C., Pewsey, from 10 a.m. to 5 p.m. each day except Saturdays. Copies of specification and form of tender and schedule may be obtained from the engineers (Messrs. Fairclark & Son, C.E., Lendal-chambers, York), on deposit of 5s. Sealed tenders, endorsed "Tender for Well and Borehole, Contract A," must reach the Clerk on or before 10 a.m. on September 28.

STONE, MATERIALS, AND STORES.

SEPTEMBER 8.—MANCHESTER.—SETTS.—The Paving, Sewering, and Highways Committee of the Manchester Corporation invite tenders to be delivered before 10 a.m. on September 8 for supply of—(1) 2,500 tons best solid Lonsley rock 6-in. Haslingden grit setts, (2) 2,000 tons 3 in. by 6 in. granite setts. Forms of tender may be obtained on application to the Chief Clerk, Mr. Wm. Henry Talbot, Town Hall, Manchester. Mr. Wm. Henry Talbot, Town Clerk, Town Hall, Manchester.

SEPTEMBER 11.—GELLIGAER.—LIMESTONE.—Gelligaer and Rhigos R.D.C. invite tenders for supplying the undermentioned quantities of broken limestone (2-in. gauge) and gravel, delivered carriage paid at the following railway stations, viz.—Darran, 150 tons limestone and 30 tons nut limestone and gravel; Fochriw, 200 tons limestone and 120 tons nut limestone and gravel; Pontllyn, 400 tons limestone

and 20 tons nut limestone and gravel, Ffrith, 140 tons limestone and 50 tons nut limestone and gravel; Britfild, 50 tons limestone and 20 tons nut limestone and gravel; Bargoed, 500 tons limestone and 100 tons nut limestone and gravel; Ysgam (R.R.), 340 tons limestone and 210 tons nut limestone and gravel; Henegod (R.R.), 150 tons limestone and 60 tons nut limestone and gravel, Ffaldknoch Siding, 250 tons limestone and 20 tons nut limestone and gravel; Beddng, 20 tons limestone and 20 tons nut limestone and gravel; Ystrad Mynach, 100 tons limestone and 30 tons nut limestone and gravel. Specification and form of tender may be obtained upon application to Mr. James P. Jones, Surveyor Council Offices, Henegod. Tenders, endorsed "Broken Limestone," must reach Mr. Frank T. James, Clerk, 134, High-street, Merthyr Tydfil, not later than September 11.

SEPTEMBER 15.—CHORLEY.—PAVING SETTS, ETC.—The Chorley Corporation invite tenders for the supply of the following articles, which may be required during a period of twelve months from October 1 next, viz.—Paving setts and kerbs, flags, for street and other purposes; broken granite and chippings for roads; limestone chippings; glazed earthenware pipes for sewers and drains. Specification and form of tender may be obtained on application to Mr. Wm. Leigh, Borough Surveyor, Town Hall, Chorley. Tenders, endorsed "Paving Setts, etc.," to be forwarded to Mr. John Mills, Town Clerk, Town Hall, Chorley, on or before September 15.

SEPTEMBER 19.—LEIGH-ON-SEA.—PIPS.—Leigh-on-Sea U.D.C. invite tenders for the supply and delivery of 22 tons, or thereabouts, of 4-in. diameter and 3-in. diameter cast-iron pipes and specials. Particulars may be obtained on application to Mr. John W. Liversedge, C.E., Surveyor to the Council. Tenders to be signed, sealed, and delivered to the Clerk to the Council, Mr. Carlyle Crosswell, not later than September 19.

SEPTEMBER 20.—MERTHYR TYDFIL.—STORES.—Hills' Plymough Company, Ltd., Merthyr Tydfil, invite tenders for the following stores for the twelve months ending September 30 1907:—(1) bar and other iron; (2) castings; (3) bolts, nuts, rivets, nails, etc.; (4) timber; (5) iron plates, etc.; (5) colliers' tools, etc.; (6) leather goods; (7) girders, channels, and rails; (8) files, etc.; (9) steam tubes and fittings; (10) electric appliances; (11) oils, tallow, and grease; (12) lumber, etc., etc. Forms of tender may be obtained upon application in writing, and must be sent in not later than September 20.

NO DATE.—LONDON.—STORES.—The Directors of the N.W. Railway Company invite tenders for the supply of oil, grease, ironmongery, waste, castings, asbestos, and indiarubber goods, chemicals, brake blocks, firebricks, electrical sundries and other general stores, for twelve months. Forms of tender may be had on application to the Secretary, Mr. Geo. H. Langham, Worcester House, Welbroke, London, E.C. Parties applying must state the particular contract or contracts for which they propose to tender. Samples and patterns may be seen at the Company's Office, James-street Station, Liverpool.

Public Appointment.

Nature of Appointment.	By whom Advertised.	Salary.	Applications to be in
*WORKING FOREMAN	Seaford R.D.C.	Not stated	Sept. 11

Auction Sales.

Nature and Place of Sale.	By whom Offered.	Date of Sale.
*BUILDER'S PLANT AND STOCK, ETC., PAINTING, CHAIRS, PRICES, 10, LONDON, EDING.	Robt. Newman	Sept. 11 & 12
*DEALS, BATTENS, ETC., 10, LONDON, EDING.	Churchill & Sons	Sept. 11
*BRICK-MAKING MACHINERY PLANT, ETC., NEWPORT, MON.—On the Premises	Chas. E. Evans & Jolliffe	Sept. 13
*BRICK-MAKING PLANT—Abbey Brickfields, Faversham	Jackson & Son	Sept. 13
*FREEHOLD BUILDING LAND, SHREWSBURY—The County Mart, Shrewsbury	J. T. Skelvington	Sept. 13
*JOBBY WORKS HENRY-STREET, GRAY'S-INN ROAD	Wm. Hall, Waterfalls, & Owen	Sept. 28
	May & Rowden	Oct. 2

PRICES CURRENT.—Continued from page 307.

STONE (continued).		HARD YORK (continued).		SLATES (continued).	
s. d.		s. d.		ln. ln.	s. d.
Anchor in blocks.....	1 10 per ft. cube, deld. rly. depôt	3 in. sawn two sides slabs a. d.		20x10 permanent green	11 12 6 per 1000 of 1200 at r.d.
Beer	1 6 " " "	(random sizes)	1 2 per ft. sup., deld. rly. depôt.	18x10	" " 9 12 4
Greenhill	1 10 " " "	2 in. self-faced random	0 5 " " "	18x8	" " 6 12 6
Darley Dale in blocks	2 4 " " "	Flags	0 5 " " "		
Red Cornhill	2 2 " " "				
Bed Cornhill	2 0 " " "				
Clooseburn Red Freestone	2 0 " " "				
Bed Mansfield	2 4 " " "				
YORK STONE.—Robin Hood Quality.					
Scrapped random blocks.	2 10 " " "	Hopton Wood (Hard Bed) in blocks	2 0 per ft. cube, deld. rly. depôt.		
6 in. sawn two sides land-	ings to sizes (under	" " " 6 in. sawn both	sides landings	2 7 per ft. super. deld. rly. depôt.	
40 ft. super.)	2 3 per ft. super., " "	" " " 3 in. sawn both	sides random	1 0 " " "	
6 in. rubbed two sides	ditto, ditto	" " " 2 in. do.	0 8 3 " " "		
3 in. sawn two sides slabs	(random sizes)				
2 in. to 2 1/2 in. sawn one	side slabs (random				
sizes)	0 11 1/2 " " "				
1 1/2 in. to 2 in. ditto, ditto	0 7 1/2 " " "				
6 in. " " " " "	0 6 " " "				
HARD YORK.—					
Scrapped random blocks.	3 0 per ft. cube, " "				
6 in. sawn two sides land-	ings to sizes (under				
40 ft. super.)	2 8 per ft. super., " "				
6 in. rubbed two sides	ditto				
ditto	3 0 " " "				

WOOD.

BUILDING WOOD.	At per standard.	£ s. d.	£ s. d.
Deals: best 3 in. by 11 in. and 4 in.	10 0	15 0	0
by 8 in. and 2 in.	13 0	14 0	0
Deals: best 3 in. by 7 in. and 8 in.	11 0	12 0	0
Battens: best 2 1/2 in. by 7 in. and 8 in.	10 0	10 0	0
Battens: best 2 1/2 in. by 6 in. and 8 in.	10 0	10 0	0
Deals: seconds.	1 0	0	0
Battens: seconds.	1 0	0	0
2 in. by 4 in. and 2 in. by 5 in.	8 10	10 0	0
Swedish larks	8 10	10 0	0
Foreign Saw Boards:			
1 in. and 1 1/2 in. by 7 in.	0 10	0	0
3 in.	1 0	0	0
At per load of 50 ft.			
For timber: best midding Danish or Mowbray (specification)	4 10	0	0
Seconds	4 0	0	0
Small timber (8 in. to 10 in.)	3 12	0	0
Small timber (6 in. to 8 in.)	2 10	0	0
Pitch-pine timber (30 ft. average)	4 0	0	0

JOINTERS' WOOD.

JOINTERS' WOOD.	At per standard.	£ s. d.	£ s. d.
White Sea: first yellow deals,	24 0	0	0
3 in. by 9 in.	22 0	0	0
Battens, 2 1/2 in. and 3 in. by 7 in.	18 0	0	0
Second yellow deals, 3 in. by 9 in.	17 0	0	0
Battens, 2 1/2 in. and 3 in. by 7 in.	13 0	0	0
Third yellow deals, 3 in. by 9 in.	13 0	0	0
Battens, 2 1/2 in. and 3 in. by 7 in.	11 0	0	0
Petersburg first yellow deals,	21 0	0	0
3 in. by 9 in.	18 0	0	0
Do, 3 in. by 9 in.	13 0	0	0
Second yellow deals, 3 in. by 9 in.	13 0	0	0
Do, 3 in. by 9 in.	11 0	0	0
Third yellow deals, 3 in. by 9 in.	13 0	0	0
Do, 3 in. by 9 in.	11 0	0	0
White Sea and Petersburg:			
First white deals, 3 in. by 11 in.	14 0	0	0
Battens, 2 1/2 in. and 3 in. by 7 in.	11 0	0	0
Second white deals, 3 in. by 11 in.	13 0	0	0
Battens, 2 1/2 in. and 3 in. by 7 in.	10 0	0	0
Pitch-pine: deals,	18 0	0	0
Under 2 in. thick extra	0 10	0	0
Yellow Pine—First, regular sizes	32 0	0	0
Odments	33 0	0	0
Seconds, regular sizes	33 0	0	0
Yellow Pine odments	32 0	0	0
Kauri Pine—Planks, per ft. cube.	0 3	0	0
Danish and Swedish Oak Logs:			
Large, per ft. cube	0 3	0	0
Small	0 2	0	0
Walnut Oak Logs, per ft. sup.	0 0	8 1/2	0
Dry Walnut Oak, per ft. sup.	0 0	8 1/2	0
3 in. do. do.	0 0	7	0
Dry Mahogany—Honduras, per			
basin, per ft. super, as inch.	0 0	9	0
Selected, Figury, per ft. super.	0 1	6	0
as inch	0 0	10	0
Dry Walnut, American, per ft.	0 0	10	0
super, as inch.	0 0	10	0
Teak, per load	17 0	0	0
American Whitewood Planks,			
per ft. cube	0 4	0	0
Prepared Flooring, etc.—			
1 in. by 7 in. yellow, planed and	0 13	6	0
shot	0 14	0	0
1 1/2 in. by 7 in. yellow, planed and	0 14	0	0
matched	0 16	0	0
1 1/2 in. by 7 in. yellow, planed and	0 12	0	0
matched	0 12	0	0
1 in. by 7 in. white, planed and	0 12	0	0
shot	0 12	0	0
1 in. by 7 in. white, planed and	0 12	0	0
matched	0 15	0	0
1 1/2 in. by 7 in. yellow, planed and	0 11	0	0
matched or V-jointed brds.	0 11	0	0
1 in. by 7 in.	0 10	0	0
1 in. by 7 in. white	0 10	0	0
1 in. by 7 in.	0 12	0	0
6 in. at 6d. to 8d. per square less than 7 in.			

JOISTS, GIRDERS, &c.

JOISTS, GIRDERS, &c.	In London, or delivered	£ s. d.	£ s. d.
Bolled Steel Joists, ordinary	7 0	0	0
sections	7 0	0	0
Compound Girders, ordinary	9 0	0	0
sections	12 0	0	0
Steel Compound Stanchions	9 0	0	0
Angles, Tees, and Channels, ordinary	9 0	0	0
sections	9 0	0	0
Flitch Plates	7 10	0	0
Cut Iron Columns and Stanchions			
including ordinary patterns	7 10	0	0

METALS.

METALS.	Per ton, in London.	£ s. d.	£ s. d.
Common Bars	8 0	0	0
Staffordshire Old Iron, good	8 10	0	0
merchant quality	10 10	0	0
Staffordshire "Marked Bars"	8 10	0	0
Mild Steel Bars	9 5	0	0
Hoop Iron, best price	17 0	0	0
Galvanised	17 0	0	0
(And upwards, according to size and gauge.)			
Sheet Iron Black—			
Ordinary sizes to 20 g.	9 10	0	0
24 g.	10 10	0	0
26 g.	12 0	0	0
Sheet Iron, Galvanised, flat, best quality—			
Ordinary sizes, 6 ft. by 2 ft. to			
3 ft. to 20 g.	14 0	0	0
Ordinary sizes to 22 g. and 24 g.	14 0	0	0
26 g.	15 0	0	0
Sheet Iron, Galvanised, flat, best quality—			
Ordinary sizes to 20 g.	17 0	0	0
22 g. and 24 g.	17 0	0	0
26 g.	19 0	0	0

METALS (continued).

METALS (continued).	Per ton, in London.	£ s. d.	£ s. d.
Galvanised Corrugated Sheets—			
Ordinary sizes 6 ft. to 8 ft. 20 g.	14 0	0	0
22 g. and 24 g.	14 0	0	0
Best Soft Steel Sheets, 2 ft. by 2 ft.	11 0	0	0
Best Soft Steel Sheets, 22 g. & 24 g.	12 10	0	0
Cut Nails, 3 in. to 10 in.	14 15	0	0
(Under 3 in., usual trade extras.)	9 10	0	0

LEAD, &c.

LEAD, &c.	Per ton, in London.	£ s. d.	£ s. d.
Lead—Sheet, English, 3 lb. and up.	20 12	6	0
Pipe in coils	23 2	6	0
Soil pipe	23 2	6	0
Compo pipe	23 2	6	0
Zinc—Sheet	33 0	0	0
Vielle Montagne	32 15	0	0
Silesia	33 0	0	0
Copper—			
Strong Sheet	per lb.	0 1	1
Thin	0 1	2	0
Copper nails	0 1	0	0
Brass—			
Strong Sheet	0 1	0	0
Thin	0 1	1	0
Tin—English Ingots	0 1	3	0
Soldiers—Plumbers	0 0	10	0
Blowpipe	0 0	11	0

ENGLISH SHEET GLASS IN CRATES OF STOCK SIZES.

ENGLISH SHEET GLASS IN CRATES OF STOCK SIZES.	24 d. per ft. delivered.	£ s. d.	£ s. d.
15 oz. thirds	13d.		
" fourths	13d.		
21 oz. thirds	13d.		
" fourths	13d.		
26 oz. thirds	13d.		
" fourths	13d.		
32 oz. thirds	13d.		
" fourths	13d.		
Fluted Sheet, 15 oz.	13d.		
" 21 oz.	13d.		

ENGLISH BOILED PLATE IN CRATES OF STOCK SIZES.

ENGLISH BOILED PLATE IN CRATES OF STOCK SIZES.	24 d. per ft. delivered.	£ s. d.	£ s. d.
Hartley's	13d.		
"	13d.		
Figured and Oxford Boiled	13d.		
"Oceanic" Glass, white	13d.		
Do, tinted	13d.		

OILS, &c.

OILS, &c.	Per gallon.	£ s. d.	£ s. d.
Raw Linseed Oil in pipes	per gallon	0 1	11
" in barrels	0 1	11	0
" in drums	0 2	1	0
Boiled	0 2	0	0
" in pipes	0 2	0	0
" in barrels	0 2	3	0
" in drums	0 3	8	0
Turpentine in barrels	0 3	10	0
" in drums	0 3	10	0
Genuine Ground English White Lead	per ton	22	0
Red Lead, Dry	per cwt.	0 7	0
Best Linseed Oil Putty	per barrel	1 12	0
Stockholm Tar	per barrel	1 12	0

VARNISHES, &c.

VARNISHES, &c.	Per gallon.	£ s. d.	£ s. d.
Fine Pale Oak Varnish	0 10	6	0
Pale Copal Oil	0 12	6	0
Superfine Pale Elastic Oil	0 12	6	0
Fine Extra Hard Church Oak	0 10	0	0
Superfine Hard-drying Oak, for seats of	0 14	0	0
Churches	0 12	6	0
Fine Elastic Carriage	0 16	0	0
Superfine Pale Elastic Carriage	0 16	0	0
Fine Pale Maple	0 13	0	0
Finest Pale Durable Copal	0 13	0	0
Fine Pale French Oil	0 13	0	0
Especially Flattening Varnish	0 13	0	0
White Copal Enamel	0 12	0	0
Extra Pale Copal	0 10	6	0
Best Japan Gold Size	0 16	0	0
Best Black Japan	0 10	0	0
Oak and Mahogany Stain	0 8	6	0
Brunswick Black	0 16	0	0
Berlin Black	0 10	0	0
Knotting	0 10	0	0
French and Brush Polish	0 10	0	0

TERMS OF SUBSCRIPTION.

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TENDERS.

Communications for insertion under this heading should be addressed to "The Editor," and must reach us not later than 10 a.m. on Thursdays. (N.B.—We cannot publish Tenders unless authenticated either by the architect or the building-owner; and we cannot publish announcements of Tenders accepted, unless the amount of the Tender is stated, nor any list in which the lowest Tender is under 100l., unless in some exceptional cases and for special reasons.) * Denotes accepted. † Denotes provisionally accepted.

BARROW-IN-FURNESS.—For constructing streets for the Corporation. Mr. J. Walker Smith, Borough Engineer and Surveyor	Fife-street.	Brighton-street.
W. H. Worthington	£497 0 0	£53 12 0
W. Gradwell & Co.	402 16 8	36 2 3
J. Cleator	377 1 6	31 14 2
Rainey Bros., Barrow	369 19 0	25 17 6

BARROW-IN-FURNESS.—For the construction of surface water sewers, for the Corporation:—

BARROW-IN-FURNESS.—For the construction of surface water sewers, for the Corporation:—	£ s. d.	£ s. d.
W. Underwood & Bros.	£16,850 9 10	
W. Gradwell & Co., Ltd.	15,597 0 6	
J. S. Dawson	15,431 12 0	
Clark & Robinson	15,019 15 1	
Balney Bros.	14,930 0 0	
Smalley & Booth	14,926 0 0	
Johnson & Langley	14,165 1 8	
G. Bell & Sons, Ltd.	13,983 4 11	
G. Mackay & Son	13,738 16 4	
J. Bentley	13,469 17 0	
J. Laing & Son, Carlisle	11,660 0 0	

BARRY.—For the erection of public offices in Holton-road, for the Barry Urban District Council. Messrs. C. E. Hutchinson & E. Harding Payne, A.A.R.I.B.A., 29, John-street, Bedford-row, W.C., architects:—
A. Richards £8,510 0 0 E. R. Evans & Jones Bros. 8,600 0 0 Sons 27,770 0 0 Lloyd & Tape 8,647 15 10 D. Davies & W. Britton 2,270 0 0 Sons 7,760 0 0 H. S. Rendell 5,950 0 0 J. Allen & Sons 7,701 10 0 D. W. Davies 7,488 0 0

BECCLES.—For new hotel, with stabling, coach-house, and cart shed, Lygate-road, Beccles. Mr. Arthur Pells, F.S.I., architect, Beccles:—
A. Richards £2,694 0 0 Gull 22,195 0 0 Jones & Sons 2,636 0 0 J. Youngs & Son 2,185 0 0 T. H. Yelf 2,385 0 0 D. Boddy & Son 2,185 0 0 Downing & Son 2,307 0 0 F. R. Hippenster 2,185 0 0 T. Farlington & Son 2,100 0 0 Greenwood & Sons 2,263 0 0 G. E. Hawes, Nor- King 2,215 0 0 Wicks 1,890 0 0 R. F. Brett 2,205 0 0 Hindes & Co. 1,881 0 0

COLEFORD (Glos.).—Accepted for the erection of a doctor's residence. Mr. E. G. Davies, architect, Hereford and Monmouth:—
Forest of Dean Stone Firms, Ltd., Coleford £1,010

HOLYWELL GREEN.—For paving works for Stain-lead-with-Old-Lindley Urban District Council. Mr. J. H. Walker, Surveyor, Mechanics' Hall, Stainlead:—
A. R. & N. Barnardough. On a Schedule of Prices. R. & B. T. 2,370 0 0 T. Farlington & Son 2,100 0 0 Greenwood & Sons 2,263 0 0 G. E. Hawes, Nor- King 2,215 0 0 Wicks 1,890 0 0 R. F. Brett 2,205 0 0 Hindes & Co. 1,881 0 0

KNOTTY ASH.—For the erection of laundry buildings at Highfield Infirmary, for Liverpool Select Vestry. Mr. Edmund Kirby and Mr. W. E. Willink, architects 5, Cook-street, Liverpool:—
Bullen, Bros., & Sons, Ltd., 39, Almond-street, Liverpool 25,908 0 0

LONDON.—For 170 yds. of 3-in. to 5-in. steam pipe, etc., at Workhouse, Renfrew-road, Lower Kennington-lane, S.E., for Lambeth Guardians. Mr. G. E. Arnold, Consulting Engineer, 195, Kennington-road, S.E.:—
Z. D. Berry & Sons, Albion Works, Regency-street, Westminster 225 0 0

LUTON.—For paving, etc., in Ash-road and William-street, for the Town Council. Mr. S. F. L. Fox, Borough Surveyor, Town Hall, Luton:—

LUTON.—For paving, etc., in Ash-road and William-street, for the Town Council. Mr. S. F. L. Fox, Borough Surveyor, Town Hall, Luton:—	£ s. d.	£ s. d.	£ s. d.
Free & Sons	£412 0 0	W. H. Worthington	£360 8 0
M. Thacker & Co.	382 4 0	Jacobs & Burton	353 18 4
Patent Victoria	373 1 8	W. H. Wheeler	337 0 8
Stones Co.	373 1 8	G. P. Woodrill	335 0 0

NAIRN.—For additions and alterations to Larkfield. Mr. W. Mackintosh, architect, Inverness:—
Messrs. D. Rose, Forbes 2,216 0 0
Carpenters: A. Mc Lean & Son, Nairn 206 0 0
Stalers: Reid & Chapman, Nairn 190 0 0
Plumber: F. H. Wink, Nairn 190 0 0
Painters: Fowler & Kennedy, Inverness 232 7 0
Total amount of tenders accepted £1,206 10 8

ROSS (Herefordshire).—For erecting a detached house at Bridgnow, near Ross, for Mr. J. Martin Newton. Messrs. Grooms & Betington, architects and surveyors, Palace-chambers, Hereford. Quantities by architects:—

ROSS (Herefordshire).—For erecting a detached house at Bridgnow, near Ross, for Mr. J. Martin Newton. Messrs. Grooms & Betington, architects and surveyors, Palace-chambers, Hereford. Quantities by architects:—	Amount of Tender.	Additional for Oak, etc.	Total Amount of Tender.
W. Rowbery	£433 7 0	£5 18 8	£438 15 8
W. Jones	1,400 0 0	55 0 0	1,455 0 0
J. T. Jones	1,270 0 0	82 10 0	1,352 10 0
J. B. Kemp & Sons	1,355 0 0	62 4 0	1,417 4 0
W. Lewis	1,335 0 0	47 16 0	1,382 16 0
W. Powell	1,260 0 0	26 0 0	1,286 0 0
W. Bell	1,230 0 0	48 10 0	1,278 10 0
W. Bell	1,200 0 0	70 15 0	1,270 15 0
C. Cooks	1,200 0 0	64 8 4	1,264 8 4
E. W. Wilks, Hereford	1,135 0 0	42 2 0	1,177 2 0

REDBOURN (Herts.).—For the erection of a seven-roomed cottage at Church End, for Mr. G. A. Dunn. Mr. E. A. Fernand, architect, 11, Chichester-street, London, S.W., quantities by the architect:—
W. J. Nigam 2,592 0 0 W. Payne 2,592 0 0 Edwards & Medway 380 0 0 H. Salisbury & Son 340 0 0 G. Neal 367 0 0 E. Peak, Redbourn 339 0 0

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The Trade Union Congress.



HAT is the principal lesson to be learnt from the Trade Union Congress of 1906? We submit that the answer to the above question is undoubtedly the fact that trade unions can no longer be considered the associations which they were when legislative protection was given them in 1871 and 1876, but that they are socialistic combinations. The definition of a trade union in the Act of 1871, as slightly amended by the Act of 1876, is as follows: "The term trade union means any combination, whether temporary or permanent, for regulating the relations between workmen or masters or between workmen and workmen or between masters and masters, or for imposing restrictive conditions on the conduct of any trade or business, whether such combination would or would not, if the principal Act had not been passed, have been deemed to have been an unlawful combination by reason of some one or more of its purposes being in restraint of trade." In the light of the above definition let us consider some of the subjects debated at the Congress. The President in his address is reported to have said: "The feeding of the children, housing of the people, old age pensions, land reform, and other questions of national importance demanded early attention"; and resolutions were sub-

mitted on the subjects of old age pensions, international arbitration and militarism, internationalisation of railways, canals and minerals, municipal banking, and the abolition of the aldermanic bench. It is most important to observe that sect. 4 of the Trades Disputes Bill, as amended by the Government, which renders it impossible to recover damages against any trade union for tortious acts in any court of justice is perfectly general in its terms, and not limited to the acts of trade unions in relation to trade disputes. The clause as drafted stands at present: "An action against a trade union whether of workmen or masters or against any members or officials thereof on behalf of themselves and all other members of the trade union for the recovery of damages in respect of any tortious act alleged to have been committed by or on behalf of the trade union, shall not be entertained by any court : : ." In the original Bill as drafted by the Government the section was limited to tortious acts committed in furtherance of trade disputes, but now it would appear that any tortious act committed by a trade union, whether directed to attain the abolition of the army, the nationalisation of railways, or even to deprive an alderman of his seat on the bench, is to give no remedy in our courts of law. The vast majority of the nation who are not socialists will, at any rate, be glad of some assurance from the Government on this point.

The attitude of the Congress towards such subjects is also worthy of note. The resolution on old age pensions affords

an example; the resolution was that all citizens, men and women, were on attaining the age of 60 to be entitled to a pension of at least five shillings a week, the entire cost of the scheme to be contributed by means of Imperial taxation; the resolution suggested no encouragement to thrift or of contributions from the "citizens" during their active life: The Congress advocated international arbitration, but on matters more within its province negated by 958,000 votes to 541,000 a resolution advocating the principle of voluntary and compulsory arbitration and conciliation in trade disputes.

The Congress, of course, expressed some anxiety as to the fate of the Trades Disputes Bill, but by a curious coincidence the same issue of the *Time* which contained the resolution on this subject contained a report of the proceedings in the South Wales coalfields in connexion with the refusal of certain miners to join the federation. According to that report windows of the houses of non-union men were broken, one non-union man was thrown into white lime, another covered with soot, others attired in white shirts over their clothing were compelled to march at the head of hostile processions, whilst some were divested of their clothes and their backs were blackheaded, all of which acts were, no doubt, excellent examples of "peaceful persuasion." At any rate, it appears to have been successful persuasion. The report of the Free Labour Association, with its large membership, also comes at an opportune time to

remind the community that all working men are not appreciative of trade union methods.

Other resolutions submitted to the Congress related to such matters as the exemption of household goods to the value of 20*l.* from seizure for rent, and the necessity for legislation rendering eviction during strikes and lockouts illegal, reform of the land laws, compulsory state insurance, and minimum rates of wages.

In all this mass of verbiage it must be borne in mind that the trade unions have in their proper sphere accomplished good work which we should be the last to depreciate, and allowance must be made for a certain amount of natural exhilaration over the concessions wrung from the present Parliament; but it is for their leaders to judge whether their real usefulness and their popularity with the public is likely to be forwarded by the promulgation of extreme views expressed in a most intolerant spirit on matters outside their proper sphere, on the occasions of their annual meetings. Conciliation has done much of late years in improving the feeling existing between capital and labour, and arbitration has avoided much productive labour passing into the hands of our trade competitors. Since the decision of the Taff Vale case strikes and lockouts have diminished, whilst the conditions of the working classes have continued to improve. The trade unions when seeking to obtain an alteration in the law as to the liability of their funds have often given the public assurances that terrorism is not their object, but that they favour conciliatory measures. The delegates to the Congress may know that the resolutions passed on this subject mean nothing, but are only part of a system of "bluff," but the general public may not be so discriminating, and will certainly question the doctrine of the Trades Disputes Bill, that a trade union can do no wrong.

ST. PETER-ON-THE-WALL, BRADWELL-ON-SEA:

ALTHOUGH so little known, there is no place on the east coast of England that can surpass in varied historical interest or in early Christian reminiscences the particular site which we are about to consider.

At the time of the Roman occupation the chief fort of our conquerors on the flit eastern shores north of the Thames was that which was built on the southern point of the wide estuary leading up to Maldon. This was the fortress of Othona. Around this Roman fortress there grew up during the four centuries of their occupation a considerable city. The Anglo-Saxon invading hordes, in the earlier days of their landing, doubtless destroyed, as was their wont, the chief features of the fort and city.

After St. Augustine, in 604, appointed Mellitus to be Bishop of London, and missionary to the pagans of the kingdom of the East Saxons (Essex), of which London was then a capital, heathen influence eventually prevailed, and the bishop, after a few years, returned to Canterbury. In the year 653 there was a second planting of Christianity

amongst these East Saxons. Sigebert the Good was converted, and, on seeking Christian teachers, Cedd, the brother of St. Chad, was sent with another priest to preach and baptise in Essex. Their success was so great that Cedd was speedily consecrated Bishop of the East Saxons. There were two centres of his authority, as named by Bede—the one at Tilbury at the entrance to the Thames, and the other, which was the first and more important of Cedd's ecclesiastical residences, at Ythancestir, at the entrance of the Blackwater. At Tilbury a monastic establishment for his converts was established by Cedd, but at Ythancestir, where there was then a considerable population, the bishop gathered round him a number of priests and deacons to form the nucleus of a native church. Ythancestir was on the site of the old Roman fortress of Othona.

It is a matter of almost supreme interest to feel assured that a visitor to the somewhat dreary north-east corner of the Hundred of Dengy, Essex, can now see standing on the verge of the sea, facing St. Peter's Sands, a tall barn-like building, by far the greater part of the fabric of which was erected in the VIIth century in the days of St. Cedd.

In the year 1864-5 Mr. Parker, the owner of this corner of Essex, spent much money and time in the intelligent investigation of the great Roman camp of Othona. Mr. C. Roach Smith described the unearthing of considerable portions of its walls, which were found to be 14 ft. thick, in the *Gentleman's Magazine* of that year, giving a woodcut of an exposed part of the wall surface formed of small, squared stones bonded at intervals by tiles. A fuller account of this fort and other ones on the *Litus Saxonicum* was given by Mr. Lewin in the *Archæologia* (Vol. XLI.) of 1867, accompanied by plans.

From the discoveries then made, and which can now be distinctly traced, it became apparent that Cedd had built the first Christian church or small minster of this kingdom right across the outer west wall of the levelled fortress, doubtless with the idea of securing a firm foundation for a considerable part of the fabric. The fortress or camp faced due east, just round the point towards the sea, and experts are satisfied that the ancient church or chapel was built in the exact centre of the west wall where the *porta prætoria*, or chief entrance, stood. This Christian building, locally known as "the old chapel," and more correctly described as St. Peter-on-the-Wall, was known in mediæval days as *Capella de la Val*, or *St. Peter-ad-Murum*.

It would almost certainly be sacked, and the interior fittings probably burnt when the Danes made their various raids up the Blackwater in the IXth and Xth centuries. When the building came to be again used for Christian worship in pre-Norman days, population had probably much shifted. The little church of such early sacred associations would still further lose its importance in Norman times, and hence it came about in the establishment of parishes that St. Peter-on-the-Wall became a mere chapelry of the parish of Bradwell-on-Sea. Some seven miles due south of this old chapel is the thriving large village or small town of Southminster, whose very name implies an early Christian settlement. Southminster, therefore, was in all probability the second Christian mission settlement of some importance in this district; and its name originated through the site being some miles to the south of Ythancestir, where the first or old minster stood.

The episcopal registers at St. Paul's Cathedral have an interesting XVth century reference to this building. In



Fig. 1. Chapel of St. Peter-on-the-Wall: North-west View.

Bishop Gilbert's register (1436-48) there is the record of an inquisition held here in 1442, when the jury found that the chapel of St. Peter-ad-Murum was dependent on Bradwell, and a chapel of ease to it, and that the rector found a priest to say mass there on Sundays, Wednesdays, and Fridays. They describe it as having a chancel, nave, and small tower with two bells, and state that after a recent fire the chancel had been repaired by the rector and the nave by the parishioners. When it was founded, and by whom, it is not surprising to find that they knew not.

The building as it now stands consists merely of the small but substantial and well-proportioned nave, but with traces of the eastern apse and western porch. The foundations of the great Roman wall to the fortress pass right under the building, about its centre, so that the east end with its former apse stood within the fort, and the west end with the entrance porch on the land side outside the fort. It may here be mentioned that a fair amount of the foundations of the fort wall are apparent on the south side of the chapel within a fold-yard; they might possibly be mistaken by any one unacquainted with the pre-Christian history of the place as parts of the foundations of ecclesiastical buildings presumably connected with the church or chapel.

The exact outer measurements of the fabric as it now stands give a length of 54 ft. 8 in. by 26 ft. 2 in. The thickness of the walls averages 2 ft. 2 in. The height of the walls at the sides and at the spring of the gables of the east and west ends very nearly corresponds to the width of the building, being close upon 25 ft. The building of the groins, or angles, at the west end is most interesting. (See Fig. 1.) Save for a few feet at the top, where Roman tiles and smaller stones are used, these angles are formed from long and heavy blocks of square oolite stone which has obviously come from some older building. At first sight the north-west angle has somewhat the appearance of "long-and-short work" of later Saxon date; but this is not the case with the other angle, and is merely an accidental effect. The reason why it is quite certain that these angle-stones, as well as the jamb-stones of some of the windows, have been previously used is that they are chiselled in several places with clean-cut mortises, which are quite useless in their present position. The fact is that these stones must have come from the great Roman gateway that stood in this place. The bottom stone of the north-west angle is 39 in. long, and its two faces are respectively 9 in. and 15 in.; the next stone above it has a length of 45 in.; the higher ones are a good deal smaller.

The whole of the fabric of the building, with the exception of an obviously later roof, as well as the east gable over the former apse and the filling-up of some of the window-openings, shows a re-use of Roman materials. A large number of small, squared stones, set in wide-jointed mortar, as well as a considerable supply of tiles, were used in building up this place for Christian worship. The tiles, besides being worked up in some of the upper courses, are exclusively and ingeniously used for turning the heads of

the arches of the window at the west end, and of the great arch into the apse; they were doubtless equally used in the west doorway and in the side windows before alteration. The longest of these Roman tiles are 16 in. in length, and their thickness varies from 1½ in. to 1¾ in.

In the centre of the west end there is a doorway 4 ft. 10 in. across, which has been built up with modern brick; it has been about 10 ft. high when perfect. About 2 ft. each side of the door openings are the remnants of the projecting walls of the original porch. When excavations were going on here in 1864-5 the foundations of the side walls of this porch were uncovered to a height of 2 ft., but these have now disappeared. This porch at some subsequent period was considerably raised, and carried the two bells which are mentioned in the report of 1442. It is clear that the porch was originally of a single stage, for the base of the west window is about 6 ft. above the top of the doorway. This round-headed window, with its tiled arch, is about 4 ft. 6 in. wide internally and 3 ft. wide at the opening.

In each of the side walls there have been two windows at about the same height and of the same proportions as the one in the west gable; but they have lost their arches and have flat wooden lintels, and are now filled up in various ways. On the north side a space of 14 ft. 8 in. in width is of later large rubble masonry. This is the comparatively modern filling-up of a square excrecence which was probably added to the building in Elizabethan times. The foundations of this adjunct still remain, and in 1865 several of the older inhabitants remembered it standing. A space somewhat similar to this on the south side has been mutilated by the insertion of great waggon doorways since the time the building was used for a barn. On this side, at the east end, now concealed by a modern wooden hovel, are the jambs of a small, blocked-up priest's doorway.

The east end of the chapel is especially interesting. The remains of most of the great archway into the former apse, as well as the jambs, formed entirely of courses of Roman tiles, are quite obvious. (Fig. 2.) The east gable above the apse has been filled up with late mediæval brick-work, which probably represents the repairs done by the rector after the fire which is recorded in the already cited 1442 entry. From the interior it becomes obvious that the entrance into the apse or sanctuary from the nave was through triple arches of Roman tiles.

We have left to the last the most noteworthy and remarkable feature of this building, and it is the more important to consider as it has led several able men to form wrong estimates as to its general age. The age of St. Peter-on-the-Wall has been variously given as (1) Roman; (2) early Saxon; (3) late Saxon; (4) Norman; and (5) Early English. As to the first of these, the idea that was once held as to this chapel being a Christianised small Roman basilica, such a supposition is absolutely untenable without any knowledge of the foundations upon which it is built; for, as has been well pointed out, the scheme of erecting such an exposed and undefended building on the verge of a highly-important fortress would be "a wretched engineering mistake," of which the Romans would certainly not be guilty. That which has led others astray in estimating the date is the presence of the remains of projecting buttresses at each side of the west angles of the church and also against the north and south walls. (Fig. 3.) These buttresses, which attain to a height of only about 14 ft., might, when carelessly observed, be considered to be later additions; but minute observation puts it beyond gainsaying that they are of the same Roman material and of the same date as the fabric itself. Now, buttresses of this nature are entirely unknown in Norman buildings, and, being original, it is quite impossible



Fig. 2. Chapel of St. Peter-on-the-Wall: North-east View.



Fig. 3. Chapel of St. Peter-on-the-Wall: South Side.

from the rest of the fabric that they can be Early English. Such buttresses, too, are equally unknown in the later Saxon work of the century or two before the Norman Conquest. Nor are there here any of the usual characteristics of work of that date, such as turned baluster shafts, long-and-short work, minute double-splashed lights, etc. On the other hand, however, such low buttresses as these, and similarly placed, are to be found in several of the earliest Anglo-Saxon churches of the Augustine influence which have, like this at Bradwell, an eastern apse and a western porch.

Mr. Peers, F.S.A., in a valuable paper on "Saxon Churches of the St. Pancras Type"—and we have no better authority on such points—which he contributed to the *Archæological Journal* for 1901, compares this building to the churches of St. Pancras, Canterbury, Monkwearmouth, Corbridge, and Brixworth. He seems to have no doubt that this is the very building that was originated by Bishop Cedd in the VIIth century; and in this opinion—an opinion formed independently before we were aware of Mr. Peers's article—we entirely concur. This, too, was the view held by Mr. Lewin in his communication to the Society of Antiquaries in 1867, for he stated that he considered it to be "the veritable handiwork of the old Saxon missionary, Bishop Cedd."

It only remains to add a very few words as to the later history of the building. Its use as a place of worship came to an end, with so very many other chapels, at the time of the Reformation. In the days of Elizabeth, James I., and Charles I., there is some record of the building being used as a lighthouse or fire-beacon to guide the shipping entering the Blackwater. This would account for several coins of these reigns having been found in the immediate vicinity of the chapel. Then came a further degradation, begun, we believe, early in the XVIIIth century, when this ancient church of St. Cedd was utilised, as at present, for farm purposes, with its accompanying mutilations. From the point, however, of mere preservation,

it is as well that the building was found to be sufficiently substantial to serve as a barn; for otherwise the fabric would have probably become a complete ruin. Yet, apart from all ecclesiastical or Christian sentiment, would it not now be possible to disassociate so unsurpassingly interesting a relic as this, of the highest architectural value, from utilitarian farm purposes, and thus preserve it from further disintegration?

When trenches were being driven round the chapel in 1865, during the investigation of the camp, a considerable number of human interments were found about the east end (which was within the camp); all of these had been placed facing the east, after the Christian fashion. This was not the case with a variety of interments found not far from the west end of the chapel and in other adjacent parts; the Romans would, naturally, bury outside the camp.

NOTES.

Landlord v.
Tenant.

WE are constantly in these columns drawing attention to the litigation that is caused by the extraordinary laxity displayed by those entering into the relationship of landlord and tenant. The latest example is the case of *Austin v. Newham*. The tenant entered into possession of a shop and dwelling-house for a period of twelve months, "with the option of a lease after the aforesaid time at the rental of 30*l.* per annum." Before the twelve months had expired the landlord demanded possession of the premises at the end of that period, and commenced an action for ejectment. In the Court below the judge of the Norwich Guildhall Court of Record dismissed the action for ejectment on the ground that the above agreement, when the option was exercised, created a further tenancy for a year from the expiration of the first twelve months. The Divisional Court have upheld this finding, but intimated an opinion that had the tenant claimed it he might possibly under this option have claimed a lease for his life. These

options require much consideration; thus in our issue of June 24, 1905, we draw attention to the case *Woodhall v. Clifton*, in which an option to purchase contained in long leases was held to be void as offending against the law of perpetuities. In the case under consideration the landlord has reason to be thankful that his tenant had not claimed all he could have been entitled to under this slipshod agreement.

THE case of *Williamson v. Durham Rural District Council* (*Law Reports*, July)

raised a point of some interest which we have not yet noted. The district council had taken proceedings against the appellant under sect. 95 of the Public Health Act, 1875, for causing a nuisance by allowing sewage from his farm to pass into a pond down a pipe vested in the council. This pipe, before the passing of the Local Government Act, 1894, had been vested in the then highway authority; the Local Government Act placed the duties of the highway and sanitary authorities then existing in the hands of the district council, and the appellant contended that the pipe was then converted into a sewer and the district council became responsible for the disposal of the sewage. By sect. 4 of the Public Health Act, drains vested in any authority having the management of roads, not being a local authority under the Act—i.e., an urban or rural sanitary authority—are especially excepted from the definition of "sewers," and the Divisional Court held that the fusion of the two authorities into one by the Local Government Act did not alter the character of existing drains.

COMMENDABLE promptitude is being displayed by the London County Council in

the construction of the new tramway lines along the Victoria Embankment and over Westminster Bridge. Large quantities of material have been delivered on the site and operations are in active progress. The new lines, both across the bridge and along the Embankment, will be laid as recommended by the Select Committee of the House of Commons on one side of the roadway on the downstream side of the bridge and the river side of the Embankment—an arrangement that will probably be satisfactory, so far as traffic conditions are concerned, under the exceptional conditions, although manifestly unsuitable in general practice. One very great objection to the position of the lines as already laid out on the Embankment is that they do not leave sufficient room for the passage of cars under the trees, and we fear that it will be found necessary to spoil the appearance of the thoroughfare by lopping branches off the trees on the inner side. At present the contracts settled do not provide for lines beyond John Carpenter-street, as the extension destined to link up Blackfriars terminus cannot be undertaken until the bridge has been widened by the City Corporation. Simultaneously with the extension of the works mentioned, the Council are arranging to continue the new subway from the Strand to the Embankment with a new station beneath Wellington-street.

This extension will furnish the long-talked-of through route between the northern and southern tramway systems. Unfortunately, as we have before pointed out, the double-decked cars in general use will be unable to enter the subway. Hence all through-passengers will be compelled to change from one vehicle to another unless single-decked cars are to be run between the north and south. Of course, some passengers would have to change in any case, as the subway could not possibly accommodate all the cars that converge at Westminster and Blackfriars respectively, and the circular service ultimately to be established will also render the transfer of passengers necessary.

Means of Escape from Fires in Factories. WITH the view of encouraging district councils to apply the powers conferred on them by sect. 15 of the Factory and Workshop Act, 1901, the Local Government Board have drawn up a set of model by-laws, proposing certain means of escape for factories and workshops in which not more than forty persons are employed. Clause (3) providing for the construction of adequate stairs and steps, permanently fixed, in buildings of more than one story is satisfactory so far as it goes, but the construction ought certainly to be of approved fire-resisting materials. The clause stipulates that such materials shall be used in every new factory building and every old building converted for use as a factory, but it requires amendment to include every new staircase, and the supports thereof, provided in any factory building of the kind contemplated by the clause. Clause (4) makes additional requirements for factories where any floor is more than 30 ft. from the ground, and in which either more than ten persons are employed or readily inflammable materials are stored. Three alternatives are stated: "(1) an external staircase be constructed of fire-resisting material, or (2) an efficient and suitable fire-escape, or (3) ready means of access to the roof of the building, and where practicable to the roof of any adjoining building." Here the third alternative is distinctly insufficient. No doubt the roof of a burning building is a more agreeable situation than the interior; but it is not a safe retreat, and means of escape from it are clearly necessary. By omitting the words "where practicable" the alternative would meet the case properly.

The Housing Question in Liverpool. THE Liverpool City Council, at a meeting last week, has given distinct evidence that, in regard to artisans' dwellings, it does not intend to compete with private owners. The policy of the Council is not to build artisans' dwellings except when it is necessary to rehouse persons who are dispossessed of their homes in consequence of public improvements. An amendment was proposed to the effect that a scheme be prepared for building artisans' and workmen's dwellings, not necessarily for the dispossessed, on the outskirts of the city, and this was negated by fifty-two votes to thirty-eight. Unless private

enterprise fails to provide workmen's dwellings, there is no reason why municipalities should take up the matter. Probably the safest way to encourage private enterprise is by such action as this of Liverpool, as the field is at once clear and safe for private owners. Municipalities have now so many irons in the fire that they should not, unless it is absolutely necessary, increase their duties, responsibilities, and expenses.

Liability of Motor-car Owners. MOTOR-CAR owners should take note of a decision given last week in the City of London Court against one of the motor omnibus companies. The omnibus had run into a van and caused damage to that, and the defence was that the accident was due to "skidding" and that the defendants were not liable. The propensity of mechanically-propelled vehicles to "skid" and "side slip" is well recognised, and there is nothing in the legislation on the subject to vary the well-established principles of law that a man must use his own property in such a manner as not to injure other people, and that the owner of anything likely to cause damage uses it at his own risk. The defence of inevitable accident only applies to something happening entirely unforeseen, and which cannot be prevented by the greatest care and skill. Where, as in the case of side-slip, the danger is clearly foreseen, it seems impossible for this defence to be successfully set up.

The Utilisation of the Rhine. HITHERTO it has been customary to instal a hydraulic power station at the foot of waterfalls or rapids. The power stations at Niagara and on the rapids of the Rhine at Schaffhausen are examples. At the conference of engineers, however, recently held at Mulhouse, in Germany, Mr. Koehlin read a paper, giving full particulars of a project for utilising the water power of the Rhine in Haute-Alsace. We learn from *L'Electricien*, which publishes the paper in full that the part of the Rhine which it is proposed to utilise lies between Basle and Vieux-Brisach, where the rate of the fall is only 1 in 1,000. As the minimum flow of water is about 300 cubic yds. per second 5,000 horse-power per mile is obtainable. The water is cleaner, and there will be less difficulty with blocks of ice, etc., in winter than in mountain torrents. It is proposed to build two power houses, each capable of generating 30,000 horse-power. A side canal will be constructed of gentle incline, and a partial barrage will be built. If necessary, boats will be able to pass up this canal. The beginning of the canal flowing to the second station will be the exit from the first station. The hydraulic power will be converted into electric power at a pressure of 30,000 volts, and will be distributed in Haute-Alsace and the Grand Duchy of Baden. In particular Mulhouse will be served by two transmission lines, which will be absolutely independent, so as to insure against an interruption of the supply. There are several electric hydraulic stations at present working in Europe at higher pressures. At Caffaro, for instance, in the north of Italy, the

pressure is 40,000 volts. The upper Rhine scheme, however, is on a much larger scale than any hitherto proposed in Europe. The objections that have, very properly, been urged against diverting the water from waterfalls in order to turn turbines apply, generally in a much less degree, to diverting water from a river into a parallel canal. If the project is carried out successfully it is highly probable that similar schemes will be proposed on other slow-running rivers, and so important economic results will follow.

The Croton Reservoir, New York. ALTHOUGH the Croton reservoir has been in use for nearly eighteen months, the dam has only just been finally completed. The more important auxiliary works were the construction of a steel arch bridge across the new spillway channel at one end of the main dam, the formation of a driveway 18 ft. wide over the bridge, and along the crest of the dam from side to side of the valley, a distance of nearly 1,400 ft.; and the establishment of an ornamental park on the downstream side of the dam. The new bridge crosses the channel by a single span of 200 ft. It is a graceful structure, but quite out of keeping with its surroundings, and destroys the harmonious effect contemplated by the original designs. The roadway serves as a connecting link between two roads following the shores of the reservoir, the whole forming a continuous highway more than 40 miles long, crossing various arms of the lake by steel bridges on granite piers. The new park has been laid out among the extensive heaps of material excavated for the foundations of the dam, which under the hands of the landscape gardener have been so treated that they no longer disfigure the naturally picturesque valley. Access to the park is afforded by a steel bridge of 150 ft. span across the dry bed of the Croton river, whose duty in future will simply be to serve as a channel for carrying away any water passing over the spillway of the dam in time of flood, and discharged from the blow-off gates for purposes of cleaning the reservoir.

The Glasgow Telephone Service. By the transfer of the Glasgow telephone system to the Post Office, the most important municipal telephone enterprise in this country comes to an end. The Glasgow exchange, now including about 12,000 subscribers, was established, in 1901, as a protest against a telephone monopoly in the hands of a private company whose service was both dear and unsatisfactory, and it may justly be said that Glasgow has indirectly been the means of benefiting the country at large by bringing the telephone company to see the advantage of more enlightened methods. In view of the transfer of all telephone services to the Post Office in 1911, no object was to be gained by the continued prosecution of a commercial enterprise that involved a certain amount of risk to the money of the Glasgow ratepayers. As a matter of fact, advantage will follow the amalgamation of the two services, hitherto conducted separately by somewhat uncompromising trade rivals.

A Test for Varnishes.

A METHOD of testing the hardness and elasticity of varnishes was described in a paper recently communicated to the Royal Scottish Society of Arts by Dr. A. P. Laurie and Mr. F. G. Baily. A film of the varnish is distributed over the surface of a warm glass plate and allowed to dry, and is then subjected to the pressure of the hard steel blunt point of a testing apparatus which has been specially devised for this purpose. The varnished plate is drawn under the point, the pressure from which is gradually increased, until a white scratch appears upon the varnish. Full details regarding the construction of the instrument and the method of conducting the test are given by the authors. Varnishes prepared from copal or kauri resins with oil and turpentine were found to require much greater pressure than mastic spirit varnish. When commencing the test the blunt point is always placed at the same height, at a mark called zero, and an arbitrary scale to represent the comparative degrees of hardness corresponding to the increasing pressure of the point upon the varnish may be used. We doubt whether the testing of varnish films upon glass plates will ever be of much use in indicating the value of the varnishes as coatings for wood, but the valuation of commercial varnishes is admittedly very difficult, and it is possible that in the hands of an experienced user of varnishes the instrument may be found to be of some service in the investigation of samples submitted for trial.

Improvements in the City of London.

THE annual Report of Mr. Sumner, M.Inst.C.E., Engineer to the Corporation, gives particulars of steps that have been and are about to be taken for widening and improving many of the streets at certain points—embracing Giltspur-street, Warwick-lane, Little Britain, Seething-lane (east side), Jewry-street, and Crutched Friars. The widening of Fleet-street is to be continued as opportunity serves, and a "give-and-take" arrangement is made in respect of the new frontage for Nos. 1-6, Lombard-street, between Mansion House-place and St. Swithin's-lane. Numerous freehold and other interests are acquired for widening the thoroughfares in Mansell and High streets, Aldgate. In respect of the alterations in Lombard-street, we may point out that Nos. 1-6 were built after the plans and designs of Sir Robert Smirke, R.A., as part of the scheme of William Mountague, City architect, for the laying-out of King William street in 1824-30, when the former Nos. 1-10 on the south side of Lombard-street, together with Little Lombard-street and Dove-court, were pulled down. No. 1—Union Bank of London and Smiths—was then rebuilt on the site of Harley & Co.'s banking-house, by sign of the Cock, into which Messrs. Smith, Payne, & Smiths removed from No. 18 at the close of the XVIIIth century. Before the Great Fire the site of the Cock had been that of the Angel, occupied by John Lindsay, goldsmith. Some years ago a cast-iron slab, bearing the device of a cock and serpent, with figures "1652," was found during

some alterations at No. 1. Messrs. Smith, Payne, & Smiths amalgamated their business in July, 1902, with that of the Union Bank of London.

Carnarvon Castle.

THE Office of Works have instructed their architect to confer with the Mayor of Carnarvon as to housing in the Castle the collection of antiquities given to the borough council by Lady Turner. In a letter addressed to the council they state that in the contemplated restoration of the fabric they will make no attempt to restore it to the original condition, but confine themselves to preserving it as a historical building and a memorial of the past. The walls of that magnificent ruin inclose an area of about three acres, and have in their thickness a gallery with loopholes. Of the many turreted towers the largest is known as the Eagle Tower, completed in 10 Edward II., and containing, by tradition, the room in which he was born. The building of the castle was begun in 1283, the cost being defrayed out of the revenues of the vacant archbishopric of York. Henry de Elreton is named as "master-mason"; he used a grey limestone from Twr Kelyn, in Anglesey, and griststone from the neighbouring Vaenol. The natural position of the fortress was well-chosen, being bounded on three sides by the Menai and an estuary of the Seiont; near the latter are the remains of an ancient fort, and a little farther, in the direction of Llanbeblig church, is the site of Segontium. The Parliamentary forces captured the town and castle in 1644; the King's army, under Lord Byron, again recovered the castle, which, however, in 1646 was surrendered. An order of 1660 for dismantlement was by some means partially evaded, and the property became vested in the Crown. There are records of the erection of the eagle on the Eagle Tower, in March, 1317; and of the King's effigy, in April, 1320, over the gateway, which had four portcullises. One of the towers was the prison-house of William Prynn. The late Sir Llewellyn Turner, deputy-constable, applied the admission fees to minor works of repairation, and his successor, Mr. C. A. Jones, has similarly contributed towards the general scheme of restoration.

LONDON HOSPITAL.—Mr. Rowland Plumbe, who has been for many years architect to the London Hospital, has been appointed a member of the Hospital Committee, in place of Sir Edgar Speyer, who has resigned.

SALE OF A CITY SITE.—The Mercers' Company, as trustees of Sir Richard Whittington's Charity, have arranged to sell the freehold, known as 7, Mumford-court, City, containing 585 sq. ft., or thereabouts, with the buildings erected thereon, for the sum of 3,350.

BALKANS EXHIBITION.—A Balkans Exhibition will be held at Earl's Court next year. The Bulgarian Government will contribute a large variety of exhibits relating to the history, mineralogy, industries, and fine arts of their country, as well as its agricultural cultivation, with some representative artisans and labourers. MEMORIAL OF DEAN HOLE, ROCHESTER CATHEDRAL.—The memorial of the late Dean Hole is now being set up at the southern extremity of the south transept of Rochester Cathedral. It takes the form of a recumbent figure of the late Dean in statuary marble, the work of Mr. F. W. Pomeroy, A.R.A., which rests upon an altar-tomb of alabaster designed by Mr. C. Hodgson Fowler, F.S.A., the Cathedral architect.

NOTE ON THE RESISTANCE OF BUILDING STONES TO FROST.

By PROFESSOR J. MALETTE, of Paris.

ATMOSPHERIC variations exercise so prejudicial an effect upon certain building-stones that the opening of a new quarry is a matter of considerable importance, for architects and engineers do not adopt materials from fresh sources without being fully satisfied as to their reliability. The prudence of this course is further justified by the fact that cases have occurred where builders have been compelled to suspend operations because they have been insufficiently informed as to the resistance to frost of the stone employed. Therefore it must be agreed that the resistance of structural materials to frost is a question of primary importance.

During a long period the Brard process was the only means by which account could be taken of the characteristic of stone to which attention is here directed. Although not enabling the problem to be solved in a direct and absolute manner, it furnished approximate results that were formerly accepted as sufficiently satisfactory.

This process was conducted by immersing a fragment of stone with sharp edges, or preferably a cube measuring a few centimetres across, in a cold saturated solution of sodium sulphate. The solution was then boiled for thirty minutes, after which the stone was removed and exposed for eight to ten days in a chamber where a moderate and constant temperature was maintained. At the end of this period the specimen was examined. If it remained intact, its resistance to frost was considered to be satisfactory. On the other hand, if the edges had lost their sharpness, showing splinters that appeared to be on the point of separation and that could be carried away by a jet of water from a wash bottle, it was regarded as liable to injury by frost.

Some modifications were made in this mode of operation by MM. Vicat, Héricart de Thury, and Husson, who attempted to render the details of execution more methodical. These scientists recommended that observations should be made at the end of pre-determined periods, and that the particles carried away by washing after each period should be weighed for purposes of comparison.

In spite of these modifications the process still presented the grave defect of indicating materials as liable to injury by frost which were not so affected, the fact being that much of the deterioration observed was caused by unduly protracted treatment.

M. Braun then attacked the problem in a different manner. He proposed to characterise as liable to injury by frost all stones whose resistance to tension is less than the expansive force of water at the moment of congelation. This idea was certainly rational, since it is precisely the increased volume of water in passing from the liquid to the solid state that causes the disintegration of stone under the influence of frost. But the absence of exact experimental methods and the inadequacy of the results obtained caused M. Braun to abandon his process.

In the present day the resistance of stone to frost is determined by laboratory tests based upon successive and rapid variations of temperature.

The specimen of stone selected for examination is cut in the form of a 7-centimetre cube, which is submerged in a vessel containing water. The vessel is placed under the receiver of an air-pump, air being exhausted until a partial vacuum of 10 in. is obtained. The quantity of water absorbed is naturally governed by the porosity of the material. If the stone is not to be employed under water it is sufficient to accept the natural absorption of the cube after immersion in water for twenty-four hours. After saturation the cube is introduced into an apparatus containing a freezing mixture capable of maintaining during several hours the temperature of from -20 deg. to -15 deg. C. After being exposed for four hours to the temperature of, say, -15 deg. C. the cube is removed from the apparatus and immersed in distilled water, or, in default, in drinking water, of which the temperature is -15 deg. C. The specimen is then examined. In cases where distilled water is employed for washing the water is collected and examined for soluble salts. After a second

immersion in water the cube is again submitted to a second freezing process, at +15 deg. C., for four hours. The process is repeated so as to subject the materials to twenty-five freezings and thawings in succession. Finally, the stone is examined under the microscope.

Fig. 1 represents marly limestone treated in the manner described above. The surfaces have suffered considerably, being broken up by cracks into fine splinters. This effect is often noticed in the case of weak stones and

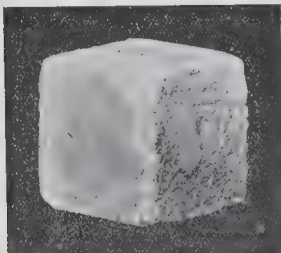


Fig. 1. Calcaire marneux.

of stones, such as argillaceous and sandy limestones, and calcareous sandstones, formed of hard elements united by cementitious material of low cohesive power.

Fig. 2 shows the appearance of a lacustral

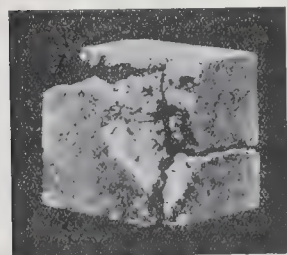


Fig. 2. Calcaire lacustre.

limestone, divided into irregular fragments, with disintegration of the edges.

Fig. 3 is a sub-oolithic limestone, divided

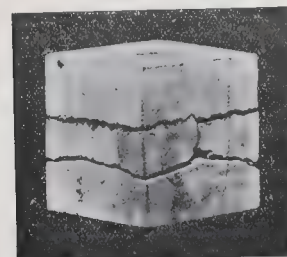


Fig. 3. Calcaire sub-oolithique.

into thin and fairly regular laminations, the soft parts of which are very apparent.

Sometimes the tests are completed by determining the compressive strength of the stone under examination, the specimens being dried after twenty-five successive freezings and thawings, and by comparison of the resistance with that of the original stone tested in the dry state and after the absorption of water to the point of saturation.

TECHNICAL SCHOOL, BATLEY.—The Technical School and School of Art at Batley was re-opened on the 8th inst., after extensions and improvements, which have cost 5,000l. Mr. A. W. Hanstock was the architect of the work.

MAGAZINES AND REVIEWS.

TO THE *Burlington Magazine* Mr. Tavenor-Perry contributes a long article, illustrated by a number of interesting though rather small drawings, on the subject of "The Ambones of Ravenna and Salerno," which he regards as worthy of more notice than they have received, and as in all probability the productions of Lombard artists educated in the Greco-Roman school of Monte Cassino, and influenced largely in their designs by Sarcenic workmen. The curious mixture of severe classical lines in the general design with an Oriental character in the decorations, which distinguishes these ambones, would be accounted for on that hypothesis, no doubt. Mr. C. J. Holmes concludes his essay on "The Development of Rembrandt as an Etcher." The comparison of the early and last states of the "Three Crosses" (in other words, "The Crucifixion"), is a striking instance of Rembrandt's extraordinary phases of feeling in regard to the treatment of his works, the "fourth state" being apparently the result of a sudden impulse to make something more tragic out of the whole scheme, in view of which a whole mass of figures is obliterated and the design reduced to an effect of light and dark. In a less bold manner the third state of "Christ Presented to the People" is metamorphosed in the fourth state, by the obliteration of nearly all the figures in front, leaving a kind of stage with two dark arches in it as the support to the principal group. The illustrations include a reproduction of the wonderful design of "Dr. Faustus," with the light emanating from the cabalistic sign appearing in front of the window. This is one of the most remarkable of all Rembrandt's conceptions; yet in it we notice, as in most others of his works, how the value resides in the total effect and not in the conception of the personages; the head of Faustus is a commonplace head of a man in a nightcap of the period; it adds nothing to our conception of Faustus, though the design as a whole adds immensely to our conception of the mysterious power of the Faustus legend. The "Christ Entombed" is to our thinking overrated, except as a piece of composition and lighting; nor can we by any means agree that as an interpreter of sacred scenes Rembrandt claims a place with Fra Angelico. We can see none of the spirit of reverence or faith in Rembrandt's religious scenes; on the contrary, he seems to us to regard them merely as opportunities for powerful experiments in effect.

In the *Art Journal* Lady Victoria Manners writes the second and concluding part of an article on "The Pembridge and Vernon Tombs at Tong," the illustrations of which bear out what is said as to their interest and beauty. We quite concur in the expression at the close of the article, that "lovers of the beautiful would do well to study more carefully the exquisite and often little known memorial sculpture in English parish churches." "Some Drawings of Chiswick," by Mr. E. C. Clifford, reproduced apparently from pencil drawings, are models of sketching of this kind, and show how much of picturesqueness is still left in Chiswick. A very good colour print of Strand-on-the-Green is added, but we prefer the monochrome sketch. The drawings are accompanied by some notes by the artist. We learn from the *Art Journal* that there is some hope that Mr. Holman Hunt's really great picture "The Lady of Shalott" may be acquired for the Tate Gallery. There could not be a better representation of a remarkable though unequal painter. The frontispiece to the number is a reproduction of Opie's charming portrait of "Mrs. Warde" which was exhibited this year in Gallery I. at the Old Masters Exhibition at Burlington House.

The *Berliner Architekturwelt* contains two curious examples of the eccentricities of modern German street architecture, in "Das Grüne Haus" at Charlottenburg, by Herr Gessner, and a House in Flats in the same suburb, by Herr Linkenbach. The former consists of apparently cemented or roughcast walls from the title, we presume, these are coloured green, portions of which stand upon plain square pillars partially decorated with a kind of trellis pattern. The whole seems an attempt to get rid of architectural details as much as possible, and reduce a

large street house to the appearance of a magnified hut. The other, the "Wohnhaus," has the wall on the lower two stories covered with a chequer pattern; above this is a string-course formed by an immense and clumsy moulding from which spring a series of narrow piers running up the front and apparently decorated with sgraffito. It is a kind of architecture run mad. The "Neubau des Kriminalgerichtsgebäudes," by MM. Thömer and Vohl, seems to indicate that official architecture, at all events, still clings to masonic formula; this is an effective and freely modelled classic front. A "Decorative Malerei" by Herr Dahmen is ingenious and effective, and we like the treatment of an access to an underground passage in the Wilhelms Platz, by Herr Grenander, the solidity and simplicity of which contrasts favourably with the eccentric entrance hoods put up in Paris over the stairs to the Metropolitan railway stations. The number contains a short essay on "The Modern Cemetery" by W. C. Behrendt. The author expresses his surprise at the cemetery and its monuments having been so long neglected by the modern movement in art. Indeed, it was not till after landscape gardening was acknowledged to rank as an art that the laying-out of cemeteries was considered from the artistic as well as from the utilitarian point of view, yet even now the monuments for the most part are the produce of the uninspired artisan and perpetuate the hideous style in vogue in the seventies. Herr Grässel, who planned the new cemeteries of Munich, may be styled the creator of the modern cemetery, for he has shown how by terracing the land the greatest economy in ground space may be united with artistic planning, and how by the suitable disposal of chapels, fountains, seats, and hedges the eye may obtain rest from the prevailing monotony. Exhibitions are now encouraging this branch of art, and at Dresden this year a tract of land was reserved for a miniature grave-yard. It was laid out by Max Hans Kühne, who turned to advantage the natural irregularities of the site, while the red-roofed chapel with glistening coloured windows, the enclosing walls niched for urns, the family vaults, grave-stones, and tablets are all the work of gifted architects and sculptors, and present a fine contrast to the usual trade designs. It should be borne in mind that the cemetery is not only a spot dedicated to the past, but that it should also testify to the sentiments of the living present.

The plates of the *Architektonische Rundschau* are chiefly occupied with illustrations of the buildings of the exhibition this year at Nuremberg, which, though not very beautiful, display a good deal of original character, especially those bearing the name of Professor Ullmann, of Nuremberg.

Concrete and Constructional Engineering for this month is a very good number. Captain Sewell, U.S.A. Army, gives some instructive notes on "Constructional Lessons from San Francisco," illustrating his remarks with photographic views taken for him on the site of the recent fire. Dr. Desch concludes his short series on "The Setting of Portland Cement," devoting attention this month to the micro-structure of that material. Mr. Twelvetrees discusses further types of "Reinforced Concrete Bridges," one interesting example in Great Britain being Tuckton Bridge, Bournemouth, with a total length of 353 ft., and specially designed for heavy tramway traffic. "Reinforced Concrete Railway Sleepers" is the subject of an article by Mr. G. H. Kimball, which deserves the study of British railway engineers. In addition to the foregoing original contributions, a large amount of useful matter relative to plain and reinforced concrete will be found in the same issue of the magazine.

In an article in the *National Review* on "The Development of the Steam Turbine" Mr. C. A. Parsons and Mr. H. G. Dakyns, jun., point to the remarkable evolution in applied mechanics that is represented by the history of this latest type of steam engine. There is a wide gulf between the original 10 h.p. turbine, built in 1884 and now in the South Kensington Museum, and the perfected machine of more than 10,000 h.p. at present in course of construction for the *Lystania* and the *Mauritania* of the Cunard Line. While the embryo turbine of 1884 was coupled to a dynamo running at 18,000

revolutions per minute, these latest developed engines will be coupled to screw propellers for operation at less than 200 revolutions per minute. The development of the turbine on land has been largely aided by the vibration troubles caused by the use of reciprocating engines in buildings near central electricity stations, and more recently by the fact that turbines can be built in sizes quite impracticable for reciprocating steam engines. In view of the vibration known to arise from prime movers of the latter type, it is astonishing that the London County Council should have adopted them at the tramway generating station which so seriously threatens the Greenwich Observatory. After citing the progress that has been made in turbines for use on land, the authors turn to its application to marine work, which, though historically second, soon became first in importance. The satisfactory results achieved on cross-Channel steamers and ocean liners are well known to most of our readers, and it is reported in the *Naval Annual* for this year that the Admiralty have decided that practically all vessels being built for the Royal Navy are to be fitted with Parsons' turbines. While believing that the turbine will ere long entirely supersede the reciprocating engine in vessels of 16 knots speed and upwards and over 5,000 indicated horsepower, the authors do not think it probable that reciprocating engines will be altogether replaced by turbines in slower vessels, as the increased diameter and weight for a small number of revolutions would be prohibitive. In the facts that on land nearly two million horse-power of Parsons' turbines are either at work or being built, and that on sea about one-fifth of the total steam tonnage of the world is similarly propelled, we have ample proofs of the useful part already played by this form of prime mover. That so important a development has been achieved by and on the initiative of British engineers is indeed a matter for congratulation.

In the *Fortnightly* "Cygnus" writes a very good article on "Motor-cars in the Present and Future." Among other points he suggests that if the idea embodied in the Krieger system, that a car may be driven by electricity generated by a separate engine on the car, can be simplified and worked economically, the petrol-driven car will become "as obsolete as a pack horse." We agree with the writer in thinking that legal speed-limits are a mistake. What is wanted is legal responsibility on the part of the owner of the car for any and every injury caused by his machine. Speed-limits on open roads are, as he says, "merely irritating," while the possession of a speed-limit encourages the driver to work up to it in places where he should not. In regard to the matter of dust, the writer suggests that the owner might be liable to pay compensation for special injury or inconvenience caused by the dust he has raised. The necessity for a permanent improvement of the high roads, in view of motor-car traffic, is well insisted upon at the close of the article.

The *XIXth Century* contains an article by the Rev. E. Ledger, Gresham Lecturer on Astronomy, on "Halley's and other Comets," being a summary of the present position of knowledge and scientific speculation in regard to these erratic members of the solar system.

In *Scrivener* Mr. John Vaughn (*sic*) gives, under the title "The Thirtieth Anniversary of a Great Invention," a history of the invention and improvement of the telephone, with sectional diagrams of Bell's first telephone and of one of the latest models.

In *Harper* Mr. W. D. Howells gives his impressions of "Kentish Neighbourhoods—including Canterbury," and writes with much eloquence and genuine feeling of the impressions produced on him by the beautiful cathedral, the exterior view especially. The pretty illustrations to the article are by Mr. Fowe Bailey, who includes among them a sketch of one of those glimpses of old houses rising out of a water-course that flows between them, which are to be seen at various points in going through Canterbury streets, and in a vague way remind one of Venice—with a difference. Also should be mentioned Mr. Janvier's article on "A Little Mexican Town" with its Toltec name—Coyoacán, the description and illustrations of which take one quite out of the beaten track of archaeology.

The town is connected with the name of Cortes, and the house still stands in which it is averred that he killed his wife—why, no one seems to know. The fact of the murder appears to be authentic, whether the house is so or not.

The *Antiquary* contains a very interesting article on a new subject—"Venetian Bridges and Street Names." It gives an account of some Venetian legends and superstitions, and their connexion with the names of some streets (or canals) and bridges. Mr. E. C. Vansittart is the author.

MOTTOES ON MANTELPIECES.

THE custom our forefathers originated of placing mottoes and texts upon their chimney-pieces, as well as upon their doorways and over their windows, is not yet quite discontinued, for the late Lord Armstrong caused a motto to be placed on the chimney-piece of the dining room in the fine mansion he built on the Rothbury Hills, in Northumberland. He chose the familiar words, "East or West, home is best," which give a restful and welcoming air to the large and pleasant room and its hospitalities.

Looking, however, to early examples, we may note the wording on the mantelpiece of the housekeeper's room in Arbury Hall, Warwickshire, which says, "Truste in God, and feare Him with al thy harte." George Eliot described this room in "Mr. Gill's Love Story," and gave the motto with a difference, as heralds say: "Fear God and Honour the King." Sir Walter Scott, it may be mentioned, too, said that the chimney-front in the Quaker's parlour described in "Red Gauntlet" was inscribed with "Trust in God," showing that he, also, appreciated the quaintness of these inscriptions.

The carved mantelpiece of the banqueting-hall in Farnham Castle has "A Deu Foy. Aux Amis Foyer," which has been amplified into "To God we yield the faithful heart, the hospitable hearth to friends." One of these inscriptions in the hall of the Vicars' Close, at Wells, says, "In vestris precibus habebatis commendatum. Dominum Ricum Pomroy, quem salvat Deus. Amen." Another, in the porter's lodge in the grand old hospital of St. Cross, at Winchester, says simply, "Dilexi Sapientiam." Over the fire-place in the long room at Boughton, Northamptonshire, we may read, "Ne sis Argus foris et Doun Talpa," which may be translated, "Do not be an Argus at home and a mole abroad." At Knolle, in Surrey, there is another Latin example, "Æstate frige Hyeme incalisco."

Some of the chimney-pieces in the manor-house of South Wraxall, near Bath, have inscriptions. "Death seizes all" is one of them. This is the house in which Sir Walter Raleigh lived for some time. Carbrook Hall, near Sheffield, has a chimney-piece lettered, "Understanding reacheth Heaven. Understanding is a well-spring of life. Good understandings depart from evil. Ignorance is a beast." A mantelpiece in Widemarsh-street, Hereford, reads, "When ye sytte by ye fyre to keep yr selves warme, take heed leaste yr tongues doe yr naybours noe harme."

In the gatehouse of Leeds Castle, Kent, someone has cut upon the mantelpiece in the Constable's room these words, "Whyte that ye may my ladye plesse, not sors of travayle the werke, quoth Oracius." This is supposed to have been cut to pass away the time by some resident who found abundant leisure in the moated residence in question.

Sometimes old inscriptions are uncovered in the course of alterations. A mantelpiece that had been bricked up in an upstairs room in a house in High-street, Tewkesbury, was found to have the following lengthy inscription on it when opened out a few years ago:—"Three things pleseth booseth God and man: concorde between bretheren: anytie between nayghbours: and a man and his wyfe that agreeth well together. Fower things hurt much the site of man: teares, smoke, wynde and the worst of all to se his frends unluckye and his fose happye. These fyve thyngs are rare sene: a fayre younge womane withought a lover, a younge man without myrth, an old userer without money, any great fayre without music." Occasionally these fanciful statements ran round the cornices of rooms, as at Earl's Court, where may be deciphered:—"A nyce wyfe and a back doore often make a rich

man poor," and "Trust upon good atturance and trye ore you trust for fear of repentance." The fifth Earl of Northumberland followed this fashion and decorated two of his residences, Wressell Castle and Leckington Manor-House, with remarks of the same kind:—"He that slepeth in somer in winter suffereth payne. And he that in youth is vydyll in age must needs complaine. And he that in youthe witheth virtue maketh advance in age of all grace shall have plementous habundance. An old proverb it is meane it is a treasure why sholde not youthe at times enioye his pleasure." Round the frieze of the dining-room in Speke Hall, near Liverpool, runs:—"Slepe not tell ye hathie considered how thow hathie spent y day past. If thow haue well don, thank God. If othr. ways repent y." It was not, however, always admonitions that lit up cornices. On a frieze in Ripley Castle is the mere record:—"In the yeare of owre Ld M.D.M.V. was this howse buydyd by Sir Wyllyam Ingoldshay, Knight, Phillip and Maria reigning at that time." The lettering in some instances extended to beams. Thus, at Somerset Court, South Brent, some vanished hand placed:—"I wroght not the poor, I fear not the rich; I have not toose littel, nor I have not tooe much. I was set up right and even." Another beam in a house on the confines of two counties, at Meppenshall, said, "If you wish to go into Hertfordshire, hitch a little nearer the fire."

Wales has some examples of this old-world lettering, though not so many as Scotland, where we find doorways, windows, and walls very frequently thus enriched, as well as the internal features of dwellings. A Welsh mantelpiece at Newton, near Brecon, has a pedigree upon it:—"John Games, the son and heir of Edward Games, the son of John, the son of Morgan, the son of David Gam, 1582. On God depends everything. Games." This David Gam is the knight mentioned by Shakespeare in the play of "Henry V." as being among the slain in the great battle. And that this record was not singular we have evidence in another mansion at Abermarlais, Carmarthenshire, where a pedigree is set out that goes as far back as King Coel, Emperor of Great Britain. A fine Scottish example has:—"As with the fire, So with thy God do stand, Keep not far off, Nor come thou too near hand."

To return to the mantelpiece. Over the fireplace in the entrance-hall of Aston Hall the founder thought well to place the following lines:—

If service be thy meane to thrive,
Thou must therein remain
Both silent, faithful, just, and true,
Content to like some paine;
I may be sure,
Or hope of worldly gaine,
If feare of God may thee procure
To serve does not disdaine.

ASIATIC ART AT BETHNAL GREEN MUSEUM.

At Bethnal Green Museum there is now on view a large portion of the Asiatic collection of Lord Curzon of Kedleston. The collection illustrates the art of India, Burma, Nepal, and Tibet, with a few specimens from Persia, Afghanistan, Siam, and China. The collection is a large one. It will remain on view for some months, and will be varied or added to from time to time. To all who care about the art of the East, and to those who know nothing of it, the exhibition is recommended. That portion showing a number of objects connected with the Coronation durbar at Delhi in 1903 will, of course, attract some attention. Some slight idea of the extraordinary splendour of that occasion is given by a painting in oils of the entrance to Delhi by the Viceroy and native princes on elephants. Many cases contain souvenirs of this event—caskets in silver, ivory, wood, and other materials without number, presented to Lord Curzon by municipalities and other public bodies in India; most of these are without artistic interest from the introduction in their design of Western ideas. Some of the best modern work from the Art Exhibition at Delhi is here on view—specimens in wood, ivory, metal, and jade, of carving and inlay, and costly enamel work from Jaipur. It is a pleasure to see this fine modern work, for it is unfortunately the case that Western ideas and Western methods

re slowly ruining the native art productions, though we hope the evil may be recognised in time to prevent their being exterminated. The domestic utensils, furniture, and images collected by Lord Curzon in Tibet, Sikkim, and Nepal are of special interest; some of the seated figures of Buddha were presents to the Viceroy from the ruling Lamas at Lhasa and Shigatse, in Tibet. The collection from these sources illustrate a common style and religion. The household implements in use among the Tibetan monks and people are very attractive—bronze and copper tea-pots, beer-jugs, water-pitchers, and lamps, and many other useful and quaint utensils, nearly all fit and beautiful in the treatment of the material and the design for which they are made. The Siam and Burma exhibits are of a more refined order of beauty—faience and lacquer work, ivory carving, and dress fabrics, each example a perfect work of art in its way. The combination of colour, form, and pattern of the cloisonné enamels and porcelain from Peking, of the textiles in silk and velvet from Persia and India, constitute one of the charms which throw their spell and glamour over the East and make its arts one of the most fascinating and elusive to the student; it cannot be understood apart from the life of the producers.

Architectural Societies.

NORTHERN ARCHITECTURAL ASSOCIATION.—The Association offers to students (and Associates not in practice, nor yet twenty-five years of age) a first prize of books of the value of 2l. 2s. and a second prize of 1l. 1s. for the best set of drawings or testimonies of study as required by the R.I.B.A., to be submitted for their Final Examination. Similar prizes will also be given for the probationary work for the Intermediate Examination.

THE MARKET HOUSE, CHIPPING CAMPDEN, GLOUCESTERSHIRE.

The Market House, Chipping Campden, is one-storied building situated in the centre of the main street, and is still used for market on Wednesdays. It is in a style common to the Cotswolds, and is built of stone and roofed with stone slates, the roof being supported in the interior with stone columns and wooden beams. P. H. KEYS.



Tudor House, Broadway, Gloucestershire. From a Sketch by Mr. P. Hubert Keys.

TUDOR HOUSE, BROADWAY, GLOUCESTERSHIRE.

Tudor House, Broadway, is picturesquely situated in the main street, and is faced with local stone and roofed with stone slates. P. H. KEYS.

Correspondence.

WATER IN TAR FOR ROADS.

SIR.—It is generally agreed that most of our main roads will need reconstruction to meet the requirements of modern traffic, but this costly undertaking will necessarily occupy many years in its fulfilment. If, in the meantime, the dust nuisance can be substantially abated by merely painting the surfaces of the roads with tar, the road authorities will no doubt be prepared to incur the small additional expenditure. During the last two years many papers on the subject of tarred roads have appeared in the *Builder* and elsewhere, but

Engineering Societies.

JUNIOR INSTITUTION OF ENGINEERS.—Mr. William B. Bryan, Chief Engineer of the Metropolitan Water Board, has been elected President, in succession to Mr. Dugald Clerk.



Market House, Chipping Campden. From a Sketch by Mr. P. Hubert Keys.

while some surveyors have pronounced tarring to be an unqualified success, others have been less happy in their experiences.

It would be useful if those surveyors who have tarred roads under supervision, and who, in the public interest, are publishing the details of their work, would give full particulars as to the nature of the tar used. Two forms of tar are manufactured at many gas works:—(1) Coal tar, which results from the distillation of coal; and (2) carburetted water-gas tar (sometimes called oil-gas tar) which results from the decomposition of certain oils under high temperatures. Coal tar is commonly very viscid at atmospheric temperatures, while carburetted water-gas tar is usually perfectly fluid. Coal tar does not as a rule contain more than 3 or 4 per cent. of water, but carburetted water-gas sometimes contains a much larger amount.

Both descriptions of tar have been used with success for road-painting, but it has been stated that the presence of water greatly detracts from the value of the tar for road-painting, surveyors would add to the value of their published work if they would state the proportion of water in the tar used. The determination of the proportion of water can readily be made by any analyst. So far as the writer is aware no such records have yet been made in connexion with the use of tar for road-painting. In those cases in which the tar is heated to about 190 deg. Fahr. in open boilers before use much of the water would be expelled from the tar, and for the determination of the water it would be necessary to take a sample of the hot tar immediately before the tar is applied to the road.

H. F. HILLS

Books.

A Handbook on Reinforced Concrete for Architects, Engineers, and Contractors. By F. D. WARREN. (New York: D. Van Nostrand Company. London: Crosby Lockwood & Son, 1906.)

ACCORDING to statements in the preface, the object of the author in preparing this volume was to provide a reference handbook with the view of enabling busy men to design structures in reinforced concrete without being compelled to calculate the proportions of members by the aid of a text-book. The author appears to hope, also, that his work may have a tendency to discourage the use of empirical formulæ and rule-of-thumb methods, and to lead towards a standard and universal system of design. We really cannot see that this handbook is likely to do much good in the direction indicated, for its real motive is to suggest design by tables whose accuracy the user is asked to accept upon the assurance that "the treatment of the many phases entering the design has been carried out along well-known formula based upon the theory of elasticity, but modified by the usual assumptions, such as the 'conservation of planes' and 'Hooke's Law,' and not upon empirical formulæ based upon experiments." The reader is invited to take note of the fact that, before applying the theory of elasticity to any particular part of the design, "a sufficient number of tests were carried out along this basis to approve it, and determine the coefficients and constants." This further assurance is unsatisfactorily vague, and is not calculated to give confidence to practical designers. It is true that in Part II. results are given of two tests of beams, fifteen tests of a floor, and one test of a roof. We must point out, however, that no information is given as to the names of the persons by whom the tests were carried out, or the place where they were conducted. The beam tests may be useful as isolated examples, but are obviously insufficient as a basis of the extensive series of beam tables which the author hopes will supersede empirical formulæ and rule-of-thumb methods. The floor tests were carried out by some unnamed person, in some unknown place, on some unknown date, upon a concrete floor reinforced by an unknown proportion of steel rods. The total load in each case is stated with regard to sections of the floor indicated by figures and letters, but which cannot be identified because no plan is given, and a further mysterious element is that the total loads are stated in "square feet" and "lineal feet." Probably the author meant to express the loads in pounds per square foot, and pounds per lineal foot, but

there is nothing in the tabular results to show whether the loads were in pounds, hundred-weights, or tons. The results of the roof test also are rendered practically useless because no details of the construction are given. Part II. is concluded by three diagrams on which the results of various tests, for which no authority is given, are plotted, showing the relation between expansion and temperature, and indicating the coefficient of expansion for concrete at 0.0000642, which agrees approximately with the generally accepted value.

From the evidence here presented we are scarcely prepared to accept the view of the author that the contents of Part II. can be regarded as "justifying the use of various constants and coefficients in preparing the tables under Part III." We presume the foregoing words are intended to convey the meaning "justifying the values of the various constants and coefficients that have been adopted by the author in calculating the tables in Part III." As printed, they obviously mean something quite different, and in common with many of the explanatory remarks by the author show a lack of facility in the use of language which detracts in no inconsiderable measure from the practical utility of the volume to busy men. Part III. contains seven voluminous tables, from which it is said that the dimensions and proportions of reinforced concrete beams for any bending moment can be picked out. For instance, in using Table I., when the bending moment is known, the next higher value is picked out in the proper column, according as a factor of safety of 3.5 or 5 is required. On the same horizontal line of the table will be found the external dimensions of the beam, the area of steel, and the number and size of the bars into which the steel should be divided. In passing, we may point out that in the author's explanation on p. 76, column 5 is wrongly quoted, instead of column 9, as that in which will be found the area of steel in tension.

On p. 80 the author gives what he calls the "routine" by which the safe allowable resisting moments, both of compression and of tension, were deduced. Unfortunately, the method of computation is based upon an entire misconception of the mechanical principles governing the design of beams, and for this reason the tables are worse than useless. The author's views upon shear are equally fallacious, and their application totally invalidates the series of tables intended as a guide to the proportions of reinforcement for resisting shearing stresses. Moreover, it is not clearly stated at the top of the tables that all the dimensions relate only to 1:2.4 or 1:1.5 concrete, which is assumed to have an ultimate compressive strength of 3,000 lb. per square inch, and that with the factors of safety employed the proportions given in the tables involve the extreme fibre stresses of 850 lb. and 600 lb. per square inch respectively for concrete compression. Tables IV. and V. relating to continuous beams are calculated entirely for the extreme fibre stress of 850 lb. per square inch for concrete in compression, and this fact is not clearly stated at the top of the tables as it should be. The same objections apply to Tables II. and IV.

Other tables given in Part III. relate to the proportions of floor slabs and columns. The tables relating to floors are based on the same fundamental errors which were made the foundation of the tables of beams, and the table of columns is calculated upon data which the author has not made public.

From the foregoing comments it will be seen that these tables are not only unreliable, but, on the author's own showing, they involve stresses which are not compatible with prudent design.

A series of tables similar to these, if calculated by some well-known authority, in accordance with generally approved formula, and with constants and stresses such as are adopted in safe practice, would be of considerable assistance in the design of beams, floors, and columns. Even then the tables ought to be accompanied by clearly-worked examples showing completely the manner in which each was calculated to enable the designer to satisfy himself as to the accuracy of the proportions given, and all necessary data ought to be printed at the top of each table so as to obviate all risk of misunderstanding on the part of occasional users.

However, we are strongly of opinion that complete structures in reinforced concrete cannot be satisfactorily designed by any tabular method. The various members of a complex structure are so interdependent that they cannot properly be considered as absolutely separate units. If they were so treated by designers, relying solely upon tables, we feel sure that the effect upon reinforced concrete construction would not be as suggested by the author of this work to "remove some of the prejudicial influence at work tending to demerit its worth because of unfamiliarity with its design."

So far as this handbook is concerned, we can only express the hope that its sale in this country will not be large enough to do much harm, and the regret that a responsible firm of British publishers should have been advised to undertake its publication.

The Annual of the British School at Athens. No. XI.—Session 1904-1905. (London: Macmillan, 11. 1s. net.)

THE latest *Annual* of the British School at Athens is exceptionally full of things of various interest. As a result perhaps of the School excavations at Palaikastro, in Crete, merging into those at Laconia, in Sparta—the latest field of research—we have no fewer than fifteen separate subject articles, which, with their subdivisions, really amount to twenty-four. Dr. Arthur Evans is given the place of honour for his brief account of the preceding season's work at Knossos, describing further researches in the outlying part of the Minoan paved-way leading west from the palace, some constructional discoveries in the palace itself, and the important restoration of the Hall of the Colonnades rendered necessary by a collapse. The plan given on p. 9 would be the better for a north point to aid the description.

Further on in the volume there is an exhaustive article by Dr. Mackenzie on "Cretan Palaces" dealing with certain theories of construction recently advanced by Dr. Dörpfeld and Professor Noack. We have no doubt that Dr. Mackenzie is right in his conclusions. His theme is to be continued, we are glad to say.

The School work proper is dealt with in a series of articles on Palaikastro and Laconia, which record an active campaign, principally a tabulation and arrangement of small data, thoroughly and carefully done. It does not make showy publication, but it works the evidence to the bone, as is imperative in modern methods of research. Mr. R. M. Dawkins (the newly-appointed Director) is chief contributor.

There are other articles of more general character, and we are glad to see that the topographical element is not entirely neglected. Mr. Hasluck edits "Dr. Covel's Notes on Galata" (1669-1677) with a useful explanatory note, and Mr. Dawkins contributes "A Visit to Skyros," which should prove interesting to the general reader as well as to specialists; but we should have liked a section or photograph of the church which he illustrates by plan. Mr. A. J. B. Wace has an interesting article on "Frankish Sculptures at Parori and Geraki" illustrated by photographs, under the heading "Laconia," and Mr. R. C. Bosanquet (retiring Director) writes on the Temple of Dictæan Zeus, etc., at Palaikastro.

There are other articles too numerous to mention. The most important plan at the end of the volume is the plate of Phæstos illustrating Dr. Mackenzie's article, the first complete plan of Phæstos yet published in an English journal; it is regrettable that the figures on the plate are so small, making comparison with the text difficult. There is also a coloured plate of a fine early vase from Knossos and other plates showing a map of Constantinople in the XVth century, an archaic relief from Angelona, two Greek busts, a view of the State entrance at Phæstos, a view of the ninth magazine at Knossos, Neolithic objects from Magasá, a key-plan of the town of Palaikastro, detailed plan and section of the temple site, plans of early and late walling, with photos, and a terra-cotta relief and fine bronze shield, all from the same site.

The volume is also illustrated by numerous cuts in the text.

London Topographical Record. Vol. III. (Chiswick Press, and Clifford's-inn, E.C. 1906.)

THIS volume, issued for the years 1903-4 by the London Topographical Society, contains their fifth and sixth annual reports, with addresses from the chair and proceedings, and three articles—by Mr. F. G. Hilton Price, Dir.S.A., upon the "Signs of Old London," a subject he has made particularly his own; by Mr. J. G. Head, F.S.I., upon "Alterations in North Saint Marylebone"; and by Colonel W. F. Prideaux, C.S.I., upon "Salway's Plan of the Road from Hyde Park Corner to Counter's Bridge" (Fulham boundary). On March 18, 1899, we printed an account of Joseph Salway's unique survey, extending over about fifty sheets, all dated in June, 1811, made by him when surveyor to the Kensington, etc., Turnpike Trust, and deposited in the British Museum. The drawings have since been reproduced in a most admirable form by the Society. Colonel Prideaux's "Notes" are just what one would look for from the hands of a so painstaking and accurate expositor. In his address (1904) upon relics and vestiges of old London, and his paper upon XVIII-XVIIIth century signs in and around St. Paul's Churchyard, Mr. Hilton Price discourses in his wonted easy and attractive style, giving relief and animation to the theme; he contributes many valuable particulars concerning the traders themselves, their tokens, publications, and wares, with illustrations of tickets, bill-heads, etc. Mr. Head, a well-known estate agent and surveyor practising in the Borough, recounts the manifold changes which have occurred during fifteen years past under his own observation in the St. John's Wood and adjoining districts consequently upon the construction of the Great Central and other railways and of electrical lighting works. More than 70 acres of house property belonging to Lord Portman and the Eyre Estate trustees have been quite transformed from Marylebone-road and Lord's cricket-ground. Mr. Head adds a shaded general plan and photographs and plans of some of the demolished houses and their gardens—amongst them being the homes of George Eliot (three), Mrs. Siddons, Huxley, Tyndall, Sterndale Bennett, Edwin Landseer, Kossuth, and Mary Lamb. The north block of Bickenhall-mansions, we may observe, supplanted in 1896-7 York-buildings, where at No. 8 (afterwards No. 77, Marylebone-road) Leigh Hunt lived in 1817-20. The Society has lately been reconstituted upon a greatly improved and liberal basis; this volume and its predecessors evince that the conductors highly appreciate the scope and variety of their aims, and how those aims may be best attained. It is gratifying, too, to find the names of eminent architects upon the Council, and that the members include many public libraries and institutions at home and abroad, as well as several American universities. Their publications are ably edited by Mr. T. Fairman Ordish, F.S.A., who has been a chief collaborator since the founding of the Society twenty-six years ago.

British Rainfall, 1905. By HUGH ROBERT MILL. (London: Edward Stanford. 1906.)

AT the present moment people in general are far more concerned at the lack of rain in 1906 than about the rainfall that took place in the preceding year, although, even to the average man in these parched days, we may recommend this volume as a refreshing study. To engineers and authorities upon whom devolves the duty of finding and providing supplies of water for public and industrial purposes or who have occasion to deal with the drainage of land the book possesses a distinct value as a standard work of reference and comparison.

The work conducted by the British Rainfall Organisation—of which Dr. Mill is the moving spirit—is entirely unofficial, and constitutes one among many undertakings of national character that are left by the State to private enterprise. The position is quite different in Germany, where rainfall observations and the compilation of results are undertaken by the officials of public departments. Thanks to the voluntary work performed by some 4,000 observers in the United Kingdom comparatively few areas of considerable extent are unrepresented, and the observations rendered available constitute a

most useful record, as abundantly evidenced by the yearly volume produced by Dr. Mill.

Part I. of the present issue contains two original articles—one giving an interesting account of the remarkable compendium of rainfall statistics prepared by Professor Hellmann, of the Royal Prussian Meteorological Institute, and the other dealing with the relation of evaporation to other meteorological phenomena. As the extent to which evaporation takes place largely governs the amount of water available for use it is a matter for regret that only eleven stations in the British Isles are equipped with tanks for the collection of data. In Part II. will be found notes from observers on the rainfall and weather generally, records relative to heavy falls of rain and their distribution over the country, similar data concerning the distribution of rainfall in time, a classification of rainy days, drought, and spells of rain, and the usual comprehensive tables of annual and monthly rainfall.

Reference to records shows that since 1891 the general rainfall of the British Isles has been comparatively heavy, one year and much lighter for the two next years. This sequence cannot reasonably be regarded as a permanent institution, and, as Dr. Mill justly points out, "a grievous disappointment must be in store for anyone who is rash enough to make definite forecasts based upon the occurrence of the past fifteen years." In fact, it is not improbable that 1906 will prove to be an exception to the rule. So far as last year is concerned, the general rainfall in England and Wales was 16 per cent. below the average for the past twenty-five years, and, with the exception of 1902 and 1893, there has not been so dry a year since the memorable drought of 1887.

While the work of the British Rainfall Organisation is in no way prophetic the information collected is indispensable to all who have occasion to inquire into the probable supplies of water available, and the volume now published is one of a series whose obvious merits require no commendation on our part. The only unsatisfactory feature connected with it is that the cost of maintaining the Organisation is greater than the income derived from subscriptions and the sale of publications. So great a national work ought clearly to be placed upon a more secure financial basis.

BOOK RECEIVED.

ATTRITION TESTS OF ROAD-MAKING STONES. By J. Lovegrove. (The St. Bride's Press. 5s.)

Fifty Years Ago.

FROM THE *Builder* OF SEPTEMBER 13, 1856.

DAUGHTER AND INSANITARY HOUSES.—Little Swan-alley, where fell the house that proved a grave for four poor creatures last week, is a few paces out of the fine thoroughfare Moorgate-street, and a very short distance from the region of gold, Lothbury. The alley is about seven feet wide, with houses on both sides, all in a miserable condition, dangerous alike in a structural and a sanitary point of view. The house that fell was at the back of the houses on the north side of the alley. It was a mere heap of rubbish. The tenants were advised at different times to leave it, but, as one of them said at the inquest, in words we have often recorded before, she would gladly have done so if she could; but she had a large family, and it was very difficult to get reasonable lodgings in the neighbourhood, and so she would take the chance. The coroner, after summing up the evidence that had been given, pointed out that it was the duty of the jury to inquire if there had been that culpable neglect on the part of any persons which would make them criminally responsible; whether there had been omission amounting to culpable neglect on the part of those who had charge of surveying the district, or of any other person. If they were of that opinion, they must say who were to blame, and it would be their duty to return a verdict of manslaughter against him or them; or, if they did not feel justified in coming to that conclusion, then they must say it was an accidental occurrence. The jury, after deliberating for some time, returned the following verdict:—"Accidental death from suffocation by the falling of the

house, No. 9, Little Swan-alley," accompanied by the following recommendation:—"The jury earnestly recommend to the Commissioners of Sewers that they would authorise a special survey forthwith to be made of all the buildings, in the city of London, that from age or other cause may be supposed to be out of substantial repair." It is to be hoped that this recommendation will be attended to immediately, as there are houses around the site of the recent accident, without going farther, in an imminently dangerous state. There are houses in Blue-Hart-court and Bell-alley (we would especially instance No. 4, in the latter place, that looks as if it might come down at any moment), which should have immediate attention. In New-court, although more decent in aspect externally, the fronts overhang very considerably. In a sanitary point of view, air and light are sadly needed in this nest of alleys. We can remember when it was much worse, it is true—when the tenants had no water, and every house was a reeking fever-still. It is bad enough, however, even now. In one of the houses that we entered, the smell was perfectly overpowering, and in many the cadaverous aspect of the occupants shows the degradation of the vital powers. Let us hope that out of evil may come good.

Illustrations.

CANTON HOUSE, WESTMINSTER.

THIS large block of buildings has recently been completed in Tothill-street, Westminster, on the site immediately west of that on which the new Wesleyan Hall will be erected. Mr. J. S. Gibson is the architect.

We had asked Mr. Gibson for illustrations of the building, and in addition to photographs of the exterior he kindly sent a large-scale detailed and figured elevation, with a section of the front wall. This we have reproduced on a plate larger than our usual size, more especially for the benefit of our younger student readers, to whom a working drawing of this kind, by an experienced architect, should be of considerable practical value for study.

The following is the architect's description of the building:—

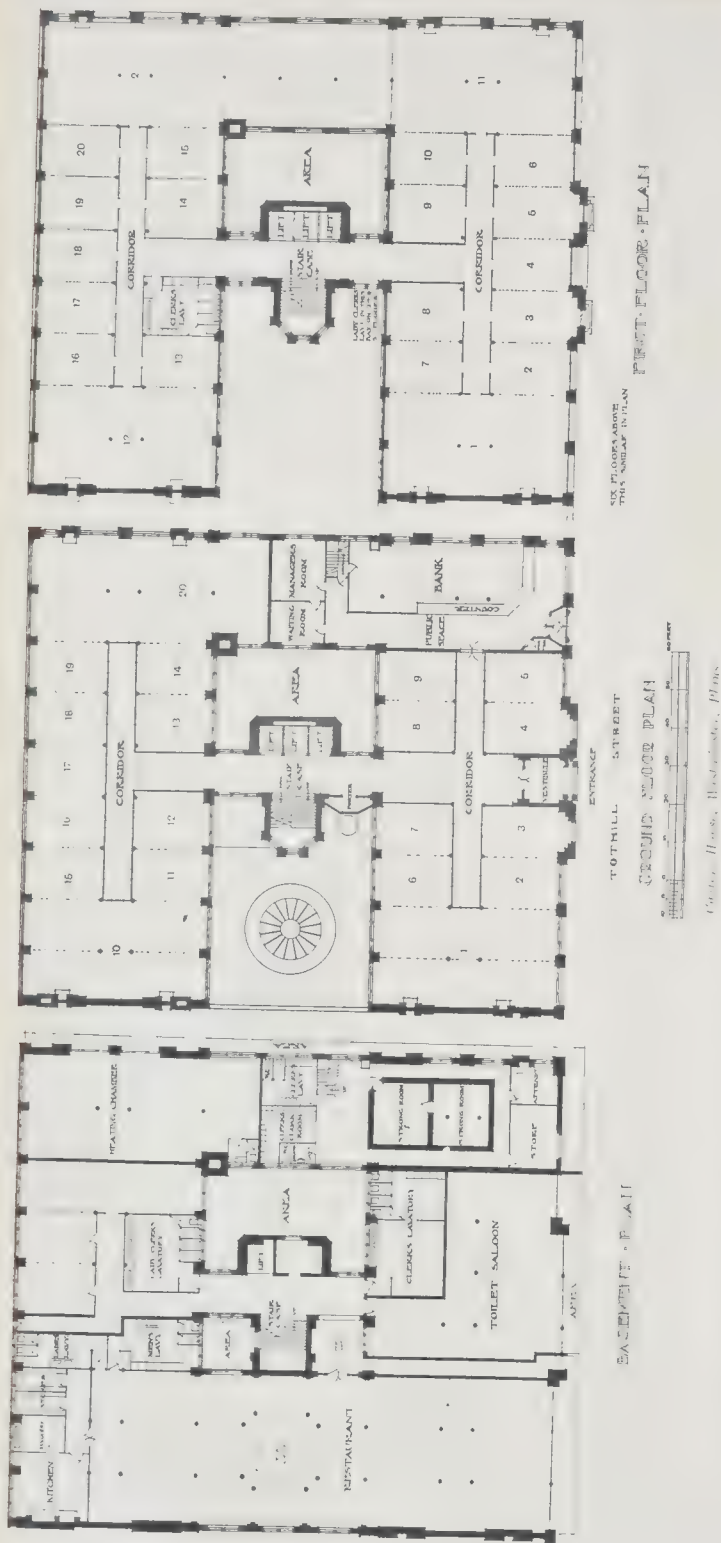
"This large block of buildings has been erected on part of the site formerly occupied by the Royal Aquarium, in Tothill-street, Westminster, and, as shown by the plans, it has been designed as a purely business structure.

The first consideration was the necessity of plenty of light and air to all the offices and easy and direct access to all parts. The exterior walls are built to comply with the Building Act, and the whole of the interior of the building on the upper floors has been left to be divided up by partitions to suit the requirements of the various tenants. It might be thought that the "double" corridor type of plan adopted would be dark, but, as the partitions forming the corridors are glazed from about 7 ft. high to the ceiling, every floor is remarkably light and cheerful, and for such large blocks of buildings I think this type of plan will be often used.

In preparing the foundations the old concrete foundations of the Aquarium gave some trouble, and these had to be removed by blasting. The subsoil was of so soft a nature that the whole building was placed on a concrete raft, which has made an admirable foundation.

The three lower floors are entirely of skeleton steel construction, the upper floors having the external walls built to take the weights without the aid of steel stanchions, as will be seen by reference to the detail drawing. All the floors and roofs are steel encased in coke-breeze concrete, the flat roofs covered with asphalt and the sloping roofs with green slates. The whole of the surfaces of the office floors are treated in a rather novel manner, as they are finished with granolithic covered with linoleum, and so no wood floors are used in any part of the building. I used this method in some smaller blocks of office buildings in the City, and, as it seemed to be liked by the tenants, the same method of finishing these floors was adopted here with success.

On the basement floor is a large restaurant,



with access from Tottil street as well as the interior of the building; all the heating, and a circulating plant, are here, the hall, being heated by atmosphere, steam, and every office is provided with an independent radiator, very low fireplaces being used.

On the ground floor the east corner has been reserved for a bank, and the remainder of the building is divided into three parts, each of any size. The entrance hall contains three elevators, and the remainder of the building is divided into three parts, each of any size. The entrance hall contains three elevators, and the remainder of the building is divided into three parts, each of any size. The entrance hall contains three elevators, and the remainder of the building is divided into three parts, each of any size.

of the ground floor level. Provision has been made for telephone and electric lighting to be placed in any office without interfering with the structure or decorations of the building.

The whole of the entrance hall and stairs have been admirably executed in "Stoneville" by Mr. Gilbert Stables, who also executed the floors outside decorations, by Messrs. Bellman & Co.

The front of the building to Tottil street is of bath stone of a good oblong and texture, which promises to weather very well. The building is of stone and brick and will be perfectly masked by the new Western Hall now being erected from the designs of my friends, Messrs. Lamb & Richards.

Refer to a novel feature is the use of wood extensively for all windows, which are hung to open out in the hallway way for ventilation, and also to open upwards for the purpose of cleaning.

The stairs are as shown on the views most of the stairs, and only a part of the whole is shown in the plan. The stairs will be made early next year, and the other part will be made later.

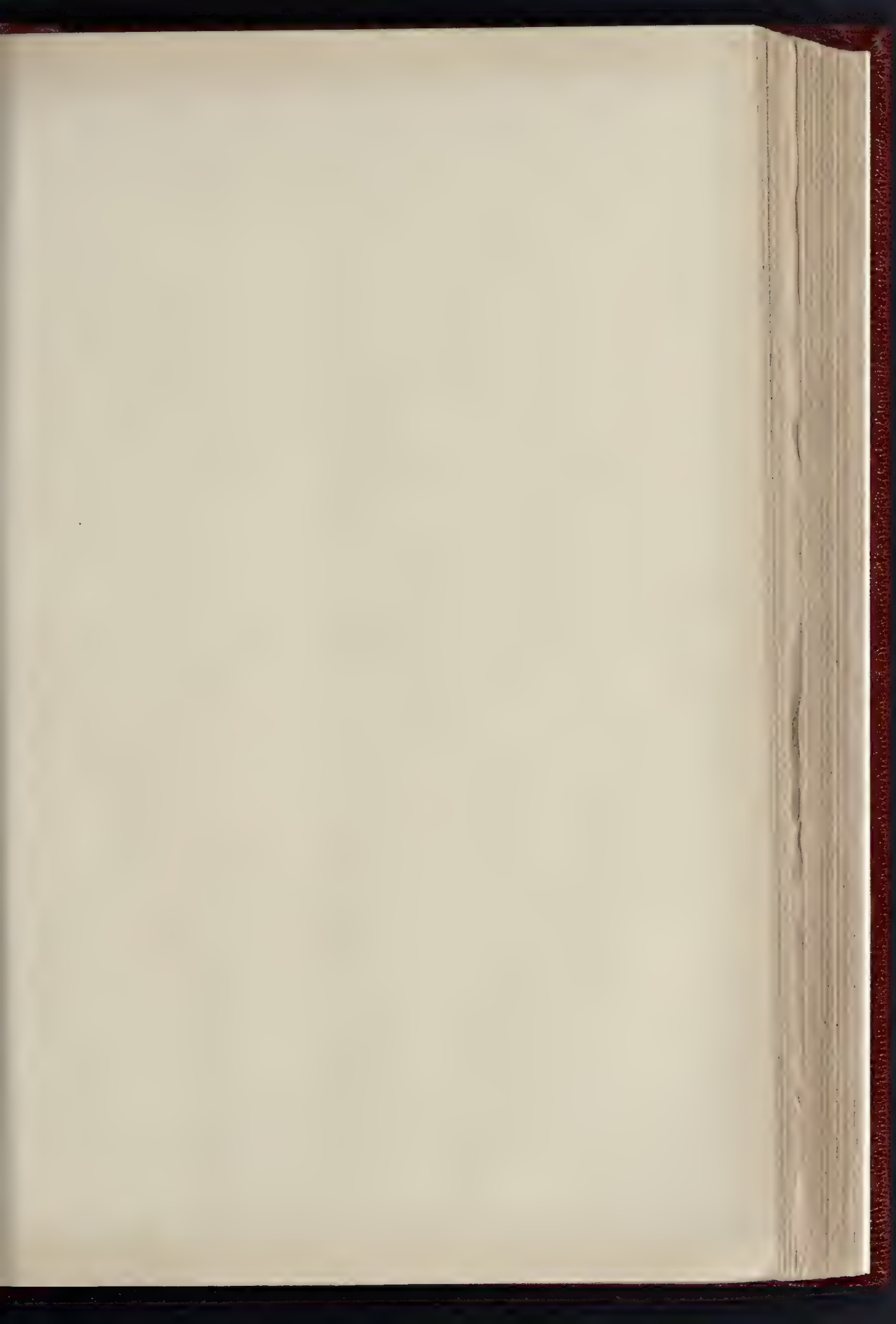
The entrance hall, for the whole, is a very fine room, and the other part will be made later.

The entrance hall, for the whole, is a very fine room, and the other part will be made later.

In the *Builder* for January 6, 1906, as a result of this building, the spirit of which I hope will be the same, and with many of the same, the architect of this building, I think, has been the best of his kind, and the other part will be made later.

The entrance hall, for the whole, is a very fine room, and the other part will be made later.

The entrance hall, for the whole, is a very fine room, and the other part will be made later.

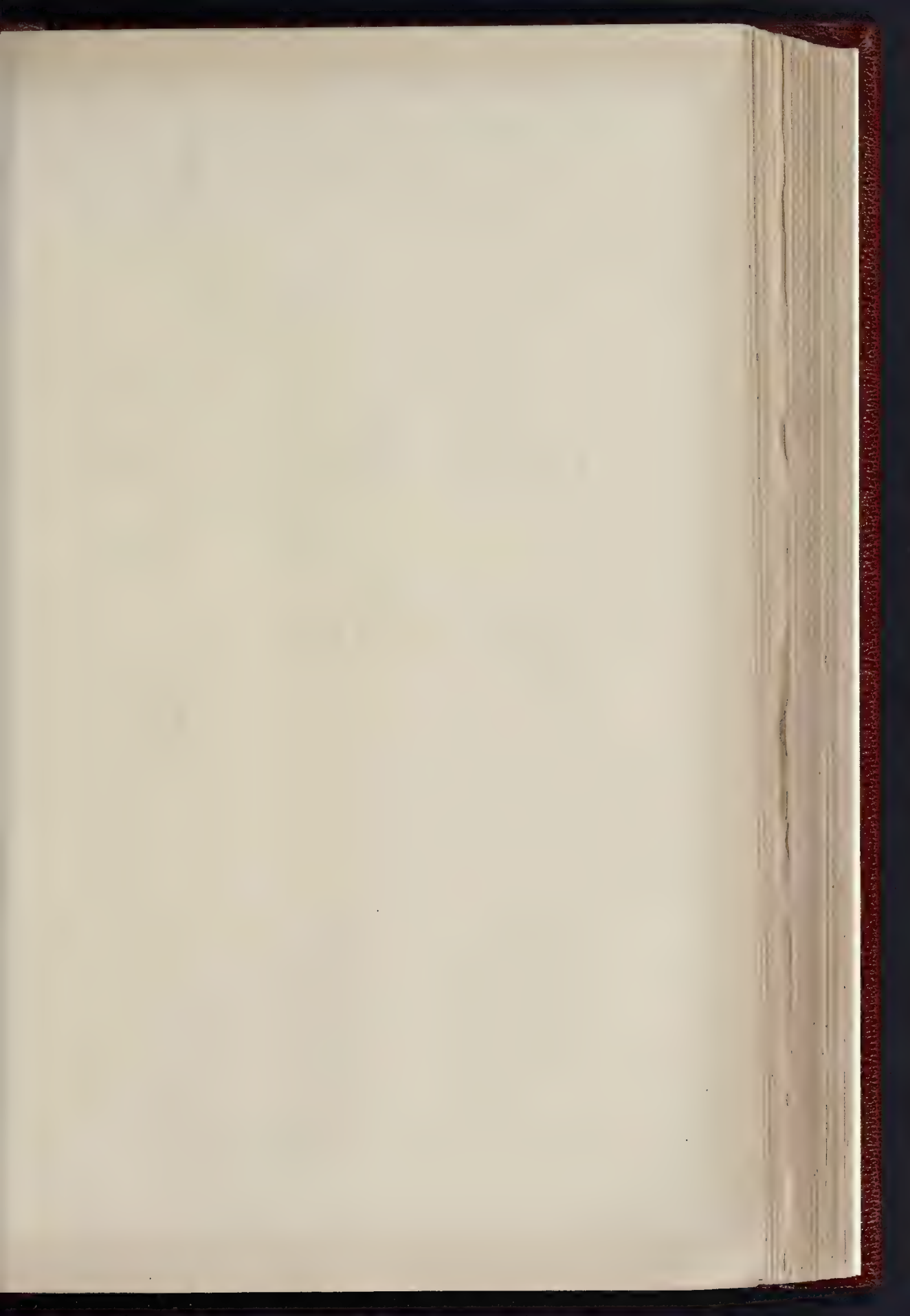


THE BUILDER SEPTEMBER 15, 1906.





CANTON HOUSE WESTMINSTER—MR J S GIBSON, F.R.I.B.A., ARCHITECT
GENERAL VIEW.



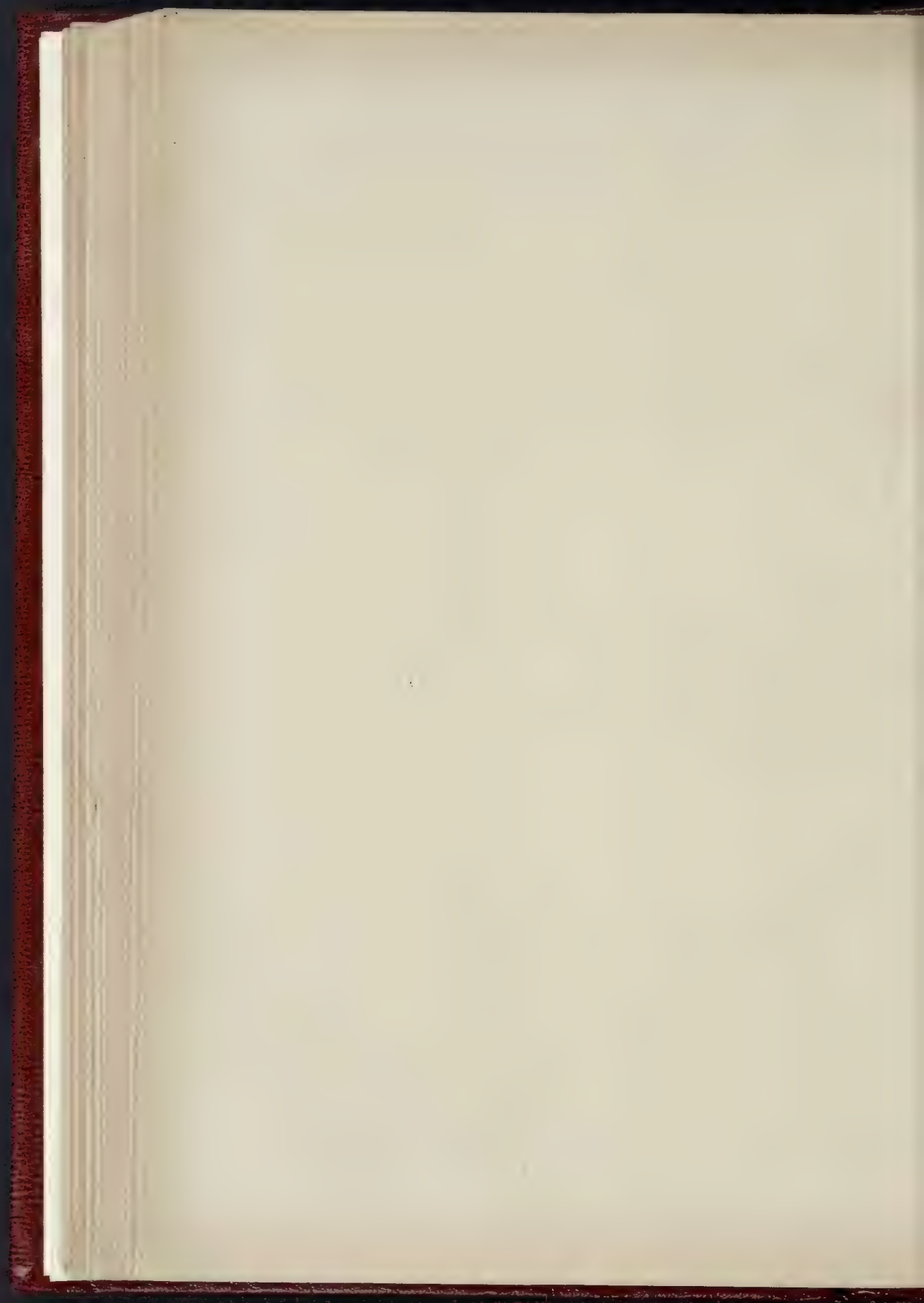
THE BUILDER, SEPTEMBER 15, 1906

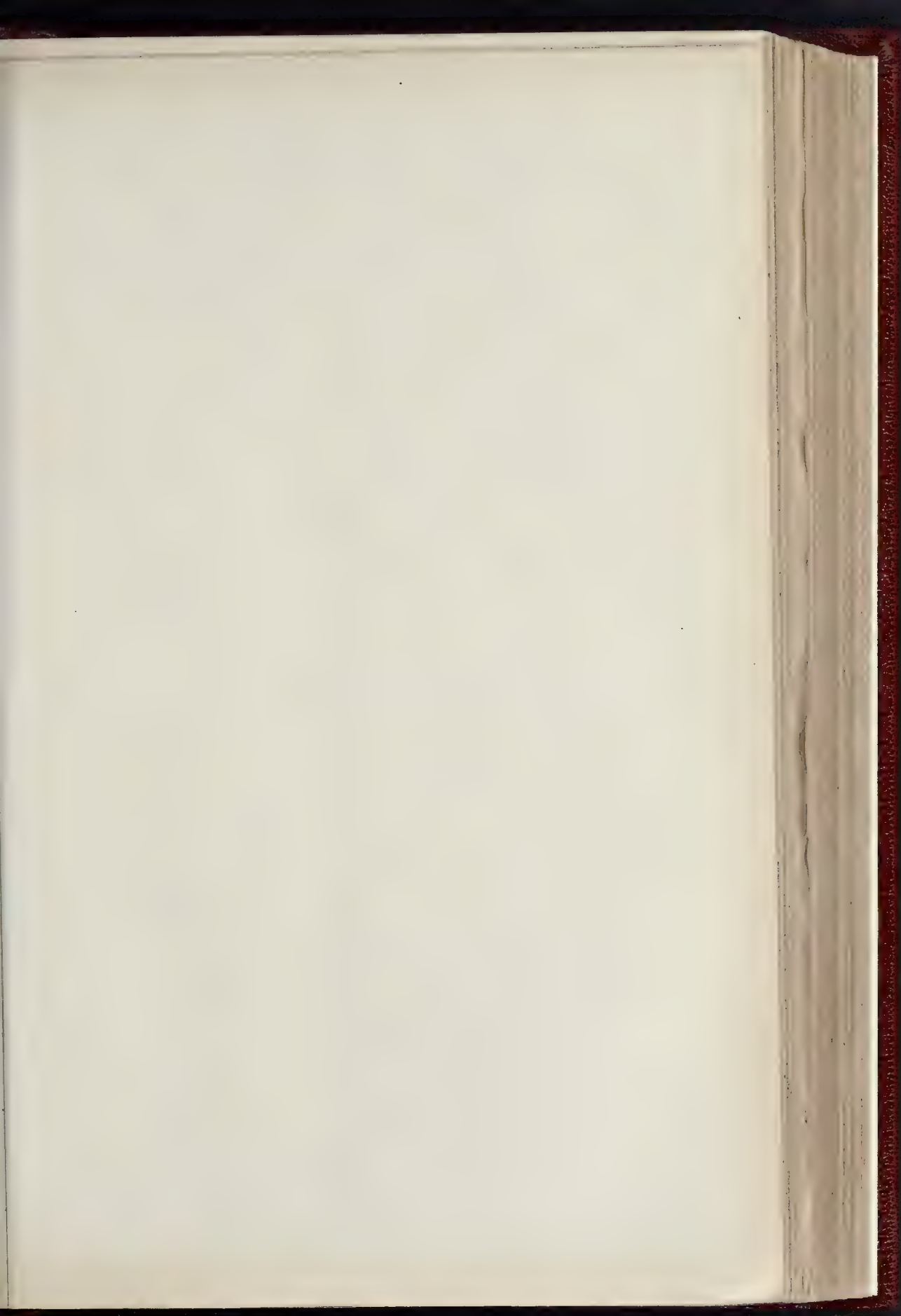


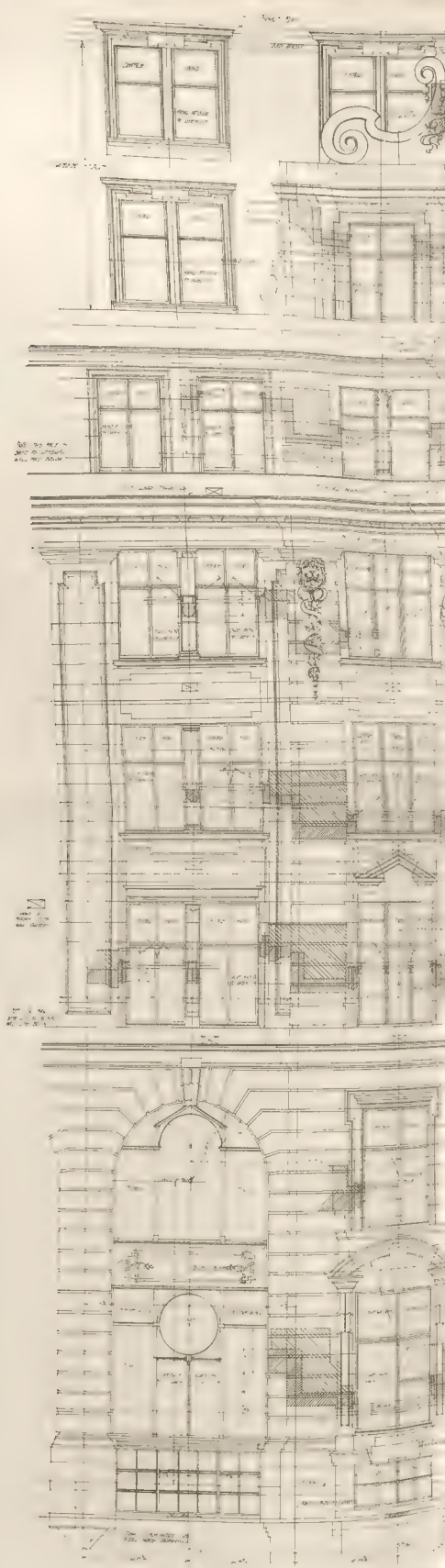


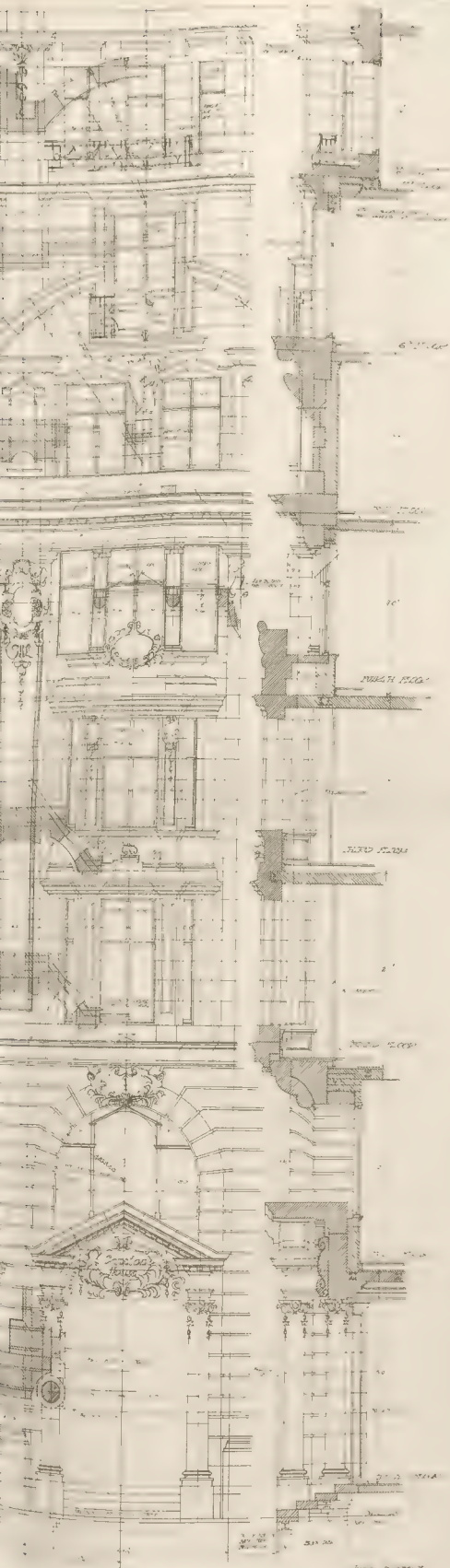
CARLTON HOUSE, WESTMINSTER. MR. J. S. GIBSON, F.R.I.B.A., ARCHITECT.
CENTRE PORTION OF FRONT TO TOTHILL STREET.

NO. PHOTO "HARLES" 1-1-4-2 EASTINGHOUSE STREET, EIGHTH-AND-EC.









ARCHT. & CIVIL ENGRS.
JAMES H. HARRIS & CO.
NEW YORK

Trade Catalogues.

We have received from "Simplex Conduits, Ltd.," of Queen Victoria-street, a leaflet describing three additional accessories they are making. The first consists of a very cheap watertight lamp-holder made of galvanised steel, which ought to be useful for electric lighting in damp situations. The second of a cheap ceiling-rose fitting, and the third of a novel wall-fastener. In our opinion this wall-fastener will in many cases dispense with the necessity of plugging the walls, and so will greatly facilitate the installing of the conduit system.

Messrs. Newton, Chambers, & Co., of Thorncliffe Ironworks, near Sheffield, send us a pamphlet containing illustrations and full dimensions of standard plates for cast-iron tanks, with all flanges inside. In addition to ordinary square and oblong plates varying in size from 3 ft. to 5 ft. square and from 3 ft. by 2 ft. 6 in. to 5 ft. by 4 ft. 6 in., special plates are made for bottom and outside corners and for inlets and outlets. The thickness of the plates ranges from $\frac{3}{8}$ in. to $\frac{1}{2}$ in., and by suitable selection a tank of any given capacity can be built up. The flanges are machined square along their full width with the tool-cut running in the longitudinal direction, thus forming fine ridges that help to retain the jointing material in position. In succeeding pages of the pamphlet diagrams are given of thirty tanks built up of standard plates, the capacities being from 675 gals. to 25,000 gals. In these diagrams the distinctive number and thickness of each plate is stated, but no information is given as to the diameter, and pitch of the bolts or to the position and diameter of the tie-rods. The makers naturally leave such points to the designer, although if desired they will settle them for customers. So far as architects are concerned it is desirable, of course, that calculations of the kind involved should be made independently of the makers, but the new standards for plates will be found of great convenience, besides insuring speedy delivery and avoiding the unnecessary cost sometimes caused by the making of patterns for plates of special sizes.

The Hoisting Appliances Company send us an abridged catalogue giving particulars of hoisting tackle, some forms of which are both novel and ingenious. For instance, Pickering's "Excelsior" safety landing-hoist for warehouses is a neat arrangement, taking up no floor space and necessitating no structural alterations. It comprises a movable gantry running on rollers in a horizontal direction, and arranged so that it can be moved quite easily, being drawn out for hoisting or lowering goods between the ground and the upper story of a building, and drawn in for lifting goods from or depositing them upon the floor over which the hoist is fitted. This seems to be a very handy appliance for places where headroom is limited; the cathead does not project when not in use; the hoist is a tenant's fixture, and can be erected without municipal authority. The same type hoist is equally suitable for operation through a loophole, a window, or over a well-hole. The "Coburn" trolley track, for transferring goods from one workshop to another in industrial establishments or warehouses, is a novel form of overhead tramway. The hoist-carrier runs in a rounded groove, the form of which materially assists its movement; the wheels are fitted with roller bearings, and the load can be taken with perfect ease round curves of small radius. The "Handyman" portable crane comprises a steel arm, with a radius of 3 ft. 3 in., mounted upon a steel frame, and provided with hand-hoisting gear. The 30-cwt. size is 8 ft. high, and lifts the load 6 ft. 6 in. A good selection of other more or less familiar types of light hoisting machinery is described in the catalogue.

Messrs. Joseph Sonkey & Sons, of Bilton, send us a circular describing the main features of a new invention which they are placing upon the market, under the name of "Skeleton Steel" reinforcement, for the construction of concrete-steel lintels. The skeleton is stamped out of a single strip of metal, corrugated, and expanded in the form of a light girder, having two tension strips and one compression strip. The lower and upper members being connected by diagonal

strips for resisting-shear. Thus the skeleton is triangular in cross-section. This type of reinforcement is made in stock sizes from 3 ft. long, increasing by increments of 1 ft. up to 8 ft. long. Each skeleton is of suitable dimensions for a lintel $4\frac{1}{2}$ in. wide, the depths recommended ranging from 6 in. to 10 in., according to the span. For lintels 9 in. wide two of the skeletons are to be embedded side by side. Similar reinforcement is supplied for walls, girders, floors, and roofs, the thickness of metal being proportioned by the makers according to requirement. It is claimed by the licensees that, as these special sections are formed in one piece each, they are superior to separate rods and stirrups. We grant that the secure connexion of the elements for withstanding tension, compression, and shear respectively is in itself an advantage. But the use of stereotyped reinforcement is not to be advised on principle. It does not provide for differences of loading, and tends to take away from the designer the opportunity of proportioning and arranging the steel in conformity with ascertained conditions. In the design of concrete-steel structures, however simple, the architect or engineer should invariably be guided by his personal knowledge of mechanical principles, and should not trust to adventitious aids. Like a patent medicine, skeleton steel may be permissible on occasion by those who know its capabilities and limitations. For the architect to rely upon this, or any other patented form of reinforcement, as a guide to scientific design would be as not less unwise than for a medical practitioner to adopt patent medicines instead of judiciously selected and compounded *materia medica*.

Mr. Carl Flohr, a German lift manufacturer with offices in London, sends us his catalogue of electric and hydraulic passenger and goods lifts. In the earlier pages of the book will be found descriptions and illustrations of various safety appliances, such as catch-devices and safety door-locks, which, as well as the electric push-button control, are applied to Flohr lifts. The bulk of the catalogue is devoted to photographic views illustrating numerous patterns of lifts fitted in private houses, hotels, public institutions, warehouses, manufactories, and railway stations on the Continent. There is also a photograph on p. 57 of a large building-material lift installed in a lofty tower on the site of the work to be executed. So far as we can judge by perspective views the mechanical equipment of these lifts seems to be of sound design. The structural and decorative features of the lifts are decidedly good so far as appearance affords any criterion.

Messrs. John Spencer, of Wednesbury, send us a sheet list of their wrought-iron tubes and fittings for gas, water, and steam, tubes and fittings for wells, boiler-tubes, solid-welded steel flange-tubes, sewer ventilating-shafts, and telegraph-poles. We do not find any statement as to whether the tubes and fittings mentioned in the catalogue are threaded in accordance with the British standard specification. It is very desirable that all tube-makers should work to a uniform standard, as the differences hitherto prevailing have caused unnecessary trouble to pipe-fitters.

LUNATIC ASYLUM BUILDINGS.

The Lunacy Commissioners in their annual report, just issued as a Parliamentary Blue Book, give detailed information as to new asylums in course of erection, sanctioned, or approved, as well as respecting alterations, additions, and improvements, temporary buildings, etc. In regard to the Essex second asylum (Colchester) they state that the preliminary plans of the reception block, idiots' block, consumptives' block, paying patients' pavilion, nurses' and attendants' blocks, chapel, farm buildings, and other detached buildings have now been settled. Particulars relating to the plans and estimated cost of the London County tenth asylum (Long Grove) have been already published. It is proposed to supply this asylum with electric current for lighting and power purposes from the central station which already supplies the Horton Asylum and the Epileptic Colony. It will, however, be necessary to enlarge the station and plant at an estimated outlay of 10,000. Horton Farm, a farmstead on the Horton estate, is to be utilised for the purposes of the asylum, and the buildings, which had fallen into a bad state of repair, are to be renovated and made suitable at a cost of 1,010. Satisfactory progress is being made

with the second Worcestershire (Barnsley Hall) Asylum, which it is hoped may be ready for occupation before the close of this year. It has been decided to deal with these sewage bacteriologically, and the necessary works for this are estimated to cost 3,000. Plans for the second portion of Storthes Hall Asylum have been approved. The estimated cost of this portion is 93,800. New sanitary annexes are being erected in connexion with the private patients' block of Cornwall Asylum at a cost of 2,200. Contracts amounting to 17,670. have been approved for the erection of two additional blocks at North Wales Counties Asylum (Denbigh). At Hants Asylum a new house is to be built for the medical superintendent at a cost of 2,800. A contract for carrying out various improvements and additions at the laundry of Barning Heath Asylum (Kent) and for erecting a small hospital for infectious cases has been sanctioned, the amount being 10,096. Another contract, amounting to 9,760., has also been approved for the erection of a new boiler-house and chimney shaft, the supply of two new steam boilers and for other works having for their object the increased protection of the patients and buildings against fire. At an estimated cost of 2,603., and chiefly by the provision of modern sanitary arrangements, some more of the wards of the old Lancaster Asylum are to be improved. Plans of permanent wards to be built on the site of temporary blocks at Banstead Asylum have been approved. The new buildings will provide accommodation for 300 patients, and the cost of their erection, after making allowance for taking down the temporary blocks and utilising the fittings as far as possible, is placed at 30,753. At Bexley Asylum a detached block is being erected for the reception and special treatment of fifty acute male patients in order that they may be placed under the most favourable conditions for recovery. The cost will be 12,142. A range of twelve cottages is to be built for male attendants at Napsbury Asylum (Middlesex) at a cost of 2,900. There is to be a new detached laundry, to cost 11,500., at Northampton County Asylum. A new ward for fifty patients is to be added to Wilts Asylum at a cost of 4,638. Contracts amounting to 1,543. 10s. 10d. have been sanctioned for the erection of airing-court shelters, cart sheds, and a cricket pavilion, etc., at Croydon Borough Asylum. The pressure on the existing accommodation in Hull City Asylum has been so great that it has been decided to provide additional wards by placing another floor on the existing one-storied buildings. These extensions are estimated to cost 19,950. The female division of Norwich City Asylum having proved inefficient it has been decided to expend the sum of 9,000. in providing additional wards and making other improvements. At Nottingham City Asylum the temporary dormitory for forty female patients erected in 1898 to relieve overcrowding pending the completion of the permanent buildings is now to be replaced by an ordinary brick building to cost 3,000. The Commissioners have prepared a return, by order of the House of Commons, respecting the cost of buildings per head, etc., but they point out that in many of the newer asylums administrative buildings have been erected largely in excess of present requirements with a view to future enlargement, which will be able to be effected at a much lower rate than the cost per bed given in the return, and will, of course, still further reduce the average. The Commissioners observe, in conclusion: "The variations shown in the cost of asylums have been to some extent the result of several obvious causes. Some of them were built when the price of building was comparatively low; others at periods of special inflation of prices. The size, cost, and character of the site, and the high price of land obliged to be purchased for subsequent enlargement in the districts which have become urban; the distance from the source of supply of the building materials, and consequent expense of carriage; the complete initial construction of roads in some but not in all cases; the equipment of the asylum in respect of new farm buildings, means of lighting, water supply, and disposal of sewage, as against adequate farm buildings already on the estate, adjacent public gas, electricity, water supply, and drainage facilities available; elaborate systems of heating and ventilation as against open fireplaces and natural means only; the introduction of the block system of asylum construction and the provision of intercommunicating corridors to secure facility of administration; the provision of ample cottage accommodation for staff, rendered necessary by remoteness from towns and the absence of rentable buildings; the extensive use of glazed brick dados and other wall facings, costly as capital expenditure, but labour and cost-saving in subsequent administration; the introduction of unnecessarily expensive fittings and appointments after the approval of the plans in which no indication of their intended use appeared; the architects' fees, saved in many instances by the employment of the county or borough surveyor, who is otherwise remunerated for his services; and the specific enforcement, in some contracts, upon contractors of the trades union regulations and rates of wages—these may all be mentioned as important factors in the differentiation of cost."

Apart from these considerations the return exhibits the average cost per bed of buildings and land in county and borough asylums at 2237. 11s. 9d.

The Student's Column.

ROOFS: STRUCTURALLY CONSIDERED.—IX.

16.—Loads on Roofs.



HE loads that have to be supported by roof structures are of two main classes:—

(a) Permanent loads.

(b) Occasional loads.

(a) *Permanent Loads* include the weight of the roof covering and framework, and in some cases the weight of lanterns, ceilings, and other structural or architectural details, not strictly forming part of the framework proper.

All such loads are constant, and invariably act in a vertical direction, but there is another class of load for which provision has often to be made, namely, live loads, due to machinery connected with, or suspended from, the roof framework. In the present article we confine attention, so far as permanent loads are concerned, to the weight of roof principals and other parts of the framework to be discussed hereafter.

The weight of the permanent load represented by roof covering is calculated from the quantities and weight of the materials employed, the square of 100 super. ft. being the accepted unit of measurement because it permits the accurate computation of laths, battens, tiles, slates, and other materials which could not be taken into account conveniently if weights were calculated for a small unit such as the square foot.

Nevertheless, as in the design of roof structures it is usual to reckon permanent and other loads per square foot, the weights calculated per square should be reduced for reference to the smaller unit of measurement. As this merely involves the movement of the decimal point two places to the left, practically no trouble is thereby occasioned.

In paragraphs 5 to 15 we have already stated the weights of various covering materials per square, and it is an easy matter to reduce these to weights per square foot. But the results so obtained will not represent the total weight of the covering, for nails, bolts, laths, boarding, sheathing, mortar, putty, and other incidentals applied to the fixing of the covering have also to be considered.

As the weights per square of various coverings vary considerably, and as there are available numerous alternative methods of laying the different materials, it would be a laborious task to calculate weights per square foot for every possible combination, even for the most generally used materials, and the results would constitute a formidable series of tables, far too extensive for inclusion in the present article.

While the exact value of the permanent load, so far as that is represented by the covering, should always be calculated for roofs of given design, it is very convenient to have at hand a table stating average weights that can be used for approximate estimates and preliminary designs.

Table XIX. contains approximate weights for various roof coverings.

The weight of roof covering is usually estimated in pounds per square foot of roof surface, but sometimes the weight is taken on the basis of pounds per square foot of ground area covered by the roof.

In the latter case the weight varies with the pitch of the roof, and may be calculated from the weight per foot of roof surface by the aid of the simple trigonometrical rule that the base of a triangle is equal to the hypotenuse multiplied by the cosine of the angle subtended by the two sides in question, or

$$\text{base} = \text{hyp} \times \cos \theta.$$

As the base of a triangle thus calculated is obviously shorter than the hypotenuse, the ground area is proportionately less than the area of an inclined roof.

Consequently the weight (W_1) per square foot on the ground area is greater than the weight (W) per square foot on the roof surface, and the weights per square foot are

TABLE XIX.—APPROXIMATE WEIGHT OF ROOF COVERINGS PER SQUARE FOOT OF ROOF SURFACE.

Material	Notes.	Weight lb. per sq. ft.
Asbestos-cement tiles	$\frac{1}{2}$ in. thick	21
Asphalted felt	With tar and sand	10
Battens	3 in.	10
Boarding	1 in.	10
Copper	11 in. without boarding or rolls	12
Glass	Without sash bars	15
Iron corrugated	16 S.W.G.	25
Iron sheet	do	43
Lead	do	110
Shingles	Without boarding or battens	12
Slates	Without boarding or battens	12
Terra-cotta tiles	Without boarding or battens	12
Thatch	Without boarding or battens	12
Tiles, pan	Without boarding or battens	12
Tiles, plain	Without boarding or battens	12
Uralite tiles	Without boarding or battens	12
Wet-laid paper	Without boarding or battens	12
Zinc	Without boarding or battens	12

inversely proportional to the areas, as shown by the equation

$$W_1 = W \div \cos \theta \quad (1)$$

Example (1). Find the weights per square foot of ground area corresponding to the weight of 10 lb. per square foot of roof surface for roofs with the slopes of (1) $5^\circ 43'$, (2) $22^\circ 0'$, (3) $33^\circ 40'$, and (4) 45° .

$$(1) W_1 = 10 \div \cos 5^\circ 43' = 10 \div 0.9950 = 10.0525 \text{ lb.}$$

$$(2) W_1 = 10 \div \cos 22^\circ 0' = 10 \div 0.9272 = 10.785 \text{ lb.}$$

$$(3) W_1 = 10 \div \cos 33^\circ 40' = 10 \div 0.8323 = 12.015 \text{ lb.}$$

$$(4) W_1 = 10 \div \cos 45^\circ = 10 \div 0.7071 = 14.14 \text{ lb.}$$

(b) *Occasional Loads* include the weight of snow, the pressure of wind, and the weight of workmen and appliances employed in roof maintenance and repair.

As a general rule the last of these need not be taken into account, as the usual allowance for snow provides a sufficient margin of safety, especially in view of the fact that repairs are never executed when a roof is covered with snow. The customary allowance for wind pressure is also large, but there is a possibility that high winds might arise after the fixing of stagings and other appliances for the purposes of repair. Therefore it may sometimes be wise not to regard the calculated wind load as including occasional loads due to repairing operations.

The importance of taking into account the weight of temporary staging and platforms suspended from roof members is emphasised by the Report of Major Pringle to the Board of Trade on the Charing Cross accident in December, 1905.

The following extracts from the Report contain particulars relative to the staging employed on the roof for the purposes of repair at the time of the failure:—

"In accordance with former practice, timber staves were slung under the entire surface of the south end bay of the roof. Each stage, in two portions, measured 35 ft. in length by from 124 ft. to 20 ft. in width. They were suspended by hanging irons from the roof purlins, and formed a series of platforms, at different levels, extending from wall to wall. Sailcloths were provided under the staging, which was close-boarded, as a protection for the workmen.

At the time of the collapse half the length of the staging extended on either side of the principal nearest to the wind screen, which was thus loaded with extra weight due to staging, men, necessary materials, etc. In addition, there appears to have been stacked outside on the crown of the roof zinc sheets and glass, which are estimated to have weighed about a ton.

After making all allowances for glass, etc. which had been removed, the total extra weight brought on the roof appears to have been about 32 tons, and it is estimated that of this total the proportion carried directly by the first principal, which was the one to fail, was about 174 tons. This represents about 5 lb. per square foot of roof area supported by this principal. The additional weight of the temporary staging was the immediate cause of failure, but as the total stress in tension, at the time of failure on the whole sectional area of the bar did not exceed 513 tons per square inch, I find that for the necessary purposes of repair such a stress was not in any way unreasonable, and could not be anticipated to cause danger of failure."

Of course, it is admitted that if it had not been for the hidden flaw in the broken tie-bar at Charing Cross the roof would easily have carried all the staging employed, as well as a heavy wind load. We do not suggest that it is always necessary to make special allowance for such apparatus in the design of ordinary roof structures, but the opinion

quoted is sufficient to indicate that the class of occasional load to which reference is here made ought not to be entirely overlooked.

Snow Loads.—The weight of snow likely to accumulate upon a roof depends so much on the locality that no general rule can be laid down.

In the United Kingdom a thickness of 6 in. is rarely exceeded, and as the weight of freshly-fallen snow is about 6 lb. per cubic foot, the corresponding load for a layer 6 in. thick would be 3 lb. per square foot on a flat roof. In exceptional circumstances it is possible that successive falls might deposit snow to a depth equivalent to 12 in. of freshly-fallen snow, but even then the total weight per square foot of horizontal surface would not exceed 6 lb., which is the maximum allowance made in this country.

By the rules of trigonometry, the area of a roof surface bears to the ground area covered by the same roof the proportion represented by the equation

$$\text{hyp} = \text{base} \div \cos \theta,$$

and as the weights (W) per square foot of roof surface and (W_1) per square foot of ground area are inversely proportional to the areas in question, we have

$$W = W_1 \times \cos \theta \quad (2)$$

Example (2). Find the weight of snow per square foot of roof surface corresponding to the weight of 8 lb. per square foot of ground area covered by roofs with the slopes of (1) $5^\circ 43'$, (2) $22^\circ 0'$, (3) $33^\circ 40'$, and (4) 45° .

$$(1) W = 8 \times \cos 5^\circ 43' = 8 \times 0.9950 = 7.960 \text{ lb.}$$

$$(2) W = 8 \times \cos 22^\circ 0' = 8 \times 0.9272 = 7.418 \text{ lb.}$$

$$(3) W = 8 \times \cos 33^\circ 40' = 8 \times 0.8323 = 6.658 \text{ lb.}$$

$$(4) W = 8 \times \cos 45^\circ = 8 \times 0.7071 = 5.657 \text{ lb.}$$

In North America the snow load varies considerably with the latitude, being taken at about 30 lb. per horizontal square foot in Canada, Northern New England, and Minnesota; 20 lb. in the latitude of New York and Chicago; 10 lb. in the latitude of Baltimore and Cincinnati; and at reduced values for Southern latitudes.

For roofs having a pitch of 60 deg. and upwards the snow load may be neglected, as at such slopes the snow would not be able to accumulate.

Wind Pressure.—The pressure of wind on the roof of a building depends upon the direction and velocity of the wind, and upon the inclination of the roof.

Wind is usually assumed to move horizontally. When wind impinges upon the inclined surface of a roof it exerts a small force along the surface, but this is so small as to be negligible so far as roof loads are concerned, although it is of importance in connection with the penetration of rain, snow, and draughts through the joints of the roof covering.

The resultant pressure of horizontal air movement against an inclined roof surface may be represented, for all practical purposes, by a normal force varying with the slope of the roof.

Reliable data are not available for guidance as to the maximum wind pressure attained in this country, but the pressure of 40 lb. per square foot is rarely exceeded on a surface of considerable area.

The pressure of 41 lb. per square foot has been recorded at Greenwich, and the pressure on the old Tay Bridge, when that structure was blown over, is estimated to have been fully 42 lb. per square foot.

The Board of Trade requirement is that an allowance for wind load of 56 lb. per square foot shall be made for railway bridges in exposed positions.

In the United States the usual allowance for wind load on a vertical surface is from 30 lb. to 50 lb. per square foot.

The normal pressure per square foot on the inclined surface of a roof can be calculated approximately by either of the following empirical formulae:—

Hutton's formula:

$$p_n = p \cdot \sin \theta^{1.84} \cos \theta - 1 \dots (3)$$

Duchemin's formula:

$$p_n = p \cdot 1 + \sin^2 \theta \dots (4)$$

where p_n = intensity of normal pressure on roof.

p = intensity of horizontal wind pressure.

θ = angle of roof surface with the horizontal.

Of these two rules that of Duchemin is the more convenient for general use, and is also preferable for the reason that it gives slightly higher results, and therefore conduces to safer design.

Example (3). Find the intensity of normal wind pressure on a roof with the slope of 30 deg., the intensity of horizontal wind pressure being taken at 40 lb. per square foot.

Using Duchemin's formula, we have

$$p_n = 40 \cdot 1 + \sin^2 30^\circ$$

$$= 40 \cdot 1 + 0.25 = 40.25$$

$$= 40.25 \times 0.5 = 20.125$$

Table XX. has been calculated in the same way for the roof slopes commonly used in architectural practice.

TABLE XX.—NORMAL WIND PRESSURE ON ROOF SURFACES ON VARIOUS SLOPES. (Calculated by Duchemin's Formula.)

Angle with Horizontal.	Ratio of Rise to Span.	Horizontal Wind Pressure.	
		40 lb. per square foot.	50 lb. per square foot.
5° 0'	—	0.9	8.6
5° 43'	1/16	7.8	9.6
7° 36'	1/8	10.4	13.0
10° 0'	1/6	13.5	16.8
11° 18'	1/5	15.1	18.8
15° 0'	1/4	19.4	24.3
18° 26'	1/3	23.0	28.7
20° 0'	1/3	24.6	30.8
22° 30'	1/2	28.0	35.5
25° 0'	—	28.7	35.8
26° 33'	1/2	29.1	36.8
30° 0'	2/3	32.0	40.0
33° 40'	1	37.1	45.8
35° 0'	—	34.5	43.1
40° 0'	—	36.1	45.4
45° 0'	—	37.7	47.1

For the purpose of comparison we give in Table XXI. the normal pressures for some roof slopes, in accordance with Hutton's formula.

TABLE XXI.—NORMAL WIND PRESSURE ON ROOF SURFACES ON VARIOUS SLOPES. (Calculated by Hutton's Formula.)

Angle with Horizontal.	Horizontal Wind Pressure.	
	40 lb. per square foot.	50 lb. per square foot.
5°	5.1	6.4
10°	12.1	15.1
15°	14.9	18.0
20°	18.4	22.6
25°	22.6	28.8
30°	26.5	33.0
35°	30.1	37.8
40°	33.3	41.6
45°	36.0	47.0

PROPOSED NEW BUSINESS PREMISES, LIVERPOOL.—It is intended to erect new premises at the corner of Edmund-street and Bixteth-street, Liverpool, with a main entrance immediately opposite the new Cotton Exchange, to provide accommodation for merchants, brokers, and others engaged in the cotton trade. The designs for the proposed building have been prepared by Messrs. Matear & Simon, architects.

Builders' and Contractors' Column.

A NOTE ON ESTIMATING FOR EXCAVATION AND CONCRETE WORK.

THERE are one or two points which might be given more attention by builders in estimating for foundation work. Firstly as regards excavation: Sufficient allowance is not generally made for the expansion of the excavated material. The usual practice seems to be to assume that 1 yd. in the solid will make the load of 1½ yds. in the loose. In actual work this allowance is sufficient for dry earth, but is quite inadequate in the case of clay soils, the expansion of which varies from 50 to 100 per cent. Secondly as regards concrete: A customary method appears to be to assume that six parts of ballast and one part of cement will make six parts of concrete. This, however, is not the case, the shrinkage of the ballast after adding the cement and water being as much as 20 per cent. in some cases, and varying, of course, with the nature of the aggregate. A ton of cement is often assumed to be equivalent to a yard cube, whereas it will be found actually to measure one-twelfth of a yard only. The difference in cost these allowances make is best shown by an example. Let us assume the 6 to 1 Portland cement concrete is to be made, the price of ballast being 6s. per yard cube delivered and the cement 30s. a ton delivered, including cost of sacks and unloading.

Then by the usual method the cost will be as follows:—

6 yds. cub. ballast at 6s.	=	s. d.
1 yd. cub. cement at 30s.	=	36 0
		30 0
	6) 66 0	
Labour and water		11 0
		1 6
Profit, 10 per cent.		12 4
		1 3
Cost per yd. cub. of concrete		13 9

Whereas the correct method gives the cost as follows:—

6 yds. cub. ballast at 6s.	=	s. d.
1½ tons cement at 30s.	=	36 0
		32 11
	6) 68 11	
Labour and water...		11 6
		1 6
Shrinkage, say 15 per cent.		13 0
		1 11
Profit, 10 per cent.		14 11
		1 6
Cost per yd. cub. of concrete		16 5

Showing an increase in price over the first method of practically 20 per cent. The fact that some builders make these allowances whilst others disregard them probably accounts to a considerable extent for the wide difference in estimates for ground work, and it would be interesting to hear the results of observations taken by other persons. The shrinkage in the case of coke breeze concrete floors is inappreciable, 6 yds. of breeze and 1 yd. of cement making 6 yds. of breeze concrete.

Obituary.

L. FRANÇOIS BOITTE.—We have to record the death at Fontainebleau, at the age of seventy-six, of M. Louis François Boitte, architect, and a former winner of the Grand Prix de Rome. He was a pupil of Elnuet and of Questel, and on his return from his studentship residence in Rome he was appointed by Paul Dubois to design the architectural portion of the monument to General Lamoricière now in the cathedral of Nantes. In 1877 he was appointed architect to the palace of Fontainebleau, where he made some important restorations, and also published a learned monograph on the building. During four years he undertook, at the Ecole des Beaux-Arts, the course of lectures on the history of architecture. M. Boitte had unhappily lost his sight for some time previous to his death.

POLICE-COURT ROOM, PORTOBELLO.—The transformation of the interior of Portobello Municipal buildings is so far advanced that the new police-court room has been opened. Mr. Morham, the City Architect, prepared the plans.

General Building News.

NEW CHURCH, WARRINGTON.—The foundation-stone of the chancel of a new church, which is being built at Warrington, Staffordshire, was laid on the 6th inst. The church will consist of nave, seating 216, with north porch, chancel, accommodating a choir of twenty, with the clergy, and with space for communicants and the communion table, the length being 22 ft., and the width 17 ft. There will be a recess on the south side of the chancel like a small organ-chamber, with arched openings to the chancel and to the nave. A transept on the south side of the nave provides a vestry with a screen to divide it from the nave. Under the vestry is a heating vault, it being intended to heat the church with a hot-water apparatus. The whole will be built of stone, the interior being plastered, and having stone dressings to the chancel arch, and the windows of the chancel. The roofs will be well timbered, open up to the ridge, and covered with Staffordshire tiles. The seating of the nave will be chairs, with benches for the choir in the chancel. The builder is Mr. Thomas Godwin, of Hanley, his contract being 1,630l., and the architects are Messrs R. Scrivener & Sons.

NEW CHURCH, KINNEAGAD, CO. WESTMEATH.—The foundation-stone has just been laid of a new Roman Catholic church at Kinneagad, of which Mr. T. S. MacNamara, Dublin, is the architect, and Mr. J. Wynne, of Dundalk, the builder. The style of architecture is Gothic, and the church comprises nave, transepts, and sanctuary, with side chapels. It will be built of local stone, with window and door dressings of limestone from the Tullamore quarries. The main entrance to the nave has a chancelled limestone porch, and two traceried two-light windows light the gallery. There is a broad octagonal chancel with chancels on either side, and divided by arcading with richly-worked arches and columns of granite from the Galway quarries. The pinnacles and bases of the columns are of granite from the Newry quarries. The nave has an open timber roof, the wrought and moulded principals of which rest on carved corbels. The transepts have open timbered roofs, with three-light traceried windows in the gables and ornamental cat-refoil lights in the side-walls. The tower and spire will rise to a height of 170 ft. The dimensions of the church are: length, 128 ft.; nave, 34 ft. wide; with double transepts 32 ft. wide.

CHURCH RESTORATION, KNOCKAND, N.B.—During the past year extensive alterations have been carried out on the Parish Church of Knockand. The contractors for the work were—Mason, Mr. Robert Sutor, Aberlour; carpenter, Mr. George Bruce, Petty; plasterers, Messrs. Hume Brothers, Dufftown; painters, Messrs. Dixon & Bain, Grantown; plumbers, Messrs. Fyfe & Co., Aberlour; heating, Messrs. MacKenzie & Moncur, Edinburgh. The architect was Mr. John Robertson, of Inverness. The total cost of the repairs will amount to about 2,000l.

CHURCH RESTORATION, HENSTEAD.—The restoration of Henstead Parish Church has now been completed. The plans were prepared by Mr. W. D. Caroe, architect to the Ecclesiastical Commissioners, and these have been carried out by Mr. J. S. Smith, of Norwich. The south door has been relieved of a thick colour wash, while the small north Norman door, which was previously lost to view in brickwork, has been opened out. Formerly there was little indication of the separation of the chancel from the nave, but a projection on the outside of the north wall led to the finding of the Roof Stair which has now been replaced, and a wood beam of Norfolk oak, weighing three-quarters of a ton, has been placed in position. The whole of the seating and woodwork in the new church is new, and from one piece of oak panelling that has been found the architect has designed the oak seating, panelling, the pulpit and the prayer-desk.

ROMAN CATHOLIC SCHOOL, BRADFORD.—A new Roman Catholic school in connexion with St. Peter's Church, Bradford, was opened on the 10th inst. The building consists of three stories, the basement forming a large assembly-room, and the two upper floors being divided into class-rooms. Accommodation is provided for about 600 scholars. The school has been erected from plans prepared by Mr. E. Simpson.

PRIMITIVE METHODIST SCHOOL-CHURCH, DARLINGTON.—A new school-church is being erected by the Primitive Methodist body at Harrogate Hill. The building will provide school accommodation, as well as being a place of worship. It will be of red brick with light buff terra-cotta facings, and is being built by Messrs. J. and J. Airey, contractors, of Darlington, from designs prepared by Messrs. Kitching & Lee, architects, of Darlington. The total cost of the two sites and the building, including furniture, will be about 1,350l.

WESLEYAN SCHOOL CHAPEL, QUEEN'S FERRY, FLINTSHIRE.—A new Wesleyan School Chapel has been opened at Queen's Ferry. The architects were Messrs. Green, Knowles, & Russell.

of Liverpool; the builders being Messrs. E. Blane & Son, Connah's Quay. The chapel is designed to seat 400 people.

WORKMEN'S HALL, NEW TREDEGAR.—A new workmen's hall has been built at New Tredegar. The building stands on a site on the Tredegar-road, and the total cost of the work is 5,500l. The interior of the building contains two floors, ground and gallery, and has a seating capacity for between 1,500 and 1,700. The main floor is 100 ft. by 50 ft., and the depth of the stage is 22 ft., and it is fitted up with wall and foot lights. To the rear of this lie the dressing-rooms, etc., and two main lobbies, which also connect with the scene dock. There is also space partitioned off for an orchestra. The gallery has a front of iron network, access being gained by stone stairways, with an addition in steel for emergency. Externally, the hall is built with native stone, relieved in front with Forest of Dean dressings, and the sides are cemented in rough cast, with fine dressings. The approach consists of one main lobby, with ticket offices and two stair lobbies. The architects are Messrs. James & Morgan, Cardiff; the builder Mr. Henry Rowlands, New Tredegar and Treherbert (whose foreman is Mr. Charles Watkins); and the general superintendent Mr. D. W. Price.

PROPOSED COUNCIL CHAMBERS, LEADGATE.—On the 5th inst. Mr. W. A. Ducat, Local Government Board Inspector, had an inquiry in the Council Chambers, Leadgate, respecting the application of the Urban Council to borrow 600l. for the provision of public offices and Council chambers in St. Ives-road, Leadgate. The clerk (Mr. J. H. Coupland) explained that it was intended to have a Council chamber at the back of the offices for the clerk and surveyor in the front. Mr. W. Robson (Surveyor) also gave evidence.

MISSION-ROOM, WORTHING.—The new mission-room, which has been erected in connexion with St. Paul's Church, Worthing, on a site in Gordon-road, was opened recently. The hall has been built by Mr. R. James from the plans of Mr. F. C. Cook, and will accommodate about 250 people. It is of brick, with stone facings and slate roof.

PUBLIC BATHS, SOUTH SHIELDS.—On the 5th inst. the commemoration-stone of the new baths and wash-houses, which are being erected in Derby-street for the South Shields Corporation, was laid. The cost of the buildings will be about 15,000l., exclusive of the cost of the land; and the plans, which have been prepared by Mr. J. H. Morton, architect, of South Shields, make provision for a hall with swimming-pool, the water area of which will be about 100 ft. by 50 ft. wide. The seats for spectators will be arranged in the form of an amphitheatre. In the winter the large bath can be floored over, and the hall adapted to the needs of a concert-room, or for public meetings. There are to be sixteen slipper-baths and twelve douche-baths for men on the first floor, and four baths for women on the ground floor. Forty washing compartments will be provided in the public wash-house, and there are also store-rooms, boiler-house, engineer's workshop, engine-room, and storage tank to hold 6,000 gallons of hot, and 6,000 gallons of cold water. The buildings will be electrically lighted throughout.

THE VICTORIA BATHS, MANCHESTER.—These baths were opened by the Mayor of Manchester on the 7th inst. The site covered by the new building, which is of red Ruabon brick and terra-cotta, built in the Renaissance style, has an area of 7,395 sq. yds. There are three swimming-baths in the building, a first-class bath and a second-class bath for men, and a separate bath for women. The first named is 75 ft. long and 40 ft. wide, and the depth varies from 3 ft. to 6 ft. The bath is of concrete with a lining of asphalt, and the inside surface and the sides and ends are faced with glazed bricks. The bottom is laid with tiles. This bath will hold 78,612 gallons of water. There are dressing-boxes around the sides, and above these a gallery for the use of spectators. Showers from the roof are provided to cool the atmosphere, and a diving-board is provided with a water-chute. The top of the chute is 12 ft. 6 in. from the water level. The second class men's swimming-bath is 75 ft. by 35 ft., and the women's swimming bath is 75 ft. by 30 ft. Foot and shower baths are provided for workpeople. The other bathing provisions are Turkish and Russian baths, and six-two first and second class private wash-baths. The wash-baths are of porcelain and all the fittings are of gun metal. The Turkish and Russian baths are on the ground floor. One of the cooling rooms in the basement has been decorated in Oriental style. A coffee-room, a bicycle storage room, and a complete system of electric bells and telephones are provided. The water supply is obtained from a bore-hole 760 ft. deep, 18 in. in diameter at the top, and 4½ in. at the bottom. It is lined with perforated

pipes, and the water is pumped by air pressure. A feature of the machinery equipment is a plant for continuous purification of the water used in the swimming baths. The premises have been built by Messrs. C. H. Norton & Sons, to the designs of the City Architect, Mr. Henry Price. The engineering work has been designed and carried out under the direction of Mr. L. H. Lewis, the hydraulics engineer of the Waterworks Committee, and the machinery and equipment of the laundry under the supervision of Mr. J. Derbyshire, the manager of the Manchester Corporation baths. The total cost has been 54,144l.

COUNCIL OFFICES, CAMBERLEY.—The opening of the new offices of the Epsley Urban District Council took place a short time ago. The offices have been erected on the Blairmore site in the London-road, Camberley, and are of local bricks, with tiled roof, the walls over the main entrance being enriched with columns and pediment in Monk's Park stone. From the entrance is a flight of stairs to the first floor, where a corridor communicates with offices for the clerk, the surveyor, the medical officer, and sanitary inspector. There is also a strong room and a cloak room and lavatory. On the upper floor is the council chamber, 37 ft. long and 25 ft. wide. All the walls are distemper white and the woodwork is painted a dark brown. The building is heated by hot water from the basement, which is reached by a sloping way from the main entrance. The offices have been built by Mr. W. Watson, of Ascot and Camberley, in accordance with designs by Messrs. H. R. and B. A. Poulter, architects, Camberley, and the total cost is 2,330l.

MEMORIAL HALL, BOTHWELL, N.B.—On the 8th inst. the Russell Memorial Hall, in the village of Bothwell, was opened. The hall, which occupies the site of the old parish school, has been designed by Mr. Alexander Cullen, architect, Hamilton, and is of Gothic design. It accommodates about 400, while at the back there is a hall for ladies' work, with necessary adjuncts. The cost has been about 2,500l.

INDUSTRIAL SOCIETY'S PREMISES, HUDDERSFIELD.—The Huddersfield Industrial Society's new premises in Buxton-road were opened recently. A considerable portion of the premises hitherto known as the Victoria Hall have been pulled down, but the hall itself has practically remained untouched. The new part has a frontage of 92 ft. to Buxton-road; the height from the footpath to the top of the parapet is 54 ft., exclusive of the roof; and the depth from front to back is 82 ft. The building consists of a basement, ground floor, first and second floors, and an attic. In the basement is a restaurant, a commercial room, a smoke room, and lavatory accommodation for ladies and gentlemen, together with a kitchen and scullery, fitted up with the cooking apparatus, by Messrs. T. A. Hays & Co., Huddersfield. On the ground floor there are furniture departments, etc., on the first floor showrooms, and the second floor is reserved for stockrooms. The attic is used for a workshop. The building is electrically lighted and heated by steam. The cost of the additions is about 10,000l. The whole of the works have been carried out from designs prepared by and under the supervision of Mr. Joseph Berry, architect, Huddersfield.

Stained Glass & Decoration.

ST. ANDREW'S CHURCH, NOTTINGHAM.—On Thursday a window and tablet were unveiled and dedicated in memory of the late Mr. H. S. Irons, for many years organist of the Church. The memorial is a single figure window in the style of the Medieval period, the subject chosen being the figure of Saint John the Evangelist. The window has been executed by Mr. Alex. Gascoyne (Messrs. Gascoyne & Son), of Nottingham, and the bronze tablet by Messrs. Elgood & Brown, of Chester, under the direction of Mr. A. Ernest Hazell, architect, of Nottingham.

Sanitary and Engineering News.

BAKER-STREET AND WATERLOO RAILWAY.—Mr. T. J. Hare presided over the recent sixteenth half-yearly general meeting. The Underground Electric Railways Company of London, contractors, have completed the line, and the carriage depot and workshops at St. George's Circus, Southwark. The line is now opened to Kennington-road (Westminster Bridge-road Station), and it is anticipated that the extension to Paddington Station will be completed, as far as Edgeware-road, before next winter. The Elephant and Castle Station was opened for traffic on August 5. The uniform fare of 2d. for any distance is now relinquished, and arrangements are being made with other companies for the issue of through tickets. For the period of sixteen weeks during which the

line had been open, the gross receipts amounted to 23,490l., and the total working expenses to 16,680l., exclusive of maintenance of way works, car stations, repairs, and renewals of rolling stock, etc., those items being payable by the Underground Electric Railways Company. The spaces throughout the line have now been let for advertisements.

WATER SUPPLY IN MIDDLESEX.—Dr. Young, the Medical Officer of Health for the County of Middlesex, in his annual Report issued on Monday, says that the water supply of the county, except some of the outlying parts of rural districts, is now provided with water from one or other public water supply, and from returns made by local medical officers of health it appears that, in the case of each of twenty-six districts, the number of houses obtaining water from the public mains is over 90 per cent. of the whole, and in most of these the percentage is given as 99 or 100. As regards the remaining districts, it is reported that in Feltham 75 per cent., in Hayes 80 per cent., in Ruislip-Northwood 80 per cent., and in Uxbridge (rural) 70 per cent. of the houses obtaining water supply, whilst in the case of six districts information is not given. New wells were sunk in three districts, viz., four in Staines (urban), two in Sunbury, and nineteen in Staines (rural). These were probably deep wells in connexion with waterworks. Wells were cleaned and repaired in twenty-nine districts, and in fourteen districts a total of forty-seven wells were reported as having been closed owing to the water being found to be polluted. In the majority of the districts from 80 to 100 per cent. of the houses are supplied on the constant system, and from the record of houses supplied during the year with draw taps direct from the mains it appears that the number of houses so circumstanced is gradually increasing.

DRAINAGE SCHEME, AYR.—The drainage scheme for the burgh of Ayr, which has been proceeding continuously for the past ten years, has been practically finished at a cost of 90,000l. The entire work, including the concentration of the sewerage, formerly discharged through nine outfalls on the beach, and its conveyance out to sea through two outfalls, was designed and has been carried out by Mr. John Eaglesham, C.E., Ayr, who was burgh surveyor when the scheme was inaugurated. There have been laid down in all 32 miles of main and outfall sewers, varying in size from 9 in. to 48 in. diameter, much of the being built of brick 48 in. diameter. The outfall sewer for the south side of the river is of 42 in. diameter cast-iron pipe, and it is carried on iron saddles resting on iron screw piles, out to sea, 468 yards beyond the esplanade wall, which rises from the beach and 323 yards out from low-water mark of spring tides, the depth of water at the outfall being 21 ft. The main outfall for the division of the burgh on the north side of the river is 24 in. diameter. Of the total cost of the scheme, 42,000l. was for the concentration sewers and outfalls, being 35,500l. for the south side and 6,500l. for the north side.

TRANSPORTER BRIDGE, NEWPORT. On the 12th inst. Lord Tredegar opened the transporter bridge at Newport. Mr. Arnold, with Mr. R. H. Haynes, the Newport Borough Engineer, are the joint engineers of the structure.

Foreign.

FRANCE.—The Académie des Beaux-Arts has decided to defer till next year the award of the prize founded by Duc, the eminent architect, which was to have been awarded this year.——M. Bourgon, architect to the Department of Meurthe-et-Moselle, has been commissioned to build a new prison at Nancy, at an estimated cost of a million and half francs.——The Department of Fine Arts intend to restore the grand staircase of the castle of Loches, once a residence of Louis XI., and which is classed as a Monument Historique.——The municipality of Nancy have opened a competition for the construction of a tuberculosis hospital in the ancient convent of the Dames de Sacré Cœur at Nancy.——A competition has been opened for the reconstruction of the bridge of La Roche Bernard over the Vilaine. It is to be a steel bridge of one bay 103 metres in length.——A bridge is to be built over the Loire at Clermont.——A competition is to be opened for the best scheme for bringing water from the lake of Bourget to Aix.——The municipality of Nice will open a competition for the construction of a new lycée for boys.——A bridge is to be built over the Isère between the communes of Les Fauries and Eyneuse.——The Municipal Council of Paris intend to form, in the garden of the Chateau de Bagatelle, a botanical garden, together with a museum and a permanent exhibition of plants. There will also be a laboratory and an experiment field, which it is expected will be of use both to horticulturists and artists.——M. Charmy, the sculptor, has just completed a bust of Zola, to be erected by a subscription

Committee at Mâcon on the 30th inst.—The Department of Fine-Arts has been classed among monuments of the Port of the Church of Lorges (or of Chêr), formerly attached to the Château Montigny. The church contains some important sculptures of the XVth century. The buildings of the bishop's palace have also been classed under Monuments Historiques. A new lunatic asylum is to be built at Mâcon, at a cost of 2,000,000 francs.—A scholastic establishment, under the name of Collège Jules Ferry, is to be built at Saint-Dié.—M. Leheureau, architect, has been commissioned to carry out at Neufchâteau (Vosges) a building to contain a theatre and a concert-room, at an estimated cost of 100,000 francs.—The Conseil-Général of La Vendée has under consideration a scheme for constructing a dyke about 4,000 metres long in order to connect the island of Noirmoutier with the mainland. The cost is estimated at 1,600,000 francs.—A vote of 1,700,000 francs has been made for the cost of raising the water-level in the basin of the Port of St. Nazaire. A sum of 100,000 francs has also been voted for the provision of an additional supply of water to the town.—It is proposed to demolish the Pont Neuf at Cahors, which dates from the XIVth century, and replace it by a steel bridge. Street protests have been made against the proposal. In historical and archaeological grounds.—In a bridge over the Aude at Carcassonne, between the Rue Antoine Marly and the abbatoir, is to be rebuilt in concrete-steel. The cost is estimated at 110,000 francs.—The death is announced, at the age of fifty-four, of M. Alexandre Monod, architect, of Tours, a member of the Société Centrale des Architectes. The death is also announced, at Paris, at the age of seventy, of a talented sculptor, M. Etienne Leroux. He was author of many interesting works, among which may be mentioned the statue of Jeanne d'Arc at Compiegne and the monument to Sadi-Carnot at Chabanais. He had received medals at various Salon exhibitions, and was elected to the Legion of Honour in 1878.

GERMANY.—The Society of Architects and Engineers of Bohemia has recently celebrated its fortieth anniversary. The city of Prague presented the Society on this occasion with the gold medal for merit as a recognition of the signal services the Society has rendered the town on questions of art and sanitation. The burgomaster styled the Society "the advisory body" of the municipality and complimented it on uniting professional ability with tactful ways and economical methods.—The Bismarck Monument in Hamburg is an example of the assistance architecture can render sculpture by providing a suitable setting and thus enhancing its effect. The architect, Emil Schandt, and the sculptor, Ledor, together designed this fine work. The statue is 14.8 metres high, and stands on a mighty stepped base, while the ground around is enclosed with flights of steps and a boundary wall. The figure weighs 235,000 kgs. and is built up of 100 blocks of stone in ten courses. Thirty masons and sculptors worked on the figure at four different levels.—As the new Town Hall in Leipzig has not sufficient accommodation for all the administrative departments of the town, a new block of offices has been built on the adjoining square, connecting two bridges with the main building. The plans were prepared by engineer Licht, who also designed the Town Hall and the building will cost 2,850,000 francs.—May 29th was the centennial of the birthday of Karl Böttcher, the investigator of the methods of construction adopted by the Greeks, and the author of the then epoch-making work "The technique of the Greeks."—Whilst pulling down a house at Pfreimd, a small iron chest, 30 by 15 by 14½ centimetres was found, containing seven goblets and a quantity of jewellery bearing the Augsburg mark and dating from the XVth century. This is supposed to be part of the treasure of the Landgraf von Leuchtenberg and to have been walled up at the beginning of the Thirty Years' war. The collection was purchased for 40,000 marks by Messrs. Aichinger, of Weiden, and presented to the Bavarian National Museum.—The Architectural section of the Art Exhibition in Berlin is of very modest proportions, yet the room set apart for the exhibit is unfortunately large enough for them and too large for the public. None of the designs represent the work of municipal or provincial official bodies, so that we cannot compare this work with that of independent architects. The entries for the Art Exhibition in Berlin are of very modest proportions, yet they reached on the last occasion and show a satisfactory degree of artistic merit.

AUSTRIA.—On August 21st died the painter Eugen Felix, in his seventieth year. He was a versatile and prolific artist, handling with equal facility animal life, portraiture, and nature pictures. His chief works, "Pan with Bacchantes" is a model of grouping and of the treatment of the nude.

SWITZERLAND.—In April 1905, the new hospital at Interlaken was opened. It consists of three buildings: the main block for seventy beds, the isolation block for twenty-eight beds, and the

dependence which includes the mortuary, dissection room, laundry, etc. Herr Ernst Baumgart, of Bern, designed the hospital, which cost 585,000 francs, sum included.

PARTIAL RE-BUILDING OF LEGRHORN.—Mr. Carmichael, the British Vice-Consul, in a report recently received at the Foreign Office, states that during the past year considerable portions of the old town of Leghorn have been demolished. Fortunately the old town has but little historic interest or artistic beauty, so that archaeologists can have no cause of complaint. The Grand Duchy of Tuscany was without a proper seaport town, and Leghorn was planned in one design at the end of the sixteenth century and built in an incredibly short space of time. None of the buildings demolished is of more ancient date, and many of them had been some time since condemned as uninhabitable. The hospital, a huge building, once the residence of the numerous Leghorn slaves, was entirely surrounded by the worst of the slums. The present demolition clears it completely, leaving ample open space on all sides. A part of the space is being laid out for gardens. Much of the space secured by the general demolition will be preserved unbuild upon, thus giving light and air to the town; the piazzas thus secured will be surrounded by handsome public buildings, such as the new post office. Further demolition on a large scale is in contemplation; in fact, it is scarcely an exaggeration to say that almost the whole of old Leghorn might with advantage disappear. Signor Guido Vaccari, the architect, has published an interesting statement for the demolition and reconstruction of the southern quarter of old Leghorn. He estimates the cost of expropriation at 104,580*l.*; the cost of rebuilding a large handsome modern quarter, including the new prefecture, chief police office (questura), savings' bank, and arcade of shops at 30,000*l.*; the cost of paving, drains, etc., at 40,000*l.*; and he adds a margin for technical and unforeseen expenses of 17,420*l.* The capital required for the whole scheme is thus 462,000*l.* The rental of the new quarter, estimated at 19*l.* per square metre, would yield 45,714*l.*, and after deducting an estimate of 19,400*l.* for taxes, upkeep, management, and insurance, the percentage of profit or the capital would be about 5.7.

SOUTH AFRICA.—A survey party recently arrived at Mbeane, the new capital of Swaziland, and building operations on an extensive scale will follow at no distant date.—At Erawo, in the Transvaal, building work in connexion with the new English church has been begun by the contractors, Messrs. Dougherty & Russell. The site given by the Government in Joubert street.—Mr. T. E. Colcutt, president-elect of the Royal Institute of British Architects, has given his award in the matter of the competitive designs for the Transvaal University College which were invited from South African architects. The successful competitor is Mr. R. Howden; the second premium being awarded to Messrs. G. A. H. Dickinson & McCowat, and the third to Messrs. Stucke & Banister. Designs were invited for the entire block of buildings, but it is only intended to proceed at present with the erection of the east wing at an estimated cost of 80,000*l.* In presenting his report Mr. Colcutt stated that twenty-nine designs were submitted by twenty-eight architects, one architect having sent in two designs. He added that many of the designs, besides those selected, "are of considerable merit, and I venture to express the feeling that your Council, by adopting the first premiated design, will have the opportunity of seeing a building erected which will be worthy of a great city." Mr. Howden has been in practice on the Rand for eight or nine years and has designed several important and private buildings. As far as we can judge by a rough engraving in a Johannesburg paper, Mr. Howden's design, though rather monotonous in effect, will make a dignified building. The front elevation shows five blocks identical in treatment, except that the centre and the two end blocks are considerably wider than the intermediate ones. The design shows a rusticated ground story with an engaged Ionic order above, running through two stories, and a heavy cornice and balustrade. This is carried on without alteration across the whole front, seven bays in the centre and side blocks and four bays in the intermediate blocks, the blocks being separated by deep recesses. The same design is carried unbroken across the flank of the building. There is not much thought or invention shown in this, but at all events there is no eccentricity and nothing in bad taste. In regard to the internal arrangements, the basement is to be given up to mining and metallurgy, with the museum for each branch. In connexion with the mining department there will be a general laboratory, a private laboratory, and a lecture room. In connexion with the metallurgy department will be a laboratory, a metallography room, a sampling and grinding room, a laboratory for wet work, a dark room, and a balance room. The ground floor will include a council chamber, registrar's and secretary's office, a large room for the use of technical societies, and for the Seymour Memorial Library, a general lecture-room and an examination hall. The first floor will provide

for the teaching of physics and mathematics, together with class-rooms for teaching the classics, modern languages, and English literature, and also class rooms for evening technical class work. The second floor is devoted to surveying and chemistry, with two large chemical laboratories.

Miscellaneous.

THE CARNEGIE LIBRARY, DUNDEE.—In view of the recommendation of the Sites Committee for the Carnegie Libraries the members of the Dundee Institute of Architects and other architects in Dundee have addressed a memorial to the Provost and Town Council giving reasons against placing this work in the hands of the Burgh Engineer and City Architect. The memorialists are not aware of any single instance in which a city official has been entrusted with the carrying out of such work, and keeping in view the importance of careful and thoughtful planning in a library building, and recognising that it should be of a monumental character, and give an artistic expression of its purpose, urge that it is desirable to extend the area of thought brought to bear upon its design, so that the best results may be secured, and that the incentive of competition is the best method of securing this end. Without reflecting on the Burgh Engineer's merits as an architect they point out that with so many official and administrative duties, along with the supervision of work of an intricate and practical nature, it is not possible for him to give the necessary amount of reflection and study which such buildings demand, and that if it is placed in his hands he must necessarily delegate the greater part of the work to irresponsible assistants. Furthermore, they point out that if the work of designing and carrying out these libraries is done by the Burgh Engineer the attendant expenses would be actually borne by the ratepayers of the city instead of by the donor. A deputation waited on the Town Council on this subject on Thursday, the 6th. Mr. Alexander Speed moved that consideration of the matter be delayed for a month, contending that this matter was being rushed. Mr. John Robertson moved that the matter be proceeded with, and that the City Architect be instructed to proceed with the preparation of the working plans. Ex-Provost Brownlee seconded. Mr. Carnegie moved that the plans be thrown open for competition. As the result of a long discussion, the Council, by 20 to 5, instructed the City Architect to proceed with the preparation of the plans for the libraries.

NATIONAL GALLERY.—The statue of Gainsborough, which Mr. Thomas Brock, R.A., sculptured in marble, in terms of the testamentary dispositions of the late Mr. Henry Vaughan, has been deposited, by bequest of the deceased, in the Tate Gallery, Millbank. The 49th annual report of the trustees of the National Portrait Gallery states that the total number (168,769) of visitors during last year shows a satisfactory increase for every day in the week, and is the highest since the new gallery was opened ten years ago. The average attendance on Sundays during the summer months amounted to 432. Whilst they are much hindered by lack of wall-space in their efforts to keep up a historical and chronological system of hanging the exhibits the trustees have not yet been able to make arrangements for the acquisition from the military authorities of the site of St. George's recruiting barracks, and so to meet their urgent requirements for an extension of the Gallery.

LONDON, BRIGHTON, AND SOUTH COAST RAILWAY.—At the last general meeting, held under the presidency of Lord Cottesloe, it was announced that a contract for the equipment, for the electrical working of the South London line between Victoria and London Bridge had been undertaken by the General Electric Company, of Berlin, with a stipulation that the plant—the motor equipments excepted—should be of British manufacture. The London Electric Supply Corporation have contracted to supply energy in a minimum amount of 4,000,000 Board of Trade units for a period of seven years, and will bring duplicate concentric mains from their power station at Deptford to Queen's-road station, Peckham, whence the railway company will take two concentric mains to their main distribution centre at Denmark-hill. The traction will be on the single-phase overhead system, for which a sub-contract is taken by Messrs. R. W. Bleckwell & Co., of Westminster, the trucks being made by the Leeds Forge Company. The eight trains are to consist of a trailer between two motor-cars apiece. Messrs. Kinraid, Waller, & Dawson, consulting electricians, will supervise the general electrical work. The enlargement and improvement of Victoria Station have necessitated a complete alteration of the signalling arrangements, for which a fresh system, partly electrical and partly mechanical, is being substituted. The eastern side of the terminus is reserved essentially for the suburban traffic, a large portion of which is now

temporarily transferred to a part of the new station to enable the contractors to continue the work of re-construction.

CONDITION OF HENLEY BRIDGE.—At a meeting of the Henley Corporation on the 6th inst. a special Report was presented to the Corporation by Mr. Griffiths, Engineer to the Thames Conservancy, who said that the cracks in the arches were caused by the settlement of the Oxfordshire abutment, and of No. 1 arch, the latter of which had settled the most. It was apparent, he said, that the structure just above the water level was bulging out upstream, and the parapet was doing the same. A second cause of the settlement of the bridge was the excessive traction-engine traffic over the bridge, which caused great vibration. The crack of No. 3 pier could be traced right to the foundation. It would be expedient to tie the bridge together longitudinally as it was in two parts, and when traction engines passed over the action of the wheels was to thrust out the weakest side of the bridge. The timber foundations of the bridge were well preserved, but nevertheless, the Corporation must place some substance under the foundations of No. 3 pier so as to form a solid foundation. Until the diver had completed the operations at the foundation of No. 3 pier it would be impossible to tell the extent of the work required on the superstructure, but once it was known vibration would be greatly diminished. The Corporation finally decided to act on Mr. Griffiths's suggestion as to the solid foundations for No. 3 pier, and to leave the question of tying the bridge together until this foundation was made safe.

A QUESTION OF CHURCH "RESTORATION."—The Chancellor of the diocese of Hereford has granted a faculty to the rector and churchwardens of Sarnesfield for certain alterations to be done to their parish church for the purpose of undoing some former work of so-called restoration. The circumstances are thus set forth in the Chancellor's judgment:—"In this case the Rev. William Marshall, the rector of the parish of Sarnesfield, and the churchwardens have applied to the Consistory Court to grant a faculty authorising them to make certain alterations and repairs in the parish church. The costs of the repairs and alterations will be defrayed by Mr. Isaac Marshall, of Sarnesfield Court, brother of the rector, who is the principal landowner in the parish, and patron of the living. The church is a small one, containing accommodation for sixty persons, the population of the parish being 115, but it is a very ancient one, and remarkable for its architecture, and I therefore felt it my duty to take the evidence in London of Mr. Roland William Paul, F.S.A., who is acting as architect for the patron. According to Mr. Paul's evidence, it dates from Norman times, and the original church consisted of the present nave and chancel only, to which additions have been made during the XIIIth, XIVth, and XVth centuries. About the year 1190 a chapel was erected called 'The Sarnesfield Chapel,' and the wall on the south side was taken down for the purpose of adding the present aisle, probably for processional purposes, and to give access to the chapel. In the latter part of the XVth century the west tower was erected with a wooden porch and engine, as well as a new window of the same date. The chapel is now used as a vestry. In 1870, under a faculty from this court, certain parts of the chancel and south wall of the chapel were rebuilt, and three slightly windows were inserted in the north wall of the church, two old windows were taken out of the south wall of the chapel, and one large modern window replaced it. The church is in very bad repair, principally owing to the work done in 1870. The timber of a portion of the roof requires repair, and the original south wall of the church in some parts requires to be underpinned. It is now proposed to take down the modern work of 1870 and to replace it in accordance with the old lines on which the church was originally built. In the south wall of the chapel it is proposed to substitute for the present modern window two windows of the same pattern as the old ones, of which a photograph exists, and in the last wall of the chancel to substitute for the modern one a new window on the same lines as the old one. It is also proposed to make good the old north wall of the church by taking out the three modern windows inserted in it in 1870. There are other minor works to be done, such as substituting an oak pulpit for the present stone one, and inserting a new Holy Table for one of stone. There will be choir seats in the chancel, and accommodation for from eighty to ninety persons in the church. In the opinion of the court the proposed alteration will be in keeping with the original architecture of the church, and, in so far as desirable to be made, I will, therefore, decree the faculty to issue as prayed." In delivering the judgment on behalf of the Chancellor, his Surrogate, the Rev. A. J.

Capel, remarked that people were beginning to find out that restoration was a totally different thing to re-construction. A great deal of work had been done in connection with churches during the last fifty years which would all have to be done over again, for it would have to be pulled down, and the original state of the fabric replaced.

RANSOMES' ELECTRICALLY-DRIVEN HORIZONTAL LOG BAND SAW.—A new type of saw-mill capable of dealing with logs of any timber up to 4 ft. in diameter, and if necessary up to 100 ft. long, has recently been introduced by Messrs. A. Ransome & Co., of Newark-on-Trent. The most noteworthy feature of the machine, which has been patented by Messrs. Ransome & Lavo, is that the saw is driven by a concealed electric motor built around the shaft of the driving pulley, an arrangement making the machine entirely self-contained and obviating all driving belts, countershafts, and gear wheels. Thereby a considerable loss of power is eliminated and the width of the machine is reduced to 17 ft. 6 in. as compared with 34 ft. 8 in. the latter being the width of a similar machine operated by belting from a countershaft. The motor, capable of developing 50 electrical horse-power, was specially designed by Mr. Lavo, who must be congratulated on the achievement of designing an enclosed motor capable of keeping cool while supplying the large demand for power required without being too heavy for attachment to the saw pulley shaft. A supplementary motor of 12 electrical horse-power, transmitting power through a silent driving chain, is provided for the reciprocating movement and the rising and falling motions of the log carriage. Other features of the machine to which attention may be directed are the ball bearings for the saw pulley shafts, and the automatic device for raising and lowering the saw, the speed of this motion being controllable by means of a hand lever. The machine, which is designed on the familiar model of the iron-planing machine, is built up on a massive bedplate providing a steady foundation for the uprights of the main frame and extending beneath the auxiliary frame carrying the control apparatus. The travelling carriage has two longitudinal rolled steel girders of deep section connected transversely by cast-iron arched beams fitting over the top flange of each girder and against the inside face of each web. The track on which the carriage runs consists of steel rails laid on longitudinal sleepers and 8 in. wheels in suitable frames, bolted at short intervals apart. No special foundation is required for the machine when in regular use. At a trial run conducted a week or two ago at the makers' works, the saw merely rested on the floor and although the saw was run at the speed of 7,000 ft. per minute no vibration was perceptible. The saw fitted to this machine is very thin and having comparatively little set, the result is that a larger number of boards can be cut from a log than would be possible if a vertical frame or horizontal slide and double blade reciprocating frame were employed. During the trials mentioned above, when 1,077 sq. ft. of elm and oak boards were cut from the log, the electric current used was 11.5 Board of Trade units, which at 1d. per unit gives about 10.88d. as the cost of cutting 1,000 sq. ft. of boards. The cost of labour is stated to have been at the rate of 2s. 8d. for the same measurement, making the total cost for power and labour a fraction over 3s. 6d. per 1,000 sq. ft. of boards. The new saw is interesting as an example of progress in mechanical and electrical engineering, as well as of its practical utility to those engaged in the timber industry.

ROMAN FORT, COLDBURN.—Colonel L. J. MOTZEN, R.E., SWANSEA, is excavating an old Roman camp which occupies an elevated site, about 7 acres in extent, situated on the Sarn Helen Roman road, which extends from Neath to the Gaer, Brecon. Last summer the operations were commenced for a few weeks, and attention was then only devoted to the ramparts and ditches. The foundation of the rampart was discovered to be of a wooden log paving (oak), about 18 ft. wide. The ditches, at a good depth, also revealed the presence of bones and sticking tin pegs. Recently the excavations were re-started, and the space inside the ramparts were re-started, and the result that a quantity of pieces of pottery and urns, bits of bottles and Roman glass, pieces of bricks, brick floors, stone pitchings, etc., have been discovered. In addition the wooden foundation of the rampart has been proved in another corner as well as suggest that it will be found enclosing the entire camp. The management and the carrying out to the operations are under the direction of Mr. Sydney Lloyd, M.E., Swansea.

NORTHAMPTON INSTITUTE.—In view of the increasing work of the Institute and the inefficiency of the economy of the Institute, the large size of the building, the Governing Body have for the coming session taken the rooms of the British Horological Institute in Northampton-square. This extension has made it possible to place the work of the Technical Optics Department in the buildings and to free the rooms occupied last session by the department for extending work of other departments. In the rooms thus vacated there has been already

equipped during the vacation an intermediate electrical engineering laboratory, and another room is to be devoted to an extension of the junior laboratory, another to an extension of the senior electrical testing laboratory, another to an extension of the instrument workshop. The chief extension in the Mechanical Engineering Department consists of an additional room devoted to the Power Laboratory, which has enabled the classes for automobile engineers to be considerably developed.

THE BELFAST NEW CITY HALL.—The first meeting of the Belfast Corporation was held recently in the new City Hall. It is stated that the acoustic properties of the building were not perfect; the members were unable to understand what each other said, while the reporters found the greatest difficulty in getting a position in the room where their work could be efficiently done. It is probable that before the next monthly meeting steps will have been taken to remove the defect.

Capital and Labour.

'CONCRETERS' AND ASPHALTERS' ASSOCIATION.—This Association recently met in Manchester, and passed a resolution to the effect that one month by members should be given to architects, surveyors, and builders, and all others concerned, that in future members of the Association will refuse to prepare any ground for patent flooring, terrazzo, etc., where cheap foreign labour is employed to displace British labour. It is contended that in future such work should be done by members of the Association and under proper conditions. It is alleged that at present many Italians and Germans are brought over to England to lay patent floors under conditions of labour that are altogether unsatisfactory. The meeting also approved of an alteration of rules for admitting to membership those who follow the wood-block flooring trade. It was further agreed to create a section of the Association for the concrete and asphalt labourers, who number 500 in Manchester and the surrounding districts, and another section for bricklayers' labourers and others.

Patents of the Week.

APPLICATIONS PUBLISHED.*

16,502 of 1905.—A. M. JOHNSON and T. RYAN: *Fastening Bolt and Holder for Doors.*

This relates to a fastening bolt and holder for doors, comprising a casing pivotally mounted on the door, a bolt slidably mounted on said casing, and means for holding said bolt against movement in said casing.

16,564 of 1905. G. M. SCOTT: *Sash Hangers.*

This relates to sash hangers, comprising a bracket containing a clock spring and pinion and a rack adapted to be respectively mounted in a window frame and an adjacent side rail of a window sash, so that the downward movement of the sash will wind up the spring, and means for locking said pinion in any desired position of the sash, in combination with a spring-actuated roller mounted near the corner of said upper sash diagonally opposite to said bracket in the case of an upper sash and horizontally opposite in the case of a lower sash.

23,598 of 1905.—W. H. PRESTWICH: *Canopy for Open Fire Grates or Stoves.*

This relates to a canopy for an open fire grate or stove made of fine wire netting or gauze or perforated plate.

25,317 of 1905.—H. H. HESSE: *Machines for Making Roofing Tiles.*

This relates to a roof tile moulding machine for manufacturing rebated tiles and is characterised in that the base plate of the mould, which imparts the desired profile to the underside of the tile, is rounded to correspond to the rounded part of the side walls of the mould and of the guiding rails for the moulding tools, for the purpose of giving the tile at its rounded part the same stability as its remainder.

25,773 of 1905.—D. SINCLAIR and SINCLAIR IRON CO., LTD.: *Radiators for Heating Buildings and the like.*

This relates to radiators for heating buildings and the like, and consists in the arrangement of inwardly turned flanges, preferably two on each side cast on the sides of the combustion chamber, and a metal plate forming the bottom of the circulation chamber and the top of the combustion chamber secured between the flanges on each side, which plate is secured in position by suitable means, such, for instance, as iron cement.

* All the applications are in the stage in which opposition to the grant of Patents upon them can be made.

PATENTS.—Continued on page 334.

SEPTEMBER 24 **Liverpool.**—Rosa M KING, DRAIN-
enders for The Select Vestry of this Parish invite
a competition for certain works of road making and ad-
justment at Oliver's Field, Waverley now in course of
plans and prospectus to be sent on application to the
undersigned. Mr. P. H. DAVIES, a clerk of the office of
the Council, in the Town Hall, Liverpool, is the
agent for the works of road making and adjustment
and plans and prospectus to be sent on application to the
undersigned. A plan of the works to be carried out
in the enclosed plan is obtained at the Council Office
on payment of a deposit of 2/6. Sealed tenders must

be delivered to Mr. H. J. Hagger, Vestry Clerk, Parish Offices, Brownlow hill, not later than September 24.

SEPTEMBER 24.—OLLEY.—STREET WORKS.—Tenders are required for the sewerage, paving, and making good of Back Gurney Street, Olley. Drawings and specification may be seen at the offices of Mr. J. E. Sharpe, Engineer and Surveyor, Council Offices, Olley, where quantities may also be obtained. Depositing tenders for 11. is. and to whom sealed tenders must be delivered at the office not later than 2 p.m., September 24.

SEPTEMBER 25.—GATEHEAD.—PAVING, ETC.—Tenders are invited for paving, etc., the following streets viz.: (1) Pitt-street; (2) Orion-street; (3) back Orion-street East; (4) back Orion-street West. Plans and specifications may be seen, and quantities obtained, at the office of Mr. N. J. Pattinson, Borough Engineer, Town Hall, Tenders are to be sent in, sealed and endorsed "Tender for Street Paving," on or before 2 p.m. on September 25.

SEPTEMBER 27.—EBBVALE.—ROAD WORKS.—The Ebbvale U.D.C. invite tenders for the work required in widening Libanus-road and the approach road to Sunny Bank Houses and Moor Pleasant road. Plan and specification may be seen, and form of tender, with bill of quantities, obtained, by appointment at the office of Mr. F. J. Thomas, the Town Surveyor. A deposit of 10s. which must be made in postal notes, will be required from each person who obtains a copy of the form of tender and bill of quantities. Tenders, enclosed in a sealed envelope, endorsed "Tender for the Ebbvale Libanus Road Improvement," must be delivered at the office of Mr. T. Hughes, Clerk, not later than September 27.

SEPTEMBER 27.—TEDDINGTON.—PRIVATE STREET WORKS.—The U.D.C. of Teddington invite tenders for the following works in connexion with the making-up of Munster-road, in the Parish of Teddington, viz.: 3,862 super. yds. of roadway forming and metalling; 1,015 lin. yds. of kerbing; 1,015 lin. yds. of channeling; 2,312 super. yds. of tarpaving. Plan and specifications may be seen, bills of quantities and form of tender, enclosed in a sealed envelope, endorsed "Private Street Works," must reach Mr. G. H. Salmons, Clerk, Elmfield House, Teddington, not later than noon on October 1.

OCTOBER 2.—BANGOR.—RESERVOIR, ETC.—The U.D.C. of Bangor (Co. Down) invite tenders for the construction of a reservoir and auxiliary works at Ballysallagh Major, about four miles from the Town Hall, Bangor; also the laying out of a line of 22 in. main from the intended reservoir to Bangor Urban District boundary. Tenders to be framed as follows:—Firstly—the contractor to execute all work and to supply all pipes, ironwork, and other materials; secondly—the contractor to execute all work and supply all materials other than the pipes and ironwork, which will be supplied to him at Bangor by the U.D.C.; thirdly—ironfounders to supply and deliver at Bangor all iron and steel work, pipes, and valves, as described in specification and schedules. Plans and specification of the intended works may be seen at the offices of Messrs. McCreesh & Sons, 7, Chichester-street, Belfast. Quantities for the intended works may be obtained from Mr. S. C. Hunter, Scottish Provident Buildings, Belfast, from whom a copy of the specification may be had on a deposit of 5s. 5s. Tenders, accompanied by priced bills of quantities, and specification to be lodged with Mr. James Milliken, Town Clerk, at the Town Hall, Bangor, not later than 12 o'clock noon, October 2.

OCTOBER 2.—GREENHEAD.—NEW TANK AND FILTERS.—The Irvine and District Water Board invite tenders for the construction of a covered clear-water tank, two additional filter beds, inspection house and meter chamber, boundary walls, the providing, laying, and jointing of cast-iron and fire-clay pipes and other related works at Greenhead filtering station, Parish of Stevenson. Drawings may be seen at the office of the Superintendent, Mr. James Clark, Greenhead Channel Works, Irvine, and a copy of the specification and schedule of quantities may be obtained from him on payment of 11. is. An assistant will meet intending contractors at Kilwinning G. and S.W. Railway Station, on September 15, at 11.15 a.m., to point out site of works. Sealed offers, endorsed "Tender for Tank and Filters," to be lodged with Mr. James Campbell, Jun., Secretary Bank of Scotland, Saltcoats, not later than October 2.

OCTOBER 2.—MORETON-IN-THE-MARSH.—SEWER WORKS.—Chipping Campden R.D.C. invite tenders for the provision, laying, and jointing of cast-iron and stoneware pipe sewers, together with manholes and lamp-holes, construction of pump well, engine house, lifting tanks, and other incidental works in accordance with the drawings and specification

which may be seen, and bills of quantities and form of tender obtained, at the offices of the engineers, Messrs. Wilcox & Raikes, 65, Temple-row, Birmingham, on payment of a deposit of 31. 3s. Sealed tenders, on envelopes supplied, endorsed "Moreton-in-the-Marsh Sewerage—Contract No. 1," to be delivered to Mr. Oliver H. New, Clerk to the Council, Chipping Campden, not later than 12 o'clock noon on October 2.

*** OCTOBER 4.—BROMLEY.—ROAD MAKING.**—The Councils of Bromley, Beckenham, etc., invite tenders for certain works of sewerage, levelling, paving, channelling, and making good Hayes road. Plans and sections may be seen, and specifications, bills of quantities, and forms of tender obtained, at the office of the Borough Engineer, Bromley, Kent, on payment of 11. is. Tenders, endorsed "Tender for Hayes-road," must be delivered to the Clerk of the Bromley R.D.C., Park House, Beckenham lane, Bromley, Kent, not later than October 4.

*** NOVEMBER 8.—CAPETOWN.—ASPHALTE PAVING.**—The agents for the City of Capetown Corporation are prepared to receive sealed tenders for supplying and laying asphaltic paving in Long-street and Darling-street, and maintaining same for twelve months. Specification may be seen, and forms of tender, etc., obtained, upon application to Messrs. Davis & Soper, 54, St. Mary-axe, E.C., to whom samples must be delivered not later than 4 o'clock p.m., November 1, and sealed tenders, endorsed "Tender for Asphaltic Paving," must be delivered not later than 4 o'clock, November 8.

STONE, MATERIALS, AND STORES

SEPTEMBER 17.—NEWCASTLE-UPON-TYNE.—UNDERGROUND CONVENIENCE.—The Corporation of Newcastle-upon-Tyne invite tenders for the construction of an underground public convenience in the Haymarket. On payment, by contractors, of 21. 2s. to the City Treasurer, specifications, conditions, bills of quantities, and form of tender can be obtained, and drawings inspected, at the City Engineer's Office, Town Hall, Newcastle. Tenders to be sent to the Secretary, Councils, Committee Clerk's Office, Town Hall, Newcastle-upon-Tyne, to be sent in before noon on September 17.

SEPTEMBER 17.—ROCHESTER.—STORES, ETC.—The Corporation invite tenders for the supply of the following for the twelve months ending September 29, 1907, viz.: (1) Tools; (2) horse hire; (3) Portland cement; (4) curbs and paving materials. Specification and form of tender can be obtained from Mr. William Banks, A.M. Inst. C.E., City Surveyor, Guildhall, Rochester. Sealed tenders must be delivered to Mr. Aspley Kennette, Town Clerk, Guildhall, Rochester, before 4 o'clock, September 18.

SEPTEMBER 20.—PENTRE RHONDDA.—PIPS, TUBES, ETC.—The Pentre Rhonda U.D.C. invite tenders for the following:—Contract No. 7—lead and compo pipe and block tin; contract No. 8—wrought-iron tubes and fittings; contract No. 15—hazards at Pentre, Llyn-y-pia, and Porth contract No. 41—erection of boundary wall at Blaenyclydach storage tank; contract No. 42—repairing Cornish boiler at Porth Gas-works. Forms of tender for contracts Nos. 7, 8, and 15 may be obtained on application. Plans and specifications may be seen for contracts Nos. 41 and 42, and forms of tender supplied, upon application to Mr. Octavius Thomas, the Engineer and Manager, Gas and Water Offices, Pentre Rhonda, upon depositing the sum of 11. is. No form of tender other than that issued by the Council will be accepted. The contractors will be required to pay the current rate of wages ruling in the district. Tenders to be addressed to the Chairman of the Gas and Water Committee, endorsed "Contract No. 7, etc.," and delivered to Mr. Walter P. Nicholas, the Clerk, to the Council, Council Offices, Pentre Rhonda, on or before 10 a.m. on September 20.

SEPTEMBER 22.—MANCHESTER.—TARTA COTTA.—Manchester Education Committee invite tenders for the supply of tarta cotta for the Oswald-road Municipal School, Chorlton-cum-Hardy, Manchester. Plans may be seen, and a copy of the bill of quantities (including specification) obtained, at the offices in Deansgate, Manchester, on a deposit of 11. is. Cheques to be made payable to the Accountant, Education Offices, Deansgate, Manchester. Tenders on the forms and in the envelopes provided, must be delivered at the Deansgate Offices of the Education Committee not later than September 22.

*** SEPTEMBER 25.—EDMONTON.—GRANITE.**—The Edmonton U.D.C. invite tenders for supply of blue Guernsey and Aberdeen granite for the period between September 29, 1906, and September 30, 1907. Forms of tender and full particulars may be obtained from Mr. G. Eedes, Eades, Council's Engineer, Town Hall, Edmonton. Sealed tenders on form supplied, endorsed "Tender for Granite," to be

delivered to Mr. Wm. Francis Payne, Town Hall, Edmonton, not later than 12 noon, September 25.

*** SEPTEMBER 25.—EDMONTON.—PORTLAND CEMENT.**—The Edmonton U.D.C. invite tenders for the supply and delivery at the Edmonton Low Level Station on the G.E.R., or by barge at the River Lee, navigation of Portland cement as and when required by the Council for the period between September 29, 1906, and September 30, 1907. Forms of tender and full particulars may be obtained of Mr. G. Eedes, Eades, Council's Engineer, Town Hall, Edmonton. Sealed tenders, on form supplied, endorsed "Tender for Cement," to be delivered to Mr. Wm. Francis Payne, Town Hall, Edmonton, not later than 12 noon, September 25.

*** SEPTEMBER 25.—EDMONTON.—STONEWARE PIPES.**—The Edmonton U.D.C. invite tenders for the supply and delivery at the Edmonton Low Level Station on the G.E.R., or at the Town Hall Yard, of stoneware pipes for six months ending March 31, 1907. Forms of tender and full particulars may be obtained on application to Mr. G. Eedes, Eades, Council's Engineer, Town Hall, Edmonton. Sealed tenders, on form supplied, endorsed "Tender for Stoneware Pipes," to be delivered to Mr. Wm. Francis Payne, Town Hall, Edmonton, not later than 12 noon, September 25.

*** SEPTEMBER 25.—HANWELL.—BROKEN GRANITE.**—The Hanwell U.D.C. are prepared to receive tenders for supply of 14-in. and 2-in. hand-broken Guernsey, Channel Island, or Clew Hill granite for the period ending March 31, 1907. Forms of tender, contract, etc., may be inspected at Council's office after Monday, September 17, between 10 a.m. and 5 p.m. Tenders, sealed and endorsed "Tender for Broken Granite," to be delivered to the Clerk, Council Offices, Cherington-road, Hanwell, W., not later than 12 noon, September 25.

SEPTEMBER 25.—LONDON.—STORES.—The Directors of Bombay, Baroda, and Central India Railway Company invite tenders for the supply of the following stores, viz.:—Class A—(1) Eyebolts and strand wire, for fencing; (2) pillars, posts, etc., for fencing; (3) accumulator cells, etc.; (4) axes for carriages and wagons; (5) india-rubber fittings; (6) steel boiler tubes; (7) tyres for carriages; (8) tyres for engines; (9) cast-steel engine wheel centres; (10) copper plates and rods; (11) brass boiler tubes, Class B—(1) Panel Plates, Class C—(1) Tube ferrules. Tenders must be made on forms, copies of which, with specifications, can be obtained from Mr. W. V. Constable, Secretary, Council Offices, Gloucester House, 2, 3, and 4, Bishopsgate-street Without, London, E.C., on payment as follows:—For Class A 21s. each, for Class B 10s. 6d. each, and for Class C 5s. each (which will not be returned).

SEPTEMBER 26.—ABERDEEN.—STORES.—Tenders are wanted for supplies, for the ordinary harbour works, the following articles for one year, from November 1, 1906, to October 31, 1907, inclusive, viz.: No. 1, steel and iron; No. 2, ironmongery; No. 3, crane chains; No. 4, cast-iron work; No. 5, timber; No. 6, chandlery; No. 7, plumber work; No. 8, brass and copper work; No. 9, indiarubber and asbestos; No. 10, painter work; No. 11, ropes and yarn; No. 12, stones and road metal; No. 13, bricks and drain-pipes; No. 14, oils; No. 15, sails; No. 16, canvas; No. 17, carting and sand; No. 18, books and stationery; No. 19, printing; No. 20, coal, lime, and other measures; No. 21, ropes, etc., for the salmon fishings. All according to schedules which will be delivered to intending contractors at the Harbour Engineer's Office, Aberdeen. Sealed tenders, addressed to the Aberdeen Harbour Commissioners, and endorsed, are to be lodged with Mr. R. Gordon Nicol, Harbour Engineer, on or before September 26.

SEPTEMBER 27.—ROMFORD.—GRANITE.—The Romford U.D.C. invite tenders for the supply of 1,500 tons of blue Guernsey granite, broken to 14 in. cube. The granite to be delivered free at Romford Station at such times and in such quantities as the Council may require before March 31, 1907. A contract and bond, with sufficient sureties, will have to be entered into and given by the person or persons whose tender may be accepted. Tenders (with samples, and marked "Tender for Granite") to be sent to Mr. Charles T. King, Clerk, Council Offices, Romford, on forms to be obtained from the surveyor on or before September 27.

*** OCTOBER 11.—CAPETOWN.—WOOD BLOCKS.**—The agents for the City of Capetown Corporation are prepared to receive tenders for the supply of creosoted red deal blocks, also Australian and other hard wood blocks. Blocks to be 5 in. deep, 3 in. wide, 9 in., 8 in., and 7 in. long. Specifications may be seen, and form of tender obtained, upon application to Messrs. Davis & Soper, 54, St. Mary-axe, E.C., to whom samples are to be seen, not later than 4 p.m., October 4, and tenders, endorsed "Tender for Supply of Wood Blocks," to be delivered not later than 4 o'clock p.m., October 11.

Public Appointments.

Nature of Appointment.	By whom Advertised.	Salary.	Applications to be in
*CIVIL ENGINEER	Newcastle, Co. Down U.D.C.	Not stated	Sept. 22
*VISITING OR OCCASIONAL TEACHERS	London County Council	(See advertisement in this issue)	Sept. 24

Auction Sales.

Nature and Place of Sale.	By whom Offered.	Date of Sale.
*BRICK-MAKING PLANT, Abbey Brickfields, Faversham	Jackson & Sons	Sept. 18
*FREEHOLD BUILDING LAND, SHREWSBURY—The County Mart, Shrewsbury	Wm. Hall, Wateridge, & Owen	Sept. 23
*FREEHOLD PROPERTY, SHOREDITCH—At the Mart	Reynolds & Eason	do.
*JOINERY WORKS, HENRY-STREET, GRAY'S-INN ROAD	May & Bowden	Oct. 3

PATENTS.—Continued from page 330.

22,787 of 1905.—G. WATSON: *Manufacture of Bricks from Clinker and Lime.*

This relates to a machine for mixing and slaking clinker and lime, comprising a mixing chamber, beaters revolving therein, and means for adjustably inclining the chamber to effect and control the travel of the mixture therethrough.

21,933 of 1905.—R. GRIMM: *Sectional Girders and Columns formed of Concrete strengthened with Iron.*

This relates to girders and columns formed in sections of concrete strengthened with iron members, the various sections of which can be readily put together, and can be easily taken to pieces, wherein the concrete body of each sectional part, at those places where the ends of the iron flays or tie bars are situated, is formed with recesses so that the ends are thus exposed and can be readily connected together.

6,725 of 1906.—M. J. ADAMS: *Closet Seats.*

This relates to a combined closet basin and seat, the latter being composed of pulp or other suitable non-conducting material, attached to a suitably perforated rim of the closet basin and forming an integral part thereof.

12,496 of 1906.—A. S. DOUGLAS and A. DOUGLAS: *Earth or Ash Closet Doors.*

This relates to an earth or ash closet door, comprising a frame having its top wider than its bottom, the sides being provided with instanding ribs sloping downwards from near the front of the top to near the back of the bottom, suitable studs being provided in front of the ribs to furnish a space to receive the sides of a suitably shaped door.

7,634 of 1906.—C. DODSON: *Sliding Sashes.*

This relates to a clamping device for securing a sliding sash in any desired position and effecting a fluid tight joint along its side edges, comprising a rigid strip secured to the window frame, a plate spring secured to the sliding sash, and means for drawing the plate spring into close contact with the rigid strip, said means comprising a spill passing through the sash and secured at one end to a plate spring, and a cam handle pivotally mounted on the other end of the spill and adapted to bear against the face of the sash or a plate thereon.

16,841 of 1905.—W. RICHARDS: *Cement for Attaching Glass or Pottery Tiles of Bricks, Walls, and other Surfaces.*

This relates to a cement for attaching glass or pottery tiles to bricks, walls, and other surfaces, consisting of a base formed by the admixture with oil of the following ingredients, namely, mastic, a cement such as Parian or Keen's cement, a binding material such as whitening, fine sand, and ground glass.

21,019 of 1905.—H. COULTHURST, J. COULTHURST, and A. COULTHURST: *Apparatus employed in the Manufacture of Earthenware and like Pipes.*

This relates to apparatus employed in the manufacture of earthenware and like pipes, and consists of two platforms carried by side frames as hitherto. The said frames are mounted in trunnions supported by screws working in suitable side standards or supports. The platforms are secured to the said frames by means of bolts passing through lugs on the platforms and through slots in the side frames so that the distance between the two platforms may be adjusted to suit the length of the being manufactured. Secured to the inner sides of the side frames, about mid-way of their length, are suitable brackets forming nuts in or through which work screws connected at their inner ends to an adjustable curved saddle or cradle which occupies a position substantially central to the apparatus.

MEETINGS.

FRIDAY SEPTEMBER 14.

Royal Sanitary Institute (Lectures for Sanitary Officers).

—Dr. J. Friesley on "Sanitary Law"—III. 7 p.m.

SATURDAY, SEPTEMBER 15.

Northern Architectural Association.—Week-end visit to Chichester.

—Excursion meeting. Members to assemble at Repton-road Tramway terminus at 3 p.m. St. Gabriel's and St. Mark's Churches, and the transepts should be visited.

MONDAY, SEPTEMBER 17.

Royal Sanitary Institute (Lectures for Sanitary Officers).

—Dr. G. Newman on "Duties of a Sanitary Inspector"—I. 7 p.m.

WEDNESDAY, SEPTEMBER 19.

Royal Sanitary Institute (Lectures for Sanitary Officers).

—Dr. G. Newman on "Duties of a Sanitary Inspector"—II. 7 p.m.

Institute of Sanitary Engineers.—Opening sessional meeting. Holborn Restaurant. 7.30 p.m.

President Institution of Builders' Foremen and Clerks of Works.—Quarterly meeting of the directors. 7 p.m.

Ordinary meeting of the members. 8 p.m.

FRIDAY, SEPTEMBER 21.

Royal Sanitary Institute (Lectures for Sanitary Officers).

—Dr. G. Newman on "Duties of a Sanitary Inspector"—III. 7 p.m.

SATURDAY, SEPTEMBER 22.

Junior Institution of Engineers.—Visit the Knight Bevan, and Sturge Portland Cement Works of the Associated Portland Cement Manufacturers. Train leaves Charing Cross at 1.25 p.m. for Northfleet.

Institute of Sanitary Engineers.—Visit to Hampton Sewage Works.

TO CORRESPONDENTS.

NOTE.—The responsibility of signed articles, letters, and papers read at meetings rests, of course, with the authors.

We cannot undertake to return rejected communications, and the Editor cannot be responsible for drawings, photographs, manuscripts, or other documents, or for models or samples sent to or left at this office, unless he has specially asked for them.

Letters or communications (beyond mere news items) which have been duplicated for other journals are NOT DESIRED.

All communications must be authenticated by the name and address of the sender, whether for publication or not. No notice can be taken of anonymous communications.

We are compelled to decline pointing out books and giving addresses.

Any communication to a contributor to write an article, or to execute or lend a drawing for publication, is given subject to the approval of the article or drawing, when received, by the Editor, who retains the right to reject it if unsatisfactory. The receipt by the author of a proof of an article in type does not necessarily imply its acceptance. The Editor cannot undertake to read and consider articles offered for acceptance unless they are type-written.

All communications regarding literary and artistic matters should be addressed to THE EDITOR; those relating to advertisements and other exclusively business matters should be addressed to THE PUBLISHER, and not to the Editor.

PRICES CURRENT OF MATERIALS.

*. Our aim in this list is to give, as far as possible, the average prices of materials, not necessarily the lowest. Quality and quantity may obviously affect prices—a fact which should be remembered by those who make use of this information.

BRICKS, &c.	
	£ s. d.
Hard Stocks.....	1 10 0 per 1000 alongside, in river.
Rough Stocks and Grizzles.....	1 7 0 " " "
Picked Stocks for Facings.....	2 17 6 " " delivered.
Fletions.....	1 8 0 " " at railway dep't.
Red Wire Cuts.....	1 14 0 " " "
Best Fareham Red.....	3 12 0 " " "
Best Red Pressed.....	" " "
Gunton Facing.....	5 0 0 " " "
Best Blue Pressed.....	" " "
Staffordshire.....	3 15 0 " " "
Do. Bulbrose.....	4 0 0 " " "
Best Stourbridge Fire Bricks.....	3 14 0 " " "
GLAZED BRICKS.	
Best White and Ivory Glazed Stretchers.....	12 0 0 " " "
Headers.....	11 0 0 " " "
Quoins, Bullnose, and Flats.....	16 0 0 " " "
Double Stretchers.....	19 0 0 " " "
Double Headers.....	16 0 0 " " "
One Side and one End.....	19 0 0 " " "
Two Sides and one End.....	20 0 0 " " "
Plays, Chamfered, Squints.....	20 0 0 " " "
Best Dipped Slat Glazed Stretchers, and Headers.....	12 0 0 " " "
Quoins, Bullnose, and Flats.....	14 0 0 " " "
Double Stretchers.....	15 0 0 " " "
Double Headers.....	14 0 0 " " "
One Side and one End.....	15 0 0 " " "
Two Sides and one End.....	15 0 0 " " "
Splays, Chamfered, Squints.....	14 0 0 " " "
Second Quality White and Dipped Slat Glazed.....	2 0 0 " " less than best.
Thames and Pit Sand.....	7 0 per yard, delivered.
Thames Ballast.....	5 6 " " "
Best Portland Cement.....	27 0 per ton, " "
Best Ground Blue Lias Lime.....	19 0 " " "

NOTE.—The cement or lime is exclusive of the ordinary charge for sacks.

Grey Stone Lime..... 11s. 6d. per yard, delivered.

Stourbridge Fireclay in sacks 27s. 0d. per ton at rly. dpt.

STONE.

	£ s. d.
Bath Stone—delivered on road wagons, Paddington Depot.....	1 6 3 per ft. cube.
Do. do. delivered on road wagons.....	" " "
Nine Elms Depot.....	1 6 3 " " "
PORTLAND STONE (20 ft. average)—	
Brown Whitbed, delivered on road wagons, Paddington Depot.....	2 1 " " "
Elms Depot, or Fulmoor Wharf.....	2 1 " " "
White Bashed, delivered on road wagons, Paddington Depot.....	2 2 3 " " "
Elms Depot, or Fulmoor Wharf.....	2 2 3 " " "

	£ s. d.
Ancoaster in blocks.....	1 10 per ft. cube, deld. rly. dep't.
Beor.....	1 6 " " "
Greenhill.....	1 13 " " "
Darley Dale blocks.....	4 " " "
Red Corneshill.....	2 " " "
Cloveland Red Freestone.....	2 " " "
Red Mansfield.....	2 " " "

STONE (continued).

YORK STONE—Robin Hood Quality.	
	£ s. d.
Scrapped random blocks.....	2 10 per ft. cube, deld. rly. dep't.
6 in. sawn two sides landing to sizes (under 40 ft. super.).....	2 3 per ft. super., " "
6 in. rubbed two sides ditto, ditto.....	2 6 " " "
3 in. sawn two sides slabs (random sizes).....	0 11 3 " " "
2 in. to 2 3 in. sawn one side slabs (random sizes).....	0 7 2 " " "
1 3 in. to 2 in. ditto, ditto.....	0 6 " " "
HARD YORK—	
Scrapped random blocks.....	3 0 per ft. cube, " "
6 in. sawn two sides landing to sizes (under 40 ft. super.).....	2 8 per ft. super., " "
6 in. rubbed two sides ditto.....	3 0 " " "
3 in. sawn two sides slabs (random sizes).....	1 2 " " "
2 in. self-faced random slabs.....	0 5 " " "
HOPTON WOOD (Hard Bed) in blocks.....	
	2 0 per ft. cube, deld. rly. dep't.
" " " 6 in. sawn both sides landings.....	2 7 per ft. super. deld. rly. dep't.
" " " 3 in. sawn both sides random slabs.....	1 0 " " "
" " " 2 in. do. do.....	0 8 3 " " "

SLATES.

In. In.	£ s. d.
20 x 10 best blue Bangor.....	13 2 6 per 1000 of 1200 at r. d.
20 x 12 " " " ".....	13 17 6 " " "
20 x 10 first quality.....	13 0 0 " " "
20 x 12 " " " ".....	13 15 0 " " "
16 x 8 " " " ".....	7 5 0 " " "
30 x 10 best blue Port. minor.....	12 12 6 " " "
16 x 8 " " " ".....	6 12 6 " " "
20 x 10 best Eureka un-fading green.....	15 17 6 " " "
20 x 12 " " " ".....	7 6 " " "
18 x 10 " " " ".....	13 5 0 " " "
16 x 8 " " " ".....	10 5 0 " " "
20 x 10 permanent green.....	13 6 " " "
18 x 10 " " " ".....	9 12 6 " " "
16 x 8 " " " ".....	6 12 6 " " "

TILES.

	£ s. d.
Best plain red roofing tiles.....	42 0 per 1000 at rly. dep't.
Hip and Valley tiles.....	50 0 per 1000 " "
Best Broseley tiles.....	50 0 per 1000 " "
Do. Ornamental tiles.....	52 6 " " "
Hip and Valley tiles.....	4 0 per doz. " "
Best Euxton red, brown, brindled do. (Edwards).....	57 6 " " "
Do. Ornamental do.....	60 0 " " "
Hip tiles.....	4 0 per doz. " "
Valley tiles.....	3 8 " " "
Best Red or Mottled Staffordshire do. (Peakes).....	51 8 per 1000 " "
Hip tiles.....	54 0 per doz. " "
Valley tiles.....	3 8 " " "
Best " Rosemary brand plain tiles.....	48 0 per 1000 " "
Best Ornamental tiles.....	50 0 " " "
Hip tiles.....	4 0 per doz. " "
Valley tiles.....	3 8 " " "
Best " Harshill brand plain tiles, sand-faced.....	50 0 per 1000 " "
Do. pressed.....	47 6 " " "
Do. Ornamental do.....	50 0 " " "
Hip tiles.....	4 0 per doz. " "
Valley tiles.....	3 6 " " "

WOOD.

	At per standard.
Deals: best 3 in. by 11 in. and 4 in. £ s. d.	£ s. d.
by 9 in. and 2 in. by 6 in.....	13 0 0 14 0 0
Deals: best 3 by 9.....	13 0 0 14 0 0
Battens: best 2 3 in. by 7 in. and 8 in., and 3 in. by 7 in. and 8 in.....	11 0 0 12 0 0
Battens: best 2 3 by 6 and 3 by 6.....	0 10 0 less than 7 in. and 8 in.
Deals: seconds.....	1 0 0 less than best.
Battens: seconds.....	0 10 0 " " "
2 in. by 4 in. and 2 in. by 6 in.....	8 0 0 10 0 0
2 in. by 4 in. and 2 in. by 5 in.....	8 10 0 9 10 6
Foreign Sawm Boards—	
1 in. and 1 1/2 in. by 7 in.....	0 10 0 more than battens.
2 in.....	1 0 0
Fir timber: best middling Danzig or Memel (average specification).....	4 10 0 5 0 0
Seconds.....	4 0 0 4 10 0
Small timber (6 in. to 8 in.).....	5 12 0 5 15 0
Small timber (6 in. to 8 in.).....	5 12 0 5 15 0
Swedish balks.....	2 10 0 3 0 0
Pitch-pine timber (30 ft. average).....	4 0 0 4 15 0

JOHNSON'S WOOD.

	At per standard.
White Sea: first yellow deals.....	24 0 0 25 0 0
3 in. by 9 in.....	23 0 0 23 0 0
Battens, 2 3 in. and 3 in. by 7 in.....	6 10 0 18 0 0
Second yellow deals, 3 in. by 7 in.....	19 10 0 20 0 0
3 in. by 9 in.....	17 10 0 19 0 0
Battens, 2 3 in. and 3 in. by 7 in.....	13 10 0 14 10 0
Third yellow deals, 3 in. by 11 in. and 9 in.....	13 10 0 15 0 0
Battens, 2 3 in. and 3 in. by 7 in.....	11 0 0 12 0 0
Petersburg: first yellow deals, 3 in. by 11 in.....	21 0 0 22 10 0
Do. 3 in. by 9 in.....	19 0 0 19 10 0
Battens.....	13 10 0 15 0 0
Second yellow deals, 3 in. by 11 in.....	16 0 0 17 0 0
Do. 3 in. by 9 in.....	14 10 0 15 0 0
Battens.....	11 0 0 12 10 0
Third yellow deals, 3 in. by 11 in.....	13 0 0 14 0 0
Do. 3 in. by 9 in.....	12 10 0 14 0 0
Battens.....	10 0 0 11 0 0

WOOD (continued).

Joints' Woon (continued).	At per standard.	£ s. d.
White Pine and Petersburg—	£ s. d.	£ s. d.
First Pine—Planks, 3 in. by 11 in.	14 10 0	15 10 0
Second Pine—Planks, 3 in. by 11 in.	13 10 0	14 10 0
Battens—	11 0 0	12 0 0
Second white deals, 3 in. by 11 in.	13 10 0	14 10 0
Yellow Pine—Planks, 3 in. by 11 in.	13 10 0	14 10 0
Battens—	10 0 0	11 0 0
Yellow Pine—Planks, 3 in. by 11 in.	13 10 0	14 10 0
Under 2 in. thick extra—	18 0 0	21 0 0
Yellow Pine—Planks, regular sizes	44 0 0	upwards.
Oddments—	32 0 0	0 0 0
Second, regular sizes—	33 0 0	0 0 0
Yellow Pine—Planks, 3 in. by 11 in.	13 10 0	14 10 0
Curri Pine—Planks, per ft. cube.	0 3 6	0 5 0
Danzig and Stettin Oak Logs—		
Large, per ft. cube—	0 3 0	0 3 6
Small—	0 2 6	0 2 9
Wainscot Oak Logs, per ft. cube.	0 5 6	0 6 0
Best Wainscot Oak, per ft. sup.		
1 in. do. do—	0 0 9	0 0 9
1 in. do. do—	0 0 7	0 0 7
Dry Mahogany—Honduras, Ta-		
basco, per ft. super, as inch.	0 0 9	0 1 0
Selected, Figure, per ft. super.	0 1 6	0 2 6
Dry Walnut, American, per ft.		
super, as inch—	0 0 10	0 1 0
Teak, per lb.—	37 0 0	22 0 0
American Whitewood Planks,		
per ft. cube—	0 4 0	0 5 0
Prepared Flooring, etc.—		
1 in. by 7 in. yellow, planed and		
shot—	0 13 6	0 17 6
1 in. by 7 in. yellow, planed and		
matched—	0 14 0	0 18 0
1 in. by 7 in. white, planed and		
matched—	0 16 0	0 1 0
1 in. by 7 in. white, planed and		
shot—	0 12 0	0 14 6
1 in. by 7 in. white, planed and		
matched—	0 12 6	0 15 0
1 in. by 7 in. white, planed and		
matched—	0 15 0	0 16 6
1 in. by 7 in. white, planed and		
beaded or V-jointed brds.—	0 11 0	0 13 6
1 in. by 7 in. white—	0 14 0	0 18 0
1 in. by 7 in. white—	0 11 0	0 11 6
1 in. by 7 in. white—	0 12 6	0 15 0
6 in. at 6d. to 9d. per square less than 7 in.		

JOISTS, GIRDERS, &c.

In London, or delivered	£ s. d.	£ s. d.
Railway Vans, per ton.	7 0 0	7 10 0
Compound Girders, ordinary		
sections—	9 0 0	10 0 0
Steel Compound Stanchions—	12 0 0	13 0 0
Angles, Tees, and Channels, ordi-		
nary sections—	9 0 0	10 0 0
Filch Plates—	9 0 0	10 0 0
Cast Iron Columns and Stanchions		
including ordinary patterns—	7 10 0	8 10 0

METALS.

Per ton, in London.	£ s. d.	£ s. d.
Common Bars—	8 0 0	8 10 0
Standard Crow Bars, good		
merchant quality—	8 10 0	9 0 0
Standard "Marked Bars"—	10 10 0	10 10 0
Mild Steel Bars, matches—	8 15 0	9 0 0
Hoop Iron, best price—	9 0 0	10 0 0
" Galvanised—	17 0 0	18 0 0
(And upwards, according to size and gauge.)		
Sheet Iron Black—		
Ordinary sizes to 20 g.—	9 10 0	10 0 0
" 24 g.—	10 10 0	11 0 0
" 28 g.—	12 0 0	13 0 0
Sheet Iron, Galvanised, flat, best quality—		
Ordinary sizes, 6 ft. by 2 ft. to		
3 ft. to 20 g.—	14 0 0	15 0 0
Ordinary sizes to 22 g. and 24 g.—	14 0 0	15 0 0
" 26 g.—	15 0 0	16 0 0
Sheet Iron, Galvanised, flat, best quality—		
Ordinary sizes to 20 g.—	17 0 0	18 0 0
" 22 g. and 24 g.—	17 0 0	18 0 0
" 26 g.—	18 0 0	19 0 0
Galvanised Corrugated Sheets—		
Ordinary sizes 6 ft. to 8 ft. 20 g.—	14 0 0	15 0 0
" 22 g.—	15 0 0	16 0 0
" 26 g.—	15 15 0	16 15 0
Best Soft Steel Sheets, 6 ft. by 2 ft.		
to 3 ft. by 20 g. and thicker—	11 10 0	12 0 0
Best Soft Steel Sheets, 22 g. & 24 g.—	12 10 0	13 0 0
" 26 g.—	14 15 0	15 0 0
Cut Nails, 3 in. to 6 in.—	9 10 0	9 15 0
(Under 3 in., in usual trade extras.)		

LEAD, &c.

Per ton, in London.	£ s. d.	£ s. d.
LEAD—Sheet, English, 3 lb. and up.	20 15 0	21 0 0
Pipe in coils—	21 5 0	22 0 0
Sold pipe—	23 15 0	24 0 0
Compo pipe—	23 15 0	24 0 0
Zinc—Sheet—		
Vicille Montagne—	33 10 0	34 0 0
Silence—	33 5 0	34 0 0
COPPER—		
Strong Sheet—	0 1 1	0 1 1
Thin—	0 1 1	0 1 1
Copper nails—	0 1 0	0 1 0
BRASS—		
Strong Sheet—	0 1 0	0 1 0
Thin—	0 1 0	0 1 0
Tri—English Ingots—	0 1 0	0 1 0
Solder—Flumbers—	0 0 8	0 0 8
Turners—	0 0 10	0 0 10
Blowpipe—	0 0 15	0 0 15

ENGLISH SHEET GLASS IN CRATES OF STOCK SIZES.

STOCK SIZES.		24d. per ft. delivered.
15 oz. thirds	.....	13d.
15 oz. fourths	.....	34d.
21 oz. thirds	.....	24d.
21 oz. fourths	.....	44d.
26 oz. thirds	.....	34d.
26 oz. fourths	.....	5d.
32 oz. thirds	.....	44d.
32 oz. fourths	.....	34d.
Fluted Sheet, 15 oz.	.....	44d.
21 oz.	.....	34d.
	.....	44d.

ENGLISH BOILED PLATE IN CRATES OF STOCK SIZES.

Hartley's—	24d. per ft. delivered.	£ s. d.
" " " "	24d.	24d.
" " " "	34d.	34d.
" " " "	44d.	44d.
" " " "	54d.	54d.
" " " "	64d.	64d.

OILS, &c.

Raw Linseed Oil in pipes—	per gallon	£ s. d.
" " " "	0 1 0	0 1 0
" " " "	0 2 0	0 2 0
" " " "	0 1 1	0 1 1
" " " "	0 2 0	0 2 0
" " " "	0 3 10	0 3 10
" " " "	0 4 0	0 4 0
Genuine Ground English White Lead—	23 10 0	23 10 0
Red Lead, Dry—	0 7 0	0 7 0
Best Linseed Oil Putty—	1 12 0	1 12 0
Stockholm Tar—	1 12 0	1 12 0

VARNISHES, &c.

Per gallon.	£ s. d.
Fine Pale Oak Varnish—	0 8 0
" Pale Copal Oak—	0 10 6
Superfine Pale Elastic Oak—	0 12 6
" Fine Extra Hard Church Oak—	0 10 0
Superfine Hard-drying Oak, for seats of	
Churches—	0 14 0
Fine Elastic Carriage—	0 12 6
Superfine Pale Elastic Carriage—	0 16 0
Fine Pale Maple—	0 16 0
Finest Pale Durable Copal—	0 18 0
Extra Pale French Oil—	1 1 0
Edgehill Flattening Varnish—	0 18 0
White Copal Enamel—	1 4 0
Extra Pale Paper—	0 12 0
Best Japan Gold Size—	0 10 6
Best Black Japan—	0 16 0
Oak and Mahogany Stain—	0 8 0
Brunswick Black—	0 8 6
Berlin Black—	0 16 0
Knottling—	0 10 0
French and Brush Polish—	0 10 0

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TENDERS.

Communications for insertion under this heading should be addressed to "The Editor," and must reach us not later than 10 a.m. on Thursdays. (N.B.—We cannot publish Tenders unless authenticated either by the architect or the building-owner; and we cannot publish announcements of Tenders accepted unless the amount of the Tender is stated, nor any list in which the lowest Tender is under 1000, unless in some exceptional cases and for special reasons.) * Denotes accepted. † Denotes provisionally accepted.

ANSTWICK.—For sewerage and sewage disposal works (Contracts Nos. 1 and 2), for Settle Rural District Council. Mr. T. A. Foxcroft, Engineer and Surveyor, Town Hall, Settle. Contract No. 1. Cumberland Bros., Benthams, Lancaster £1,822 6 10 Contract No. 2. Cumberland Bros., Benthams, Lancaster 244 8 5

ARUNDEL.—For making-up, etc., 400 sq. yds. of Wood View-road and Ford-road, including 580 ft. Norwegian granite kerb and brick channelling, for the Town Council. Mr. E. F. Farrington, Borough Surveyor, Town Hall, Arundel. Quantities by Borough Surveyor—Potter Bros., £245 0 0 H. W. Haggett £216 8 7 M. Webb £240 15 0 M. Thacker & Co. 198 7 5 J. Jackson £240 5 9 E. G. Holland* 189 18 7 E. H. King £239 6 6

BANGOR.—For erecting new free library. Messrs. Dixon & Potter, architects, 65, King-street, Manchester:—W. Jones £3,808 0 0 E. Thorp & Son £3,310 0 0 E. Jones & Son 3,850 0 0 W. Osburn & Son 3,230 0 0 R. J. Williams 3,543 0 0 J. Williams & Son 3,165 0 0 J. Jones & Son 3,875 0 0 H. Hughes & Son 3,814 0 0 H. Hughes & Son 3,814 0 0 R. Evans & Son 3,333 0 0 Bottle Livers 3,814 0 0 W. Parry £3,314 10 0 pool £2,860 0 0

BARNOLD SWICK.—For street works, for the Urban District Council. Mr. W. Bennett, Town Surveyor, Town Hall, Barnoldswick—

T. Starkey	£ s. d.	£ s. d.	£ s. d.
S. B.	—	—	2,114 8 0
F. Sugden	—	—	1,726 11 11
J. Miles	—	—	1,660 11 6
W. J. Mc-	1,127 8 8	510 16 8	1,647 4 11
Donald	—	—	—
W. Baker	1,054 5 9	400 8 6	1,544 14 8
Kelchley	—	—	—
J. Green	1,029 14 7	496 7 9	1,526 2 4
Burnley	—	—	—

CAISTOR.—For constructing and testing a new water main at Moorfoot, for the Rural District Council. Mr. E. J. Silcock, M.Inst.C.E., 10, Park-row, Leeds. Quantities by engineer:—B. Tabor £1,288 12 3 Castle & Co., £1,225 6 0 Jenkins & Sons 1,276 0 0 T. Egan & H. Shadlow 1,208 8 6 Sons £1,211 17 0 Schofield & Co. 1,266 12 1 R. C. Crawford 1,158 0 3 J. K. Jones 1,286 4 0 Mitchell & Son 1,108 5 0 J. Totley 1,282 0 0

CAVERSHAM.—For sewage disposal works (Contract No. 2) and manager's cottage, for the Urban District Council. Mr. A. J. Smith, Engineer and Surveyor, 11, Bridge-street, Caversham:—

Tenders for New Sewage Works.	£13,551 16 6
A. G. Osenton	£13,551 16 6
Hardy, Bates, & Co.	12,348 14 6
Hewitt & Sons, Ltd.	12,073 4 11
R. T. Jeffrey	11,381 14 8
W. Moss & Sons, Ltd.	10,947 13 3
T. Vale & Sons, Ltd.	10,693 11 2
H. Hill	10,258 6 7
J. Moran & Son, Ltd.	10,170 11 3
B. Cooke & Co.	10,053 0 0
Bower Bros.	9,228 13 0
Chick & Carden	9,783 17 11
McCarthy E. Fitt	9,727 0 0
A. Faulks	9,065 12 9
H. W. Godwin	8,437 1 0
S. Lewis & Bro.	8,297 0 0
A. Streeter & Co.	8,208 3 9
Collier & Catley, Ltd., St. Mary's	
Bulke, Reading*	8,483 1 2
H. Harris & Son	8,425 17 0
G. G. Rayner	8,320 14 7
R. H. B. Neal, Ltd.	8,090 8 11
T. H. Macdonald	8,086 0 0
(Surveyor's estimate, £8,771 17s. 6d.)	
† No schedule.	
‡ Incomplete.	

MANAGER'S COTTAGE.

Managers' Cottages.	£499 0 0	R. Bell & Sons	340 0
W. Hawkins	£499 0 0	G. Stockwell &	335 0
W. Stokes & Sons	498 15 0	Sons	335 0
J. Trinder & Sons	495 0 0	Fisher Bros.	335 0
H. A. Wyeth	465 0 0	Batten Bros.	335 0
P. W. Romaine & W. Romaine	405 12 0	Southampton	325 0
H. W. Godwin	377 0 0	street, Reading*	325 0
(Surveyor's estimate, £300.)			

HACKNEY.—For the erection of a central library for the Borough Council. Mr. Henry A. Crouch, architect, 12, Gray's Inn-square, W.C.:—

Extra Cost	£ s. d.	£ s. d.	£ s. d.
If Ancaster	318 0	13,000 0	
Stone is	850 0	13,200 0	
substituted	615 0	12,900 0	
for	325 0	12,553 0	
Monks Park.			

£	£ s. d.	£ s. d.	£ s. d.
A. Dearing & Sons—	12,484	318 0	13,000 0
A. F. Vigor & Co.	12,440	850 0	13,200 0
Kirk & Randall—	12,293	615 0	12,900 0
T. & M. Patrick—	12,228	325 0	12,553 0
Palman & Fother-			
ingham	12,183	320 0	12,503 0
Marin, Wells, & Co.	12,029	331 0	12,960 0
Sheldrick Bros.	11,975	650 0	12,525 0
C. Wall, Ltd.—	11,970	709 0	12,679 0
C. Castle & Son—	11,950	461 10	12,111 10
F. & H. F. Higgs—	11,885	491 0	12,376 0
Leslie & Co.—	11,780	610 0	12,400 0
Perry & Co.	11,780	491 0	12,277 0
A. Fairhead & Son—	11,769	700 0	12,469 0
W. Lawrence & Son	11,674	538 0	12,209 0
E. Lawrence & Son	11,663	615 0	12,278 0
C. R. Price—	11,650	695 0	12,245 0
W. J. Fryer & Co.—	11,500	600 0	12,100 0
Sabry & Son—	11,500	600 0	11,900 0
J. Chesman & Sons	11,467	580 0	12,047 0
H. L. Holloway—	11,465	500 0	11,965 0
Fitch & Cox—	11,180	605 0	11,785 0
E. E. Nightingale—	11,047	1,171 0	12,218 0
Kilby & Gayford—	10,998	630 0	11,628 0
Shurman & Sons—	10,989	600 0	11,589 0
C. P. Roberts—	10,952	276 0	11,228 0
Edwards & Melway			
Kennington Steam			
Joinery Works, 9,			
Elthorpe-street,			
Kennington Cross,			
S.E.—	10,602	500 0	11,102 0†

HARPENDEN.—For making up Douglas-road. Mr. J. H. Leverton, surveyor:—W. H. Worth-ington £1,841 3 6 H. Powdrell, £1,195 18 0 E. C. Jarvis, £1,320 6 0 C. Killing-T. Adams £1,303 6 10 back Cam-den Town* 1,091 9 3 [Surveyor's estimate, £1,293 8s. 6d.]

HARROGATE.—For private street works, in back road off York-road, for the Corporation. Mr. F. Bagshaw, Borough Engineer and Surveyor, Harrogate:—A. Leatham, 4, Park-villas, New Park, Harrogate* £282 2 4

HEREFORD.—For taking down three old cottages, numbers 86, 87, and 88, Widemans-street, Hereford, and erecting three new cottages on the site. For Mr. W. Davis. Mr. H. Skyrme, architect, 188, Widemans-street, Hereford. Quantities by architect:—W. P. Lewis & Co. £844 E. Cooke £735 W. Powell £739 E. Davies* £720 [All of Hereford.]

KIRKCUDBRIGHT.—For the construction of filter-beds and the providing and laying of a line of cast-iron pipes from Lochgarry to Kirkcudbright, for the Town Council. Mr. R. Miller, Borough Surveyor, Kirkcudbright:—J. Low £300 5 9 D. W. K.H. £310 14 6 P. Drummond & Son £33 10 0 J. G. Heather, Dumfries* 303 18 9

LLANON.—For erecting new offices and other work at Council school. Mr. G. Dickens-Lewis, County Architect, Aberystwyth.—
 W. Jones £295 0
 T. James 240 0
 D. P. Jones 209 0
 W. Edwards £15 10

LONDON.—For the erection of new premises in Middlesex-street, E., for Messrs. C. & H. Finegold. Mr. C. B. Hollist, architect and surveyor, 35, Jewry-street, E.C.—
 S. Lissner .. £7,200 0 0
 F. W. Scott .. 5,950 0 0
 C. Sims .. £5,565 17 6
 Amended and accepted at £5,350.

LONDON.—For exterior painting and repairs to laundry roof at the Strand Union Workhouse, Upper Edmonton, for the Guardians. Mr. A. A. Kekwick, architect, Outer Temple, Strand.—

	Painting.	Repairs to roof.
A. Monk	£945	1,265
T. Shurington	908	242
Love & Co.	875	205*
W. C. Ridgway	650	—
J. Stewart	558	198
Barrett & Power	538	313
J. J. Richards	524	—
A. Porter	493	340
F. W. Harris	439	—
H. Willmot	429	—
J. Johnson	410	—
W. Moore & Son	399	—
Limmer & Galloway	309	—
Pat McCarthy	297*	—

MABLETHORPE.—For additions to the Council Schools, for Lindsey County Council Education Committee. Messrs. Seaver & Gamble, architects, Bank-street-chambers, Lincoln.—

	Thompson & Sons
Sprakes & Sons	1,323 0 0
J. Crowshaw	1,229 0 0
F. Moore	1,485 10 0
J. Gutteridge	1,390 0 0
Hinson & Co.	1,344 0 0
Thompson & Sons	1,323 0 0
J. Crowshaw	1,229 0 0
A. J. Elmes	1,375 2 0
Maver Bros.	1,245 0 0
P. Scarborough	1,112 10 0

NORTHAMPTON.—For widening the approaches of Irillingborough Bridge for the County Council. Mr. C. S. Morris, County Surveyor, County Hall, Northampton.—

	F. Benson
Smith & Son	£1,875
G. J. Fisher	1,740
R. Marriott	1,740
G. Henson & Son	1,600
Berrill & Green	1,578
Hackley Bros.	1,557
F. Benson	£1,555
Sturgess & Sons	1,541
E. Irwin & Son	1,461
Goodman & Murrell	1,259

NORTHAMPTON.—For rebuilding constable's house at Brackley police station, for the County Council. Mr. C. S. Morris, County Surveyor.—

	Sturgess & Sons
O. Orchard & Son	£490
J. S. Kimberley	460
J. F. Booth	435
G. F. Watson	428
W. R. & T. Hawkins	490
R. Coxford	389
R. Marriott	383
Sturgess & Sons	£368
Berrill & Green	360
Goodman & Murrell	360
Goy & Co.	350
B. Holloway, Northampton	325

PENRITH.—For building river walls and constructing steel girder bridge across river Emont (Sewerage Works, Contract 3), for the Urban District Council. Mr. J. F. Kewstubb, Resident Engineer, Town Hall, Penrith. Quantities by Messrs. Briceley, Holt, & Co., engineers, Blackburn.—

	W. Gracethwaite
W. Gracethwaite	£2,005 0 0
F. Firth	1,702 10 10
J. Jackson & Son, Penrith	1,618 18 1
Mackay & Sons	1,567 18 0

STANSTED (Essex).—For the extension of sewers, for the Rural District Council. Mr. E. T. Watts, Surveyor, Thorley, Bishop's Stortford.—

	W. & C. French
J. J. Quarterman	£2,811 0 0
C. Wall	2,748 0 0
Nairn & Sons	2,125 0 0
G. Bell & Sons	1,485 0 0
F. C. Thompson	1,437 16 7
Langley & Johnson	1,421 9 3
T. Free & Sons	1,321 0 0
A. Woodridge	1,311 8 3
W. & C. French	£1,280 0 0
Hill	1,250 0 0
G. U. Rayner	1,179 0 0
W. & C. French	1,179 0 0
J. Jackson	1,123 0 0
Black & Sons	1,120 8 3
W. Johnson	970 0 0

SANDOWN.—For alterations and additions to the Town Hall, for the Urban District Council. Mr. L. G. Dwyer, Surveyor to the Council. Quantities by Surveyor.—
 J. White

STRET福德.—For the erection of twenty pairs of semi-detached cottages in Lacy-street, Stretford, near Manchester, for the Stretford Urban District Council. Messrs. John Bowden & Co., architects, 14, Ridgely, Manchester.—

	M. Stone & Sons
Howard & Son	£7,450 0 0
A. Spittal	7,400 0 0
J. Caldwell	7,154 0 0
S. Warburton	7,008 5 7
J. & J. Parish	6,912 2 0
G. W. Dawson	6,885 0 0
H. Vickers & Son	6,730 0 0
Feardley & Sons	6,712 0 0
A. Rodkinson	6,610 0 0
E. Powell	6,385 0 0
M. Stone & Sons	£6,247 0 0
W. Thorpe	6,237 0 0
W. Watson	6,230 10 0
T. Mitchell	6,140 0 0
T. Williams & J. Gerrard	6,120 0 0
Ross, Ltd.	6,113 0 0
F. Cain, Stretford	6,100 0 0

SWINDON.—For erecting schoolroom, Upper Stratton, for Primitive Methodist Trustees. Mr. J. Hyde, 13, Lichfield-grove, Church End, Finchley, London, N.—
 W. Tarnant

TARLAND (N.B.).—For rebuilding shops and bakehouse, for the trustees of the late Charles Grant. Mr. W. E. Gaul, A.R.I.B.A., 258, Union-street, Aberdeen. Quantities by the architect.—

	G. Duncan, Inverurie
Stuker & Craica, Aberdeen	£119 9 0
Wright & Son, Aboyne	99 9 7
Pheniar, W. Hill, Banff	27 0 0
Glennie, J. Mason & Son, Aberdeen	45 13 6

WESTON-SUPER-MARE.—Milton, new infant's Council school, Messrs. Hans Price & W. Jane, architect. Weston-super-Mare.—

	C. Addicott
H. A. Price	£2,140 0 0
A. G. Heard	2,380 0 0
E. Preece	2,277 0 0
G. Pollard & Co., Ltd.	2,148 0 0
C. Taylor	2,142 0 0
C. Addicott	£2,315 0 0
A. J. Colborne	2,020 12 6
H. J. Bear & Sons	1,830 0 0
B. W. Pollard	1,740 0 0

YORK.—For extending the district for buildings, for the Corporation. Mr. A. Crox, Architect, Guildhall, York.—
 F. Shepherd & Co., Lead Mill-lane, York .. £703

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ILLUSTRATIONS.

New Organ, Cheltenham College Chapel.....	Mr. H. A. Frothero, F.R.I.B.A., Architect.
A Competition Design for the Peace Palace at the Hague.....	By Mr. G. A. Bligh Livesay, F.R.I.B.A.
City Chambers, Leeds.....	Messrs. Perkin & Bulmer, Architects.
Font Cover, Walsham-le-Willows.....	Mr. W. G. Horseman, Architect.
Font Cover Counterpoise Weights, Loughborough.....	Mr. W. S. Weatherley, F.R.I.B.A., Architect.

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The Development of Iron and Steel Roof Design.—I.



IRON and roof construction on a large scale may be said to have commenced with the Exhibition building of 1851, the chief members of which were afterwards

incorporated in the Crystal Palace. As everybody knows, the original idea was due to Sir Joseph Paxton, but it is not so generally known that its realisation depended in great measure upon the assistance given by Sir Charles Fox on behalf of the contractors, Messrs. Fox & Henderson, of Birmingham.

The main arched ribs of the Exhibition building, like those of the Crystal Palace roof, were intended to act as girders without exerting lateral thrust, although provision for arch action was afterwards made by the addition of bracing between the supporting columns, thus enabling these members to act as abutments. Further progress was evidenced in the construction of the Crystal Palace by the skilful combination of cast-iron and wrought-iron in the roof of that building. The details of both designs were worked out by Sir Charles Fox, most of the working drawings being made by that gifted designer, Mr. R. M. Ordish, then engaged in the office of Messrs. Fox & Henderson.

The Crystal Palace roof may be looked upon as the prototype of some

other arched roofs to which we direct attention hereafter, and its self-contained character may have suggested to Messrs. Fox & Henderson, with whom Mr. Ordish was still associated, the suitability of the arched trusses forming the principals of the roof erected in 1851-4 over the New-street station, Birmingham.

Fig. 1 is a diagrammatic representation of this roof, which has a clear span of 212 ft., and is a magnificent specimen of early engineering, still in serviceable condition.

In consequence of the accident to the Charing Cross station roof, some question was raised as to the safety of the roof at New-street, more particularly as this was admittedly the model of the unfortunate structure in London. Therefore, it is worthy of record that the London and North-Western Railway Company have reliable evidence that at the time their Birmingham roof was erected each of the tie-bars was tested far beyond the stress it bears to-day, that when these bars was last examined they were shown to be absolutely sound, and that the ironwork of the roof generally is in an excellent state of preservation. We have the best authority for stating that when the next periodical cleaning and painting of the ironwork takes place the tie bars will again be thoroughly examined, and that no apprehension is entertained by the company as to the stability of the roof.

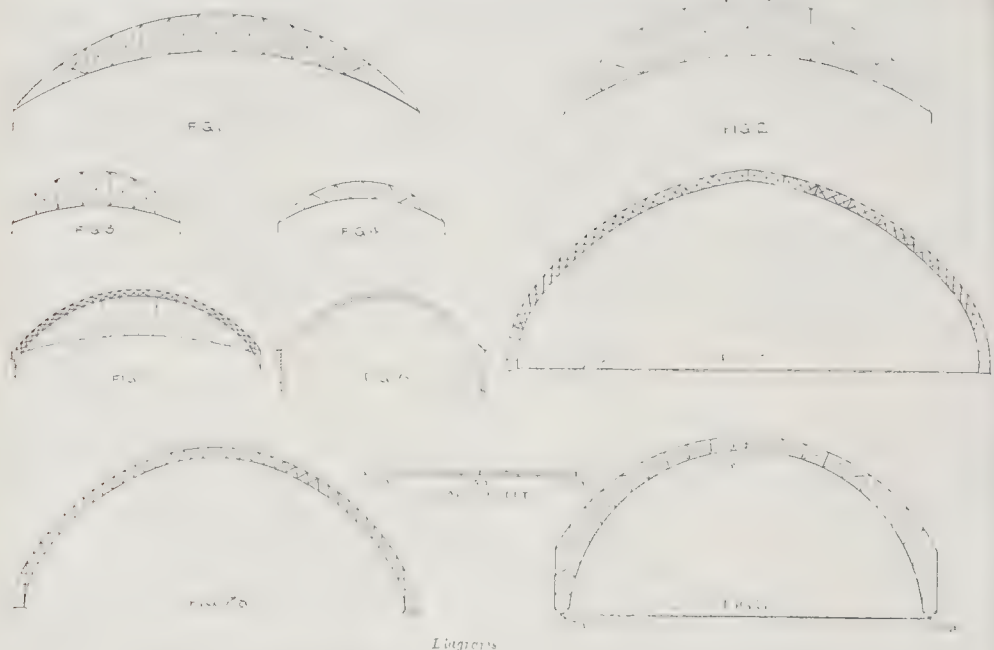
The roof of Fenchurch-street station, designed by Mr. Berkeley, and built about 1851, was another historic structure

until its replacement about four years ago by a new roof. The original design was similar in respect of the arrangement of the bracing to that at Birmingham, and one praiseworthy feature which redounds to the credit of Mr. Berkeley was the adoption of duplicate tie-bars at a time when the necessity for such a safeguard was not generally recognised by structural engineers.

As stated in our article of December 23 last,* the designs of the roofs for Charing Cross and Cannon-street stations were generally similar, but the details of the latter are superior in several respects. At Cannon-street the clear span of the roof is 190 ft. 4½ in., the rise of the rib at the centre being 60 ft.; and the rise of the tie-bar 30 ft., making the truss 30 ft. deep at the centre. Each main truss consists of a segmental rib with a tie-bar and bracing as in Fig. 2. The main rib is a plate girder, 21 in. deep by 14 in. wide, the tie-bar has a uniform diameter of 5½ in. throughout, in nine lengths, the ends of each being swelled out to form eyes which are secured by bolts to coupling blocks, and the vertical struts, dividing the principal into nine panels, consist of two T-bars bolted back to back with a stiffening plate to each bar, and the diagonals are plain bars 6 in. wide by ½ in. thick, these members bolted and riveted to a plate projecting from the coupling-blocks.

The east end of the truss is fixed, and the west end is provided with a rocking-saddle, beneath the bottom plate of which rollers are placed to provide for

* The Builder, Vol. LXXXIX., p. 602.



Lignons

expansion and contraction, the object of the hinged foot being to insure that stress shall pass through the centre of the group of rollers under all circumstances. Thus the connexions of the tie-bar are not only more secure than were those of the former roof at Charing Cross, but by permitting more freedom of action they obviate the bending moments that are sure to be developed in the parts of a bar with rigid connexions. Further, the arrangement of the expansion device at the free end of the principal is in every way superior to the analogous arrangement at Charing Cross.

The wall construction of Cannon-street station is considerably thicker than at Charing Cross, to say nothing of the towers at the south end. Between the two towers is a gable screen consisting of two wrought-iron trusses of the same radius as that of the roof ribs and nearly horizontal at the bottom. These two trusses are spaced 11 ft. apart and connected so as to form one broad girder, which, being held down by wall bolts, constitutes a firm and effective bracing for the walls.

An undesirable feature presented by both the Cannon-street and the old Charing Cross roofs is that, as the ironwork is mounted upon exceedingly high walls, examination and maintenance are rendered unnecessarily difficult. Inspection, cleaning, painting, and renewals can only be conducted from scaffolds suspended from the roof principals, involving methods of work that are neither safe nor convenient. The risk of failure is distinctly accentuated by erecting ironwork in positions where it cannot be inspected easily and thoroughly, and the consequences of any partial failure are needlessly increased by the exaggerated form of a design that is

good in itself, if carried out in accordance with all the precautions suggested by practical experience.

Among other early examples of roofs with segmental trusses one of the best known is that over the London Bridge terminus of the London, Brighton, and South Coast Railway, comprising a centre span of 88 ft., and two side spans of 87 ft. and 91 ft. respectively. The main features of the 88 ft. span are as follows:—The system of bracing is represented in Fig. 3, the main rib being a curved plate girder, the ends of which are bolted to columns. The tie-bar, of 2½ in. diameter throughout, is made in separate lengths joined by screwed coupling-boxes somewhat similar to those at Charing Cross. The struts of the bracing are tubular and the diagonal ties consist of flat bars, the bracing being connected with the screwed coupling-boxes, by means of a saddle-piece on top of each coupling-box, the strut fitting into a socket, and the ties connected by bolts to projecting lugs. The strut is provided with a bolt, which passes through the middle of the coupling-box and serves to hold the saddle in place. This arrangement is certainly not one that would be adopted in the present day.

The old Blackfriars passenger-station (London, Chatham, and Dover Railway) possessed a roof of excellent design, which was removed when the station became converted into a goods depot. The principals of the main roof had a span 87 ft. 3 in., the rib being a curved plate girder, and the tie-rod consisted of two parallel bars, having the uniform width of 5 in. and varying in thickness from ½ in. to ¾ in. The bracing, of which Fig. 4 is a diagram, consisted of duplicate bars, the tie-bars and bracing being connected by a 2-in. diameter

turned pin at the junction of the three members. This is a good method of construction, as the duplicate bars give the assurance of safety that is always to be desired in roof trusses of the kind.

Another important example is furnished by the roof of Lime-street station, Liverpool, designed by Sir John Fowler, and built by Messrs. Handyside & Co., in 1872-3. The main portion of the station, which was enlarged in 1875, has principals with an average span of 212 ft., the bracing being similar in arrangement to that in Fig. 4.

The main rib is a curved plate girder, the ends of which are supported on columns. The main tie consists of a series of four 5½-in. by ¾-in. flat bars, placed side by side, the ends of the separate lengths of the links being swelled out to form eyes, connected at each joint by a steel pin 1½ in. diameter. In every case the bars were forged solid without welds. Each member of the bracing consists of two angle bars spaced apart by cast-iron distance pieces secured by bands of half-round iron. The diagonals of the bracing are connected by ¾-in. web plates, each of which has an eye at the bottom through which passes the steel pin connecting the different sections of the main tie. At the top the bracing is connected in a somewhat similar way, but the web plates are riveted to angle brackets attached to the main rib. This roof is a very fine example of practical and theoretical design which it would be difficult to improve upon in the present day. Apart from its other meritorious features, the roof is quite safe from any accident such as that which overtook the unfortunate structure at Charing Cross, for with four solid forged links in each length of the main tie, one or two bars

each length might break without involving failure of the principal affected.

A form of design somewhat resembling the Charing Cross roof in principle, although differing in points of detail, is typified by the roofs of Victoria station (London, Chatham, and Dover Railway), the Central station, Liverpool, and Queen-street station, Glasgow. Fig. 5 illustrates the general idea embodied in these roofs. Each principal is really an arch with the ends connected by a main tie-bar looped up by radial ties.

The roof at Victoria comprises two arches of 127 ft. and 129-ft. span respectively, one end of each being supported by roller bearings on brick walls, and the other ends fixed to the top of a cast-iron column. The bracing of the arch itself comprises a double system of triangulation and perpendiculars between the upper and lower flanges, the principals being spaced 35 ft. apart, centre to centre. This roof was designed by Sir John Fowler, as also was that of the Central station, Liverpool, which has nine principals of 160 ft. span, spaced 55 ft. apart. The general construction is similar to that of the Victoria roof, but it should be noted that all the tie-bars and rods are of steel.

Queen-street station, Glasgow, is the most important example hitherto built of the tied arch construction now under consideration. The roof includes nine principals of 170 ft. span and spaced 41 ft. 6 in. apart.

In the three last-mentioned examples single tie-bars are relied upon to take the thrust of the principals, an arrangement which, in view of the wide spacing between the principals, cannot be regarded as satisfactory.

Let us now turn to an entirely different type of roof, in which the principal of the arch is applied in such a way as to obviate the use of tie-bars.

The earliest arched roof for a railway-station was that at King's Cross, built in 1851, on a system entirely new in this country, the arched ribs consisting of a series of wooden planks held together with screws and trenails. The roof, included two spans of 105 ft., the abutments of which were constituted by the station walls and buildings. In 1869 the ribs over the arrival platforms were replaced by wrought-iron arches of similar shape, and in 1887 the roof over the departure platforms were similarly replaced, owing in each case to the signs of decay which became evident in the timber. Fig. 6 is an elevation of the new rib, which is practically a reproduction of the design employed in the Great Northern station at Bradford.

Paddington was the first railway-station to be spanned by wide and lofty iron arches. The roof was designed by Brunel, and built by Messrs. Fox & Henderson, about 1856. It consists of three spans, the centre one 102 ft. 6 in., and those on each side of 70 ft., 68 ft., respectively. This is one of the most elegant structures of the kind in existence, and the simple method of ornamentation in the web of the ribs is particularly worthy of commendation.

The next noteworthy type of iron roof design in railway practice is illustrated in St. Pancras station, St. Enoch's

station, Glasgow, and the Central station, Manchester.

St. Pancras station, completed in 1867, was designed by Mr. W. H. Barlow, F.R.S., then chief engineer to the Midland Railway, the design of the ironwork having been intrusted entirely to Mr. R. M. Ordish, to whom Mr. Barlow publicly gave all the credit for the fine engineering work represented by the roof in question. The main requirements of the case were that an unimpeded width of 240 ft. should be provided between the walls of the building, that the roof should be without complicated bracing and easy of access, and that buttresses should not be built outside the station walls. The design prepared by Mr. Ordish admirably fulfilled these conditions, and resulted in a distinctly novel form of railway roof construction, which is diagrammatically represented in Fig. 7. Each latticed rib is carried down to a massive base plate placed upon masonry foundations below the floor level, the abutments being formed by 20 ft. of solid brickwork. The ends of all the ribs are connected by girders below the floor level of the station, although it is doubtful whether any tensile stress actually comes upon these members.

The roof of St. Enoch's station, Glasgow (see Fig. 7a), has a span of 198 ft., and is very similar in general design to St. Pancras, although the bracing of the main rib is not quite the same, and there are no ties connecting the ends of the arch ribs. The ends of these members are secured to base plates bolted down to masonry foundations, and with the object of counteracting the outward spring of the arches the base plates extend 20 ft. inwards. This roof was designed by Mr. A. Gallo way, and built by Messrs. A. Handysides & Co. in 1871.

The roof of the Central station, Manchester, on the same principle as that of St. Enoch's, has a span of 210 ft., and was built soon after the completion of the Glasgow roof.

The opinion is generally held that roofs of the St. Pancras type are unnecessarily extravagant in first cost, and have other disadvantages for which, however, railway managers of a past generation, and not the designers, must be blamed. As illustrating the change that has taken place with regard to this point, it is worthy of remark that in referring to the St. Pancras station, Sir Ernest Paget, the chairman of the Midland Railway Company, said that although the proprietors were proud of it as a triumph of engineering skill, it was an utter abomination as a railway-station from an economical point of view, and was incapable of lateral extension.

It ought to be pointed out, however, that the St. Pancras type of roof has been reproduced in various important structures on the Continent and in the United States within recent years. Some of the more modern examples of this class embody the principle of the three-hinged arch, a method of treatment which has the advantage of defining wind and load pressures.

The roofs of the new station of the Pennsylvania Railroad at Pittsburg and the Jersey City terminus of the same

line both represent the St. Pancras type of design. These stations are practically alike, except in respect of some minor details, and the dimensions are approximately the same, being about 555 ft. long by 260 ft. wide by 110 ft. high over all. Fig. 8 is a diagram showing the general design of the trusses, which are of the three-hinged type, spaced alternately 9 ft. and 40 ft. 6 in. apart, and braced together in pairs, the vertical ends of the ribs being braced on each side of the building by a continuous line of lattice girders. The ribs have the span of 255 ft. between the centres of the end hinges, a rise of 93 ft., and the clear height of 87 ft. above rail level. The hinge at the crown is in the centre of a panel, where the diagonals are made extra heavy for the purpose of transmitting the stresses to the 5-in. centre pin which engages jaw-plates locking the two sections together. At the foot of each half of the rib a double-webbed shoe is riveted, having a semi-cylindrical bearing and jaw-plates engaging the lower hinge-pin and locking it to the pedestal. This pin receives the end of the horizontal lower chord or tie which connects the two ends of the rib and takes the thrust of the arch. The lower chord crosses the station in a closed trough below ground level, and is formed of a 12-in. I-beam in 30 ft. lengths riveted up by means of double web and single flange cover-plates. This roof was built in 1902 from the designs of Mr. W. H. Brown, chief engineer to the Pennsylvania Railroad Company.

Another American roof of similar type is that of the Drill Hall, in the Maryland Armoury, Baltimore, built in 1904. The roof covers an unobstructed floor area about 293 ft. long by 199 ft. wide, the space being spanned by ten three-hinged arch ribs, with a rise of 88 ft., the ends of which are joined below floor level by a tension member, consisting of two 8-in. channel bars for the purpose of resisting the outward thrust.

It is interesting to note that when the ribs of a roof, such as these examples, are adequately connected by horizontal chords, each rib really forms a series of bowstring girders of gigantic proportions, resting upon solid earth. Moreover, the public actually walk inside the girders instead of being many feet below them, as happens in buildings roofed over by trusses of the ordinary kind.

(To be concluded in next issue.)

INSTITUTE OF BRITISH DECORATORS.—The first gold medal of the Institute of British Decorators has been awarded by the Council to Sir William B. Richmond, K.C.B., B.A., in consideration particularly of his important decoration of St. Paul's. The presentation will be made at Painters' Hall, on Monday, November 26.

LONDON COUNTY COUNCIL CENTRAL SCHOOL OF ARTS AND CRAFTS.—The school will open for the eleventh session on Monday, September 24. The curriculum provides instruction in a wide range of artistic handicrafts, including book-binding and typography, silversmiths' and goldsmiths' work, engraving and die-sinking, stained glass, embroidery, lace, dressmaking, miniature painting, cabinet work, carving and gilding, architecture, modelling, drawing, design, etc. Nominal fees only are charged, and apprentices, learners, and improvers are admitted free. A day technical school for boys, preparatory to the silversmiths' and kindred trades, has also been established and will open on October 1. Prospectus and full particulars can be had on application to the Secretary, 316, Regent-street, W.

NOTES.

The Labour Market.
THE Memorandum of the Board of Trade issued by the Labour Department relating to labour in August records further improvement in the building trade, which at last seems to be sharing in the improvement in trade generally. The trade unions' returns as to the unemployed are also satisfactory, the percentage being 3·8, as compared with 5·4 per cent. in August, 1905. It is to be hoped that the unrest apparent in the leaders of the Labour party will be confined to the agitators and that this improvement in trade will not be checked by unnecessary strikes. The total number of workpeople affected by disputes in progress during the month was 14,096, or 3,191 less than in August, 1905, and the duration of the disputes 109,100 working days compares with 346,200 working days in August, 1905. Conciliation played an important part, changes of wages affecting 267,300 workpeople being arranged by mediation or conciliation boards, and we trust that the attitude of the delegates of the trade unions as exhibited at the recent Congress in no sense expressed the opinion of the workpeople towards efforts to extend the policy of conciliation.

Reafforestation.
Isle of Man.
 A GOOD deal has been heard recently of the desirability of reafforestation on waste land in England. In the Isle of Man the question has been taken up practically, and it would seem with success. A recent inspection was, it appears from the *Manx papers*, recently made of a tract of mountain land of 18 acres near St. John's, between Douglas and Peel, on which some 50,000 coniferous trees have been planted. It appears from the inspection which took place this month that the trees are doing well; already, as even the casual visitor can see, they show appreciably much vigorous growth on the mountain-side. Unlike Scotland, the moorlands of the Isle of Man are not used as game preserves, so that one of the chief difficulties of reafforestation in Scotland does not exist in the Isle of Man. There can be no doubt that with care and proper supervision a large quantity of useful timber could be grown in Great Britain. It is not very creditable to the larger island that a lead should have been given in this matter by a small community like the Isle of Man, though the necessity for a home supply has no doubt been emphasised there by the paucity of woodland in the island.

Tunnel Ventilation.
 A PAPER of world-wide interest on the ventilation of railway tunnels is printed in the current issue of the *Proceedings of the American Society of Civil Engineers*. The author, Mr. Charles S. Churchill, has collected recent data relative to the condition of the air in various European and American tunnels which are valuable for comparison and guidance. His figures show that marked improvement has taken place since 1902 in the atmospheric conditions of such lines as the Metropolitan, District, City and South London, and Central London railways.

For instance, on the Metropolitan Railway in 1902 tests made for the London County Council showed that the air in a carriage contained 28·8 parts of CO₂ per 10,000 volumes, while a sample of air taken from a car between Gower-street and Portland-road stations in June, 1905 contained 14·07 parts of CO₂ per 10,000 volumes, the outward air containing at that time only 1·75 parts. On the District Railway the air from a carriage contained 15·1 parts of CO₂ in 1902, and 11·27 parts in June, 1905, when the outer air contained 3·55 parts. The condition of both these lines will naturally be further improved when steam locomotives are finally abolished. On the City and South London, where artificial ventilation is not practised, the air is worse than in other tubular railways, the results of three different tests showing a proportion of CO₂ ranging from 8·69 parts to 14·2 parts per 10,000 volumes, or from three to five times the quantity found in the outer air. Since the application of fans to the ventilation of the Central London Railway the proportion of CO₂ in the carriages has been reduced by about 50 per cent., or from 3·7 times to 2·45 times the quantity in the outer air, which is a substantial improvement. The Great Northern and City Railway easily takes the first place, judging by a test made in July, 1905, when the air from a carriage was found to contain only 2·35 parts of CO₂ per 10,000 volumes, as against 1·75 parts in the outer air. The atmosphere on the Paris Metropolitan Railway seems to be almost as good as that on the last-mentioned line, but in the New York Subway the proportion of CO₂ is stated at 15·58 parts per 10,000 volumes, while the temperature is often exceedingly high.

Lightning-Conductors in America.
 DURING the present year manufacturers of cable in the United States have noticed a sudden increase in the demand for lightning-conductors, which had been dwindling steadily for several years. This is generally attributed to the action of the fire insurance companies, who have threatened to raise the rates of insurance on farm buildings, etc., unless they are efficiently protected from lightning. This sudden conversion of the American companies to a belief in the efficacy of lightning-conductors is noteworthy. Recent statistics prove that over 80 per cent. of the total losses due to fires in farm buildings, etc., in America have been caused by lightning. Fires due to this cause occur most frequently in wooden buildings, but stone and brick buildings have also been struck and set on fire. So far, however, no case has been recorded of a fire caused by lightning in a steel building. The *Electrical World* of New York, in commenting on the revival of the industry, gives some useful hints on the design of lightning-conductors. It is pointed out that greater protection is afforded by eight or ten galvanised iron wires 3 mm. in diameter than by the usual copper rod conductor of 15 mm. diameter. The thin wires are practically invisible. It is recommended that they be stretched vertically, joining a horizontal conductor on the roof with a parallel horizontal

conductor on the ground. It is also recommended that two good "earths" be made with the lower conductor, and that all joints between wires should be soldered and painted. We think that the *Electrical World* lays too much stress on the superiority of iron to copper in this connexion. The only advantage of iron over copper are its higher melting-point and its greater specific heat. It can thus get rid safely of a larger amount of electrical energy than a copper conductor. In damp climates, however, and in the neighbourhood of chemical works, copper is much less liable to corrode than iron. The difference in the cost also is so trifling that it need not be taken into account. For protecting wooden barns, storing inflammable grain, a modified "bird-cage" network of telegraph wires is recommended.

Tests of Concrete-steel Beams.
 In a pamphlet printed for circulation at the Brussels Congress of the International Association for Testing Materials, Dr.-Ing. Fritz von Emperger, of Vienna, states the results obtained by several series of tests upon reinforced concrete beams. The tests show generally that the breaking-weight of a concrete-steel beam depends very largely upon the adhesion between the concrete and the reinforcement, and serve as an indication of the manner in which the resistance of such beams can be increased. All the beams tested were of T-section, about 6 in. deep by 20 in. wide across the compression flange and had the clear span of 6 ft. 6 in. between supports. The tests were conducted upon twenty-two beams of series A and C reinforced with two bars of 2-in. diameter, and eight beams of series B reinforced with eight bars of 2-in. diameter. Each series commenced with a beam reinforced simply by straight bars, and the others were provided with additional reinforcement in the form of bent-up bars and stirrups. The first beams of series A and B developed adhesive power equal to 80 lb. and 110 lb. per square inch respectively, while beams with stirrups gave from 240 lb. to 400 lb. per square inch for series A, and from 330 lb. to 550 lb. per square inch for series B, thus showing very conclusively the value of shear reinforcement as a means of increasing the adhesion between the concrete and the steel. For the purpose of ascertaining the effect of a mechanically perfect bond some tests were made upon beams in which the horizontal bars were screwed at each end and secured by nuts and washers. The effect of this arrangement was that all slipping of the metal was obviated, and that a surprising agreement was obtained between the elongations observed in the beams and those exhibited by specimens of the same material in the testing machine.

Wreck of the Duluth Swing Bridge.
 THE collision of a large lake steamer with the swing span of the Duluth-Superior bridge has provided one more illustration of the truth that the safety of a steel structure depends absolutely upon the integrity of its individual members, and has shown, with dramatic effect that such

structures are able to offer very little resistance against forces applied in directions not anticipated by the designer. The Duluth bridge, situated between the inner and outer harbours of the city, comprises two fixed bowstring girder spans and a swing span 501 ft. long. This span was struck about 20 ft. from the central pier by the stem of a steamer, approaching at dead slow speed, with the result that the compression booms of the truss were cut in two. One end of the span immediately sank into the channel, and a moment afterwards the other followed suit. The impact of the vessel pushed the whole structure on its bearings, but apparently without injuring the central masonry pier. It appears that the prevailing practice has been for the captain of a vessel approaching the bridge to signal for the span to be swung open and to keep on his way in the hope that the passage will be clear by the time the vessel has reached the entrance. The mishap affords another instance of the foolhardy risks habitually run in the United States, as the outcome of the feverish desire to save time which characterises the inhabitants of that country.

The Railway
Disasters
in America.

It has been reported in the daily Press that the serious disasters which occurred this week on the Chicago Rock Island and Pacific and the St. Louis and San Francisco railways were both due to bridge failures. This is probably an error, for in the case of the former accident the true cause appears from the statement of a survivor to have been the undermining of the track running alongside the Cimarron river owing to severe floods. The result was that as the train passed over the fatal point the lines gave way and several of the carriages were submerged, thus drowning nearly all the inmates. In a country like the United States, where railways run through sparsely-populated regions, unexpected injury to the permanent way cannot be detected so readily as in Great Britain, but, as heavy floods have prevailed during the past fortnight on the section of the line affected, it is reasonable to suppose that the desirability of examination should have occurred to the railway engineers. Whether or not this precaution was taken we cannot say, but, judging by the happy-go-lucky manner in which railway traffic is conducted in the United States, we should imagine it was omitted. The second accident on the same river was due to the collapse of a railway bridge said to have been weakened by the floods of the past fortnight. We do not yet know whether the bridge was one of the flimsy structures through which American trains are in the habit of falling, or if it was one of substantial character whose stability was impaired by recently-undermined foundations. In the latter alternative the railway company would have no reason to anticipate danger, and can scarcely be blamed for lack of precautions. More detailed information on the point will be interesting.

The Swindon
Tramway
Accident.

In our "Note" of July 14 last we referred to the probably defective condition of the magnetic brake of the runaway car

which caused the death of five passengers and more or less serious injury to between seventy and eighty others. Colonel von Donop, in the Board of Trade Report now issued, confirms the opinion that the accident was primarily due to failure of the brake mechanism. It appears, however, that this apparatus was less to blame than various officials employed in the tramway department of the Swindon Corporation. The car was a new one, with which the drivers had not thorough experience; it was placed on the route during the Bath and West of England Show, when a rush of traffic was clearly to be anticipated; and complaints had been made by drivers regarding it before the accident. In view of these facts, Colonel von Donop very reasonably concludes that the car ought not to have been used at all on the day in question, and that if used it ought to have been removed immediately upon the receipt of complaints. For the error of leaving the car on the route the traffic manager is held responsible, but in justice to him it should be mentioned that he sent a fitter to remedy the defect while the car was waiting at the Corn Exchange. The extraordinary thing is that neither this fitter nor the driver of the car displayed the least anxiety to have the brake put right, an adjustment that Colonel von Donop says could easily have been performed if these men had been willing to carry out their instructions. While tending in some measure to restore confidence in tramway brake mechanism, the Report throws into high relief the callous indifference which tramway managers and men are apt to display for the safety of the travelling public.

The
Photographic
Salon.

At the first glance the fourteenth exhibition of the Photographic Salon at the Society of Water-Colours gallery seems really to promise some of that art-feeling in photography which we are told is to be developed; for Mr. Cadby's studies of children, which form the first five or six things in the catalogue, are really charming, and are quite out of the ordinary run of photographic work. We do not know how the effect is got, but they are very delicate photographs, in which white predominates, the hair of the figures being the only dark portion. He has been very fortunate in his children, who are full of natural character. These prints are therefore very well placed in the foreground of the exhibition, to beguile the visitor on; but we must confess that we soon get disillusioned, and find the exhibition mostly composed of work that is of little interest except as mere representation of fact. In this respect Mr. Mortimer's two sea-pieces (59 and 63) are very useful studies, and in the one called "Dirty Weather in the Channel" we are struck by a line of run of the waves which seems quite different from what one usually sees in a painting of sea. We have often remarked that architecture might well receive more attention in these exhibitions, as it is a class of subject for which photography is peculiarly fitted; and in this exhibition we notice more architecture than usual; but in some cases the value of photography in giving the sharpness and

texture of architecture seems to be deliberately evaded, and Mr. A. Marshall makes Santa Maria della Salute and the Pantheon into misty phantoms. What is supposed to be gained by this treatment we know not; certainly Mr. F. H. Evans's sharp and precisely defined photographs of architecture are much more to the point, that of "Sunlight and Shadow, Mont St. Michel" (87) especially; we may also mention Mr. Kimber's "A Sunlit Cloister" (117). Mrs. Kasebier has found one or two good subjects in the bows and sterns of ships in dock, though they are very tame compared with what a good artist in charcoal would make of the same things. Among other exhibits Mr. Puyo's "L'Etang" (26) looks very like a picture, and Mr. Percy Wright has been singularly fortunate in catching just at the right moment the action of an old woman leading a couple of children through a village street—"The Truants" (139); it might really be a black and white sketch by an artist; but this is in the main a piece of good luck.

The
Campanile,
Venice.

The work of reconstructing the Campanile at Venice has been temporarily suspended in consequence of a difference of opinion amongst architects and others as to how many steps there should be above ground at the base of the structure. In the old tower two steps were above ground, but it is now urged that three should be visible, and this and other matters are under consideration by the Commission. The new Campanile has been raised about 20 ft., but very little can be seen of it, as the work is surrounded by an unsightly hoarding, which in the circumstances cannot be removed for some time to come, much to the regret of artists and others. The bronze gates of the loggia, which were not much damaged, have been repaired, and Sansovino's Madonna has been reconstructed, the old pieces picked up after the fall of the tower being used.

NOTES ON MOSAIC AND MARBLE INLAY.—I.

It is usual for writers on the subject of mosaic to commence with a reference to the well-worn quotation from the book of Esther, which describes the pavement in the palace of Ahasuerus as made of porphyry and white marble set together, as proving the antiquity of its use. The recent discoveries at Cnossos have, however, brought to light a much more ancient form of mosaic. Whether the curious porcelain plaques which represent the façades of houses were used for floor or wall decoration, the effect must have resembled *opus sectile*, and the fact that some of the windows are pierced through, while others are only sunk, suggests the probability of the inlaying of another material in the hollows. The sinkings also suggest the possibility of the use of some kind of mastic to fill them and make the surface level, as in the Roman *opus sculptratum*.

The Egyptians and Assyrians do not appear to have made much use of mosaic or marble inlay for their floors or walls, preferring carving in low relief or painting on hard plaster (as at Tel-el-Amarna) or the breadth of effect of large slabs of stone; but in the museums examples may be seen of ivory carvings, with inlays of coloured stones and vitreous pastes on too large a scale for use as objects of personal adornment, which were probably parts of pieces of furniture. In the British Museum is a small Egyptian column decorated with mosaic, found at Port Said, ascribed to the VIth century B.C., and at Boulak is one of the same period found

in the Fayum, showing that its use was not unknown to them. The Egyptian glass tesserae, made by fusing together many rods of coloured glass arranged in a pattern and then cutting the mass across at right angles, are well known. Here we have what is to all intents and purposes mosaic on a very small scale, and the magnifying and modification of the manufacture is a small matter to an intelligent and mechanical people.

It is generally assumed, with great probability, that the art is Oriental in its origin and travelled westwards through Greece to Rome. The Greeks called it *pepaphos*, from which the Arabs made the word *foscifosa*, though both Hesiod and Sophocles use *lithostratos*. In Latin the general names used are *lithostratum*, *opus musivum*, *mosaicum tessellatum* (from *tessella*, a die). *Musivum*, a late Greek word, is generally used for vitreous mosaic, as opposed to *lithostratum* for marble pavements. The only Greek example which has come down to us is the noble mosaic in the temple of Zeus at Olympia (470-457 B.C.), and this does not give us a very high idea of the talent of the Greek craftsmen, being merely an imitation of a carpet not very well executed, but it is probably not very early. Pliny says that "lithostrata" were introduced in Rome in the time of Sylla (80 B.C.); at all events, there is still in existence a pavement formed of small pieces, which he ordered to be laid down in the Temple of Fortune at Praeneste. The durability of the ancient pavements is mainly due to the extraordinary care which was bestowed on the preparation of the bed. Vitruvius gives curious details on the expedients adopted to ensure their lasting. "In order that the mortar at the joints may not suffer from the frost" (this is a slab pavement) "at the approach of winter every year it should be saturated with the dregs of oil, which will prevent the frost affecting it." "If extraordinary care be required, the pavement is covered with tiles, 2 ft. square, properly jointed, having small channels of the size of 1 in. cut on each edge. These are filled with lime tempered with oil, the edges being rubbed and pressed together. Thus the lime in the channels growing hard suffers neither water nor anything else to penetrate. After this preparation the upper layer (two parts of fresh rubbish, one of potsherds, and two of lime) is spread, 1 ft. thick, and beaten with sticks. Over this either large tesserae, 2 in. thick, or angle tiles are laid at the inclination above directed (2 in. in 10 ft.), the pattern having been drawn and liquid cement poured on, an even surface being obtained by friction with marble, and work so executed will not be easily injured." The cement for finer mosaics was slaked lime one part, powdered marble three parts, mixed with water and white of egg. The Greeks made a kind of composition pavement for winter rooms, which was something of the same sort as the Roman *opus signinum* without the tesserae of marble. The surface was excavated 2 ft. deep, the bottom was well rammed, and a layer of rubbish or potsherds spread over it with a slope towards the holes of the drain. "A composition of pounded coal (charcoal, of course), lime, sand, and ashes is mixed up and spread thereover, $\frac{1}{4}$ ft. in thickness, perfectly smooth and level. The surface being then rubbed with stone it has the appearance of a black pavement." It was absorbent and warm to the feet of the slaves.

At first mosaic appears to have been used only for the pavements of temples, colonnades, and houses to which special distinction was desired to attach. From simple geometrical designs they progressed to those of a more complicated kind, lessening the size of the stones, then the imitation of natural objects commenced. The carpet already mentioned at the Temple of Zeus at Olympia is a motif of frequent occurrence. On the floors of triclinia they imitated the fragments of food thrown on the floor, and great reputation was gained by the "asarotus oculus," in which this imitation was carried to the verge of deception; so early were the true principles of art violated. Sosus, of Pergamon, was celebrated for these mosaics, an example of which is to be seen in the Lateran Museum; in the Capitoline Museum is a copy of one of his best-known works, found in the villa of Hadrian, a basin on the edge of which are two pigeons. The largest antique mosaic was found at

Palestrina (the ancient Praeneste), a curious geographical, zoological, and ethnographical picture of Egypt. A writer in *Archæologia* in 1790, says that it was made by Greeks. "as appears from the inscriptions." Another very large antique mosaic is that found in 1869 in the Piazza Vittoria, Palermo, and now in the Museo Nazionale in that city. Wherever the Romans went mosaic pavements are found, and it is unnecessary to multiply examples since the various museums are full of them. Reference may, however, be made to those discovered in North Africa, to the large one representing circus games discovered at Seville in 1799, and the enormous mosaics from the baths of Caracalla. The designs for the smaller floors are generally geometric, and the colours employed are few; if figures or animals are introduced, as became the case in the more important rooms in the 11th century, the arrangement is geometric, though the details may be free and even pictorial, as is seen in those found at Carthage and Saur. The most elaborate examples that can be quoted are the celebrated Battle of Arbela in the museum at Naples and the floor of Hiero II.'s pleasure gallery, which had subjects from the Trojan War. The artists who produced these elaborate works occasionally signed them, and Muntz gives the following list of names thus obtained: Sosus (already mentioned), Dioscorides of Samos (who is said to have executed a comic subject for Cicero's Villa), Heraclitus, Proclus, Julius Soter, Fuscus, Prostatius, Ariston, Neithodorus. These ambitious works are rarely so successful as the simpler pavements in black and white, or with even five or six colours; the talent of the mosaicist seems to be overweighted and the palette overcharged. The columns and fountains decorated with mosaic now in the museum at Naples should not be overlooked, as showing another application of the material.

From the IVth century A.D. mosaic became the special decoration of religious buildings. The church of S. Costanza, on the Via Nomentana, close to S. Agnese, contains the earliest examples at Rome. The Liber Pontificalis says: "Constantine built the basilica of St. Agnes, saint and martyr, at the request of Constantia his daughter, and a baptistery in the same place, where was baptised, by the Bishop Sylvester, Constantia his sister with the daughter of Augustus." The mosaics remaining are those on the two apses and the vault of the aisle which surrounds the church. The vault is divided into eleven compartments with a grey ground, in several of which the same design is repeated. They are decorated with simple ornament, medallions and single figures, with branches of flowers, birds, and vases strewn over the surface, and two compartments show vintage scenes, the whole surface being covered with vine branches, among which naked children gather the grapes. The wine-press and the ox-wagons, which transport the grapes thither, are below on each side. The vault over the place where the sarcophagus of Constantia once stood (now in the Vatican Museum) has a gold ground. In the apses Jesus Christ is represented twice; in one case He stands blessing with His open right hand and holding in the left an unrolled scroll, on which is "Dominus paxem dat" and the labarum monogram; two apostles, Thomas and Philip, stand near; four lambs, which symbolise the faithful, are arranged in couples in front, and three streams of water; while two shapeless buildings at each end, sheltered by a palm-tree, suggest the two cities of Bethlehem and Jerusalem which appear so often. The apostles are robed in white. The other composition in which, seated on the globe, He gives the keys to S. Peter, with palm-trees, symbols of Judea, making up the composition, has been copied in colour in the catacomb called Platonia. There may perhaps be earlier examples in the catacombs (which Gerspach says were executed by hands "guided rather by faith than talent"), such as the very curious one in the cemetery of S. Hermes representing the resurrection of Lazarus and the prophet Daniel.

The catacombs were used till Alaric's taking of Rome (410), but burials gradually ceased after the edict of Milan. The word catacomb is derived from the phrase "kata tumbas" (sometimes written "cumbas"), near the tombs ("of SS. Peter and

Paul" understood) on the Via Appia, the catacomb of S. Sebastian. They generally have several stories, and as many as five even are known. A very complicated symbolism was gradually evolved, much of which was pagan in origin. The common symbols are the Anchor (sign of hope), the Lamb or Sheep, the Dove (the Christian soul freed from earthly bonds) with an olive branch (peace by the Bible). In later mosaics it sometimes represents the souls of the apostles. The Phoenix (the soul) is a later symbol, rarely found in the catacomb but sometimes carved on pagan tombs. The fish (Christ) is a symbol of the time of the apostles. The Cross is never painted in early times, but suggested by a bird with spread wings or a man praying with outstretched arms. The Greek "tau" was used instead of it also. The Good Shepherd, the Vine, the Wise and Foolish Virgins, and Noah's Ark are common; Jonah, Daniel, the Three Children in the Furnace, Adam and Eve, the Sacrifice of Abel and Cain, Elijah in the Fiery Chariot, and the Raising of Lazarus, all symbolising Resurrection. Baptism is symbolised by Moses Striking the Rock and the presence of Deity by a hand issuing from a cloud. The figure of Christ does not appear till the IVth century. The Virgin appears often in the 11th, and in the catacombs of S. Priscilla is a picture of her seated, which De Rossi thinks nearly of apostolic age. The figures called "Orantes" are regarded as symbols of prayer; sometimes they may mean the Church on earth on the soul of the dead praying for salvation. The holy mysteries are only occasionally represented. Flowers and trees are generally symbols of Paradise. In the catacombs of S. Domitilla the story of Psyche appears, and Orpheus is of frequent occurrence. After Constantine's Edict the Lamb becomes an important symbol. The stag at the fountain symbolises baptism and the 42nd Psalm, the peacock and eagle triumph, and the palm and crown martyrdom. In the Primitive Church the attitude of prayer was either prostrate with hands raised to Heaven or with the arms stretched out crosswise or standing; never kneeling. The nimbus was very rarely used in Christian art before the IVth century; at S. Costanza Christ has it (a large disc of graduated blue), but not the apostles. In S. Agatha, Ravenna (400), Christ has a cruciferous nimbus and the angels simple circles. At S. Maria Maggiore, Rome, Herod has a nimbus, and at S. Vitale, Ravenna, one is given to both Justinian and Theodora. In a mosaic of the Triumph of Neptune and Amphitrite, found near Constantine, in Algeria, both Deities have it. The Throne in Heaven appears, the twenty-four Elders and other symbols form the Apocalypse, the four beasts the symbols of the Evangelists. The book with the seven seals, the candlesticks, the four angels, and the Lamb was so commonly used as the symbol of Christ that the Council of Constantinople (683) decided that it was no longer to be used, since there was danger of the figure of Christ being left out altogether. The rules for the distribution of subjects over the walls and vault had the force of law for 800 years, from the beginning of the Vth to the end of the XIIIth century. The great arch in front of the sanctuary was reserved for symbols of the triumph of religion, and was therefore called the "triumphal arch." The apse and tribune very often repeated these symbols, but completed the subject by the representation of holy personages, thus forming a picture of which Christ was always the centre. The nave walls were reserved for narrative compositions, scenes from the Old and New Testaments, parables, etc. Until the end of the Vth century baptisteries were always outside the church. To encourage the building of churches Constantine freed from taxation architects, painters, sculptors, and mosaicists. M. Gerspach says his successors imitated him, and so a school was formed on the shores of the Bosphorus.

The church of S. George, Thessalonica, was built by Constantine during his first stay in that city, according to Texier and Pullan, and the bricks bear Christian stamps. The cupola is covered with mosaics—rich palaces in the style of the Pompeian paintings, with curtains looped to the sides and hanging lamps, peacocks, and richly-dressed figures in adoration with raised hands standing on

a patterned pavement in perspective. "In the centre of each of these compositions is a little octagonal or circular house, surrounded by columns and covered by a cupola; it is screened off by low barriers, and veils conceal the interior. A lamp suspended from the ceiling indicates its character; it is the new tabernacle, or *sanctum sanctorum*, of the Christians." There is a great variety in the design of these little temple buildings; in one instance there are no veils but lamps hung beneath each arch; in another in which the curtain appears there are four columns and a dome with three steps, evidently a high altar; in another there is a ciborium with a lamp suspended, but neither veil nor altar, in the centre of a semi-circular apse. There are ten principal colours used, but the tints are infinite, and the tesserae are all vitreous. "The outline of each figure is marked by a dark shade, and the middle is filled with cubes, which are arranged so as to follow the outline." In S. Sophia, Thessalonica, the bricks in the women's gallery are stamped in the same way as those in S. George. The dome has a mosaic of the Ascension on a gold ground. The Virgin and the Twelve Apostles surround the dome, separated by trees. The Christ is in the centre, but an Arabic inscription leaves only his feet visible. The figures are more than 12 ft. high. In the apse is a Virgin seated with the infant Jesus; on the walls is a diaper on a square base, with a silver cross and vine leaves. At Eski-Djouma, a church which resembles the very early church of S. Demetrius in design, the soffits of the arches have good mosaic decorations on a gold ground in the parts not plastered.

The vault of the chapel of S. Rufinus in the Lateran Baptistery is of the end of the IVth or beginning of the Vth century; on a blue ground large foliated volutes unroll, green touched with gold. In the church of S. Pudenziana, Rome, is a fine mosaic, which has been ascribed to the VIIIth century, but an inscription formed part of it before Cardinal Gaetani reconstructed the church in 1598, which ran, "Maximus fecit cum suis." De Rossi found fragments of inscriptions in the church, which showed that under the pontificate of Siricius (390-5) a certain Maximus did great works, taking eight years to execute them, at his own cost. This seems to make it certain that the mosaic is really of the IVth century. Barbet de Jouy calls it the most remarkable mosaic in Rome. The church itself may be considered as one of the most ancient in that city, having been founded by Pius I. of Aquileia on the site of the house of Pudens, though repaired by Adrian I. (772-795), having become ruinous. The composition is good, the drawing firm and expressive. S. Praxedis is remarkably beautiful; the head of S. Peter is in a grand style, and to find an equally fine type one must go back to the heads of the apostles on those previous fragments of gilded glass worked with the point found in the catacombs near the tombs of the first Christians. In the centre Christ is enthroned, SS. Pudenziana and Praxedis offer martyrs' crowns of golden leaves, below are ten figures of the apostles. Above the figure of Christ is a barren hill with a jewelled cross upon it, and a semi-circular portico forms a background to the figures, above which buildings appear. In the sky the evangelists' symbols appear for the first time. Christ holds in His hand an open book upon which is written, "Dominus conservator ecclesie Pudenziane." Some argue that the women's figures symbolise the Jewish and Gentile Churches.

From literary notices we know that there were French mosaics of the Vth century, but no examples have come down to us. A notice in the life of S. Laurence, Bishop of Siponto, a relation of the Emperor Zeno (474-91) shows how Italy looked eastward for its inspiration at that time. "When it was resolved to ornament with elegant and beautiful works the churches of S. Stephen and S. Agatha, situated near the Adriatic shore, and to build another close to the city in honour of the blessed S. John Baptist, he wrote to the Emperor hoping that their relationship would dispose him to receive his message favourably. He asked him to send him masters and workmen clever in all arts. The Emperor received the envoy of the Holy Bishop with joy, and charged himself with sending the most accomplished artists; further, with devotion and liberality, he charged

them to carry to Siponto gold to contribute to the execution of the work and help in finishing the church. Having received this precious gift the holy man began and finished admirable and precious works in the basilica of the aforesaid martyrs; then he began another of a brilliant and wonderful beauty by the different colours and little pieces of glass covered with gold with warm reflections of which it was composed. He executed this work in honour of S. John Baptist in his Episcopal Church."

The mosaics in the baptistry of the cathedral at Ravenna date from about 435 A.D., and those of the mausoleum of Galla Placidia are but a little later. The baptistry was rebuilt by Neon in 430, though constructed or adapted by Ursus 100 years and more earlier. The centre of the dome shows the baptism of Christ, with the river God of Jordan on a gold ground. Round this central subject are figures of the Apostles on a blue ground, carrying crowns. Beneath these figures runs a broad frieze, on which four altars with open books of the Gospels upon them and thrones with crosses are represented between light columns. On the lower part of the wall are mosaics of gold wreaths on a blue ground, with figures of Saints in cartouches, and elaborate ornamental opus sectile in red and green porphyry. The tomb of Galla Placidia (SS. Nazaro e Celso, 440 A.D.) contains mosaics of great delicacy. Here on a dark blue ground in the centre of the cupola is a golden cross with an aureole, and on the four pendentives the symbols of the Evangelists. There are doves drinking from a vase, stags drinking (both copied from the antique), and figures of eight apostles or prophets on the vaults. Above the door is the Good Shepherd among his sheep, young and beardless, seated and leaning on a cross; he has an immense simple nimbus, the sheep are six in number, and there are rocks and bushes round a gradated sky. Opposite is S. Laurence going to his martyrdom (described by some as Christ committing to the flames some heretical book). The drawing is good, the figures are dressed as Romans and fully draped, and the general colouring is harmonious. The ornaments and scrolls are gold or green, the draperies white, the ground a yellow-green gradually losing itself in the background. The chapel of S. Pier Crisologo, in the Archbishop's Palace, is a structure of the Vth century, and though much restored, altered, and added to, still contains remains of mosaics of that date. In the centre of the vault is the monogram of Christ supported by four angels, between them are the symbols of the Evangelists, and a beardless Christ is in the centre of the arch. The ground is golden. Above the altar are a Madonna in prayer and two Saints, which were originally in the cathedral. The arch above this has a diaper of crosses, with birds in the squares between.

The baptistry at the side of S. Restituta, at Naples, contains some remains of mosaics of the second half of the Vth century in a very bad state of preservation, and much mended with paint. It is square, with a low hemispherical cupola, which becomes octagonal in the lower part; the angles bear on cross arches, which form niches. The vault and the octagonal drum were decorated with mosaics by Bishop Sotera. The centre has a field of blue studded with stars of different sizes, the smaller of which are golden and the larger of silver, on which is the sacred monogram and A. & W. gilded; peacocks, doves, and other birds in the border feed on flowers and fruits in vases. At the summit the hand of God appears holding a crown of golden leaves enriched with sapphires and tied with ribands. A second zone surrounds the first, peopled with peacocks, doves, and other birds facing each other before a vase in the manner which we now know as Byzantine. The details have lost clearness, but the attitudes are natural and the vases elegant. Then come eight compartments with bands of ornament, arabesques, birds, and vases of flowers and fruits, which get larger as they near the base of the dome. Of the compositions between only five remain, facing each other, and two of these have been repainted, the Supper at Emmaus and the Evangelical Salutation. The one in a tolerable state shows Christ standing on a blue globe giving the law to SS. Peter and Paul, with two palm-trees in the corners of the composition, called "The Gift of God." The

saints have suffered a good deal. The third compartment contains two figures: one seated with a scroll receives the homage of a veiled woman, who kneels before him. The fifth compartment is partly mosaic and partly paint, and may perhaps represent the miraculous draught of fishes. The other two compartments are blank, though one shows traces of the figure of a kneeling woman. In the angles are symbols of the Evangelists on blue backgrounds, with stars and with red clouds, but S. Luke's bull has disappeared; they have neither wings nor nimbi. Above the niches are catacomb symbols and medallions, stags, lambs, and shepherds with palms. On the drum there are an enormous head of Christ, painted; below, two small, beardless Saints holding crowns, and robed in antique fashion; opposite, a bust of the Madonna, also painted; by her two Saints, one of whom holds a palm (XVIIIth century work); in the centre of the wall opposite the window a painted grille, on each side of which a young figure advances holding a crown of gilded oak with a jewel in the centre. One is young and one is old; they are in Roman costume, and of good style. The general colour impression is grey-blue and green. The gold is of a greenish tint also. In S. Prisco, near Capua, are mosaics of the Vth century. On the vault are scrolls like those in the chapel of S. Rufinus in the Lateran baptistry. On the arch are three rows of rosettes with scrolls between, and in a lunette a bust of Christ in a circular frame. The ground of the vault is blue.

The Lateran baptistry, which was probably originally a bath in the house of Plautius Lateranus, had two chapels added to it by S. Hilary (in 461-7)—on the right that of S. John Baptist, in which the mosaics have been preserved; on the left that of S. John the Evangelist, in which they have been destroyed. The vault of the oratory of S. John Baptist has a gold ground; in the centre is a lamb surrounded by a circle of flowers enframed by a border of ornaments forming a square; this border is prolonged cross-wise. The angles of the vault are ornamented with scrolls, and four garlands of flowers, cut in their centres by the projections of the borders, bind the four angles of the central frame together. The eight sections of the field are each decorated with a couple of birds, who face a vase filled with fruit; the species are well-drawn ducks, paroquets, pigeons, and partridges. The lamb has a nimbus. The vases of fruit symbolise the earth, like the Pagan cornucopia. The birds express the elements—the duck, water; the partridge, earth; the pigeon, air; the paroquet, fire.

The triumphal arch of S. Maria Maggiore, Rome (the Liberian basilica, founded by Liberius I., 352-66, restored and decorated by Sixtus III., 432-40), bears the subjects of the Annunciation, the Presentation, the Adoration of the Kings, the Massacre of the Innocents, and Jesus among the Doctors. In the middle of the arch is a throne in a medallion, surmounted by the Cross, and with the Apostles SS. Peter and Paul at the sides of it; the towns of Bethlehem and Jerusalem finish the composition below. There are now thirty-six pictures above the windows in the nave; six were destroyed to open the arches to the Borghese and Sixtine chapels, three on each side, and seven of the thirty-six have been replaced by XVIIth century paintings. The subjects are from the Old Testament, and the personages are dressed and armed like Romans. S. Paolo fuori was destroyed by fire on July 15, 1823. The triumphal arch has been restored, as nearly as may be reproducing that which Leo I. (440-61) put up. It shows the Apocalyptic worship: a colossal head of Christ surrounded by a rainbow, with the four Evangelists' symbols emerging from clouds above it, and with two angels at his side leaning on their sceptres, while the twenty-four Elders throw their crowns at his feet in groups of twelve. Lower down SS. Peter and Paul stand.

At Milan, in the chapel of S. Aquilinus, in S. Lorenzo, are two niches filled with mosaic, one of which, showing the Angel appearing to the Shepherds, in which the angel has no wings, but a long cross-headed pastoral staff, has been restored. The other shows Christ enthroned, surrounded by the Apostles, also seated. The ground is golden, and the Apostles have no nimbi. It much resembles

a primitive painting in the catacomb of S. Hermes. P. Garucci says that about 494 Bishop Lorenzo ornamented the churches of Milan with marbles and mosaics, and this is probably of that period.

At S. Sabina, on the Aventine, is a mosaic of the time of Celestine I. (422) on the western wall—an inscription in gold letters on a blue ground, and two figures of women on a golden ground draped like antique bas-reliefs, and representing the churches of the Circumcision and of the Gentiles. Probably the Apostles S. Peter and S. Paul were represented above them, without any other symbol.

The mosaics at Ravenna, for which Theodoric was responsible, were made by Roman workmen sent by the Prefect of Rome in answer to his request for stone and marble workmen. S. Apollinare Nuovo was built in the Vth century. Its twenty-four columns are of marble of Proconnesos, brought specially from Constantinople. It was then called S. Martin "in cielo d'oro," because of the gold backgrounds to the mosaics in the apse, which were destroyed in the XVth century, when it was reconstructed, and was the Arian Cathedral. The portions of Theodoric's work which remain are the large figures of Apostles and Saints between the windows and the twenty-six subjects from New Testament history above them. Of the same period is the baptistry of the Arians, afterwards known as the oratory of S. Maria in Cosmedin. The dome is covered with mosaics evidently suggested by those of the orthodox baptistry, but showing decadence in their style. The heads of the figures are larger, and between each couple is a palm-tree bearing dates. A throne with a jewelled cross upon it appears as the point towards which the Apostles advance. The figures in the central composition show the greatest falling off.

The church of S. Vitale is on the site of his martyrdom, and replaces a little chapel consecrated by Neon. It was built by Ecclesius (524-34), and consecrated in 547 by Maximian. Mosaics at one time entirely covered it above, and the lower walls were plated with marble. The mosaics still remaining are in the apse. On the soffit of the arch are busts of the Apostles, of SS. Gervasius and Protasius, sons of S. Vitalis, and of Christ. In the semi-dome Christ is shown enthroned on the globe, with angels on each side, and at one side S. Vitalis and at the other Ecclesius holding the church. Above the arch two flying angels hold a disc, and Jerusalem and Bethlehem fill the spandrels. Three windows are above this, the wall and spandrels enfaming which have scrolls of vine issuing from baskets and vases with birds about them—motifs which are repeated on the vault. The lower part of the apse walls has on one side a mosaic of Justinian with his bodyguard and officers of the Court, and Maximian with attendant ecclesiastics, and on the other Theodora, with her ladies-in-waiting and chamberlain, apparently going from the Palace to the church. Both Emperor and Empress have large nimbi. The space between the apse and the great arch is pierced by two triple arcades beneath a semicircular arch; the whole is covered with mosaic. The four Evangelists are shown seated, beneath whom are standing figures of prophets. On the right beneath the lower arch the tympanum is filled with the subjects the Offering of Melchisedech, the Sacrifice of Cain, Moses as a Shepherd, and the Burning Bush; on the left the Three Angels Entertained by Abraham, Sarah at the Tent-door, and the Sacrifice of Isaac face them.

The rows of Saints in S. Apollinare Nuovo virgins on one side approaching the Madonna and child, enthroned and attended by four angels, and men on the other approaching the throne of Christ, similarly attended, all bearing crowns, and separated by palm-trees—are the work of Agnellus (556-8) at the time when it was converted into a Catholic church.

The most important Eastern mosaics of this century were those of S. Sophia, Constantinople. The basilica was burnt during a tumult in 533. Justinian's architects—Anthemius of Tralles and Isidore of Miletus reconstructed it with the help of 10,000 workmen, and in 559 he was able to open the church, crying as the festival procession entered: "O, Solomon, I have

surpassed thee!" The interior was entirely covered with slabs of marble and mosaics on a ground of gold. These mosaics are the most delicate of the early Christian time; the tessere are all of vitreous pastes, and very small in the flesh, sometimes, indeed, only "half-a-line" thick, according to Kinkel. The bands of ornament further from the eye have stronger drawing, but the vault of the women's gallery is the place where the most delicate and elegant patterns have been put, being near the eye. The lunette over the door of entry, a Christ in majesty, with medallions of the Virgin and S. Michael on either side and a Byzantine Emperor in full State costume on knee and elbow in prayer at the feet of Christ, is considered to be the finest extant work of Byzantine art. Restorations were carried out in the IXth and in the XIVth centuries. Paulus Silentiarius in his poem on the church says: "Who once sets foot in this temple can desire nothing further." At evening the radiance of the light reflected from the metal work around the altar and the splendour of marble and mosaic was so great that "then it was as if under the arch of Heaven the multitude of stars sparkled. Also the shining church served as a land mark to the steersman afar on the sea; like a lighthouse it lighted his ship to the narrow entrance of the Bosphorus." Procopius also speaks most enthusiastically of its beauties: "When anyone enters there to pray, he feels immediately that this is not the work of art of men, but of the supreme Deity; and, raising his mind to God, it appears to him as large as Heaven, thinking it certainly not far off, and delighting himself in that blessed place to which his devout soul aspires. Nor is that the impression which the magnificent spectacle makes only on him who sees it for the first time, but it is renewed every time he returns, however often, as if he had never seen it before. For no one has ever had enough of it; and he who remains in the temple delights himself with that most grateful sight; and he who goes out still speaks of it, always more in wonder." Von Salzenberg says that the few remains of heads have considerable character, and that the draperies of the figures are well cast. The mosaics commence at the springing of the arches and vaults. On the western arch is a Virgin and Child and SS. Peter and Paul, much damaged. Of S. Peter only the head is left. S. Paul's head has gone, but his body remains. Between the nave windows on the south side are the figures of Anthemius, Bishop of Nicomedia; Basileos of Caesarea, in Cappadocia; S. Gregory Theologos, patriarch of Constantinople; S. Dionysios the Areopagite, S. Nicholas of Myra, Gregory the Armenian, Bishop of Greater Armenia, and Isaiah. Above are the feet of angels. On the north side, higher up, are Jeremiah and Jonah and Habbakuk, of whom only part remains. Feet with sandals appear above them. On the eastern arch (covered up) is a medallion of the book. S. John Baptist on one side and the Virgin and child on the other. Below was a portrait of John Paleologos much damaged. On the arch of the Bema is an archangel on the south side, and in the small dome of the chamber from the western buttress four angels with uplifted hands; also in a cupola of the women's gallery small remains of the Descent of the Holy Ghost, cherubs on the pendentives of the great central vault, and a Virgin with a standing child, Jesus, robed in the apse vault. It is, however, probable that all these mosaics are posterior to the iconoclastic period of the VIIIth century.*

F. H. J.

CHURCH-HALL, SKETTY.—A church-hall was recently opened at Sketty, near Swansea. Mr. Glendinning Moxham, architect, prepared the plans for the work, the cost of which will be about £1,100.

PARISH CHURCH, BROMHAM.—A fire, on the morning of September 11, destroyed part of the nave and roof, and burned out the tower, of St. Owen's Church, Bromham, near Bedford. The church contains some handsome monuments (which escaped destruction) to the Trevor and Dyve families, of whom was the royalist Sir Lewis Dyve. The church stands in the middle of the park: it was built temp. Edward IV., and was restored in 1844.

* To be continued.

PREMISES, MADDOX-STREET, W.

These premises, Nos. 41 and 43, Maddox-street, have been built for Mr. Edward Arnold, the publisher, and comprise storage, strong-room, and packing department in the basement, with extensive vaults under the roadway; manager's room, strong-rooms, sample-room, clerks' offices, and trade department on the ground floor; private rooms, etc., on the first floor. The second and third floors are for offices, with separate staircase, and further offices and rooms for caretaker are on the fourth floor. The building is equipped with hydraulic and other lifts, intercommunication telephones, and electric light. The front is of Portland stone to the first-floor level, and then Portland stone and Messrs. T. Lawrence's red bricks. The external woodwork to basement and ground floors, including lobbies, is of teak.

The general contractors were Messrs. E. A. Roome & Co., and the clerk of works Mr. W. Tiede. The constructional steelwork was supplied by Messrs. Homan & Rodgers.

Mr. W. Samuel Weatherley is the architect.

The Student's Column.

ROOFS: STRUCTURALLY CONSIDERED.—X.

17.—Timber Roof Trusses.

TIMBER is so convenient, so easily worked, and so cheap that it is never likely to be entirely superseded by other materials for roof principals and trusses of small span. Being protected from the weather, it is reasonably durable, and the chief objection against timber roof framework is the certainty of destruction in case of a serious fire.

At the present time, when the necessity for fire-resisting construction is becoming more and more recognised, it is clearly desirable that the continued employment of a highly inflammable material in roof design should be discouraged, at any rate, in cities and towns.

Apart from the flat roof-frame, which, from the structural standpoint, is analogous to a floor, and the *lean-to* frame, the most simple form of roof truss is that described as the *couple* (see Fig. 78).

Strictly speaking, however, this is not a truss, because the two sloping rafters do not constitute a rigid and unyielding frame. On the contrary, they are bound to spread under the influence of load, thus exerting pressure upon the supports in an outward direction. Consequently a roof embodying rafters so arranged comes under Class II., as defined in paragraph (1), p. 53 ante.

By the addition of a tie-beam securely connected to the foot of each rafter, as in Fig. 79, the lateral spread is counteracted, and the frame so formed may properly be designated a truss. A roof having framework of this type is known as a *tie-couple roof* or *couple-close roof*, and comes under Class I. of the general classification above mentioned.

The tie-beams are generally of timber, because they can be used as supports for the ceiling. One disadvantage that follows the application of timber ties is that they are apt to sag slightly, and therefore tend to pull the walls inwards.

This effect can be prevented by the application of a further member to the truss connected with the ridge at the top and with the tie-beam at the bottom. The vertical member is termed a *king-post*, and Fig. 80 represents the most simple form of king-post truss.

When a truss of the construction here illustrated is employed in wide spans the permanent and occasional loads cause flexure in the rafters to such an extent that intermediate support is necessary between the ridge and the lower extremity of each rafter.

Horizontal struts, as in Fig. 81, might be introduced with good effect, but a far better method of affording the requisite support is to apply diagonal struts or braces, as shown in Fig. 82, which represents what is usually understood by a king-post truss, a form of construction suitable for roofs up to about 30-ft. span.

We have traced the development of the king-post truss from the simple couple without



Premises: Nos. 41 & 43, Maddox-street. Mr. W. S. Weatherley, F.R.I.B.A., Architect.

alluding to alternative methods of treatment, the object being to make clear the defects of the more simple types of truss and the manner in which such defects can best be remedied.

In some cases where it is thought desirable not to obstruct the interior by a tie-beam at the level of the side walls the two rafters forming a couple are connected by a collar-

beam fixed about midway between the top of the walls and the ridge (see Fig. 83). A beam so applied acts as a strut or as a tie, according to circumstances. Assuming the walls to be capable of resisting the outward thrust of the rafters, the collar-beam constitutes a strut affording intermediate support for each rafter. On the other hand, assuming the walls exhibit a tendency to yield

under the outward thrust of the rafters, the collar-beam acts as a tie with regard to the upper portion of the truss, but, of course, can have very little beneficial influence in the way of reducing the outward thrust exercised by the lower part of either rafter.

Collar-beam trusses, as illustrated in Fig. 83, do not represent good construction, and are not suitable for roofs of more than

about 18 ft. span. Even when so used the dimensions of the rafters must be proportioned with due regard to the length of their free ends, and the walls must be of ample strength so as to withstand outward thrust without appreciable movement.

Fig. 84 shows a modification of the collar-beam truss, where tension members are fixed so as to tie the free end of each rafter to the collar-beam with the object of making good the weakness of the truss at its lower part. A still better form of construction is to employ a tie-beam as well as the collar (see Fig. 85), but, of course, the latter member does away with the only advantage to be derived from the substitution of the collar-beam for a king-post and diagonal bracing. When applied in conjunction with a tie-beam the collar-beam becomes a strut.

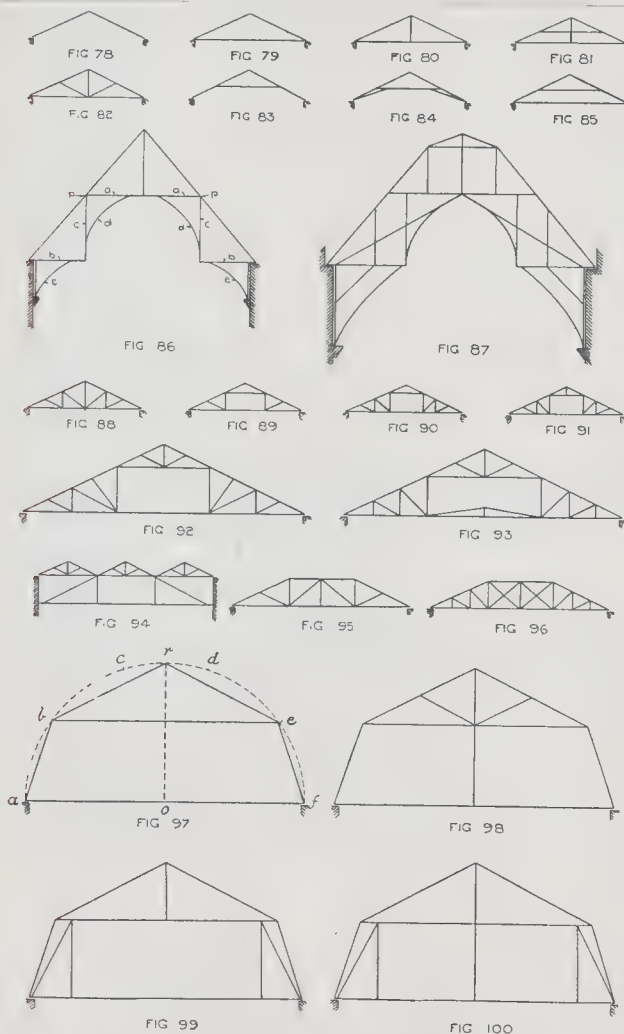
The Gothic roof illustrates the application of the collar-beam in conjunction with a hammer-beam attached to the foot of each rafter. In Fig. 86 *a*, *a* is the collar-beam, *b*, *b* are hammer-beams, *c*, *c* are struts. The three triangles formed by these members and the rafters would turn about the points *p*, *p* if not kept rigidly in position by something more satisfactory than the stiffness of the rafters.

A truss of this type can be rendered stable (1) by the application of tension members

d, *d* connecting the hammer-beams with the collar, (2) by the application of compression members *e*, *e* resting upon corbels and acting as struts against the underside of the hammer-beams, or (3) by a combination of ties and struts.

The adoption of method (1) makes the truss a self-contained structure exerting pressure on the supporting walls in a purely vertical direction. Where method (2) is employed outward thrust is exercised by the roof truss, and the walls must be of adequate strength. In cases where the two methods are applied in conjunction matters are somewhat complicated, and it is not always easy to analyse the stresses actually developed.

We may cite the roof of the great hall at Hampton Court Palace as an example, illustrating the use of ties and struts in conjunction. The construction of the roof is diagrammatically represented in Fig. 87. All the members are so strong and so securely connected that if the bottom struts were taken away it is probable that the tension members would prevent the exercise of injurious thrust against the walls. On the other hand, as the weight of the roof is carried down so far below the hammer-beams by the wall-posts, the walls would be capable of resisting any strain following the removal of the tension members.



Illustrations to Student's Column.

Referring to Fig. 86, it should be pointed out that the hammer-beams *b*, *b*, although occupying positions usually associated with ties in the roof system, are really levers. The inner end of each beam carries half the weight of the upper portion of the roof, a load that is balanced to some extent by the weight of the rafter at the outer end of the beam. Of course, the additional force required to establish equilibrium is furnished by the tie *d* or the strut *e*, or by *d* and *e* in conjunction.

Reverting now to the king-post truss, as illustrated in Fig. 82, we must point out that this form of construction is only suitable for roofs of comparatively small span. When the span exceeds about 30 ft. it is found necessary to provide additional supports for the tie-beam and additional diagonal struts to stiffen the rafters.

In Fig. 88 the two vertical ties on either side of the king-post are termed *queen-posts*. By leaving out the king-post and substituting a horizontal strut termed a *straining-beam* between the two remaining verticals, we have the *queen-post truss* (Fig. 89), which may be applied with confidence to roofs up to about 45 ft. span.

A convenient feature of the queen-post truss is that it affords space for the formation of rooms in the roof of a building.

For spans exceeding 45 ft. wide two intermediate supports are not enough for the tie-beam, and the queen-post truss is elaborated by the addition of other verticals distinguished by the term *princess-posts*, or simply *princesses*. A diagram of the modified design will be found in Fig. 90, this form of truss being suitable for roofs up to 60 ft. span. In cases where the straining-beam is of such length that there is risk of sagging, a small king-post is fixed between it and the ridge, as indicated in Fig. 91.

By extension of the principles outlined above timber trusses could be constructed of any span within the limits imposed by the mechanical properties of the material.

As the span increases the necessity becomes evident for additional members to support the rafters and tie-beam.

Assuming it were decided to design a timber truss of about 70 ft. span, the rafters between the ends of the straining-beam and the ridge would be stiffened by diagonal struts connected at the foot of the small king-post shown in Fig. 91, and those portions of the rafters between the queen-posts and the rafters would be supported by additional struts. Fig. 92 represents the truss as so modified.

In cases where the tie-beam requires further support the number of princess-posts can be increased, and that part of the tie-beam between the queen-posts can be stiffened by the addition of two ties and a vertical strut forming a rigid truss. The construction would then be as drawn in Fig. 93.

Another form of truss suitable for wide spans is that in Fig. 94, where three small king-post trusses are carried by a deep girder, which is practically a large queen-post truss with the apex removed and the addition of an upper horizontal beam, acting as a compression boom. The construction here illustrated involves the use of heavy timbers and extension of the walls above the level necessary for other types of truss previously described.

Fig. 95 shows a flat-topped truss having two queen-posts, one king-post, with two diagonal struts for supporting the straining-beam, and the usual struts as intermediate rafter supports. This form of truss is also suitable for wide spans.

Fig. 96 illustrates a somewhat similar truss for still wider spans, having two queen-posts, four princess-posts, a king-post, a double system of diagonal bracing in the two central panels, and single bracing in the outer panels.

The *Mansard*, or *curb*, roof, permitting the construction of a capacious and well-lighted attic story, is much used in this country, and under the name of the French roof has been very popular in the United States for many years past.

The usual method adopted in setting out the profile of a Mansard roof is that of Belidor, a distinguished French engineer, who lived a century and a half ago, and whose writings on timber construction remain

of practical value for the guidance of architects and engineers to the present day.

The method, illustrated by the broken lines in Fig. 97, is as follows:—

Bisect the line *af*—representing the span of the roof—at *o*, and draw the line *or* perpendicular to *af*. Upon the base *af*, with the radius *oa*, describe the semicircle *arf*, and divide it into five equal parts, *ab*, *bc*, *cd*, *de*, *ef*. Join *ab* and *ef* to give the sides of the lower portion of the roof, and *br* and *er* to give the slope of the upper portion.

The simple form of Mansard truss illustrated in Fig. 97 comprises two outer struts, a lower tie-beam, an upper tie-beam connecting the rafters, and a small king-post between the ridge and the upper tie-beam. The last-mentioned member is not shown in the diagram, because it would interfere with the broken line *or*.

A stronger form of the same kind of truss is shown in Fig. 98, where a stout king-post is carried from the apex down to the lower tie-beam, and two diagonal struts are added to provide intermediate support for the rafters.

Further rigidity is imparted by adopting the system of bracing in the lower portion of the truss as represented in Fig. 99. By carrying the king-post down to the lower tie-beam, as in Fig. 100, still further strength can be added to the construction, and if thought necessary diagonal struts can be included for intermediate support of the rafters.

Numerous other diagrams might be added of timber roof trusses suitable for different styles of architectural design, for wider spans than those hitherto contemplated, and for adoption in special circumstances. As the architectural consideration of roofs is beyond the scope of these articles, and as the modern tendency is to employ steel construction except for trusses of very moderate span, we have confined attention in the present article to typical examples most likely to be of use in ordinary structures.

Next week we shall take up the discussion of the details of simple forms of timber roof trusses.

Builders' and Contractors' Column.

THE CONSTRUCTION OF A TUBE RAILWAY.—III.

(Continued from page 276.)

Tunnelling with a Shield.

SHIELDS are chiefly employed for the purpose of supporting the ground and providing a protection for the men employed during the lining of the tunnel; they also assist to a certain extent in the work of excavation, although the greater portion of this is done by hand labour.

The shields employed for tunnelling in London clay may be divided into two classes—(1) the small shields used for driving the running tunnels, and (2) the large shields used for stations and cross-over roads; these two classes, although similar in principle, differ considerably both in construction and in the method of working.

Considerable improvements have been made in the small shields since the first were used on the City and South London Railway, the most notable being the substitution of mechanical power for hand labour for moving the shields forward.

The shield now used for driving the running tunnels consists mainly of a cutting-edge, a skin, and the jack-castings and diaphragms forming the main support of the shield. The outside diameter is 2 in. larger than the outside diameter of the tunnel lining, and the over-all length is about 7 ft. 6 in.

The cutting-edge is of cast-steel, constructed in three sections bolted together, and is slightly larger in diameter than the skin in order to facilitate the passage of the shield through the clay.

The skin, which is about 6 ft. long, consists of a cylinder, constructed of $\frac{1}{2}$ -in. steel plates, with butt-joints and cover-plates, and extends from the cutting-edge, to which it is bolted, backwards beyond the ring of jack-castings for a distance of about 2 ft. 9 in.,

forming what is known as the "tail" of the shield. The object of this tail is to support the ground and protect the miners whilst erecting the iron lining.

Immediately behind the cutting-edge is a steel diaphragm, composed of two $\frac{1}{2}$ -in. steel plates, and behind this, again, are the jack-castings, which are bolted together, and form the chief support of the shield, as well as providing a firm fixing for the jacks.

The shield is driven forward by hydraulic rams or jacks, eight in number, having a stroke of 24 in. and a diameter of 7 in. Each ram can be operated independently, or the whole or any number can be operated at once, being controlled by a system of valves. On the upper part of the diaphragm an air-engine, or intensifier, is fixed, which is supplied with compressed air at a pressure of 60 lb. per square inch, and which raises the pressure, or intensifies it, to 2,240 lb. per square inch, at which pressure it forces water into the rams. The compressed air for working the intensifier is supplied by air-compressors, and installed on the surface, and is led to the shield in air-tubes along the tunnel already constructed, being connected to the intensifier by a flexible hose. The water for the rams is drawn from and returned to two tanks fixed on either side of the shield.

The shield is fitted with an oak grouting-rib, made in sections, placed in the tail of the shield between the ram-heads and the last ring of tunnel segments fixed. The grouting-rib serves a double purpose; firstly, it prevents the grout from running out until it has set, and secondly, it distributes the pressure from the ram-head more evenly over the cast-iron segments.

The total force which can be exerted by the rams for driving a shield for a 12 ft. 6 in. tunnel forward is about 300 tons, or about $7\frac{1}{2}$ tons per foot run of cutting-edge; but in practice the force required generally varies between 150 tons and 250 tons.

A box-heading, strongly timbered, about 6 ft. high by 5 ft. wide, is driven ahead of the shield, and is always kept about 6 ft. or 8 ft. ahead of it. The heading is excavated by hand labour; two miners and two labourers working in it continuously, even whilst the shield is in motion, being just able to keep pace with the progress of the shield.

The cycle of operations for each ring is as follows:—

Let us assume that the shield is all ready to move forward, then the condition of affairs will be as follows:—The last ring of iron erected has been bolted up and grouted, the grouting-rib is in position, and is held there by the rams. The clay has been roughly trimmed to the shape of the cutting-edge for a distance of about 20 in., and the requisite number of piles have been placed in position. (Note.—The piles are of oak, about 3 ft. long by 6 in. by 2 in., and are shod with iron; they are placed against the front of the cutting-edge parallel with the skin of the shield, with one end resting in a small pocket cut in the clay face. The object of the piles is to burst out and bring down as much as possible of the clay between the cutting-edge and the box-heading as the shield moves forward, and the number used varies with the nature of the ground.) Planks have been placed from the heading to the platform of the shield to prevent the clay knocked out by the piles falling into the invert. The first two settings of the box-heading have been knocked away and placed across the entrance of the heading to protect the miners in it from the falling clay. All being ready the pressure is turned on, the rams commence to work, and the shield moves slowly forward. If the tunnel is straight the shield is allowed to advance the full stroke of the rams, but when on a curve the shield is stopped at half-stroke for the purpose of checking it for position.

At the end of the stroke the shield is stopped, the front portion being filled with loose clay knocked down by the piles. The pressure is reversed and the rams are drawn back and the grouting-rib removed; the invert of the tail of the shield is then cleaned out ready for the iron lining to be placed in position. Whilst the shield has been moving forward the segments, six in number, and the key-piece and bolts for one ring of tunnel have been brought up to the shield on trolleys ready for fixing.

The two bottom segments are first placed

in position in the invert, the wood packings are inserted in the circumferential joints, and the segments are then bolted up to the last ring fixed.

The two side plates are then dealt with in a similar manner. A temporary stage is constructed about 5 ft. high to enable the miners to fix the two top-plates and the key; these are lifted on to the stage, and the lower end of each segment is placed on the top of the corresponding side-plate; the upper end is supported temporarily on a timber strut, and is forced upwards tight against the skin of the shield, being about 1 in. above the final position; the key can now be inserted, and when this is done the struts are removed, and the two top-plates are allowed to come down into their correct position, gripping the key on either side. The whole ring is then bolted up and the stage removed.

Whilst these operations have been in progress the miners have continued to work in the heading, and at the same time two men, using the heap of loose clay in front of the shield as a platform, have trimmed the ground out ahead of the shield for a distance of 20 in., and have refixed the piles ready for the next move forward. The loose clay is now removed from the shield and heading and the ring of segments grouted, and the cycle of operations is complete.

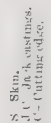
Forty rings a week is good progress, working night and day continuously.

Grouting.—This operation, which has been mentioned several times in these notes, is a most important one, as the safety of the buildings, mains, etc., along the route largely depends upon the manner in which it is done. The materials used vary considerably, the following having been used at different times:—Neat cement, neat blue lias lime, cement and lime in varying proportions, cement and sand, and lime and sand, in all cases having a considerable quantity of water with them. The grouting-pan consists of a strong steel cylindrical vessel, about 2 ft. 6 in. long and 1 ft. 6 in. diameter; a horizontal shaft runs through the centre, fitted with a number of blades, and is revolved by means of a handle. At the bottom of the cylinder is a nozzle, with screwed connexion, to which an armoured hose is coupled, the free end being held in the grouting-holes left in the tunnel segments.

On the top of the grouting machine is a valve and screwed connexion, which is connected to the high-pressure air-main in the tunnel by means of a length of flexible armoured hose. There is also an opening in the top of the machine fitted with an air-tight door. The operation of the machine is as follows:—The cement or lime is placed in the grouting machine through the opening in the top and the necessary amount of water added, the handle being revolved meanwhile in order to agitate the mixture and prevent it setting. The air-tight cover is then securely screwed down, and the valve turned on, which admits air at a pressure of 60 lb. per square inch into the upper part of the machine, forcing the grout out of the lower nozzle through the hose to the space outside the cast-iron lining of the tunnel, which it completely fills.

Packings.—In order to prevent the grout running out between the rings of segments cross-rotated deal packings are inserted in the circumferential joints. These packings are cut to the pattern of the flange of the segments, and have holes bored in them to correspond with the bolt-holes in the segments. The packings vary in thickness from $\frac{3}{8}$ in. to $1\frac{1}{2}$ in., the thinner ones being used where the tunnel is straight and thicker ones where the tunnel is on a curve.

Guiding a Shield.—A tunnelling-shield has to be steered in two directions, viz., vertically and horizontally, and great care is needed to keep the shield in its correct position. For the purpose of checking the vertical movements of the shield adjustable boning-rods are used. These are fixed as follows:—One on the shield itself, one about ten rings back further back; they are bolted to the top of the tunnel, and the adjustable cross-pieces are levelled with a dumpy level, so that the tops of the two boning-rods in the tunnel should line exactly with the rod in the shield. Should the shield be low the top rams are shut off and the bottom ones used to force it upwards, and in the same way, if it is too high, the bottom rams are closed and the top ones used. When the



tunnel is on a gradient the two boning-rods are set at such levels that the shield will follow the correct gradient if the rods bone through.

For controlling the horizontal movements of a shield two methods are employed. The first method is as follows:—Two plumb lines are suspended from the roof of the tunnel about 30 ft. apart, the leading line being about 10 ft. behind the shield; the lines are placed in position exactly on the centre line if the tunnel is straight, or on the tangent line if the shield is travelling round a curve. A movable centre-rod is attached to the shield, having the exact centre of the shield marked upon it. The plumb lines in the tunnel are set with a theodolite after careful calculations. To test the shield for position on a straight length the plumb lines are allowed to hang freely, and the centre-rod is placed in position in the shield; if the shield is correct the two lines will be in alignment with the centre mark on the shield rod, and if the shield is off line more rams are used on one side in order to bring it back again. For checking the shield on a curve a table of offsets is calculated for every foot on the tangent line, which show how much the shield should be to the right or left of the tangent line at any point on the curve. If the shield is off line it is corrected in the same manner as when on the straight.

The second method was conceived by Mr. Dalrymple-Hay. In this method two guide-rods, about 25 ft. long, are attached to the back of the shield, and are drawn forward by it as it moves. The rods are divided into feet and inches, and pass along over two indices fixed in the tunnel, one on either side, square to the centre line. Now, if the shield is travelling correctly, the readings of the guide-rods at both sides of the tunnel should be the same, but if the shield is going off line one reading will be higher than the other. When going round a curve a special shrunk-scale is calculated for the rod on the inner side of the curve, so that both rods should still read the same when on a curve. The chief advantage of this method over the first one described is that method can be taken while the shield is in motion, and indicate much more quickly if the shield is travelling off the line.

Architectural Societies.

ARCHITECTURAL ASSOCIATION. — The proposed week-end visit to Chichester, announced in our "Meetings" column last week, did not take place owing to the want of a sufficient number of entries.

Correspondence.

REASON AND TRADITION.

SIR,—May I make a few belated notes which have occurred to me with reference to your interesting articles on "Reason and Tradition"? It has seemed to me that certain of the arguments put forward on behalf of reason apply to the architecture of Greece and Rome equally with that of mediæval Europe. Tradition unchecked and reason paramount appear rather to figure in all three, and never has any one of them been bound by rigid formulae.

I am sometimes tempted to think of all architecture as Classic until the Renaissance made itself felt. The "great divide" seems most to lie in the fact that architecture previous to the Renaissance was unconscious, and afterwards it was not. When I have stood in Florence within the Church of Santo Spirito or before the Rucellai Palace I have been immediately aware of some new element for the first time ranging itself alongside of tradition. I recognise an intruding personal force in the design, and often something that I can speak of only as sheer invention. The forms might doubtless be traced back to a traditional base, but they compel you to accept them on their merits. The sacristy of San Lorenzo presents a more notable instance still. As the late Charles Garnier said, "Michelangelo made his architecture." I recall, also, an address you once gave,

in which you cited examples of the daring with which individual designs had treated detail popularly supposed to be inviolate. This visible human element was, of course, no new thing. One cannot conceive of architecture existing without it. Yet it had previously presented itself, as it seems to me, in what I may venture to call a "soluble" form—saturating tradition, while the Renaissance crystallised this into the personal.

We cannot now return to the unconscious days of innocence did we desire it. The very effort to do so would betray our self-consciousness. To lead "the simple life" we must be simple people, and this must be also the first step towards reasonable architecture. Our materials cannot teach us to be that, though they will willingly assist us. Neither can tradition be clipped like a yew hedge. To learn resource from it here, and restraint there, and freedom everywhere offers greater opportunities, as I think, towards the formation of a national architecture, though the growth be slow, than can be hoped for by establishing an aristocracy of style drawn from one source or the other, and, if I am not mistaken, the evidences of such a natural growth are apparent to-day.

C. J. T.

ESTIMATING FOR EXCAVATION AND CONCRETE WORK.

SIR,—In your issue of September 15, under the "Builders and Contractors' Column," you give two examples of estimating for a cubic yard of concrete; but I am at a loss to understand why you divide by 6 in the second example, as, inasmuch as you have added 15 per cent. for shrinkage, should not the division be by 7? Again, if you assume that the 7 yds. of dry material have shrunk 15-100ths, the amount to add to bring up to its original amount will be 1-566th of the balance of 85-100ths; also, I notice, you have added the 15 per cent. on to the labour, which, I think, is not usual, 1s. 6d. being a fair allowance for mixing and depositing a cubic yard of concrete when set in the work.

The method adopted by the writer, working on your prices, would be as follows:—

6 yds. ballast 6s.	=	s. d.
1 yd. cement	=	36 0
		32 11
		68 11
Shrinkage, 15 per cent. = add $\frac{1}{7}$		12 2
		80 13
	Divide by 7	11 7
Add labour, etc.		1 6
		13 1
	10 per cent. profit	1 4
		14 5
As against your 16s. 5d.		14 5

The statement that a ton of cement is actually only 1-12th of a cubic yard is, of course, a misprint. It will naturally depend upon the weight of the cement, which varies, the average being about 100 lb. to the cubic foot, equals $\frac{100 \times 27}{2240}$, say, 1 1-10th tons to the cubic yard.

The writer has found, by repeated actual experiment, that concrete material, composed of two parts broken granite $\frac{1}{4}$ in., one part granite dust, one part sharp red sand, one part Portland cement, all by measure, when dry will shrink as much as 32 per cent. when set in the work, and, generally speaking, the finer the material and the more cement used the greater the shrinkage.

Perhaps some of your other contributors will give your readers the value of their experience, which, I feel sure, would be of interest to many besides myself.

HARRY A. DIX, A.M.I.C.E.

Leicester.

* The "one-twelfth" should have been "eleven-twelfths." It was written in figures in the "copy," not in words, hence the printer's mistake, which we regret not having noticed.—Ed.

BOOKS RECEIVED.

BUILDING CONSTRUCTION AND DRAWING: ELEMENTARY COURSE. By Charles F. Mitchell. Seventh Edition, revised. (B. T. Batsford. 3s.)

THE EDUCATION OF AN ARTIST. By C. Lewis Hind. (Adam & Charles Black. 7s. 6d.)

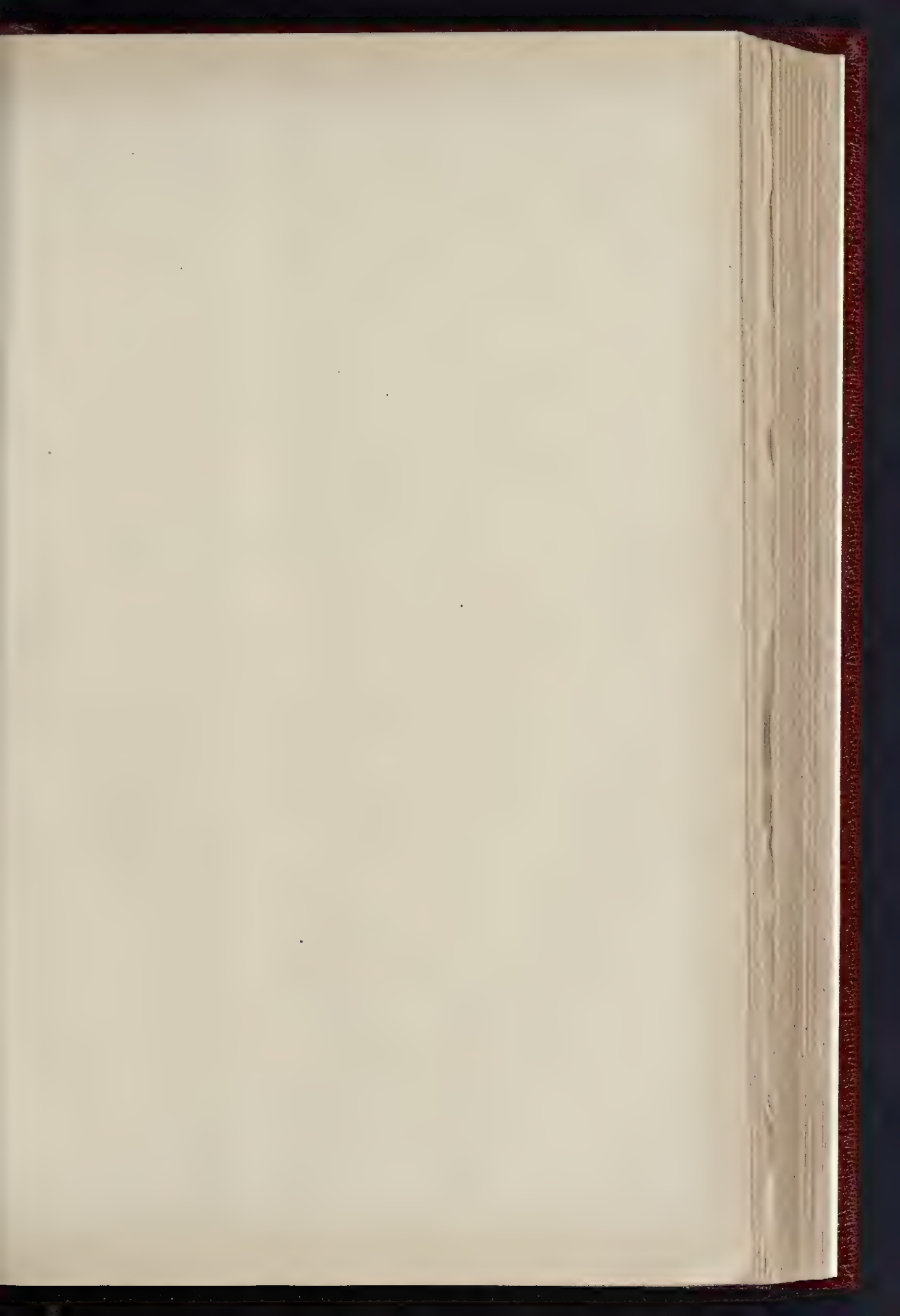
BUILDING CONSTRUCTION (ADVANCED AND HONOURS COURSES). By Charles F. Mitchell. Fifth Edition. (B. T. Batsford. 5s. 6d.)

Fifty Years Ago.

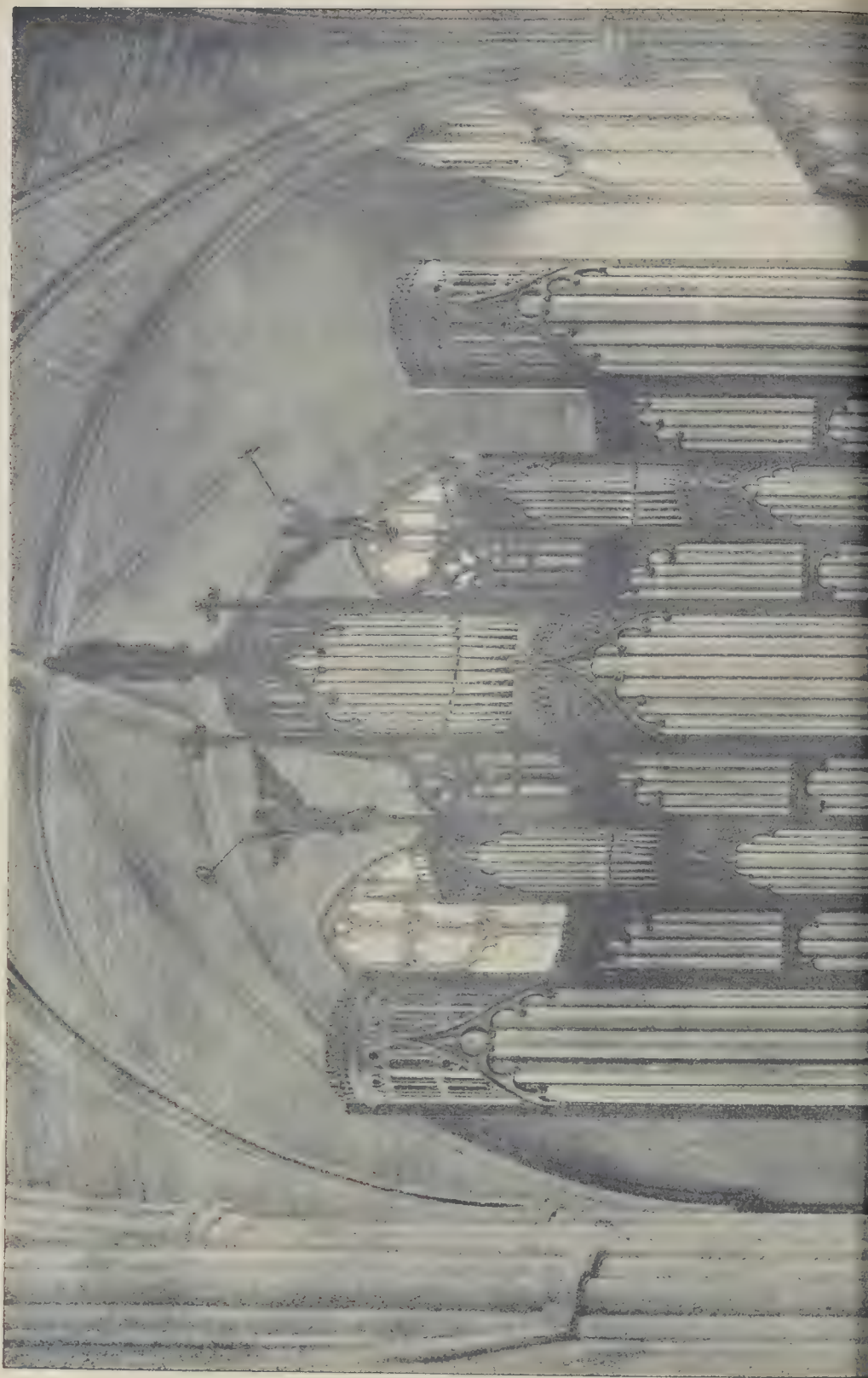
FROM THE *Builder* OF SEPTEMBER 20, 1856.

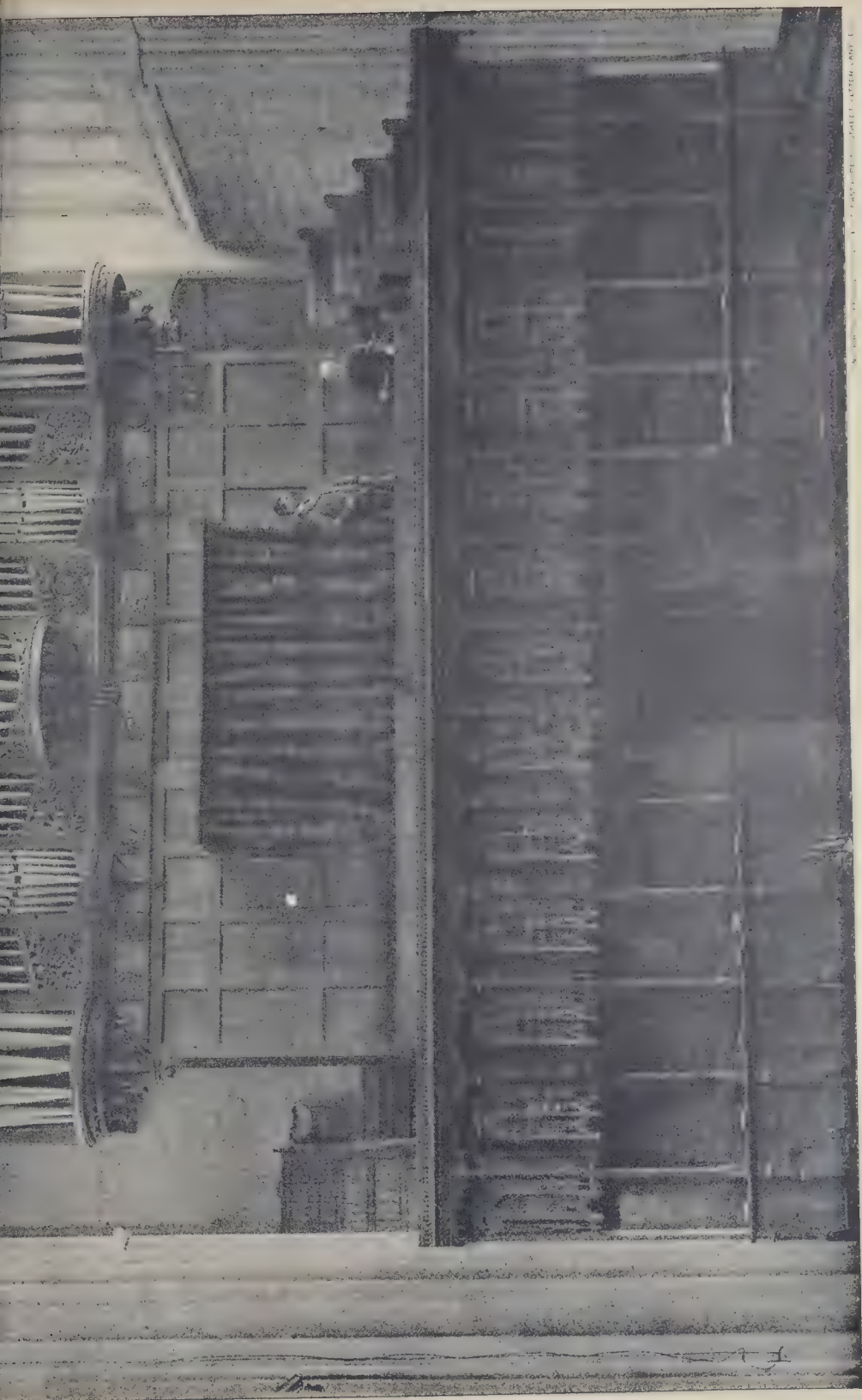
CESSPOOLS IN PARIS AND LONDON.—Paris, to the eye, is a very clean city; London, judged by sight alone, is very dirty. We must, however, again refer to the returns of the Registrar-General for practical results; and then we find that, although the metropolis of Great Britain numbers more than double the population of Paris—though we have a damp, dull-looking, smoke-laden atmosphere, and a foul river—we nevertheless have a lower rate of mortality. There must be reasons for such a result, if we can find them. Let us examine one set of works, and analyse the regulations under which they are used, striving to see if anything useful can be learned. The River Seine is not contaminated by sewage as the River Thames is, although there would be no tidal return and oscillation. The buildings of Paris do not drain into sewers, but the whole of the household and slop refuse is passed into pseudo-hermetically-closed cesspools. These cesspools are constructed under regulations, and the superintendence of the municipal body or their officers. They are also emptied by the same authorities, and a very large return is obtained by sale of the manure after it has been deodorised. The system is considered perfect by its supporters: it has been lauded by public writers; and those who only judge from surface appearances conscientiously think the Paris plan of cesspool sewerage should be imitated. But these gentlemen have probably never lived long in Paris; or if they have resided there, it has not occurred to them that the sharp and subtle stench now and then met with can have anything to do with the cesspools; neither are they conscious that such a stream of gas may be more deadly than a wound by a naked sword. The French pay a terrible penalty for their cesspool system. Their clear atmosphere and clean river do not save them from the subtle, unseen, but most deadly gases of decomposition. This cesspool taint must have something electric in it, as it pervades all available space. On a bright warm day the doors and windows of a house may stand open from morn to night without bringing relief: it is not to be blown out. The boasted hermetical sealing is only a delusion and a snare. Fermentation takes place, and the gases of decomposition force a passage through every chink and cranny, as also back along the pipes and ducts which convey the refuse. There is no such thing as a "stench-trap" in existence, nor ever will be. As previously stated, the Paris cesspools are emptied by servants of the municipal body, and no doubt many persons consider that to empty a cesspool is, for a time, to remove the cause of contamination. This, however, is not so. The sides of a cesspool are foul from infiltration, the bottom is never entirely cleared from sediment, and there is soon a covering of liquid, so that there is a larger area of decomposition, and more cubical space for the deadly gases generated. A cesspool must be a foul abomination, if near a human dwelling, under any management. London is not without cesspools: there are thousands beneath dwelling houses, and connected with them; but, fortunately, they never become municipal property. The small area covered by the City, and the defective powers of parish boards beyond City limits, have probably saved the English people from constructions so fatal to health and life. Better all the soil refuse of a city in the gutters, on the surface, or in the river, where the sun may dry it, the air ventilate it, the rain wash it, and the river dilute and remove it, than stored in cesspools, to undergo continuous fermentation and decomposition; but better still the instant removal of all soil and slop refuse (before decomposition commences), by means of drains and sewers, to some common outlet, where it can be applied at once to land for agricultural purposes. To obtain such results will be worth almost any pecuniary cost, supposing the whole outlay to be a loss; but, like all true improvements, such plan is the most economical.

"MOTTOES ON MANTELPieces."—The last line of the inscription over the fireplace at Aston Hall should have run:—"To serve does not disdain" instead of "does" as printed.

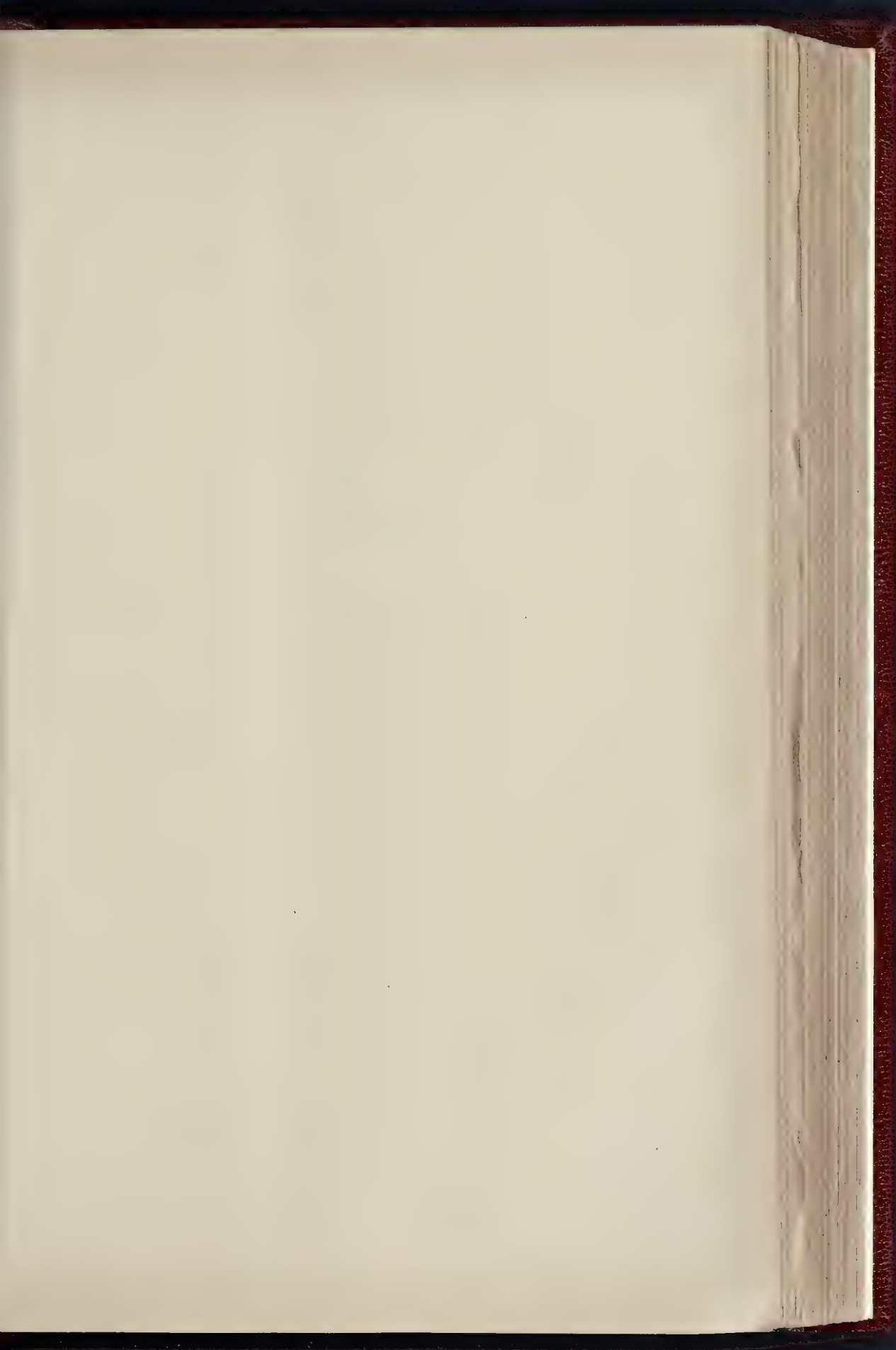


THE BUILDER, SEPTEMBER 22, 1906.





NEW ORGAN, CHETTNHAM COLLEGE CHAPEL. MR. H. A. PROBERTS, F.R.I.B.A., ARCHITECT.



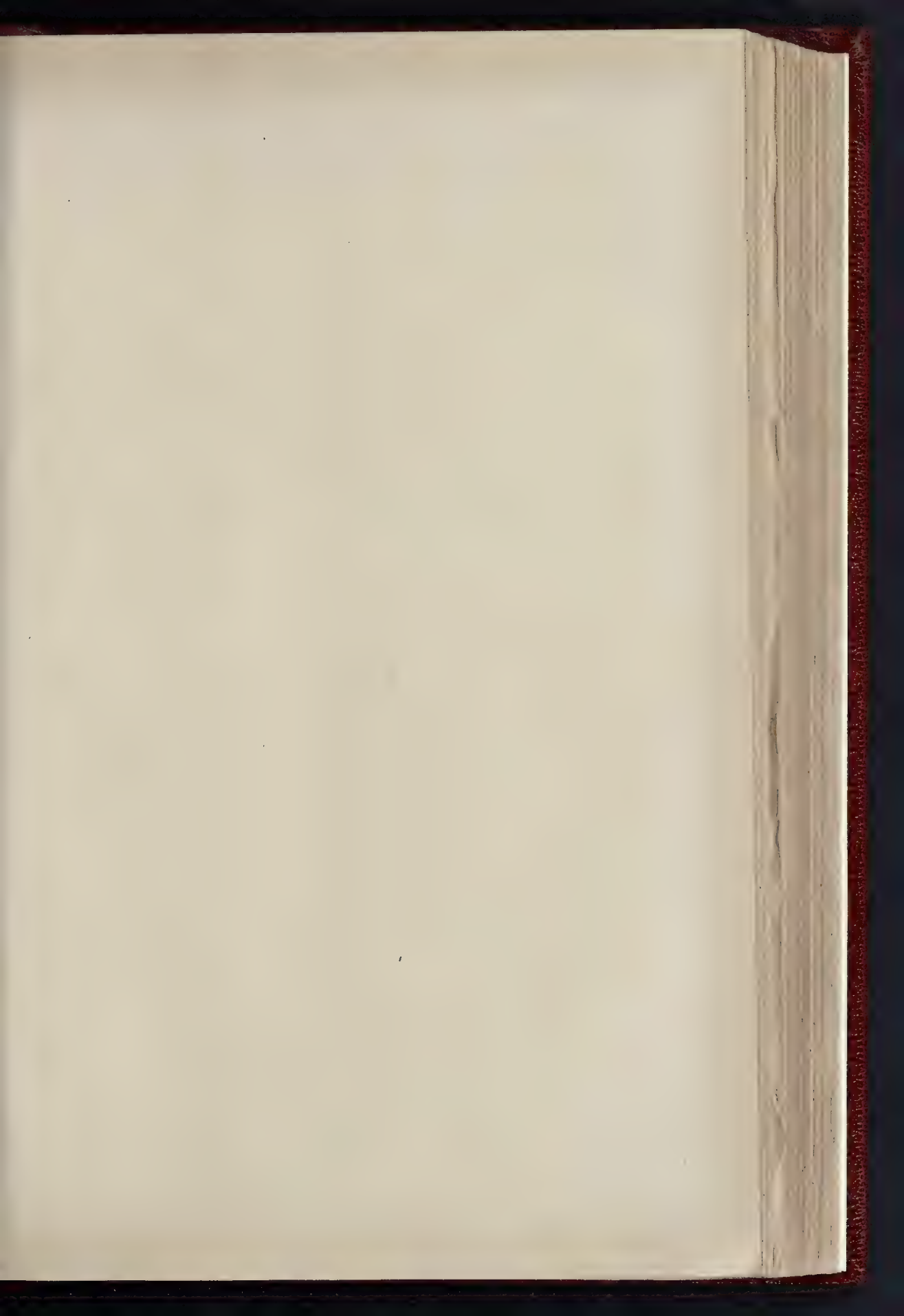


A COMPETITION DESIGN FOR THE PEACE PALACE



NO PHOTOGRAPHY TO BE TAKEN WITHOUT THE EXPRESS PERMISSION OF THE DIRECTOR

THE HAGUE.—By Mr. G. A. BLIGH LIVESAY, F.R.I.B.A

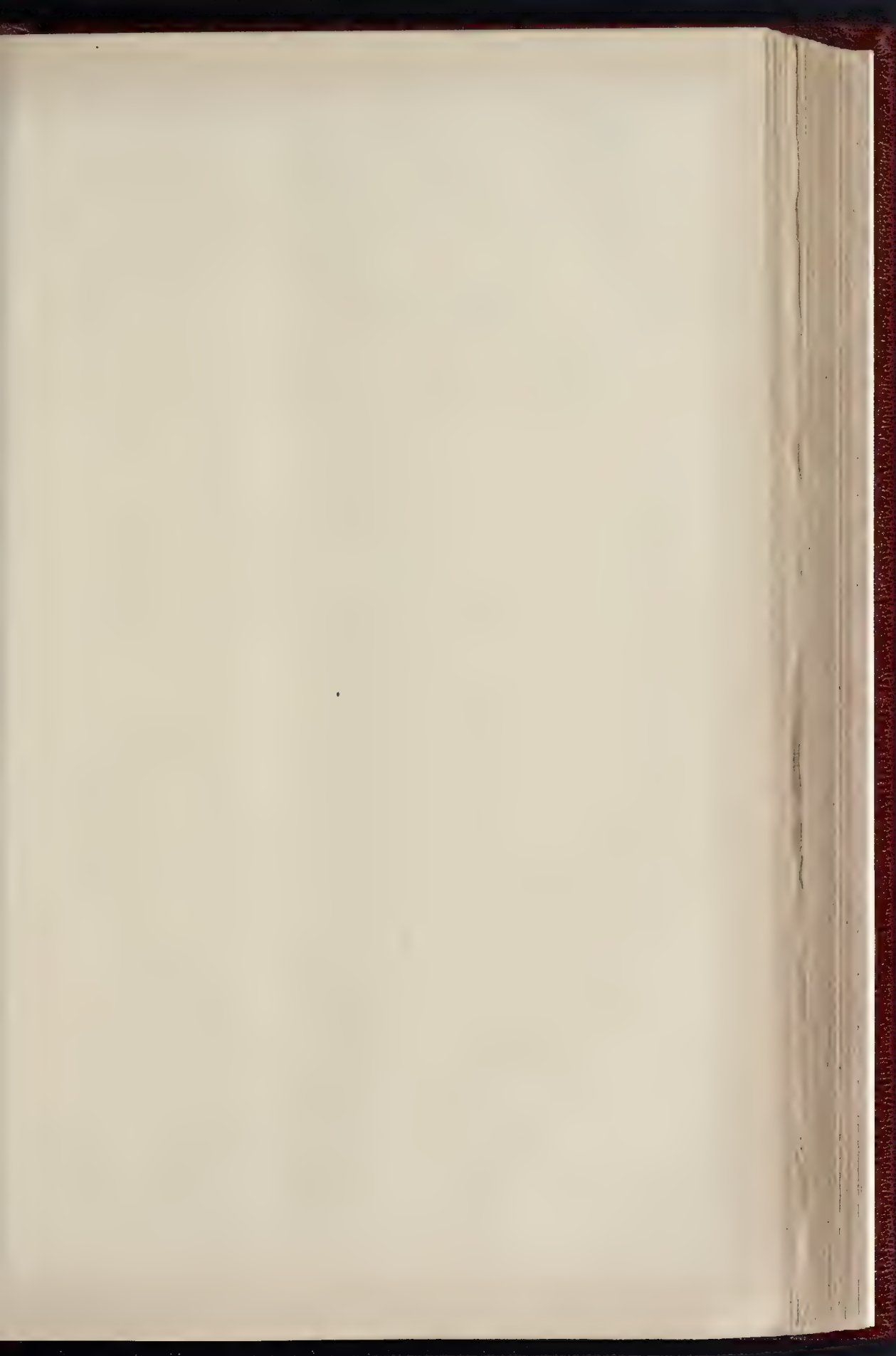




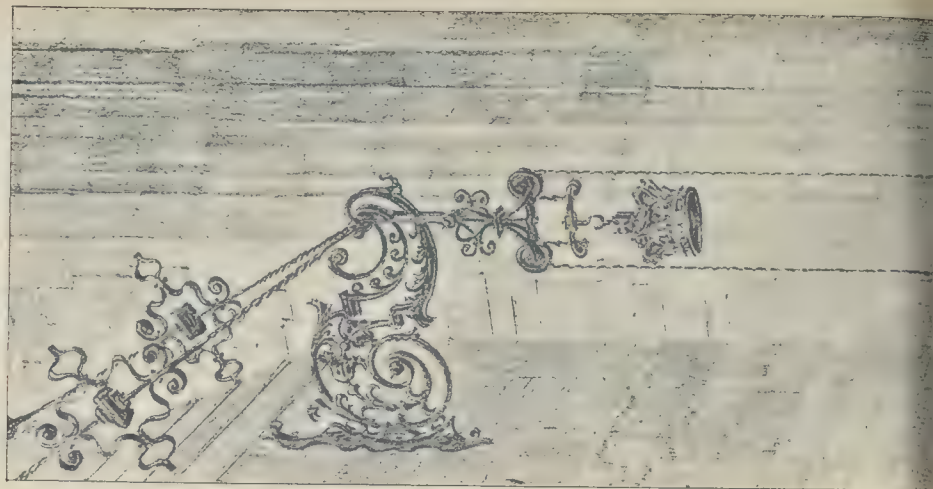
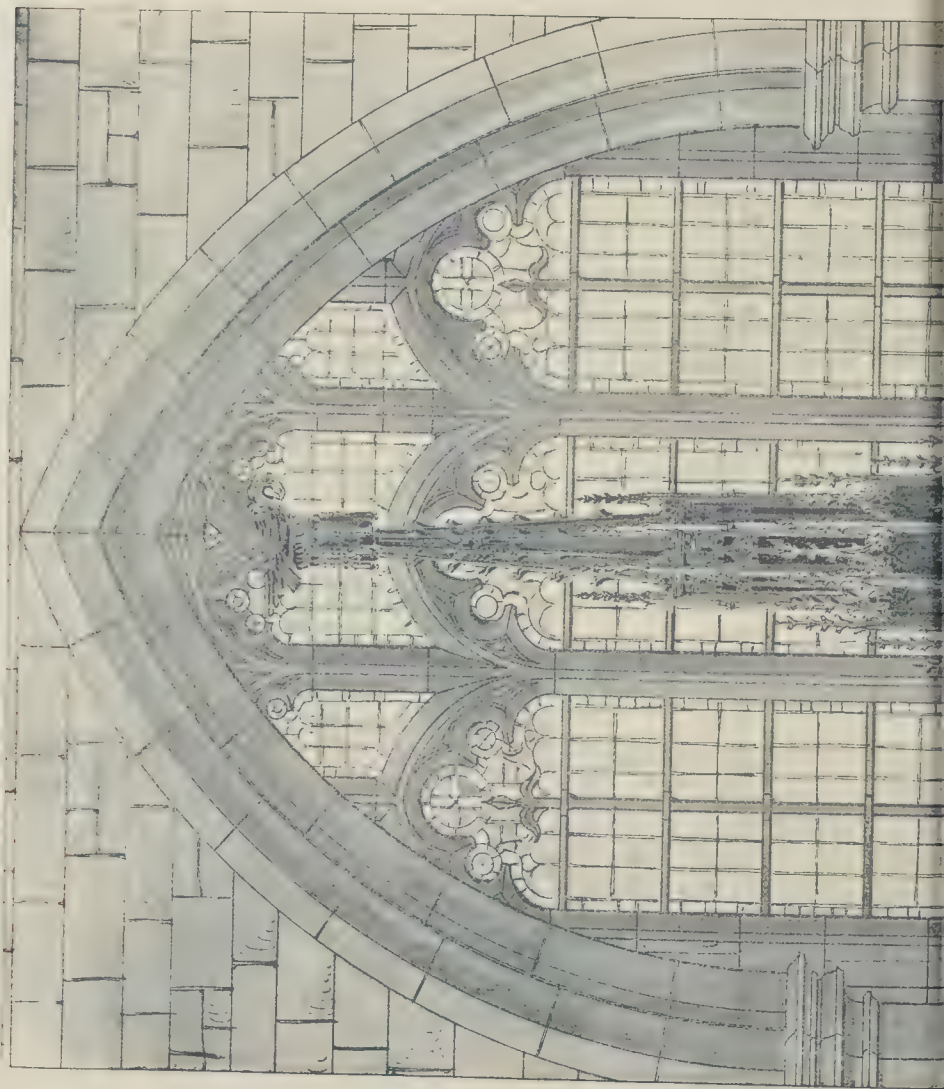
CITY CHAMBERS, LEEDS.—

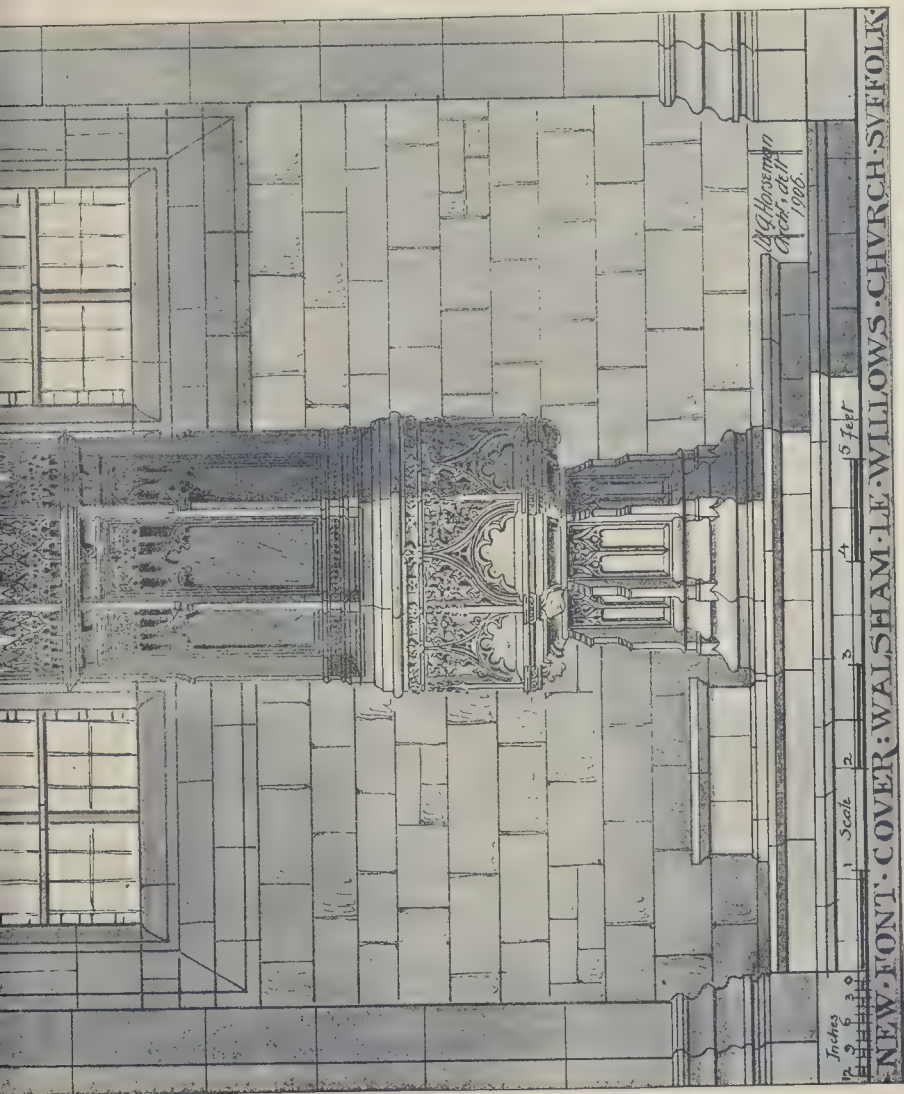


NO. PHOTO - RAL E. C. L. 4 - LEAST H. QUINC STREET PETER LANE E.C.



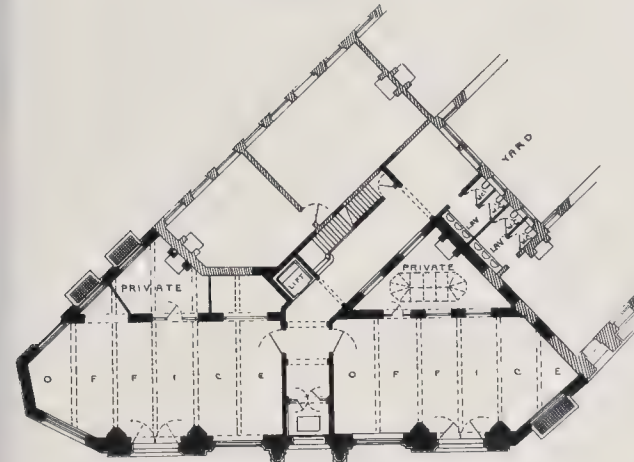
THE BUILDER, SEPTEMBER 22, 1905







FIRST FLOOR PLAN



GROUND FLOOR PLAN

Scale 1/4" = 10' 0"

City Chambers, Leeds. Plans.

The architects are Messrs. Perkin & Bulmer, of Leeds, whose drawing was exhibited in this year's Royal Academy exhibition.

NEW FONT COVER. WALSHAM-LE-WILLOWS CHURCH, SUFFOLK.

The font cover herewith illustrated has been designed in harmony with the existing XVth century font in the above church. The cover is a fixed one of oak in three stages, all of which are octagonal in plan, and the lowest stage is arranged to open outwards for the baptismal services. The middle stage is surmounted by a crocketed spire crowned by a finial of the pelican in her piety. The whole cover is being carved by a class composed of the village lads. The font at present stands upon the floor of the church, without steps, but it is proposed to provide stone steps as shown in the drawing. The whole work is being carried out from the designs and under the superintendence of the architect, Mr. W. G. Horsman, of London. The drawing was exhibited this year at the Royal Academy.

FONT-COVER COUNTERPOISE WEIGHTS. LOUGHBOROUGH CHURCH.

This wrought-iron work was designed by Mr. W. Samuel Weatherley, and incorporated an old XVIIIth-century bracket, which was repaired and strengthened. Mr. Page, art metal-worker, of Loughborough, carried out the work. The drawing was exhibited in this year's Royal Academy.

METROPOLITAN ASYLUMS BOARD.

THE usual fortnightly meeting of the Managers was held at the offices, Victoria-embankment, on Saturday, September 15, Mr. C. M. Martineau in the chair. Correspondence.—A letter was received from the Local Government Board asking the Managers to reconsider their proposal for the erection of a porter's lodge and staff cottages at Joyce Green Hospital, with a view to reducing the cost of the scheme.

Darenth Asylum.—The Works Committee reported that on the 14th inst. they accepted two tenders for laundry alterations at the Darenth Asylum, viz., that of Mr. T. Knight, Sidcup, for building works at the sum of 1,016*l.*, and that of Messrs. D. & J. Tullis, Southwark

Bridge-buildings, for engineering work at 2,885*l.* When asked to sign their respective contracts on the 10th inst., Mr. Knight declined, as he said he had made serious errors in his totals, the items amounting in all to 382*l.* 3*s.* 8*d.* He asked permission either to withdraw his tender or do the work for 1,316*l.* 3*s.* 8*d.*, which was his original tender, 1,016*l.*, plus 382*l.* 3*s.* 8*d.*; but he subsequently agreed to reduce that item to 300*l.* 3*s.* 8*d.* The Committee had satisfied themselves that Mr. Knight had made a *bona-fide* error in his tender. It would be remembered that the next lowest tender was that of Messrs. J. Ellingham & Sons, Dartford, at the sum of 1,693*l.*

They therefore recommended that Mr. Knight's tender for laundry alterations at Darenth Asylum at the increased amount of 1,316*l.* 3*s.* 8*d.* be approved and adopted.

Mr. Elliott and Mr. Lyall protested against the alteration being made, as it laid the Board open to abuse in matters of such kind. Mr. Thornley, in reply, said that they, as a Board, did not want to be unfair to anyone, and as the Committee had reported they had gone into the matter, and were of opinion that a *bona-fide* error had been made, he considered that, in fairness, they should accept the explanation.

The recommendation of the Committee was adopted.

HOUSING OF THE WORKING CLASSES IN MIDDLESEX.

In the annual Report of Dr. Young, the Medical Officer of Health for the County of Middlesex, recently issued, he says, referring to the Housing of the Working Classes Act, that remarks are made in the reports of the local medical officers of health and sanitary inspectors in the county to the following effect:—In Brentford, Dr. Bott states that the "housing question" has always been a difficulty owing to proximity to London, and the large number of workmen engaged in the town. He thinks the extension of tramways and cheapening of railway communication should induce workmen to go further afield. He also advocates the widening of the High-street because all the old and bad property in the town is in its vicinity, and if the street were widened to 80 ft. this property would have to be pulled down. In the Chiswick report reference is made to two schemes which were mentioned in last year's Report. In the case of one of these it is stated that the houses have been thoroughly repaired and are now in a habitable condition. The other scheme, known as Strand-on-the-Green, has not yet been dealt with. In Edmonton it was decided that, in order to carry out by-law No. 113 made by the District Council as regards new streets and buildings (which requires that no new dwelling-house shall be let or occupied until it has been certified after examination by an officer of the Council to be fit for human habitation), the Medical Officer of Health should give this certificate. All new houses were therefore visited by him. Certificates were granted after the first inspection in 234 cases, and after a second inspection in thirty cases. In one case a conviction and penalty was obtained against an owner who allowed his houses to be occupied before receiving this certificate. Closing orders under the Housing of the Working Classes Act were obtained in respect to three houses, and notices were served as regards two which were not fit for human habitation. In Finchley the inspector reports that, owing to failure of an owner of seven houses to carry out requirements of the authority, the works were executed by the district Council, and the cost recovered. In the report on Hayes Urban District, Dr. Higginson states that cottage accommodation is rapidly becoming more adequate; previously such has been much needed. Dr. Fletcher Little, in his report on Harrow, sets out some suggestions for the amendment of the existing by-laws. In the report on the district of Heston and Iselworth, Dr. Steegmann directs attention to the advantages of the system now in force, whereby, before a certificate is given as regards the fitness of a new house for habitation, the drains are tested by an official of the Public Health Department in conjunction with the Surveyors' Department. For the newly-created Urban District of Ruislip Northwood, new by-laws relating to streets and buildings were being framed. Dr. Ransome again repeats his remarks as to the necessity of providing suitable dwellings under the Housing of the Working Classes Act for working men in the district of Southgate. Dr. Gunther, in his report on Teddington, advises the District Council to consider the question of providing suitable cottage dwellings for the working classes in view of the fact that available sites are getting scarce and more expensive. In Tottenham twelve houses were closed as being

unfit for human habitation. The estate which is being developed by the London County Council progressed rapidly during the year, and it appears that within eighteen months it is anticipated that houses for an additional 5,000 persons will be completed. Other houses are also being erected by the Governors of the Peabody Donation Fund. In the case of Wealdstone Dr. Butler draws attention to the bad construction of some of the flats in the poorer parts of the district. He especially mentions Canning-villas; these, he states, were the subject of a special report in the previous year, but nothing appears to have yet been done, and he reports that, in his opinion, they are not fit for human habitation in their present condition.

THE ROTHERHITHE TUNNEL.

The members of the Society of Engineers, on Wednesday, the 19th inst., paid a visit to the works of the Rotherhithe Tunnel, now in progress, of which the following is a description:—

The work, which is being carried out by the London County Council, consists of a carriage and footway tunnel, with approaches, commencing in Lower-road, Rotherhithe, and terminating in Commercial-road, Stepney. The total length is 6,883 ft., of which 2,020 ft. is open approach, 1,122 ft. cut and cover, and the remainder, 3,741 ft., tunnel, lined with cast-iron and concrete. There are four vertical shafts. One on each bank of the river near the water's edge, and one at each end of the iron-lined tunnel, further inland. These shafts vary from 70 ft. to 100 ft. in depth; they are each 50 ft. diameter inside, the sides consisting of two steel skins, 5 ft. apart, with the intervening space filled with concrete. Openings are provided in the shafts for the tunnel; these openings are temporarily closed while the shafts are being sunk, and until the tunnel is connected up with them. The under-river portion of the tunnel is about 1,500 ft. long between shafts, and crosses the river diagonally in order to clear the entrances to the Surrey Commercial and the London and India Docks, which lie opposite each other at this point of the river.

The tunnel proper is circular in section, the outside diameter of the cast-iron lining being 30 ft., with a thickness of metal of 2 in. under the river, and 1½ in. elsewhere. The lining is put together in rings each 2 ft. 6 in. wide, and composed of sixteen segments, with a key-piece. The rings are bolted together by means of bolts through the internal flanges which have a depth of 14 in. These flanges will be hidden when the work is completed by the concrete lining, which will have an internal diameter of 27 ft. The faces of the iron at the joints are all machined for a width of 12 in., and the segments fit metal to metal. The remaining 2 in. at the internal edge of the flanges are recessed for caulking with lead and rust cement.

The tunnel is being constructed by the shield system under compressed air. A small pilot tunnel, 12 ft. 6 in. external diameter, was first driven across the river, and it is being followed by the main tunnel. The strata met with are known as the Woolwich and Reading beds, and consist chiefly of clay with beds of sand and shells, overlying a bed of marl or rock of a chalky nature. Below the last occur a compact bed of pebbles, and a thick bed of sand.

The cut and cover portion of the work consists of a brick barrel, 1 ft. 10½ in. thick, surrounded with concrete. The internal diameter of the brickwork is 27 ft., the same as in the case of the concrete lining in the iron tunnel. The surface of the roadway will be 5 ft. below the axis of the tunnel in order to obtain full advantage of the available width. This will allow of a 16-ft. carriage-way and two 4-ft. 8½-in. footpaths. Below the roadway the section provides for a subway which can be used for gas and water mains, electric cables, etc.

In the case of the open approach the section consists of concrete retaining walls with battering face, surmounted by a brick parapet. A concrete invert fills the space between the footings of the side walls, and upon this the roadway is to be placed. The tunnel faces on each side of the river are built of red Aberdeen granite surmounted with a massive granite parapet, the surface of the whole being polished. Both the cut and cover portion of the tunnel and the open approaches are made water tight with asphalt. At one point, viz., on the south side of the river, the tunnel approach crosses the East London Railway. The crossing occurs at the Rotherhithe station, and it has been necessary to cut away a portion of the railway tunnel, build new retaining walls, and carry the new roadway across the station platforms and the rails by means of a girder bridge. At the present time the approaches and cut and cover portion

on the south side of the river are nearly completed. All the shafts have been sunk, and the tunnel has been driven rather more than half-way across the river. On the north side of the river the open approach and cut and cover portion of the work are in progress. An extensive plant for air compressing and hydraulic purposes has been installed, including six air compressors capable together of dealing with 1,000,000 cubic ft. of air per hour. About half that quantity is at present being delivered into the tunnel. The contract was let to Messrs. Price & Reeves early in 1904, and the work is expected to be completed in 1909. The cost of the work will be about 1,000,000.

The Engineer-in-Chief is Mr. Maurice Fitzmaurice, Chief Engineer to the London County Council, the resident engineers being Mr. E. H. Tabor, assisted by Mr. A. G. Drury, member of Council of the Society of Engineers, by the latter of whom the visitors were received and conducted over the works.

ROWNTREE'S SYSTEM OF REINFORCED CONCRETE.

The latest novelty in the way of concrete-steel, the "improved patent" suggested by Messrs. Rowntree of York, the well-known manufacturers of cocoa and chocolate. As it may be thought that proficiency in the production of such delicacies is a doubtful qualification for architectural construction, we ought to explain that the new system emanates from the building department established by the firm at their works, presumably in consequence of execution of repairs and the erection of additional buildings.

From drawings we have received it would appear that Messrs. Rowntree's method is intended as an improvement upon the Hennebique system, for it includes all the essential features of that system, and so forth. It embodies additional features, of which some are good in theory but inadvisable in practice, while others are apparently based upon inaccurate views as to the distribution of stresses in structural members.

The chief novelties in the first category are: (1) a new form of patent bar with slightly extended surface, which, compared with a plain round bar of equal cross-sectional area, offers a greater surface for adhesion of the concrete, and increased resistance to flexure; (2) a form of stirrup with eight complete twists in the metal for the purpose of securing increased resistance to shear; and (3) the disposition of stirrups in an inclined direction. The new type of bar suggested is open to the objection, applying to all patented devices of the kind, that any theoretical advantage promised is counterbalanced by the extra cost of specially-rolled sections, and the inconvenience and delays that usually follow the employment of materials not obtainable in the open market. The saving of metal that might be effected by the use of twisted stirrups would be a very small item compared with the labour involved in the operation of twisting, and in the advance preparation, storage, and correct allocation on the site of the twisted stirrups, instead of equivalent members simply cut from a length of steel strip and bent to form as required. The inclination of the stirrups is an old idea which has been largely applied in the United States and on the Continent for many years past, and the only novelty in Messrs. Rowntree's arrangement is that the angle of 60 deg. has been substituted for the correct angle of 45 deg. There are, however, two practical objections to inclined stirrups. One is that a horizontal bearing for the longitudinal reinforcement cannot be obtained unless the bottom loop of the stirrup is forged at suitable angle, and the other is the difficulty of ramming concrete in a satisfactory manner between and around the loops of the stirrup without disturbing its position.

In the second category of new features are curved "stiffeners" for the compression areas between the points of contrary flexure in the adjoining spans of a continuous beam, and inclined stiffeners for the compression areas of a column base. These "improvements" would be essential if the areas in question were subject to tension, but only represent waste of material when applied in areas of concrete already adequate for the resistance of compressive stresses. Moreover, the beam stiffeners shown on the drawings are of the wrong form, because they follow a curve that is diametrically opposite to that indicated by the outline of the diagram of bending moments.

So far as concerns concrete-steel Messrs. Rowntree & Co. have evolved a system which cannot be recommended as it stands. If suitably modified and applied by a designer of experience, it might be adopted without risk, but even then would lead to unnecessarily costly construction.

General Building News.

CHURCH, HELLIHFIELD.—On the 15th inst. the Bishop of Ripon dedicated the new church of St. Aidan, which has been erected to serve the needs of the Hellifield portion of the parish of Long Preston. The total cost is about £5,500. The church consists of a nave and chancel, which will accommodate about 250 worshippers. There are also a clergy vestry and a parochial room. The tower is 55 ft. high, and is capable of holding a peal of bells. The walling is of rubble in mortar, and the furnishings are principally of oak. The architects were Messrs. Connon & Chorley, of Leeds.

WESLEYAN CHAPEL, BROCKHOLES.—A new Wesleyan chapel has been built in this village. The chapel will accommodate about 200 persons. It contains nave, chancel, minister's vestry, organ-chamber, and stone porch, with arched opening, enriched with mouldings, and carved patterns. There is also a vestry or sacristy, patterned after the pattern of the church. The outer walls of the church are faced with hammer-dressed local stone in random course, pointed in Portland cement, and having buttresses with dressed stone weatherings. The chancel arch is of dressed ashlar, with double-played jambs and drop arch, and the floor of the chancel and main aisles are of cement-concrete, stained to the colour of red tiles. The chancel ceiling is barrel-vaulted in plaster, with moulded ribs and modelled patterns. The communion rail and pulpit are in oak, the seating and open-timbered nave roof in pitch-pine, the latter unvarnished. The building has been erected from the plans and under the supervision of Mr. E. W. Lockwood, architect, Huddersfield; and the following were the contractors:—Mason, Mr. Robert Turner, Holmfirth; joiners, Messrs. J. & J. Shaw, Holmfirth; slaters, Messrs. Pickles Bros., Huddersfield; plasterer, Mr. D. B. Hunsell, Huddersfield; plumber, Mr. J. Kenyon, Holmfirth; hot water, Mr. Rayner, Holmfirth; painters, Messrs. Spence & Co., Holmfirth.

WESLEYAN CHAPEL, THORPE HESLEY.—The foundation-stones of a new Wesleyan Methodist chapel were laid at Thorpe Hesley, on the 13th inst. The new building will comprise a church to accommodate 350, an organ-chamber, and gallery, approached from the front by means of a staircase, and main entrance. There is to be one large vestry. The front and staircase of the church will be faced with sandstone bricks, with local stone dressings. The roof will be partially open, and the windows will be glazed with ornamental leaded lights. The building will be heated on the low-pressure system. The contractor is Mr. J. Cooper, of Rotherham. The design is that of Mr. A. E. Lambert, of Nottingham, whose work was accepted in open competition. The cost will be about £2,000.

NEW CHURCH, HULL.—The erection of a new chapel for the Methodist New Connexion body at Hull has just been commenced. The building will face the Boulevard, and is from designs by Mr. W. H. Bingley, of Whitefriargate. The contractor is Mr. Sanderson, of Hull, and the cost, exclusive of land, will be £2,500.

WESLEYAN METHODIST CHAPEL, SOUTH ELLESMERE.—The foundation-stones were laid recently of a new Wesleyan Methodist Chapel, which is being built at South Ellesmere. The building is being erected in King-street, and it will accommodate about 250 persons. The cost, including the land, will be about £1,000. The church is designed after the Gothic style, the architects being Messrs. J. H. Davies & Sons, Chester.

SCHOOL ENLARGEMENT, MIDDLESBROUGH.—The Middlesbrough High School has recently been enlarged by the addition of a west wing. The new wing provides accommodation for 240 pupils, an exception of the studio and music rooms on the second floor of the south wing, is arranged on two floors. The principal entrance is at the King Edward's-road front of the buildings, and another entrance is provided into the playground at the Clarendon-road front of the school. On the ground floor are a hall and hall at the north and south end of the school with staircase adjacent giving access to the upper floor. Adjoining the main entrance a waiting-room and head mistress's rooms are provided. The main feature of the ground floor is the assembly-hall, 60 ft. by 31 ft. 3 in., with a platform at one end. In addition, on this floor, are four classrooms, cloak-rooms, and lavatories for the pupils. The first floor has six classrooms, students' room, and assistant mistress's room, store-rooms, and lavatories, a corridor giving access to the classrooms. The second floor contains studio, 33 ft. by 24 ft., and two music classrooms. Mistresses' cloak-rooms and store-room are provided on

ozanine floor. There are also cellars for heating apparatus, coal storage, etc. Laboratory accommodation is provided in a separate building on the southern extremity of the site, with frontage to Clarendon-road, and includes a laboratory, fitted up for physics and chemistry, a lecture theatre, dark-room, and stores. The staircase and the whole of the first floor are of teproof construction. In addition to windows, which are provided with beads to allow of air inlets at meeting rail level, and hoppers in upper sashes, air-outlet flues are provided from the ground-floor rooms, and Couland & Lackay's concealed roof ventilators are used for extracting purposes to rooms on upper floors. Each room is provided with a fire-place, in which is fitted Shoreland's Ventilating Stove. The principal heating is by low-pressure hot-water. The interior woodwork, with the exception of the main entrance porch, which is in oak has been carried out in pitch-pine, and stained green. The floors are laid with maple blocks. Electric light is fitted throughout the buildings. The elevations are faced with red pressed bricks, and have Dunhouse stone dressings, and the roof is covered with dark Lancashire slates. The total cost of the work was about 10,000. The principal contractor was Mr. Geo. M. Radge, Normanby, who had the following were the subcontractors: Messrs. W. A. King & Son, Ltd., North Ormsby; plumbing, Mr. P. B. Watson, Stockton-on-Tees; slating, Mr. W. B. Robinson; painting, Messrs. W. L. Taylor & Son; plastering, Messrs. Smiles & Dawson; carving, Mr. A. J. Arrowsmith, London; electric lighting and heating, Messrs. Baker Bros., Spalding; the firm of Messrs. R. Lofthouse & Sons, architects, Middlesbrough. Proposed Art School, EDINBURGH.—A meeting of the sub-committee of the Provisional Committee, which has under consideration the proposed new art school for Edinburgh, was held on the 12th inst., in the City-chambers. Lord Provost Sir Robert Cranston presided, and among those present were Mr. Pittendrigh Macgillivray, R.S.A.; Mr. Kinross, R.S.A.; and Mr. Morham, City Architect. The principal object of the meeting was the consideration of a set of plans for the new school, prepared by Mr. Macgillivray and Mr. Morham, with the view of embodying, as far as possible, various suggestions made by the members of the Committee. The plans, it is understood, were found to be satisfactory, though they show that, if adopted, a larger area than that originally regarded as likely to be sufficient will be required. The meeting was adjourned for a week, by which time the Committee hope to have before them such information as will satisfy them as to the minimum accommodation which should be provided.

SYNAGOGUE, HIGHER BROUGHTON, MANCHESTER.—The new synagogue, about to be erected by the Higher Broughton congregation, will occupy the garden ground at the corner of Broughton-road and Duncan-street. It will have an entrance from about 400 persons. The main entrance, from Duncan-street, will have the main staircase (to the gallery above set apart for the ladies of the congregation) enclosed in an octagonal tower. The ark, reading platform, and pulpit will be arranged at the eastern end of the building, with the choir behind. A dome in ferro-concrete will surmount the octagonal tower, and the main vestibule will be arched. The designs for the building have been made by Mr. Delissa Joseph, architect, of London.

PROPOSED CRICKET PAVILION, THIRSK.—The Thirsk Cricket Club Committee have under consideration the erection of a new pavilion on their ground. Mr. Stokes, architect, has been appointed to prepare sketch plans and give estimates of the proposed work.

POLICE-STATION, LONGTON.—The new police-station, at Longton, has been erected by Messrs. Tomkinson & Betteley, at a cost of about 7,000. The designs were by Mr. W. H. Cheadler, County Surveyor, and Mr. A. R. Wood, Tunstall. The frontage to South-street is of red brick, with light buff terra-cotta facings. Excavations were in some places of considerable depth, and a foundation of concrete was placed over the clay surface. A dwelling-house for the superintendent forms the southerly end of the block, and the other accommodation of the buildings consists of a suite of offices, cells, and exercise yard, living and sleeping quarters for the single constables, the necessary out-buildings, and a large open area as a drill-ground. Mr. Kearton, Wolstanton, has been clerk of the works. Mr. Durose, Tunstall,

fixed the iron palisading at the front, and executed the ornamental ironwork. Messrs. Blackburn & Starling, Hanley, installed the electric bells, tubes, etc.; and Mr. Trusswell, of Newcastle, fixed the heating apparatus.

PROPOSED PIER, FLEETWOOD.—It is proposed to erect a pier at Fleetwood. The situation chosen for the new structure by the promoters of the scheme is opposite Balmoral-terrace. The pier is to be 700 ft. long, inclusive of a timber jetty 200 ft. long, and 15 ft. wide, which will have its terminus in water at all states of the tide. The entire structure will be on piles, with screw piles where necessary, the girders being of toughened steel, with Jarrold plank and ornamental seating and railing. The first length of the pier, including the pavilion, will be 247 ft., varying in width from 120 ft. to 25 ft. The second length of 25 ft. will have a width of 25 ft. throughout, and the third section is the timber jetty. The elevation of the jetty will be 12 ft. vertically below the main deck of the pier proper, which will be on a level with the existing promenade. The entrance to the pier will be located 24 ft. away from the line of the promenade, and will consist of pay-boxes on two sides, with a main covered way of 15 ft. in width, over which will be store-rooms for the use of the pier generally. On the left of the approach the manager's office will be arranged, and on the right a series of cloak-rooms; while outside these two buildings, on either side, will be exit gates, making a total of 52 ft. The pavilion has been designed to be situated within 68 ft. of the promenade. It will have seating accommodation in the body of the hall for 1,100, and in the two side galleries for 500. The whole will be constructed of timber, with glass, lead, and zinc roof, with closing over doors. Arrangements will be made for electric and gas lighting. Mr. J. E. Stafford, C.E., is the engineer of the scheme.

THEATRE, MANSFIELD.—The new Grand Theatre at Mansfield has just been opened. Externally, the building is of brick, with stone dressings. The stage is 40 ft. long by 65 ft. wide, the height being 50 ft. Four dressing-rooms, and there are extra rooms underneath. The building will accommodate about 1,240. The stalls will take 120 persons, the dress circle 120, the upper circle 400, and the gallery 600. Each section of the house has two exits, and there are also separate entrances. The heating is by electricity, and the heating by hot-water radiators. The theatre was built by Mr. A. F. Houlton, of Mansfield, from the designs of Mr. T. V. Woodhouse, architect, of Nottingham.

Sanitary and Engineering News.

LEEDS WATER SUPPLY.—It is announced that the City Council of Leeds have decided to proceed with an extensive scheme, based upon reports framed by Mr. C. G. Hensell, the City Water Engineer, jointly with Mr. Rofe, the consulting engineer, and by Messrs. H. Rofe & Son, of Westminster. The modified project involves a departure from the plans as originally adopted under the Act of 1901 for a reservoir at Colsterdale, in the Burn valley, a reservoir of 167 acres, with a capacity of 1,852 million gallons. It has been discovered that the site selected does not afford a good foundation for the retaining wall; another site has therefore been chosen, higher up the valley, for a reservoir to be embanked with a dam 154 chains long across the river Burn, for which, and for accessory works, fresh Parliamentary powers will be sought. When the Carlesmoor and Laverton reservoirs in the Laver valley and the Leighton reservoir in the Burn valley are also completed, the total storage will amount to nearly 2,265 million gallons, and the cost of the entire undertaking, after allowance made for the large sum already expended, is estimated at some two millions sterling.

ELECTRICAL LIGHTING AND ENERGY, MARLEYBONE.—The Borough Council have resolved to charge consumers within the borough limits for a supply at 240 or 480 volts (a) for ordinary lighting purposes, 8d. per unit for a quantity equivalent to 500 hours' use of the maximum demand made for energy in each year, and 1d. per unit for all energy consumed in excess of that quantity during the said year; (b) through special circuits and meters for all purposes other than lighting, 2d. per unit for a quantity equivalent to 125 hours' use of the maximum demand made in each quarter, and 1d. per unit for all energy consumed in excess of that quantity during the said quarter; and to charge 2d. per unit consumed for current

supplied by separate circuits and meters to basements not used for dwelling purposes. The meter rents will be at the rate of 10s. per annum for each fifty 8 candle-power (32 watt) lamps installed, or the equivalent in kilowatts or parts thereof, with additional meters required for those rates for separate meters rentals at special currents. A discount of 25 per cent. will be allowed, under conditions, on each quarter's account exceeding 50l., calculated upon the rates severally specified. The Council have, moreover, resolved to substitute arc lamps for the incandescent mantles in some of the lamps of the principal streets; the new installation will consist of five single arc lamps, six central arc lamps, and thirty-five arc lamp columns, each bearing two lamps, all the lamps being after the "flame" arc kind made by the Union Electric Company. The charge of 8d. per Board of Trade unit is an advance beyond that of 6d., or less, which was formerly made by the Metropolitan Company in Marylebone.

LOUGHBOROUGH WATERWORKS.—The new waterworks, for which Mr. Hodson was the engineer, were opened on September 12. The reservoirs at Black Brook, in Charnwood Forest, are equal to a supply for 60,000 persons, and the Town Council will sell the surplus (enough for 30,000) to Leicester, pending the completion, in about seven years' time, of the Derwent Valley supply system for that borough. The heavy cost, some 120,000l., of the Loughborough undertaking is due to difficulties presented by unexpected faults of the rock formation.

HARBOUR AND DOCK EXTENSIONS ON THE CLYDE AND THE FORTH.—The new works which are being carried out by the Clyde Navigation Trustees comprise a widening of the channel and harbour at Renfrew, with workshops and slips for the repair of dredging plant now being used at Blythwood and between New-shot Island and the River Cart; the removal of Pointhouse Wharf, and new timber wharves and cattle lairages at Merklains; and basins and quays at Yorkhill. The newly-completed wharf beyond Shieldhall, nearly 1,700 ft. long, is to be extended eastwards by about 430 ft. At Clydebank Dock are being constructed a pier to divert Yoker Burn, a road by the side of the Lanarkshire and Dumbartonshire Railway, and dock sidings to meet a branch line to be laid by the North British and Caledonian Railway Companies. The walls of the dock will extend over a length of nearly 6,650 ft., and it is anticipated that the quay walls will be finished before the close of next year. The Harbour Commissioners for the Forth have granted to a syndicate a lease of 8 acres on the west side of the harbour at Burntisland for the construction of a dry dock and ship-repairing workshops, to serve the ports on the south coast of Fife.

MANCHESTER SHIP CANAL.—Under the directions of Mr. W. H. Hunter, the Company's chief engineer, steps have been taken to keep the tidal water, concurrently with a deepening of the canal water by 2 ft. This has been effected by the laying of a 2-pipe siphon, 180 ft. long, across the bed of the canal at Frodsham Marsh, for conveying the Floodpool or Gutter stream, the Frodsham sewage, and the water from the low-lying lands, around which will thereby become more subject to floods. Each length of pipe is 6 ft. long, and has an inner diameter of 3 ft. 6 in.; the lengths are bound together and coated with cement 5 in. thick, enveloped with steel wire-netting. The siphon was towed down to its position from Big Field, Norton, eight miles distant, having its ends sealed, and being supported by three pontoons.

SUSPENSION BRIDGE, NOTTINGHAM.—The new footbridge over the River Trent between Trent Bridge and Wilford Bridge was recently opened. The bridge has a span of 225 ft. between centres of abutments, and is 12 ft. wide. Below the footway are two steel water mains, each 14 in. internal diameter, conveying water to and from the new reservoir on the top of Wilford Hill. The four cables, each constructed of 259 wires, are manufactured of the best plough steel. The ends of the cables on either side of the river are anchored to steel girders with adjustment arrangements, the girders being weighted by blocks of concrete. The cables pass over steel rockers on the tops of the abutments, these rockers being attached to steel girder frames built in the stone abutments. The ultimate strength of each cable is about 280 tons. The cables support, by means of fifty-eight suspension rods, the whole of the weight of the cross-girders, pipes, footway, etc. Two lines of 12 in. diameter gas pipes have also been laid across the bridge for use at any future time, and there is also provision for electric cables. The structure was designed by Mr. W. B. Bryan and Mr. E. B. Lewis, the City Architect, and constructed under the supervision of Mr. F. W.

Davies, the Water Engineer for the City. The contract for the foundations, abutments, and approaches was let to Mr. J. G. Thomas, of Lenton-boulevard, Nottingham, and the steel-work to Messrs. Handyside & Co., of Derby.

NEW WATERWORKS, BUNTINGFORD.—The well for the new waterworks has been completed by Mr. G. Hughes, of Westminster. It is 134 ft. deep, and is capable of yielding 10,000 gallons of water per hour. The cost of this first contract was 500l. For constructing the reservoir and laying some three miles of mains the District Council invited tenders, and some nineteen were received. That of Messrs. Grounds & Newton, of South Tottenham, was accepted for 3,167l. The work has to be completed within eight months. Mr. J. Chadwick, of Blatchley, is the engineer, and to him was due the scheme for the Hadham Waterworks.

THE LONDON COUNTY COUNCIL'S DRAINAGE BY-LAWS.—The Public Health Committee of St. Pancras Borough Council, in a Report issued on Monday, stated that they had had under consideration a communication from the London County Council, in reply to a letter from the Committee, in which it was pointed out, that, under No. 8 of the drainage by-laws made by the County Council under sect. 202 of the Metropolitan Management Act, 1855, sanitary inspectors were obliged to compel builders to put 4-in. ventilating pipes to 3½-in. soil pipes and 3-in. drain pipes allowed under by-laws Nos. 11 (2), 4 (9 and 10). The County Council, in their reply, called attention to the provision in No. 6 (5) of the by-laws, that, where the drain to be ventilated is not more than 4 in. in diameter a soil pipe or waste pipe containing excremental filth, although only 3½ in. in diameter, may be used as a ventilating pipe subject to certain conditions; and, further, that, in regard to the ventilation of drain pipes, the drain for which ventilation is primarily required is a drain containing sewage, which is required by by-law No. 4 to have an internal diameter of not less than 4 in. The Council stated that, under these circumstances, they had decided to take no action in the matter. The Committee had received the following report from their Medical Officer of Health (Dr. J. F. Sykes) on the subject:—

"Builders still continue to complain that they are allowed to put up a 3½-in. soil pipe and a 3-in. vent pipe to ventilate a 4-in. drain, but that if they ventilate a 4-in. drain not having a soil pipe, but a branch water-closet drain on the same level, they are compelled to make a branch 4 in. in diameter and the vent pipe 4 in. in diameter. In the by-laws, the vertical vent pipe is the continuation of a 4-in. horizontal drain, it must be 4 in. in diameter; but if to this vertical vent pipe a water-closet is connected, it becomes a soil pipe, and, together with the soil pipe, be reduced to 3½ in. in diameter. A soil pipe is a direct continuation and part of a drain, that portion which is horizontal being called drain, and that which is vertical being called soil pipe, so that a soil pipe is a vertical drain, and should be subject to similar provisions. The anomaly was typically apparent in the case of the teachers' house at All Saints' School, Pancras-street (see Plan No. 10,270), where your committee declined to take any action against the builder for putting up a 3½-in. ventilating pipe to the drain because the water-closet was on the basement level instead of the first floor. The continual irritation and annoyance caused by this anomaly is not experienced by the London County Council, but by the Borough Council, which is the executive authority, and I feel sure that the London County Council would rectify the wrong upon the representations of the sufferers if sufficient pressure were brought to bear. A great amount of confusion and complaining would be avoided if a minimum diameter of 4 in. were adopted for soil pipes in by-law 11, paragraphs 5 and 2, or if a minimum diameter of 3½ in. were adopted for drains in by-law 4, paragraphs 3, 9, and 10, and for vent pipes in by-laws 8, paragraph 4. One of these alternatives should be adopted."

A copy of the foregoing report of the medical officer is to be forwarded to the London County Council.

ELECTRICAL EXHIBITION, SHEFFIELD.—An exhibition of electrical machinery and appliances is being arranged at the Corn Exchange, Sheffield. It will be opened by the Lord Mayor at 3 p.m. on the 27th inst., and will remain open to the public daily from noon to 10 p.m. until October 20. A number of exhibits of peculiar interest to the local metallurgical and engineering industries have been secured, as well as a display of domestic and public lighting apparatus.

Stained Glass & Decoration.

MEMORIAL WINDOW, ATHELSTANFORD, N.B.—A memorial window to the late Lady Kinloch, of Gilmerton, has been placed in Athelstanford Parish Church. The window is the work of Mr. E. C. Kempe, London, and represents the Presentation of the Infant Christ in the Temple.

EMMANUEL CHURCH, SOUTHPORT.—Messrs. Percy Bacon & Bros. have just added some

more stained glass windows to this church, having executed six clearstory to light windows; the first two representing Angels; the second two SS. Peter, James John, and Andrew; the third two Isaiah, Jeremiah, Ezekiel, and Daniel.

Foreign.

GERMANY.—Professor Theodor Fischer, of Munich, who has lately been appointed to the Chair of Architecture in Stuttgart University, has influenced modern architecture in Munich to an unusual degree, and stamped it with his personality. His style, although individual, harks back to the simple work characteristic of the early local art. It is too devoid of ornament to appeal to the lay mind, but it is just this simplicity and the mastery with which he handles it that makes him rank among the greatest artists of his country. In his Evangelisch School, Stuttgart, opened last May, Fischer has developed the whole scheme of his artistic style, and shown how effect may be produced by a broad and simple treatment.

The question is ever brought up anew as to the material used for roofing our early mediæval monuments. It is, however, indisputably proved by local evidence that a portion of Wetzel Cathedral was roofed with perfectly-made tiles (16½ in. by 7½ in.) in the second half of the XIIIth century, though fifty years later these were replaced by slate. Although in Wetzel slate completely superseded tile, in the neighbouring Hessian provinces both materials were used simultaneously. Plans have been prepared for enlarging the harbour of Harburg, which town lies 10 kms. south of Hamburg; 184 hectares have been added to the existing harbour, and upon this tract of land four basins will be constructed having a depth of 98 m. These will be in direct communication with the south Elbe, and will greatly facilitate traffic, for up till now large ships for Harburg have been obliged to berth at Altona, or at Hamburg, while barges carried their cargoes to and from Harburg. The cost of carrying out the proposed additions will amount to 7,500,000 marks, plus the cost of the land, 3,800,000 marks. In a paper read before the Institute of Architects and Engineers of Munich, Dr. Bredt pleads for a modern style which shall illustrate the requirements of our times. He backs his arguments by the statement that our forefathers erected their modern buildings side by side with the ancient work, without destroying artistic effect, and we should also design modern buildings which need not be out of harmony with their ancient surroundings.

SWITZERLAND.—An electric cog-railway is to be laid from Brezgen to the summit of the Pfander. The line will be 29 km. in length, and will climb a height of 575 m. The cost is estimated at 1,200,000 francs. The Empress Eugénie has presented to the canton of Thurgau the charming XVIIIth century Castle of Arenenberg, situated on the Lake of Constance, where Napoleon III. lived as Prince Napoleon. The castle contains much good furniture and other works of art, collected during the Emperor's exile, and now rearranged by Herr Pietri, the Empress's representative.

ITALY.—The defacement of the Apollone Clock Tower, Riva, is to be feared. This tower, dating from the XIIth and XVIth centuries, is a characteristic feature of the town, and the present intention is to remove the attractive baroque tiled roof, and replace it with a "correct ornate Gothic" spire.

SOUTH AFRICA.—Notwithstanding the general depression which still obtains in Johannesburg, there is stated to be a fair amount of work in the building trade along the several routes of the new electric trams in the East Rand. At Glinton, the foundation-stone of the new parish hall has been laid. The building is being erected at the junction of Lovelock and Siemert streets by Mr. E. W. Parkin, the architect being Mr. J. Moodie. Sir Hamilton Gould-Adams, the Lieut.-Governor, recently laid the foundation-stone of the new Grey College and University, near Bloemfontein, towards the erection of which the Government have voted 125,000l. The site being a gift of the Town Council. The annual Report of the Incorporated Law Society, presented at the meeting in Cape Town, stated that the idea of erecting suitable law courts in Cape Town had made some progress. "A design has been selected out of the many submitted, and the specification for the building has been, by the courtesy of the Attorney-General, shown to your council for their suggestions. In view of the very inadequate provision for the conduct of legal work at present, the urgency for the completion of these buildings is very great."

Miscellaneous.

PROFESSIONAL AND BUSINESS ANNOUNCEMENTS.—Messrs. R. J. Nicholson & Co., electrical and mechanical engineers, have removed from Bank-buildings, Cannon-street, Manchester, to Macdonald's-lane, Corporation-street, Manchester. Messrs. Jay, Broll, & Co., 31, Old Queen-street, Westminster, have been appointed London managers to the Asbestos Paint Company, of Birmingham. Messrs. T. T. Gething & Co., quarry owners (Warwick-road, Kensington), have purchased from the Trustees of the late T. P. Lilly the business (including lease, stock, and plant) of the well-known Chilmark quarries.

CURIOUS BRACKETS.—There is a very quaint bracket supporting one of the ribs of the north aisle vaulting at Kiedrich, two miles from Ettelheim-am-Rhein, the beautiful pilgrimage resort between Rüdesheim and Mainz. It represents, when viewed in one position, the head of St. Thomas Aquinas; but in another position it shows a water-carriage carrying a calf's head, obviously intended to render symbolically the "Dumb Ox of the Sorbonne," which nick name he earned at that college. The enormous ear he is given does duty also as a snout for the calf's head. Close to it another bracket, representing a slender female figure, apparently shown in waist with the arms akimbo, and holding a book; but, curious as it is, the one of St. Thomas is the only one to which the attention of visitors is called. The church, which is galleried, has a beautiful rich vaulting, with many coats of arms, especially in the choir, and a fine XVth century altar. The interior is well decorated, and richly-carved pews, all Gothic. The whole fabric, indeed, is worthy of the closest study; but the quaint St. Thomas there hunt one, even if nothing else there does. In the adjacent St. Michael's Chapel in the churchyard is a superb candelabrum, with a double spiral shaft, and a back to back, and at the east end of the chapel is rectangular, with an apse left in, supported outside with rich mouldings on a shaft. A crypt is beneath.

A NEW FORM OF STEEL PILES.—The steel piles invented by Mr. William Clarke, of Ayr, consist of specially rolled sections which can be made in any length up to 70 ft., and from 1 ft. to 3 ft. wide. Two types of piles, of channel and I-section respectively, are contemplated by the patentee, one intended for permanent and the other for temporary work. In either case the adjoining piles are connected by a dovetailed joint, one side of each section containing a groove and the other a corresponding tongue which does not fill up the entire space and leaves room for suitable packing material. For permanent work the channel piles can be driven in the ordinary manner. In the construction of a dock, break-water, pier, or similar structure, the procedure recommended is to drive the piles to the form and to the depth required, and to within 2 ft. of the top level so that the work may be finished with a granite coping of that thickness. After the piles have been driven, the open space within the dovetailed joint is to be filled up with rust cement to make the work watertight. By bracing and shoring the piles from behind, the water may be pumped out, thus leaving the area within perfectly dry for the workmen, and after the foundations have been taken down to the depth required, the interior may be filled up to the desired level with concrete. The bracing and the piles remain permanently in their places forming a wall with a steel face. The I-section piles for temporary cofferdams are applied in a similar manner, and the piles can be withdrawn when the work is finished for use elsewhere. The procedure in this case is to surround the proposed work, at a distance of 3 ft. or 4 ft., with one row of piles and to fill up the space in the joints with oakum or other material. The enclosed area will then be watertight and excavation can be commenced at once. The idea represented by the piles here mentioned is realised in a far better way by previously patented forms of steel sheet-piling made of standard sections which are readily obtainable and can be used for structural work if required, or for having served their purpose as temporary piling. Apart from the objections that apply to all specially rolled sections, the form of joint adopted for the Clarke piles is one that cannot be completely finished in the rolling mill so as to insure uniform contact, and if, as suggested by the drawing, we have received, the grooves and tongues have to be machined, the extra work thereby entailed must mean a considerable addition to the cost.

MANDEVILLE MEMORIAL, CORK.—The monument to John Mandeville and to the three men, Loneragan, Shinnick, and Casey, was unveiled by Mr. William O'Brien, M.P., on the 8th inst. The memorial consists of a figure of Mandeville in bronze on a pedestal of limestone, on the panels of which are engraved the names of Loneragan, Shinnick, and Casey. The sculptor is Mr. Doyle Jones.

SCOTTISH BUILDING TRADES FEDERATION.—The twelfth annual general meeting of the Scottish Building Trades Federation was held on the 7th inst. in the Building Trades Exchange, George-street, Edinburgh. Mr. Patrick Knox, president, occupied the chair. Reports on the state of trade by the different branches indicated that the building trade was in a very depressed condition. Mr. Patrick Knox was re-elected president, and Mr. William Nicol, Dundee, vice-president. It was agreed that the headquarters of the Federation should be permanently fixed in Edinburgh, and that Mr. James Cameron, lecturer, Edinburgh, should act as permanent secretary and treasurer. It was arranged that a half-yearly meeting of the executive should be held in Edinburgh in April next year, and that the annual general meeting should be held in London next September. In the evening the members dined at the Royal Hotel, under the presidency of Mr. Patrick Knox. Mr. William Nicol, Dundee, and Mr. James Leslie, Aberdeen, acted as couplers. Mr. Thomas Hume, president of the Scottish Building Trades Federation, presided at the value of the Federation to the public. Not a day passed without their reading something about the unions of the workmen, more than ever before the public, largely because of their now having so many representatives in Parliament. He hoped the Federation would become so strong that they would be able to send members to Parliament to look after their interests. The President, in the course of his reply, congratulated the delegates on the spirit which had pervaded the meeting held that day. Mr. William McDonald, Liverpool, proposed "The Edinburgh, Leith, and London Building Trades Association," and Mr. Lamb replied.

NORTHERN POLYTECHNIC INSTITUTE.—The work of the architectural and building section is now organised in four sections, viz.:—(1) the architectural and building day school; (2) the building day trade school; (3) manual training courses; (4) evening classes. The architectural and building day school for young architects, builders, and surveyors, is provided with a three-year course of day study to be taken by pupils if desired. A new special two years' evening continuation course for advanced students is also provided as an alternative to the three-year day course. The second-year course is in part differentiated so that pupils who intend to become builders or architects may have opportunities of taking special classes in correspondence and book-keeping, and in office routine and business methods. The day trade school is an entirely new departure, and has been established as the result of a conference of building employers and others held at the Polytechnic last winter. The object of this school is to partially replace the apprenticeship system. For the purposes of this school, new building extensions are contemplated, and will, it is hoped, be available about the end of the year. Another feature to be introduced this year is the improved system under which building construction will be taught. Hitherto the subject has consisted of lectures on a comprehensive series of building details, followed by production of drawings of detached items of construction. In spite of the teachers' best efforts the drawings too often remained mere abstractions to the student. Hence the concrete ideas of building construction were diffuse, incomplete, and of meagre use in the correlation necessary for the simplest design. The system of comprehensive, but quite disjointed, analysis will be replaced by synthetic method. The study of details will be correlated, leading up to a single but complete and unified design of a building. Large scale take-to-piece models of complete buildings have been provided for this purpose.

A PICTURE ASCRIBED TO RUBENS.—It is stated that a picture, which has just been discovered in a house at Austruvel, near Antwerp, is pronounced by experts to be an example of Rubens. The painting is on canvas, 5 ft. by 4 ft., and was formerly in the parish church, having been taken thither from Antwerp eight years ago. It delineates the Assumption of the Virgin, with apostles and holy women opening her tomb as she ascends to heaven.

BERKELEY CHAPEL, MAYFAIR.—The site of this chapel, at the corner of Harley and John streets, has been taken for the erection of new buildings after plans and designs by Mr. R. G. Hammond. The chapel, built after the "Georgian" style, contained sittings for 1,100 persons; a memorial window to the late Duke of Clarence was set up there in May, 1894.

PROTECTION OF WOODEN PILES IN WATER.—The *United States Railway Gazette* contains a description of an appliance which, the inventor, Mr. Hammond, will effectively shield wooden piles from attacks by the teredo worm. The pile is enveloped at the surface of the water in a pipe made of cement, and divided lengthwise

into two halves keyed together with a scarf joint. The pipe sections are lowered around the pile to the water bed, and then, having settled to the extent of a few inches, are filled with a core of sand around the pile they enclose.

SCHOOL OF ART WOOD-CARVING.—The School of Art Wood-carving, South Kensington, which now occupies rooms on the top floor of the new building of the Royal School of Art Needlework in Exhibition-road, has been reopened after the usual summer vacation, and we are requested to state that some of the free studentships maintained by means of funds granted to the school by the London County Council are vacant. The day classes of the school are held from 10 to 1 and 2 to 5 on five days of the week and from 10 to 1 on Saturdays. The evening class meets on three evenings a week, and on Saturday afternoons. Forms of application for free studentships and any further particulars relating to the school may be obtained from the manager.

SCHOOL ARCHITECTS AND PLANS.—At the meeting of the West Ham Education Committee on Monday, the Works Sub-Committee reported having been informed by the architect (Mr. Jacques) that some difficulty had arisen with the auditor on the interpretation of the agreement entered into by the late School Board and himself on his appointment with reference to payment for lithography of specifications, in consequence of the following clause:—"For which commission the architect undertakes to prepare and supply all necessary plans, drawings, and specifications, and copies thereof." The architect had always provided at his own expense the necessary plans and specifications for carrying out the work, but the expense of providing an additional number of copies of the specifications for the use of contractors desirous of tendering for works had always been borne by the late School Board. In some instances, the cost of lithographed specifications required for school cleansing purposes exceeded the entire fee received by the architect for his services for the work. The Committee recommended, in order to make the matter perfectly clear, that the agreement entered into with Mr. Jacques be endorsed so as to definitely show that he is responsible only for preparing the necessary plans and specifications required for the execution of works, and not for lithographing copies applied to by contractors to enable them to tender, which, when the architect considers them necessary, shall, as heretofore, be paid for by the Education Committee. The report was adopted.

Legal.

EXETER BUILDING DISPUTE.

THE case of Smith v. Stuckey's Banking Company, Ltd., and others, came before Mr. Justice Sutton, sitting as Vacation judge, on the 12th inst., on an application by plaintiff for an interim injunction to restrain the defendant Company and Messrs Luscombe & Sons, Ltd., a firm of builders, until the trial from further pulling off the roof of No. 253, High-street, Exeter. The plaintiff also asked that the defendants should be ordered to restore the premises into the state into which they formerly were.

Counsel, in support of the application, said the plaintiff was in possession of the premises, No. 253, High-street, Exeter, as a monthly tenant under an agreement dated July 20, 1903, he carrying on there the business of a hairdresser. The landlord sold the premises to the defendant Banking Company early in the present year, and it was in the interest of the Bank to get rid of the plaintiff as the tenant as soon as possible.

Mr. Bramwell Davis, K.C., said he appeared for the defendants, and his point was that the Bank gave the plaintiff notice on April 21 to determine his tenancy on May 21, and that, as the plaintiff had not gone out of possession, he must be treated as a trespasser. His case, therefore, was that his lordship would not grant the injunction asked for.

Counsel for the plaintiff said he admitted the notice in question to terminate the tenancy was given, but his case was that that that notice had been waived, and that an entirely new agreement was entered into which set aside the old agreement.

After considerable discussion, his lordship intimated that, in his opinion, the plaintiff's remedy, if any, was damages. He refused to grant the injunction, on the Bank undertaking not to take any steps to turn the plaintiff out of possession for seven days.

NEWINGTON SEWAGE DISPUTE.

THE case of the London General Omnibus Company, Ltd., v. the Tilbury Contracting and

Dredging Company (1906), Ltd., came before Mr. Justice Sutton, in the Vacation Court, on the 12th inst., on a motion by the plaintiff Company for an interim injunction to restrain the defendants until the trial or further order from making a certain sewer, injuring the plaintiffs' premises at Newington.

Mr. Bramwell Davis, K.C., in support of the motion, said that the defendants had filed certain affidavits, and from these it appeared that the sewer was practically completed. All the excavations in connexion with the sewer were over, and the sewer would be completed in a few days. The only direction he asked for was that no order should be made on the present motion, and that the costs should be made costs in the action. Defendants said that in what they did they were acting under the direction of the London County Council. The plaintiffs had not made the London County Council defendants to the action, and he, therefore, asked for leave to amend the writ by adding the Council as defendants in case it was found that it was essential that that course should be pursued.

Mr. Mulligan, K.C., on behalf of the defendants, assented to the application of Mr. Bramwell Davis. He said that the defendant Company was an important one, and throughout the work in question defendants had acted under the supervision of the London County Council, and it was on the evidence that the defendants had carried out the work with the utmost care, and that every possible precaution was taken to prevent damage.

Mr. Bramwell Davis: You must not say that, because that will have to be determined at the trial of the action.

Mr. Mulligan said that the defendants had finished all the excavations in the front of the plaintiffs' land, and plaintiffs had therefore no further cause of complaint. He assented to the application of his learned friend that there should be no order on the motion except that the costs should be made costs in the action.

Patents of the Week.

APPLICATIONS PUBLISHED.*

18,000 of 1905. R. MARSHALL: Attachment for Fire Grates.

This relates to an attachment for fire grates, and consists of a single piece of sheet metal provided with ledges adapted to carry smoothing irons during heating, and convertible into a trivet or cooking tray, acting as a fuel economiser and guard when arranged to close in front of the grate.

23,761 of 1905.—G. T. MOORE: Elevator for Window Sashes and the like.

This relates to a window elevator, consisting of the combination of a rotatably-mounted toothed quadrant, a handle for rotating said quadrant, means associated with said handle for enabling it and the quadrant to be held in varying positions, a pinion engaging with said quadrant and adapted to be rotated thereby, a spindle upon which said pinion is keyed, a pulley keyed upon said spindle, and a flexible connexion between the window sash and the said pulley operating to elevate the window sash when the pulley revolves in one direction.

24,636 of 1905.—G. O. H. KLOPP: Cocks or Taps.

This consists in the combination with a cock or tap of a coiled spring, whereby the ball-valve will be firmly held against the seating in the outlet chamber, except when positively forced therefrom, notwithstanding diminution of the pressure of the water supply or the total cutting off of the supply.

24,787 of 1905.—H. RUDDER and J. C. ROUSE: Hinges for Doors and Gates.

This relates to hinges for doors and gates, and consists in the provision of an extension of the strap or the like, having U-shaped notches, with a depending pin and nut acting in conjunction with a post-plate with horizontal seating having radial slots therein and projections, the pin of the extension working in the radial slots, and the notches of the extension engaging the projections on the seating of the post-plate.

26,462 of 1905.—J. FABRITIUS: Building and like Structures.

This relates to a composite structure for building purposes, comprising one or more courses of bricks provided with outside irons, connecting parts of any desired cross-section, and a wrapping or winding of wire for binding the whole together, the whole construction being finally covered with cement.

* All these applications are in the stage in which opposition to the grant of Patents upon them can be made.

PATENTS.—Continued on page 359.

List of Competitions, Contracts, etc.

For some Contracts still open, but not included in this List, see previous issues. Those with an asterisk (*) are advertised in this Number: Competitions, —; Contracts, iv. vi. viii. x.; Public Appointments, —; Auction Sales, xxviii. Certain conditions, beyond those given in the following information, are imposed in some cases, such as: the advertisers do not bind themselves to accept the lowest or any tender; that a fair wages clause shall be observed; that no allowance will be made for tenders; and that deposits are returned on receipt of a boni-fide tender unless stated to the contrary.

Contracts.

BUILDING.

SEPTEMBER 24.—**Altwen.**—Two SHOPS.—Altwen and Pontardawe Co-operative Society, Ltd., invite tenders for the erection of two shops at Altwen. Plans, etc., and all particulars can be obtained at the offices of the architect, Mr. Charles S. Thomas, Herbert street, Pontardawe, or Wind-street, Swansea. Tenders to be sent in to the Secretary, Mr. Walters, Altwen, near Pontardawe, on or before September 24.

SEPTEMBER 24.—**Archiestown.**—CHURCH REPAIRS, etc.—Tenders are invited for the mason, carpenter, slater, plumber, plasterer, and painter works for repairs and improvements at the United Free Church and Manse, Archiestown. The plans and specifications may be seen at the Manse and with Mr. John Willeit, architect, Elzen, with whom tenders must be lodged by September 24.

SEPTEMBER 24.—**Middlebrough.**—CHURCH.—For the whole or the various works required in the erection of Wesleyan Church, Woodlands road, Middlebrough. Names to Messrs. Danby & Simpson, architects, 73, Albion-street, Leeds, not later than September 24, when quantities and other information will be forwarded.

SEPTEMBER 24.—**Pengam.**—HOTEL.—Tenders are required for the erection of new hotel, adjoining the station approach at Pengam (Rhymney Railway) Station, Glam., for Messrs. Griffiths Brothers, Ltd. Bills of quantities can be obtained upon deposit of 11. 1s. Drawings inspected at offices of Messrs. Lansdowne & Griggs, architects, Metropolitan Bank Chambers, Newport, Mon. Tenders must be sent not later than 4 p.m., September 24.

SEPTEMBER 25.—**Abergavenny.**—ADDITIONS TO TOWN HALL, etc.—Tenders are invited for alterations and additions to the Town Hall, Abergavenny. Plans and specifications may be seen, and bills of quantities obtained (on payment of a deposit of 2s. 2s.) at the offices of the architect, Mr. E. A. Johnson, F.R.I.B.A., Abergavenny. Indorsed tenders to be sent to Mr. J. T. Rutherford, Town Clerk, not later than September 25.

SEPTEMBER 25.—**Conna.**—RESIDENCE.—Tenders are invited for the building of a teacher's residence at Conna, according to the plans and specifications to be seen daily at the residence of the Rev. J. Murphy, P.P., Conna. Tenders to be delivered by September 25.

SEPTEMBER 25.—**Kingston-on-Thames.**—CLUB ENLARGEMENT.—The Committee of the Gladstone Liberal Club invite tenders for proposed addition to their premises. Plans and specifications can be obtained of the Secretary, Mr. B. A. Keene, Elm-road, Kingston-on-Thames. Tenders to be delivered not later than noon, September 25.

SEPTEMBER 25.—**Newtownmore, N.B.**—ADDITIONS.—Estimates required for the mason, carpenter, slater, plumber, plasterer, painter, and glazier works of additions to property at Newtownmore. Plans and specifications to be seen with Mr. Alex. Cotnam, architect, The Laurels, Kinsigau, who will receive offers up till September 25.

SEPTEMBER 26.—**Ballast.**—ADDITION TO ABATTOIR.—The Market Committee invite tenders for erection of a building at the Abattoir, M'Auley street. Drawings and specification may be seen in the City Surveyor's Office, and a bill of quantities obtained on payment of 11. 1s. Sealed tenders on office forms, endorsed "Tender for Abattoir," to be lodged with Sir Samuel Black, Town Clerk, Town Hall, Belfast, before 10.30 o'clock a.m. on September 26.

SEPTEMBER 26.—**Linthwaite.**—WAREHOUSE, etc.—Tenders are invited for the various works required in the erection of warehouse, dyehouse offices, and stable, Manchester-road, Linthwaite. Plans may be seen, and quantities obtained, at offices of Messrs. Lunn & Nave, architects and surveyors, Milnshire, to whom sealed and indorsed tenders must be sent not later than 5.30 p.m., September 26.

* SEPTEMBER 27.—**Ashford.**—LAUNDRY.—The Managers of the West London School District invite tenders for the building of a laundry at their schools at Ashford, Middlesex. Copies of the specification, bills of quantities, and tender forms may be obtained, and the drawings and site inspected, on application to Mr. F. G. Beecham, Clerk to the Managers, Ashford, Middlesex, between 10 and 4, with deposit of 51. The site must be inspected. Tenders to be sent to the above (as per instructions with the forms) before 6 p.m., September 27.

SEPTEMBER 27.—**Withernsea.**—SCHOOL, etc.—The Education Committee of the East Riding of the County of York invite tenders for the erection of an infants' school and additions and alterations to the Council School, Withernsea. Plans and specifications may be seen, and form of tender and copies of quantities obtained, on application to the Building Surveyor, County Hall, Beverley, upon depositing 11. 1s. The plan and specification can also be seen at the Council School, Withernsea. Tenders endorsed "Withernsea Council School," to be handed over to Mr. John Bickerstaff, Clerk to the East Riding Education Authority, County Hall, Beverley, not later than September 27.

SEPTEMBER 28.—**Havant.**—HOUSING.—Tenders are invited for the erection of houses at Denvelles, Havant. Plans and specifications may be seen at the offices of the surveyors, Messrs. Hall, Pain, & Goldsmith, 49, West-street, Fareham, and quantities and forms of tender obtained. Tenders should be delivered to the surveyors not later than September 28.

* SEPTEMBER 28.—**Kemel Hempstead.**—NEW BRIDGE.—The Hertfordshire C.C. invite tenders for the rebuilding of a county bridge and works of widening the main road embracing alterations to buildings at Two Waters, Kemel Hempstead. Specifications, agreement, etc., may be seen at the County Surveyor's Office, Hatfield, between 10 and 4. A copy of the specification and schedule of works and prices and a form of tender can be obtained at the County Surveyor's Office, Hatfield, on payment of 2s. Sealed tenders, endorsed "Tenders for New Bridge and Works at Two Waters," must be delivered to Mr. Urban A. Smith, H. Huntly Surveyor, Hatfield, not later than September 28.

SEPTEMBER 28.—**Saintfield.**—ADDITIONS TO MANSE.—Tenders are invited for making alterations and additions to Second Presbyterian Manse, Saintfield, County Down. Plans and specifications to be seen at the Manse, Saintfield, or at Messrs. Hobart & Heron, architects, 124, Scottish Provident Buildings, Belfast, by whom tenders will be received up to September 28.

SEPTEMBER 28.—**South Elmsall.**—WAREHOUSE, etc.—For alterations to present shop, erection of warehouse and stables, at South Elmsall, Imphel, for the Pontefract Industrial Society, Ltd. Names to the architect, Messrs. Garside & Pennington, Ropetate, Pontefract, and at Castleford. Sealed and indorsed tenders to be forwarded to Mr. W. A. Chappell, Secretary, The Stores, Pontefract, on or before September 28.

SEPTEMBER 28.—**West Bromwich.**—ERECTOR OF SMITHY.—Tenders are required for the erection of smithy, etc., at the Walsall and West Bromwich District Schools, West Bromwich. Plans and specifications and a bill of quantities may be seen at the offices of Mr. J. W. Allen, architect, High-street, West Bromwich, from whom forms of tender may be obtained. Tenders, under seal and marked "Tenders for Smithy," must be sent to Mr. J. Ward, Clerk, West Bromwich, on or before September 28.

SEPTEMBER 29.—**Ballygawley.**—PAROCHIAL HOUSE IMPROVEMENTS.—Tenders are invited for the building of a wing and for the execution of improvements to the Parochial House, Ballygawley, County Tyrone, for the Rev. Peter M. Shane, P.P. Plans and specification may be seen at the Parochial House, Ballygawley, or at the offices of Mr. J. V. Brown, architect, Belfast Bank Chambers, to whom sealed tenders are to be delivered not later than September 29.

SEPTEMBER 29.—**Coundon.**—ADDITIONS TO INN.—Tenders required for additions to "Hare and Hounds" Inn, Coundon. Plans and specifications may be seen at the offices of the architect, Mr. J. V. Brown, architect, Belfast Bank Chambers, to whom sealed tenders are to be delivered not later than September 29.

SEPTEMBER 29.—**Loughrea.**—CHURCH ADDITIONS.—Tenders are invited for works of addition and improvement to Duniry and Abbey churches, Loughrea, for the Rev. Patrick Egan, P.P. Plans and specifications may be seen at the Parochial House, Duniry, or at the offices of Mr. W. A. Chappell, M.S.A., architect, 45, Mountjoy-square, Dublin. Tenders must be delivered on or before September 29.

SEPTEMBER 29.—**Pelynt.**—REPAIRS.—Tenders are invited for the execution of repairs to the buildings, hedges, and gates of the Benefice of Pelynt, Cornwall. Specifications of the works can be seen at the Vicarage, between the hours of 10 and 4. Tenders to be sent not later than September 29, 1906, to Mr. J. M. Strong, Diocesan Surveyor, St. Stephen's Lane, Exeter.

SEPTEMBER 29.—**Penzance.**—SEAMEN'S INSTITUTE.—Tenders are invited for the erection of a Seamen's Institute at Green-street, The Quay, Penzance. Drawings and specifications may be seen at the offices of the architect, Mr. Oliver Caldwell, F.R.I.B.A., Penzance, to whom tenders are to be sent on or before September 29.

OCTOBER 1.—**Warleggan.**—CLOCK-ROOM, etc.—Cornwall Education Committee invite tenders for proposed new clock-room, etc., at the Warleggan School, according to plans and specifications, which may be seen at the school or at the office of Mr. B. C. Andrew, Architect to the Committee, Brompton, St. Austell. Forms upon which tenders must be made may be obtained at the school or from the Secretary, Cornwall Education Committee, to be sent to Mr. F. B. Pascoe, Secretary, Education Office, Truro, on or before October 1.

OCTOBER 3.—**Nether Alderley.**—SCHOOL ALTERATIONS.—Macclesfield and Education Sub-committee invite tenders for alterations at Nether Alderley Council School. Specification and quantities may be obtained from Mr. H. Bewick, County Architect, Chester. Tenders to be sent to Mr. F. J. Fred. May, Clerk to the Committee, Church Side Macclesfield, by October 3. OCTOBER 3.—**Weymouth.**—FELLS-COACHERS REPAIRS.—The Weymouth T.C. invite tenders for constructing and maintaining retaining wall, about 900 ft. in length, of fern-concrete work (Hennequin's system) on the south side of the Pier Pier within the borough, filling in and levelling up between the existing pier and the intended wall.

new fences, Portland stone coping, and other works appertaining thereto. Plans, specification, and condition of contract may be seen, and form of tender obtained, on application at the office of the Borough Engineer, Mr. W. Barlow Morgan, Municipal Offices, Weymouth. Tenders, enclosed in the official envelope, sealed, and endorsed "Retaining Wall Pier," to be delivered to Mr. H. A. Huxtable, Town Clerk, Municipal Offices, Weymouth, on October 3 by 10.30 a.m.

OCTOBER 4.—**Broughton.**—TOWN HALL IMPROVEMENTS.—The Town Halls and Markets Committee invite tenders for additions and alterations to the Town Hall, Broughton, Duke-street, Broughton. Forms of tender and bills of quantities may be obtained, and plans, etc., seen, at the Borough Engineer's Office, Town Hall, Salford. Tenders, endorsed "Broughton Town Hall Extension," and addressed to the Chairman of the Town Halls and Markets Committee, Town Hall, Salford, must be delivered at the office of Mr. L. C. Evans, Town Clerk, Town Hall, Salford, not later than 9.30 a.m. on October 4.

OCTOBER 6.—**Wickham Market.**—WORKHOUSE IMPROVEMENTS.—The Guardians of Pomesegate Union, in sealed tenders for the erection of additions to the infirmary and laundry at the Union Workhouse, Wickham Market, in accordance with the plans and specification, which with the contract and bond, can be inspected at the Workhouse. Tenders, endorsed "Workhouse Additions," are to be addressed to Mr. Waller Read, Clerk, Board-room, Wickham Market, not later than October 6.

OCTOBER 8.—**Carrick-on-Shannon.**—POST OFFICE.—Board of Public Works invite tenders for the erection of a new Crown Post Office at Carrick-on-Shannon, Co. Lirrim. The plans and specification can be seen at the Post Office, Carrick-on-Shannon. Forms of tender and bills of quantities will be supplied on deposit of 11. The separate envelopes containing the tender and the bill of quantities must be endorsed, and sent to Mr. H. Williams, Secretary, Office of Public Works, Dublin, not later than October 8.

* OCTOBER 11.—**Lambeth.**—ALTERATIONS TO BUTTS.—The Lambeth Borough Council invite tenders for alterations and extensions of Baths and Wash-houses at Kenningington. Plans and specifications, location and bills of quantities obtained at the office of the Borough Engineer, between 10 a.m. and 12 noon and 2 p.m. and 4 p.m. (Saturdays excepted). Sealed and indorsed tenders for "Kenningington Baths" to be delivered to the Building Work, Kenningington Baths, to be delivered to the Town Clerk, Town Hall, Kenningington Green, not later than 12 noon, October 11.

OCTOBER 12.—**Newport.**—INFIRMARY.—The Newport (Salop) Guardians of the Poor invite tenders for the erection of infirmary buildings. Plans and specifications can be seen, and bills of quantities and forms of tender obtained, on application to Messrs. Fleming & Son, architects, Bank-chambers, Wellington Salop. Tenders to be delivered to the Clerk to the Guardians, Newport, not later than 9 o'clock a.m., October 12.

* OCTOBER 13.—**Paddington.**—BUILDING BRIDGE.—The Borough Council of Paddington invite tenders for putting down bridge, and constructing and erecting new brick, concrete, and steel carriageway bridge (30-ft. span), new toll keeper's office, etc., in and about Warwick Avenue. Forms of tender, specifications, bills of quantities, etc., obtainable on application to Borough Surveyor. Drawings may be seen, and further particulars obtained, from 10 a.m. to 4 p.m. (Saturdays, 10 a.m. to 1 p.m.), as above. Sealed tenders, endorsed "Reconstruction of Warwick Avenue Bridge," "No. 1 Building Construction Works," "No. 2 Steel Works," or "No. 3, Nos. 1 and 2 together," to be delivered to the Town Clerk, Town Hall, Paddington, W., not later than October 13.

* OCTOBER 15.—**Coventry.**—BUILDINGS.—The Gas Committee of the Coventry Corporation invite tenders for buildings at their Pottery Works. The tenders obtained, on application to Messrs. Fleming & Son, architects, Bank-chambers, Wellington Salop. Tenders to be delivered to the Clerk to the Guardians, Newport, not later than 9 o'clock a.m., October 15.

OCTOBER 20.—**Stafford.**—SCHOOL.—The Staffordshire Education Committee invite tenders for new high school for girls, Stafford. Builders desiring to tender should apply to Mr. Graham Balfour, Director of Education, County Education Offices, Stafford, on or before October 20. Quantities will be supplied on application to Mr. Balfour.

DIV. & KIRKILL.—HOUSE.—The erection of a house (residence) at Kirkhill, Dunbar. Names to Messrs. Davidson & Phillipson, architects, Pearl Buildings, Newcastle-on-Tyne, who will supply particulars and bills of quantities.

NO DATE.—**Stanton.**—DWELLING-HOUSE, etc.—Tenders are invited for building dwelling-house, office, and outhouse, at Stanton, Devon. Apply at the office of Mr. Thomas Dowson, architect and surveyor Central Chambers, Buxtergate, Whiby.

NO DATE.—**Sandwich.**—VILLA.—Tenders for the erection of a pair of semi-detached villas at Sandwich, Kent. Names to Mr. Charles McGregor, application for quantities to be made to Mr. Thomas Dowson, architect and surveyor Central Chambers, Buxtergate, Whiby.

TO DATE.—Tunstall.—BUILDING WORK.—Tenders invited for new building at the Henry Richards Works, Tunstall. Particulars can be obtained from Messrs. A. R. Wood & Son, architects, Tun-

ENGINEERING, IRON, AND STEEL.

SEPTEMBER 24.—Dublin.—BOILERS.—The Improvement Committee of the Corporation of Dublin invite tenders for the supply and erection of two boilers, locomotive type, with necessary steam and supply pipes, at the East-road Pumping station. The drawings, specification, and form of tender may be inspected at the office of the City Engineer, City Hall, Dublin, between the hours of 10 a.m. and 4 p.m. daily (Saturdays excepted), and copies may be obtained on payment of 1s. Tenders, sealed and addressed to the Chairman of the Improvement Committee, City Hall, Dublin, and endorsed "Tender for Boilers, East-road," must be delivered by Mr. Patrick Tobin, Secretary Improvement Committee, City Hall, Dublin, not later than October 6.

SEPTEMBER 24.—Newton Abbot.—CONCRETE BRIDGE.—The U.D.C. of Newton Abbot invite tenders for the construction of a concrete bridge over the stream at Crickwell, near Newton Abbot, in connection therewith. Plans and particulars can be seen at the office of the Surveyor, Lewis Stevens, 10 Town Hall, Courtenay-street, Newton Abbot, on any bill of quantities can be had on payment of 1s. 18. Sealed tenders, endorsed "Crickwell Bridge," to be sent to Mr. Francis Wallis, Clerk, 31 Courtenay-street, Newton Abbot, not later than October 6.

SEPTEMBER 25.—Manchester.—STEEL PARAPET.—The Improvement and Buildings Committee invite tenders for the construction of a steel parapet, etc., at the Forth-street Bridge, over the Rochdale Canal. Drawing may be seen, and specification and form of tender obtained, on application at the City Surveyor's Office, Town Hall, Manchester, on payment of 1s. 18. All cheques or postal orders are to be made payable to the order of the Corporation of Manchester. Tenders, enclosed in official envelopes and addressed to the Chairman of the Improvement, etc., Committee, to be delivered at the City Surveyor's Office not later than 10 a.m. on September 25.

SEPTEMBER 25.—Stockton-on-Tees.—URINAL.—The Corporation is prepared to receive tenders for the construction of a urinal in Bowsheld-lane. Plans and specification may be seen, and further information obtained at the Borough Engineer's Office, Town Hall, Stockton-on-Tees. Tenders, endorsed "Urinal," to be sent to Mr. Arthur B. Crosby, Town Clerk, 10, Market-street, Stockton-on-Tees, not later than 10 a.m. on September 25.

SEPTEMBER 25.—Willenden.—WROUGHT-IRON FENCING.—The Willenden District Council invite tenders for 100 yds. of wrought-iron unclimbable adjustable fencing, 4 ft. 6 in. in height, and two pairs of 9-ft. gates of similar pattern to fencing, delivered to Willenden Ground, Willenden, N.W. Specification and form of tender can be obtained on application to Mr. O. Claude Robson, Council's Engineer, Public Office, Wyndford, Kilburn, N.W., and endorsed "Wrought-iron Fencing, Recreation Ground, Stonebridge," to be delivered at the Office of the Council, not later than 4 p.m. on September 25.

SEPTEMBER 25.—Cardiff.—BRIDGE.—Tenders are invited for widening the Masonry Bridge carrying Park-place over the docks. Plans, drawings, and quantities may be seen, and bills of quantities and form of tender obtained, on application at the office of Mr. W. Harpur, M.Inst.C.E., City Engineer, Sealed tenders to be delivered at the office of the City Engineer, not later than 4 p.m. on September 25. L. Wheatley, Town Clerk, Town Hall, Cardiff, not later than September 25.

SEPTEMBER 25.—Barnsley.—BRIDGE.—The Barnsley Corporation invite tenders for the widening of the bridge over the Leeds and Liverpool Canal at Padiham Junction, near Barnsley. Plans and specifications may be seen, and form of tender and quantities obtained, on application at the engineer's office, Hunt's Bank, Manchester. Tenders, endorsed "Barnsley Bridge," to be sent to Mr. C. Irwin, Secretary, Hunt's Bank, Manchester, not later than 10 a.m. on September 25.

SEPTEMBER 25.—Dudley.—LANCASHIRE BOILER.—The Guardians invite tenders for a new Lancashire boiler to be supplied and fitted at the Workhouse in accordance with specification. To be obtained from Mr. Gains W. Coster, Clerk to the Guardians, Union Offices, Dudley, to whom tenders must be sent by 10 o'clock a.m. on September 25.

SEPTEMBER 29.—Blackpool.—TURBO PLANT.—The Electricity and Tramways Committee invite tenders for the supply and fixing of one 500 h.p. 1,000 kw. single-phase alternator and one 500 kw. direct-current tramway generator; also for surface-condensing plant. Specification and conditions may be seen at the office of Mr. Charles Furness, Borough Electrical and Tramway Engineer, Blackpool, Electricity Works, West Caroline-street, and may be obtained on payment of 1s. 18. Sealed tenders, endorsed "Tender for Turbo-Generators," must be addressed to the Chairman, Electricity and Tramways Committee, West Caroline-street, and may be delivered not later than September 29.

SEPTEMBER 29.—Southport.—MOTORS, PUMPS, ETC.—The Corporation of Southport invite tenders for the whole or any portion of the following:—Contract No. 2, gas engines and pumps; contract No. 3, revolving sprinklers for filter beds; contract No. 4, screening arrangements for their new Sewage Works at Crossens. The plans may be inspected and particulars obtained on deposit of cheque for 2s. at the office of Mr. R. F. Hind, Assistant Engineer, Town Hall, Southport. Tenders, sealed, and endorsed "Contracts Nos. 1, 2, 3, or 4," to be delivered at the office of Mr. J. Ernest Jarratt, Town Clerk, Town

Hall, Southport, on or before 12 noon, September 29.

OCTOBER 4.—Weymouth.—SURFACE-SEWER DRAINAGE.—The Weymouth U.D.C. invite tenders for the construction of surface-sewer sewers within their district, with the necessary outlets, flap-chamber, overflow weirs, manholes, gullies, and other works in connection therewith. Plans, sections, specification, and conditions of contract may be seen, and quantities and form of tender obtained, on payment of 2s. 2s. on application at the office of the Borough Engineer, Mr. W. Barlow Morgan, Municipal Offices, Weymouth. Tenders, enclosed in the official envelope, sealed, and endorsed "Surface Sewer Drainage," to be delivered to Mr. H. A. Huxtable, Town Clerk, Municipal Offices, Weymouth, on October 4 by 12 o'clock noon.

OCTOBER 6.—Warrington.—ENGINE REPAIRS.—The Water Committee invite tenders for repairs to their "Water Lily" pumping engine at Winwick Pumping Station. Particulars may be had from Mr. James Deas, A.M.I.C.E., Water Engineer, Municipal Offices. Tenders to be sent in not later than October 6.

OCTOBER 13.—Wimbledon.—WOOD-CUTTING MACHINERY.—The Corporation of Wimbledon invite tenders for the supply, delivery, and fixing complete at the Depot, Queen's-road, Wimbledon, of a circular saw bench, band sawing machine, and a 12 h.p. electrical motor for driving same. Particulars may be obtained on application to the Borough Engineer and Surveyor, Town Hall, Wimbledon. Sealed tenders, endorsed "Wood-Cutting Machinery," to be delivered at the Town Hall on or before noon on October 13.

OCTOBER 20.—Haverfordwest.—RECONSTRUCTION OF MEAT MARKET.—The Corporation invite tenders for the reconstruction of the Meat Market, including new steel roof with elliptical lattice-braced principals, etc. The drawings and specification may be inspected at the Council Chamber, High-street, Haverfordwest, between 10 a.m. and 5 p.m., or at the office of Mr. J. Preece James, architect, Tenby. A deposit of 2s. 2s. is required. "Reconstruction of Market," on the forms supplied, are to be sent to Mr. R. T. P. Williams, Town Clerk, Haverfordwest, on or before October 20.

NO DATE.—Coston and Runkell.—FOOT BRIDGE.—The Forthore R.D.C. invite tenders for a new foot bridge over the river, between the Parishes of Coston and Runkell, Hartlepool. Particulars may be seen at the Council Chamber, District Surveyor, Crownthorpe, Wymondham.

NO DATE.—Filey.—REPORTS, ETC.—The Filey U.C. invite tenders for the extension of the report house, and the setting of ten reports. Particulars may be obtained of Mr. Henry Tobey, Engineer, Malton.

NO DATE.—Stechford.—BRICK CULVERT.—Construction of a 3 ft. by 2 ft. egg-shaped brick culvert, 100 ft. long, with manholes at the extremities, under the main London and North-Western Railway line at Stechford, Names to Mr. Charles F. Redfern, Surveyor, Whitehall Chambers, 23, Colmore-row, Birmingham.

MISCELLANEOUS.

SEPTEMBER 24.—Alnwick.—PILING.—R.D.C. of Alnwick invite tenders for piling about forty yards of the inner bank opposite the Major's-terrace at Warkworth. The specification may be seen upon application to Mr. Robt. Moore, Warkworth; or at the office of the clerk, Mr. H. W. Walton, Alnwick, to whom sealed and endorsed tenders are to be delivered before 1.30 p.m. on September 24.

SEPTEMBER 27.—Carlisle.—CARTING, ETC.—The Corporation of Carlisle invite tenders for the supply of 400 horse-carts, and men required in the City Surveyor's Department. The contract will be let for a period of one, two, or three years, at the option of the Corporation. Particulars may be seen, and form of tender obtained, at the office of Mr. Henry C. Marks, M.Inst.C.E., City Engineer and Surveyor, 36, Fisher-street, Carlisle, to whom tenders, sealed, and endorsed "Carting and Cartmen," must be delivered on or before 10 a.m. on September 27.

SEPTEMBER 27.—St. Austell.—STEAM ROLLER.—St. Austell R.D.C. invite tenders for the hire, during the months of November, December, and January, or longer if required, of one steam roller, 10 tons in weight, with Morrison's patent scarifier attached. Tenders, marked "Steam Rolling Tender," to be sent to Mr. John Stephens, Clerk, office, Cross-lane, St. Austell, on or before September 27.

SEPTEMBER 28.—Ashford.—FENCING.—Ashford U.D.C. invite tenders for the supply and fixing complete of approximately 1,254 ft. run of all oak park fencing, 6 ft. high out of ground, at the Warren-lane hospital site. Plan and specification may be seen, form of tender, and information obtained, on application to Mr. William Terrill, Surveyor, at his office, North-street, Ashford, Kent. Sealed tenders, endorsed "Hospital Fencing," to be sent to Mr. John Creery, Clerk to the Council, 11, Bank-street, not later than 5 p.m. on September 28.

SEPTEMBER 29.—Stourton.—FENCING.—The Rothwell U.D.C. invite tenders for providing and erecting 450 yds. of crested redwood fencing, 6 ft. high, round the New Sewage Disposal Works at Stourton. Also separate tenders for about 5 yds. of iron fencing, 6 ft. high, including fixing, etc. Plans and specifications may be seen, and particulars obtained, at the offices of the engineer, Mr. E. J. Silcock, M.Inst.C.E., 10, Park-row, Leeds. Sealed tenders, endorsed "Stourton Fencing and Iron Fencing," must be delivered to Mr. W. Dodgson, Clerk to the Council, Council Offices, Rothwell, near Leeds, not later than September 29.

OCTOBER 13.—Farnham.—SCENIC FURNITURE.—The Education Committee invite tenders for the supply of (a) cupboards and (b) desks and other furniture for the Clifford-road and Ranelagh-road Council Schools. The tenders must be separate for (a) and (b), and for each school, and cupboards only may be tendered for, and tenders may be for one school only, if desired. Specifications and information may be obtained from the Committee's Surveyor (Mr.

E. T. Johns, Tower Chambers, Tower-street, Ipswich) on deposit with him. Tenders, endorsed, to be sent to Mr. J. Hepburn Hume, Secretary, Tower House, Tower-street, Ipswich, on October 13.

OCTOBER 13.—Hertford.—STEAM ROLLING.—The Hertfordshire C.C. invite tenders for the supply of steam road-rollers for use on the main roads in the county. Particulars and form of tender may be obtained on application to Mr. Urban A. Smith, M.Inst.C.E., County Surveyor.

NO DATE.—Wetley Rocks.—SHARP SINKING AND WALLING.—Tenders are invited by the Westwood Coal and Iron Company for sinking and walling of two shafts on the Westwood Estate, near Wetley Rocks, Slafrs. For particulars, apply to the Manager, (Mr. B. Parker), or to Westwood Manor, Wetley Rocks.

PAINTING, ETC.

SEPTEMBER 24.—Manchester.—PAINTING.—The Paving, Sewering, and Highways Committee invite tenders for painting various bridges over the Rochdale Canal and the River Medlock. Specification may be seen at the office of the City Surveyor, at the City Surveyor's Office, Town Hall, Manchester, on payment to the City Treasurer of one guinea. All cheques or postal orders to be made payable to the order of "The Corporation of Manchester." Tenders, enclosed in the official envelope, and addressed to the Chairman of the Paving, etc., Committee, to be delivered at the City Surveyor's Office not later than 10 a.m. on September 24.

SEPTEMBER 25.—Leyton.—PAINTING.—The Leyton U.D.C. invite tenders for the painting work required to be done to the outside of the Town Hall and Technical Institute, High-road, Leyton, and greenhouse in Oliver-road. Specification and form of tender and other particulars may be obtained from Mr. William Dawson, M.Inst.C.E., the Surveyor to the Council, at his offices, Town Hall, Leyton, between 10 a.m. and 4 (10 and 12 on Saturdays). Sealed tenders (in special endorsed envelopes supplied with the forms) must be delivered at the meeting of the council, to be held at the Town Hall, Leyton, on September 25, at 7 o'clock p.m.

SEPTEMBER 25.—Hull.—PAINTING, ETC.—The Corporation invite tenders for the cleansing, painting, etc., required at the new Central Police-station, 10, Golder and Parliament streets. Forms of tender and other particulars may be obtained from Mr. Joseph H. Hirst, City Architect, Town Hall, Hull. Tenders, endorsed "Tender for Cleansing and Painting New Central Police-station," are to be addressed to the Chairman of the Station House Sub-Committee, to be delivered at the Town Clerk's Office, Hull, before 10 o'clock on September 26.

SEPTEMBER 26.—Manchester.—PAINTING.—The Manchester Guardians of the Poor are prepared to receive tenders for the painting of the Poor Law Offices and the Workhouse in New Bridge-street, Manchester. Specifications may be obtained at the office of Mr. A. J. Murgatroyd, architect, 23, Strutt-street, Manchester, on payment of deposit of 10s. 6d. Sealed tenders, endorsed "Painting at New Bridge-street," to be delivered to Mr. James Macdonald, Clerk to the Guardians at the Poor Law Offices, New Bridge-street, Manchester, not later than 3 p.m. on September 26.

SEPTEMBER 27.—Canterbury.—PAINTING.—Tenders are invited for painting the exterior of the buildings of the Kent and Canterbury Hospital. The specification can be seen at the hospital, and tenders under sealed cover should be delivered to A. J. Lancaster, Secretary, not later than September 27.

SEPTEMBER 27.—Darlington.—PAINTING, ETC.—The Corporation invite tenders for painting, etc., the outside of the Fever Hospital. Specification may be seen, and bill of quantities obtained, on application at the offices of Mr. George Winter, Borough Surveyor, Town Hall. Tenders, endorsed "Tender for Painting at Hospital," to be sent to Mr. H. Stevenson, Town Clerk, on or before September 27.

OCTOBER 1.—Hull.—PAINTING, ETC.—The Guardians of the Seaford Union invite tenders for painting, etc., at the Bell-street, St. George's-road, Hull. Forms of tender and all particulars can be obtained, or will be sent by post, on application to Mr. J. H. W. Solicitor, Clerk to the Guardians, Union Offices, Harley-street, Hull, to whom tenders must be sent not later than 10 o'clock a.m., October 1.

OCTOBER 1.—Marylebone-road, W.—PAINTING, ETC.—The St. Marylebone Guardians invite tenders for outside painting and repainting works at the Houseless Poor Wards, 86, East-street, Marylebone-road, W. Specifications, forms of tender may be obtained between September 21 and 25, on application to Mr. A. Saxton-Snell, F.R.I.B.A., 22 Southampton-buildings, W.C. Tenders, sealed and endorsed "Tender for Outside Painting Works, etc., Houseless Poor Wards," to be addressed and delivered to the Clerk to the Guardians, Northumberland-street, Marylebone-road, W., on or before 10 o'clock a.m., October 1.

OCTOBER 3.—Winchmore Hill.—CLEANING AND PAINTING.—The Metropolitan Asylums Board invite tenders for external and internal cleaning and painting works at the Northern Convalescent Fever Hospital, Winchmore Hill, N., in accordance with specification prepared by Mr. W. T. Hutch, Engineer-in-Chief. Specification, conditions of contract, bills of quantities, and form of tender may be inspected at the office of the Board, Embankment, E.C., and bills of quantities and forms of tender can then be obtained on payment of 1s. Tenders, addressed as notes to the form to be delivered at the office of the Board before 10 a.m., October 3.

ROADS, SANITARY, AND WATER WORKS.

SEPTEMBER 24.—Farnham.—ROAD WORKS.—Farnham U.D.C. invite tenders for the levelling, draining, channelling, kerbing, paving, metalting, and making good Adam's Park-road. Plans and specifications may be seen at the office of the County Surveyor, South-street, Farnham, Surrey, where the bill of quantities and forms of tender can be obtained any morning between the hours of 9 and 10. Sealed tenders, endorsed "Street Works on

the outside cover, to be delivered to Mr. Richard Mason, solicitor, Clerk to the Council, 21, West Street, Farnham, on or before 4 p.m. on September 24.

SEPTEMBER 24.—Halifax.—PRIVATE IMPROVEMENT WORKS.—The Highways Committee of the Halifax Corporation invite tenders for the execution of private improvement works in a portion of the road between Bank Top Inn and the land belonging to the Yorkshire and Lancashire and Great Northern Joint Railway. Plans and specifications may be seen, and forms of tender obtained, on application to Mr. James Lord, C.E., Borough Engineer, Town Hall, Halifax, upon payment of 11. Tenders, endorsed "Road Behind Bank Top Inn," must be sent to Mr. Keighley Walton, Town Clerk, on or before September 24.

SEPTEMBER 24.—Ilford.—ROAD WORKS.—Ilford U.D.C. invites tenders for levelling, metalling, channelling, paving, kerbing, and making good Glencoe-avenue, Eton road (part of), Oxford-road, Francis-avenue, Francis-road, Elizabeth-road, and Park-road (part of). Plans and specifications may be seen, and form of tender obtained, on application to Mr. H. Shaw, A.M.I.C.E., Surveyor to the Council, Town Hall, Ilford, on payment of a deposit of 21. 2s. Sealed tenders, endorsed "Tender for Private Street Works," must be sent to Mr. John W. Benton, Clerk, Town Hall, Ilford, on or before September 24.

SEPTEMBER 25.—Redcar.—PAVING, LEVELLING, ETC.—The Redcar U.D.C. invite tenders for levelling, paving, and making the back and side streets between Handfield and Soppet-street, Redcar. Plans and specifications can be seen at the Council Offices, 2, West-terrace, Redcar, on application to Mr. James Howcroft, the surveyor. Tenders, marked "Private Improvements," must be sent to Mr. Alfred H. Hill, Clerk to the Redcar U.D.C., on or before September 25, at 12 o'clock noon.

SEPTEMBER 25.—Runcorn.—PATHS. The U.D.C. of Runcorn invite tenders for excavating, filling up, and forming paths and asphalted pavements at the Runcorn Cemetery. Particulars may be obtained, and plans seen, at the office of the surveyor and water engineer, Mr. James Widding, between 9 a.m. and 5 p.m., except Saturdays. Tenders to be delivered to Mr. E. Marshall, Secretary, Town Hall, Runcorn, and addressed to the Chairman of the Cemetery Committee, endorsed "Tender for Cemetery Paths," not later than September 25.

SEPTEMBER 25.—Tynemouth.—STREET WORKS.—Tenders are invited for executing the following:—(1) Paving in Winders-terrace, and in back lanes north, south, and east of Lansdowne-terrace, North Shields. (2) Paving, etc., in Tynemouth-road, North Shields. Plans and specifications may be seen at the office of John E. Smilie, Borough Surveyor, to whom sealed and endorsed tenders are to be sent not later than 12 noon on September 25.

SEPTEMBER 26.—Stapleford.—ROAD WORKS.—Stapleford R.D.C. invite tenders for the completion of Bailey street and Wellington-street, in the parish of Stapleford. Plans and specifications can be inspected at the office of Mr. F. E. Hawley, Surveyor of the Council, Wood-street, Liskeard. Tenders marked "Stapleford streets" must be delivered to Mr. Frederic Wm. Fox, Clerk to the Council, Bank Chambers, Beasdale Hill, Nottingham, on or before September 26.

SEPTEMBER 27.—Barnford.—WATER SUPPLY.—The Chapel-en-le-Frith R.D.C. invite tenders for providing and laying about 1,300 yds. of 3-in. cast-iron pipes, together with the construction of a brick collecting chamber, and other works connected therewith, at Barnford, Derbyshire. Drawings may be seen, and bills of quantities, specification, and form of tender obtained, on application to the Council's Engineers, Messrs. Swann & Brady, Town Hall, Chapel-en-le-Frith, Stockport, on payment of 11. Tenders to be delivered on or before noon, September 27, endorsed "Tenders Barnford Water," and addressed to Mr. John Hurton Joycott, Clerk to the Council, Chapel-en-le-Frith, Stockport.

SEPTEMBER 27.—Leamington Spa.—ROAD WORKS.—The Corporation of Royal Leamington Spa invite tenders for making a short length of roadway. Plans and specification may be seen at the office of their Engineer, at the Town Hall. Tenders addressed to Mr. Leo Rawlinson, Town Clerk, Town Hall, Royal Leamington Spa, and endorsed "Tender for Road Making," are to be sent in before noon on September 27.

SEPTEMBER 28.—Birmingham.—PRIVATE STREET WORKS.—The Public Works Committee invite tenders for the construction of private street works, including road and sewer construction in Moss road (off Kingston-road) and Green-street (off Garrison-street). The drawings and specifications may be inspected, and bills of quantities and forms of tender obtained, on deposit of 11. at the office of Mr. Henry E. Stilgole, M.Inst.C.E., City Engineer and Surveyor, Council House, Birmingham, where separate tenders for road and sewer works may be sent, but to be sent in before September 28, endorsed "Tender for Private Street Works."

SEPTEMBER 28.—Hull.—ROAD WORKS.—The Corporation invite tenders for paving with concrete and draining certain backways to the south of Spring Bank West and west of Boynton-street. Forms of tender and other particulars may be obtained from Mr. A. E. White, M.Inst.C.E., City Engineer, Town Hall, Hull. Tenders, endorsed "Tender for Backways," are to be addressed to the Chairman of the Works Committee, and delivered at the Town Clerk's Office before noon, September 28.

SEPTEMBER 29.—Leeds.—ROAD WORKS.—The Highways Committee invite tenders for making asphalted footpaths, covering the existing pitched foundation of the carriage ways with broken granite, and laying channels in Allerton Drive, Chapeltown. Forms of tender and bills of quantities may be obtained, and copies of the documents forming the contract inspected, on application at the Highways Office, 255 Kirkstall road. Sealed tenders, endorsed "Tender for Private Street Works," and addressed to the Highways Committee, must be delivered at the Town Clerk's Office, Town Hall, Leeds, not later than 10 a.m. on September 29.

OCTOBER 1.—East Grinstead.—PRIVATE STREET WORKS.—East Grinstead U.D.C. invite tenders for the sewerage (sewage and surface water) and cutting works in Morion-road, and parts of Coronation-road and Stockwell-road. The drawings and specifications may be seen, and bills of quantities obtained, from Mr. W. E. Woolman, Engineer and Surveyor to the Council, during the usual office hours on depositing postal order value 11. Tenders, endorsed "Tender for Roads, Grinstead," must be sent to Mr. E. P. Whitley Hughes, Clerk to the Council, on or before October 1.

OCTOBER 2.—Hove.—BRICK SEWER, ETC.—The Hove Council invite tenders for constructing a brick sewer in Langdale-road, concrete and stoneware pipe sewers in New Church-road and Wish-road; and other works. Plans, specification, and form of contract may be seen, and bills of quantities and form of tender obtained, at the office of the Borough Surveyor (Mr. Hugh Hamilton Scott), on payment of 51. 5s. Tenders on the forms provided, endorsed "Tender for Main Drainage Works, Contract No. 2," addressed to Mr. H. Endacott, Town Clerk, Town Hall, Hove, will be received up to 6 o'clock on October 2.

OCTOBER 2.—Lewisham.—ROAD WORKS.—The Borough Council invite tenders for the levelling, metalling, and metalling the roadway, and paving the footpaths with artificial stone (in separate contracts) of Saravia-road, Lewisham. The plans and specifications may be seen, and bills of quantities obtained, at the Town Hall, (Calford (Surveyor's Department)), and copies of the specification may also be had on payment of 5s. in each case. The tenders must be in envelopes, sealed, and endorsed "Tender for Roads, Lewisham," and must be delivered by 4 o'clock on October 2, 1906, at the Town Hall, Calford, S.E.

OCTOBER 2.—Moreton-in-the-Marsh.—SEWAGE WORKS.—Chipping Campden R.D.C. invite tenders for the provision, laying, and jointing of cast-iron stoneware pipes, together with manholes and lamp-holes, construction of pump and engine-house, liquefying tanks, and other incidental works, in accordance with the drawings and specification, which may be seen and bills of quantities obtained, at the offices of the engineers, Messrs. Wilcox & Raikes, 65, Temple-row, Birmingham, on payment of a deposit of 31. 3s. Sealed tenders in envelopes, endorsed "Moreton-in-the-Marsh Sewerage—Contract No. 1," to be delivered to Mr. Oliver H. New, Clerk to the Council, Chipping Campden, not later than 12 o'clock noon on October 2.

OCTOBER 2.—Walsall.—SEWAGE WORKS.—Brown hills U.D.C. invite (Contract No. 1) tenders for the construction of detritus tanks, bacteria filters, and other incidental works in connection therewith, at the Mossnits Sewage Disposal Works, near Walsall. Plans and specifications may be seen at the offices of the engineers, Messrs. Wilcox & Raikes, 65, Temple-row, Birmingham, on payment of a deposit of 21. 2s. Sealed tenders in envelopes supplied, endorsed "Mossnits Sewage Disposal Works," must be delivered to Mr. T. H. Stanley, Clerk to the Brownhills U.D.C., 35, Bridge-street, Walsall, not later than October 2.

OCTOBER 3.—Lewisham.—WOOD PAVING WORK.—The Council invite tenders for supplying and laying created deal blocks in the roadway in front of road, Lee, from High-street, Lewisham, to Lee Green; also for repaving with the same material a portion of the roadway in Tranquil Vale, Blackheath, particulars of which are set out in the specifications and forms of tender. The plans, specifications, and conditions may be seen, and forms of tender obtained, at the Town Hall, Calford (Surveyor's Department). The tenders, enclosed in an envelope, sealed, and endorsed "Tender for Wood Paving," must be delivered by 12 o'clock on October 3, at the Town Hall, Calford, S.E.

*** OCTOBER 3.—Tooting.**—TAR PAVING, ETC.—Metropolitan Asylums Board invite tenders for new tar paving and repairs to existing paving at Tooting Bec Asylum, Tooting, S.W. Specification, condition of contract, and form of tender may be inspected at the Board's Office, Embankment, E.C., on and after September 24. Tenders, addressed as noted on form, to be delivered at the Board's Office not later than 10 a.m., October 3.

*** OCTOBER 4.—Bromley.**—ROAD MAKING.—The Councils of Bromley, Beckenham, etc., invite tenders for certain works of sewerage, levelling, paving, metalling, channelling, and making good Hayes-road. Plans and sections may be seen, and specifications, bills of quantities, and forms of tender obtained, at the office of the Borough Engineer, Bromley, Kent, on payment of 11. Tenders, endorsed "Tender for Hayes-road," must be delivered to the Clerk of the Bromley R.D.C., Park House, Beckenham, Bromley, not later than October 4.

OCTOBER 6.—Skipton.—SEWAGE DISPOSAL WORKS.—Contract No. 1.—The Skipton U.D.C. invite tenders for the construction of detritus tanks, sedimentation tanks, continuous filters, the laying out of a storm-water bed and main, and other works of connexion with their sewage disposal works. The drawings, on payment of 11. at the office of the Council's Engineer, Mr. John Mallinson, Town Hall, Skipton, may be seen, and bills of quantities, specification, and form of tender obtained, on application to the Council's Engineer, Mr. John Mallinson, Town Hall, Skipton, on payment of 11. Sealed tenders, in envelopes, to be supplied, are to be delivered to Mr. Richard Wilson, Clerk to the Council, not later than October 6.

OCTOBER 6.—Market Harborough.—STREET WORKS.—The Market Harborough U.D.C. invite tenders for the construction and making up of the following streets in the Parish of Kibworth Beauchamp:—Kirkstall-road, White-street, Buller-avenue. Plans may be seen at the office of the Council, and at the offices of the Engineers, Messrs. Everett, Sons & Co., Milstone-lane, Leicester, from whom quantities and form of tender may be

obtained upon payment of 21. 2s. Sealed tenders to be sent to Mr. Charles Burgoine, Clerk to the Council, Market Harborough, not later than 10 o'clock in the forenoon of October 6, endorsed "Tender for Kilworth Roads."

OCTOBER 10.—Stockport.—CONSTRUCTION OF SEWERS, ETC.—The Highways and Sewers Committee invite tenders for the manual and team labour and materials required in the construction of about 1,360 lin. yds. of egg-shaped sewers, varying in size from 3 ft. by 2 ft. 6 in. to 4 ft. 6 in.; 139 lin. yds. of cast-iron pipe sewers, 15 in. and 21 in. in diameter, and 6,120 lin. yds. of stoneware pipe sewers, varying from 12 in. to 36 in. diameter; together with all manholes, ventilators, the construction of a small detritus tank and screening chamber, and other incidental works for the sewerage of the adjacent areas of Cheadle and Bramhall. Plans, sections, and details may be seen, and conditions, specifications of works and materials, bills of quantities, form of tender, etc., may be obtained, from Mr. John Atkinson, A.M.Inst.C.E., Borough Surveyor, Borough Surveyor's Office, Stockport, on payment of a deposit of 31. 3s. Tenders, addressed "The Borough Surveyor, Stockport," sealed and endorsed "Tender for Sewers in Adjacent Areas of Cheadle and Bramhall," to be delivered at or before noon on October 10.

NO DATE.—Aboyn.—ROAD WIDENING.—Estimated work of widening the public road opposite Waterside, on Glen Road, Aboyn. Plans and specifications to be seen with Mr. J. Milne, Road Surveyor, Aboyn.

NO DATE.—Wealdstone.—ROAD AND SEWERS.—Tenders required for the construction of roads and sewers at Wealdstone. Specifications, plans, and sections can be seen at the offices of Messrs. Allen & Hoar, surveyors, 283, West End lane, N.W.

STONE, MATERIALS, AND STORES.

SEPTEMBER 24.—Sevenoaks.—ROAD MATERIAL.—The Sevenoaks U.D.C. invite tenders for 2,200 yds. of clean local stone, or any less quantity, according to specification, required by the Surveyor to the Council, to be delivered at the various depots within their district. Sealed tenders to be delivered to Mr. H. Thompson, Clerk to the Council, Urban Council Offices, Sevenoaks, and endorsed "Tender for Road Metal, etc.," and delivered on or before September 24.

SEPTEMBER 24.—Macadam.—The U.D.C. of Surbiton invite tenders for the supply and delivery of Rhenish columnar basalt macadam. Specification and forms of tender can be obtained on application to the Surveyor, at the District Council Offices, Surbiton. Tenders, enclosed in sealed envelopes, endorsed "Tender for Basalt Macadam," addressed to Mr. James Bell, Clerk to the Council, District Council Offices, Surbiton, must be delivered at or before noon on September 24.

SEPTEMBER 25.—Sheerness.—ROAD MATERIALS.—Sheerness U.D.C. invite tenders for the following:—(1) 350 tons of granite, 350 tons, broken to pass through a 2-in. ring; (2) good clean, broken granite, 300 yds. broken to pass through a 2-in. ring; (3) 300 yds. broken granite chippings, 20 tons; (4) good clean broken granite, 300 yds. broken to pass through a 2-in. ring. Tenders to be delivered in bags alongside the pier at Sheerness, and may not be sent to the Surveyor to the Council, but to be sent to or left with the materials must be sent to Mr. T. E. Berry, and sealed tenders, on forms supplied, stating price per yard or ton, endorsed outside "Tender for Road Material," must be delivered to Mr. Vincent J. Stalton, Clerk of the Council, Council Offices, Trimly-road, Sheerness, before noon on September 25.

SEPTEMBER 26.—Glasgow.—STEEL RAILS AND FISH-BONES.—The Corporation of Glasgow invite tenders for the supply of 1,000 to 2,000 tons of rails B.S. Section No. 5, 150 tons H.S. Section No. 5c, and 200 tons of fish-bones. Specification, with 21. form of tender and drawings, can be obtained on application to Mr. James Dalrymple, General Manager, 1, Bath street, Glasgow, and sealed tenders, endorsed "Tranvaux—Tender for Steel Rails," must be lodged with Mr. A. W. Myles, Town Clerk, City Chambers, Glasgow, not later than 10 a.m., September 26.

SEPTEMBER 26.—Halifax.—GRANITE AND DROSS.—Southdown U.D.C. invite tenders for the supply of granite and dross as follows:—150 tons of granite, to Brighouse Station; 50 tons of granite, to Elland Station; 150 tons of dross, to Brighouse Station; 200 tons of dross, to North Bridge Station, Halifax; 200 tons of dross, to Hipperholme Station. Tenders should be sent, along with sample, carriage paid, to Mr. Councilor J. S. Hartley, Messrs. Hartley & Kaye, North Bridge Stone Wharf, Halifax, and should state the price per ton, at which the material is offered, and the above-named stations respectively, in such quantities may be desired by the Surveyor to the Council. All tenders and samples must be delivered not later than September 26, and must be endorsed "Tender for Granite, etc."

SEPTEMBER 26.—Newport.—TIMBER.—Bath and West and Southern Councils Society invite tenders for supplying the timber for the show-yard buildings and other works at the Newport Show. Specifications may be obtained of the Secretaries, Messrs. F. H. Jones & Co., 1, Portland street, Bath, to whom tenders must be sent, not later than September 26.

SEPTEMBER 26.—Halifax.—GRANITE, ETC.—The Grays U.D.C. invite tenders for the supply of 150 tons of granite to the Town Wharf, Grays, and 150 tons of granite or basalt macadam, and 200 tons of dross, to the same wharf. Tenders, which must be on the form obtained, with specification, from the Council's Surveyor, at the office, High-street, Grays, and be accompanied by a sample of the material tendered, are to be delivered to Messrs. Hadden & Ash, Grays, by noon on September 27, endorsed "Tender for Macadam."

SEPTEMBER 27.—Lambeth.—PAVING STONE.—The Lambeth Metropolitan Borough Council invites

tenders for the supply of 12,000 super. ft. of new 25-in. York stone paving, "Silex" Brand. Forms of tender can be obtained from Mr. Henry Edwards, C.E., Borough Engineer, 346, Kennington-road, S.E. Scaled tenders, endorsed "Tender for York Stone Paving," must be delivered at the Lambeth Town Hall, Kennington-green, S.E., not later than 12 o'clock noon on September 27.

SEPTEMBER 29.—**Durban, Natal.**—STONEWARE Sewerage Pipes.—The Corporation of Durban invite (from manufacturers only) tenders for the supply and delivery ("free on board") of two miles each of 6 in., 7 in., and 8 in. diameter stoneware sewer pipes. Specifications can be obtained from Mr. W. H. Radford, C.E., Albion-chambers, Nottingham. Consulting and Representative Engineer to the Corporation, on deposit of 1*l.* 1*s.* Scaled and endorsed tenders must be delivered to Messrs

Webster, Steel, & Co., Agents to the Durban Corporation, 5, East India-avenue, Leadenhall-street, London, E.C., on or before September 29. The lowest or any tender will not necessarily be accepted.

★ **SEPTEMBER 29.—Paddington.**—SHINGLE.—The Borough Council of Paddington invite tenders for supply of fine crushed Thames shingle, granite chippings, or other material for strewn on carriage ways. Forms of tender, etc., to be obtained on application to the Borough Surveyor, Town Hall, Paddington, W., between 10 a.m. and 4 p.m. (Saturdays, 10 a.m. and 1 p.m.). Tenders, sealed and endorsed "Shingle," addressed to the Town Clerk, as above, to be delivered, together with samples, not later than September 29.

OCTOBER 1.—Sandgate.—HIGHWAY MATERIALS.—The Sandgate U.D.C. invite tenders for the supply

of various highway materials, to be delivered at the cost of the contractor, on or before November 30 next. Forms of tender may be had upon application to Mr. J. Shere Atkinson, Clerk to the Council, Council Offices, 51, High-street, Sandgate, to whom tenders must be sent, marked "Tender for Highway Materials," not later than October 1.

★ **OCTOBER 8.—London.**—STORES.—The Metropolitan Railway Company invite tenders for supply of general stores during twelve months ending October 31, 1907. Application for form of tender to be made after September 27. Samples and patterns of goods may be seen at the office of the Company's Storekeeper, adjoining Newell Station, N.W., from October 1 to 6 inclusive. Tenders, on forms supplied and endorsed "Tender for Stores," must reach the Secretary, 32, Westbourne-terrace, W., not later than 10 a.m., October 8.

Auction Sales.

Nature and Place of Sale.	By whom Offered.	Date of Sale.
*DEALS, BATTENS, Etc.—Great Hall, Winchester House, Old Broad-street, E.C.	Churchill & Sims	Sept. 26
*BRICKMAKING PLANT AND MACHINERY, CATFORD.	J. T. Skelding	Sept. 27
*SPRING AND BUILDING LAND, SHREWSBURY.—The County Mart, Shrewsbury	Wm. Hall, Wateridge, & Owen	Sept. 28
*JOINTERY WORKS HENRY STREET, GRAY'S INN ROAD	May & Rowden	Oct. 3
*BUILDERS' MERCHANT'S STOCK, Etc.—At Frogmore Wharf, Frogmore, Wandsworth, S.W.	J. T. Skelding	do.
*FREEHOLD ESTATE, ALTHORNE, ESSEX.—At the Mart	Cockett & Henderson	October.
*ANCIENT HOUSE ESTATE.—At the Mart	Chancellor & Sons	

PATENTS.—Continued from page 355.

5,649 of 1906.—E. C. R. MARKS (Platt, Baker Company): *Detachable Hinge for Windows and the like.*

This relates to a detachable hinge for windows and the like of the type wherein hinged brackets are adapted to slide over projections arranged respectively upon the fixed frame and the sliding sash, and a device upon the fixed frame for locking the bracket in position.

6,872 of 1906.—THE PERFECTOR WINDOW COMPANY, LTD., and W. HIGSON: *Pivoted Sash and Casement Windows.*

This relates to the application to the movable part of a pivoted sash and casement window of a semi-circular bar or plate, which is attached to the movable part of the pivot, and is provided with a number of holes, and consists in the combination therewith of a plate which has one hole, and is attached to the fixed part of the window.

7,076 of 1905.—P. LECHLER: *Radiators and like Heating Apparatus.*

This relates to a heating apparatus having a heating-chamber or shaft the cross-section of which decreases as its distance from the heating source increases, ribs on the shaft, and means for heating and for discharging the combustion gases from the shaft.

9,392 of 1906.—D. J. A. CONCE: *Fire Bars for Stoves, Furnaces, and the like.*

This relates to fire bars for stoves and the like, and consists in constructing each fire bar of two members placed together so that a space exists between their inner facing vertical surfaces, and is characterised by one member having a number of projections proceeding from its inner vertical surface and extending upwards at a distance therefrom, each projection presenting a square upper face. The longitudinal edge of the member is divided by slots into rectangular surfaces, the opposite member being similarly formed with inward projections passing, when the two first members are placed together, between the projections of the first member, a number of fire bars so constructed presenting, when assembled, an upper supporting surface for the fuel, composed of squares like a chess-board, with spaces around each square for the passage of the air and for the falling through of the ashes and refuse.

13,393 of 1906.—H. E. VANCE: *Slats for Constructing Fireproof Curtains, Screens, Shutters, Doors, and the like.*

This relates to a fireproof blind or curtain, and consists of a metallic slat provided at its edge with a hook to which the heat retardant material is applied on both sides, the material on one side extending over the back of the hook, while the material on the other side does not extend to the hook.

16,648 of 1905.—G. L. MOUCHEL: *Armoured Concrete Pipes.*

This relates to an armoured concrete pipe, comprising a wall of concrete rods with metal disposed longitudinally therein, said rods being securely tied together with a hole throughout the whole or greater part of its length, and without any diaphragm or external metal casing, said hole having a cross-sectional area larger than that of the rod for passing water therethrough as a means for sinking the pile.

16,706 of 1906.—E. G. FERRO: *Reinforced Concrete Structures.*

This relates to reinforcing means for a cementitious body, comprising longitudinal main bars or members formed of metallic structural elements, longitudinally extending plates connecting said bars, said bars being separated at other points, and transverse minor elements attached to said longitudinally extending elements where not engaged by said longitudinal plates, said minor elements also connecting parallel longitudinal bars and holding the same in position transversely within the cementitious body.

24,088 of 1905.—J. GRANICH: *Casting Moulds Used for Connecting and Luting Stoneware Pipes.*

This relates to a casting mould for connecting and luting stoneware pipes, consisting of two semi-circular parts forming a ring, the inner surface of which is of such a form that, when mounted on the pipes, a hollow space is formed between the ring and the flange of the adjacent pipe, means to hinge the two parts of the ring on one side, and means to temporarily fasten them on the other side.

1,715 of 1906.—J. S. PULLAN and W. H. MANN: *Brick Moulding or Pressing Machines.*

This relates to a brick moulding or pressing machine in which the pressing plunger is actuated through the medium of a screw, and consists in the combination with the pressing plunger of an internal die or loose plate mounted within a skeleton plate attached to the under face of the plunger, a vertically sliding collar located on the lower end of the actuating screw, and having oppositely situated inclined notches formed therein, and oppositely situated arms pivoted to the plunger, and formed with inwardly directed hooked ends adapted to engage within the inclined notches in the collar. The arrangement is such that, on the screw being actuated, the plunger and internal die are moved down simultaneously until the skeleton plate of the plunger enters the mould to a predetermined distance, when the pivoted hooked arms are caused to move outwardly from the collar into engagement with recesses formed in the press frame to retain the plunger in the down position, and allow the screw to carry the internal die further down within the mould to spread the clay outward to the underside of the skeleton plate, and produce a brick of a standard thickness on its outer edges.

3,182 of 1906.—DR. B. ALEXANDER-KATZ: *Process of Manufacturing Artificial Stone.*

This relates to a process of manufacturing artificial stones from fibrous materials such as asbestos and binding agents, such as a slowly-binding cement, in which, by utilising the well-known filtering properties of the asbestos, a mixture of asbestos cement, and but a small quantity of water, is freed from water, filtered, and shaped by means of a filter press or filtering drums.

13,348 of 1906.—M. REICH: *Scaffolding.*

This relates to a scaffolding adjustable in vertical direction, consisting of a post cross-sectioned in cross-section, guarded in a vertical tube, two angle-irons fixed in the upper end of said tube to form with their parallel shanks guards for the lateral arms of the post, the two shanks of the angle-irons being pressed

together to form one flat piece at the part projecting from the upper end of the tube, the said part of the angle-irons as well as the lateral arms of the post being provided with equidistant holes for the reception of the bolts connecting the post with the tube, the post having in its upper end vertical incisions for the reception of the vertical shanks of the L-irons forming the support for the planking, said shanks having equidistant holes for the reception of screw-bolts, which secure the bars in their position.

4,223 of 1906.—A. D'HAVE: *Arrangement of Strengthening Wires for Building in Concrete and the like.*

This invention relates to the construction of floors of strengthened concrete, and consists in the arrangement of wires and the distribution of the weight towards the support of the beams by means of strengthening elements which have four points of attachment, and have the form of elongated letter X. The invention further consists in the construction of the beams, comprising the "compression" and "tension" bars for supporting a floor of the type described, and in the use of cables and of straps or twisted wires to connect the "tension" and compression bars, the cables running through the whole length of the beams, and following the line of bending moment due to the weight of the supported structure.

SOME RECENT SALES OF PROPERTY:

ESTATE EXCHANGE REPORT.

September 4.—By G. H. MASTERMAN & Co. St. Pancras.—21, Charington-st., n.l. 101 yrs. g.r. 5 <i>l.</i> 8 <i>s.</i> 6 <i>d.</i> 52 <i>d.</i>	£256
September 4.—By MADDISON, MILES, & MADDISON (at Bungay). Bungay, Suffolk.—Broad-st., freehold stabling and warehouse, D.	120
Needham, Norfolk.—A freehold holding, 1 a. 0 r. 24 p. v.r. 7 <i>l.</i>	120
Bedingham, Norfolk.—Two cottages and 0 a. 2 r. 33 p. f.	130
A freehold house and 0 a. 2 r. 27 p.	140
September 8.—By H. J. WAY & SON (at Newport). Newchurch, Isle of Wight.—"Langbridge Farm," 82 a. 1 r. 23 p., f. y.r. 190 <i>l.</i>	3,700
September 11.—By BRADSHAW, BROWN, & CO. Cranham, Essex.—"Crouch House" and farm, 87 a. 2 r. 37 p. f. (in lots)	7,425
By OSBORN & MERCER. Walthamstow.—62, Grosvenor Park-rd., f. y.r. 27 <i>l.</i>	350
Tottenham.—12, 13, 14, 15, and 16, Chesnut-rd., f. w.r. 13 <i>l.</i> 4 <i>s.</i>	1,320
By MADDISON, MILES, & MADDISON (at Yarmouth). Yarmouth.—10 and 11, Row 24, Market-pl. (s.), f. y.r. 16 <i>l.</i>	135
1, Row 24, North Quay (s.), f. y.r. 7 <i>l.</i>	120
Wordsworth-pl., and cottage adjoining, f. 18, Howard-st. North (s.), f. y.r. 17 <i>l.</i> 10 <i>s.</i>	135
21, Kent-st., f. y.r. 12 <i>l.</i>	300
37 and 38, Well-st., n.l. 19 yrs. g.r. 4 <i>s.</i>	265
6, 4, and 7, Telegraph Cottages, f.	320
9, Queen's-pl., f. y.r. 13 <i>l.</i>	125
Gorleston, Suffolk.—The "Polly," f. y.r. 10 <i>l.</i>	248
By GRIMMAN (at Norwich). Norwich.—Back of the Inns, The "Red Rose," p.h., f. p.	940
25 and 27, Waterloo-rd. (s.), f. y.r. 10 <i>l.</i>	225
Sept. 12.—By FULLER, MOON, & FULLER. Newwood.—Durham Villas, f.g. rents 20 <i>l.</i> , reversion in 57 yrs.	520
Woodcote pl., f.g. r. 40 <i>l.</i> , reversion in 56 yrs.	895
Horley, Surrey.—"Lionel Lodge" and 37 acres, f. y.r. 50 <i>l.</i>	2,000

By DOUGLAS YOUNG & Co.
South Kensington, -84, Fulham-rd. (S.), n.d.
44 1/2 yrs., c. 200, n. 1500. £1,800
Sept. 13.—By W. A. HEAD.
Camberwell.—2 to 20 (even), Dugdale-st., n.d.
18 yrs., c. 175, n. 430, 80. 325

Contracts used in these lists.—F.g.t. for freehold ground-rent; l.g.r. for leasehold ground-rent; l.g.r. for improved ground-rent; g.r. for ground-rent; r. for rent; f. for freehold; c. for copyhold; l. for leasehold; p. for possession; e.r. for estimated rental; w.r. for weekly rental; q.r. for quarterly rental; y.r. for yearly rental; u.t. for unexpired term; p.a. per annum; y.s. for years; l.a. for lane; s. for street; rd. for road; sq. for square; pl. for place; ter. for terrace; cro. for crescent; av. for avenue; gds. for gardens; yd. for yard; gr. for grove; h. for house; p.h. for public-house; o. for office; s. for shop; ck. for court.

TERMS OF SUBSCRIPTION.

"THE BUILDER" (Published Weekly) is supplied DIRECT from the Office to residents in any part of the United Kingdom at the rate of 12s. per annum in advance. PREPAID. In all parts of Europe, America, Australia, New Zealand, India, China, Japan, etc. 30s. per annum.
Remittances payable to J. MORGAN should be addressed to The Publishers of "THE BUILDER," Catherine Street, C. SUBS. RIBBENS in LONDON and the SUBURBS, by prepayment at the Publisher's Office 10s. per annum (52 numbers) or 4s. 9d. per quarter (13 numbers), can ensure receiving "The Builder" by Friday Morning's Post.

MEETINGS.

FRIDAY, SEPTEMBER 21.
Royal Sanitary Institute (Lectures for Sanitary Officers).
—Dr. G. Newman on "Duties of a Sanitary Inspector" —
III. 7 p.m.
SATURDAY, SEPTEMBER 22.
Junior Institute of Engineers.—Visit the Knight, Bevan, and Sturge Portland Cement Works of the Associated Portland Cement Manufacturers. Train leaves Charing Cross at 1.55 p.m. for Northfleet.
Institute of Sanitary Engineers.—Visit to Hampton Sewage Works.
MONDAY, SEPTEMBER 24.
Royal Sanitary Institute.—Dr. A. Wellesley Harris on "Infectious Diseases." 7 p.m.
WEDNESDAY, SEPTEMBER 26.
Royal Sanitary Institute.—Dr. A. Wellesley Harris on "Methods of Disinfection." 7 p.m.
FRIDAY, SEPTEMBER 28.
Royal Sanitary Institute.—Dr. A. Wellesley Harris on "Elementary Statistics." 7 p.m.

SATURDAY, SEPTEMBER 29.
Northern Architectural Association.—Students' Sketching Club excursion.
Institute of Sanitary Engineers.—Visit to Engineering and Machinery Exhibition at Olympia.
Incorporated Association of Municipal and County Engineers.—Home district meeting at Windsor. 11 a.m., assemble in the Guildhall; 12 noon, visit to Windsor Castle; 1.30 p.m., luncheon in the Guildhall; 2.30 p.m., drive by brakes to inspect various buildings; 5 p.m., at the Guildhall.

PUBLISHER'S NOTICES.

Nat. Tel. 5113 GERRARD. Telegrams: "The Builder, London."

THE INDEX (with TITLE-PAGE) for VOLUME XC (January to June, 1906) was given as a supplement with the issue for July 14.
CLOTH CASES for Binding the Numbers are now ready, price 3s. 6d. each.
READING CASES (Cloth) with Strips price 8d. each.
THE NINETEENTH VOLUME of "The Builder" (bound), price Twelve Shillings and Sixpence.
SUBSCRIBERS' VOLUMES, on being sent to the Office, will be bound at a cost of 3s. 6d. each.

CHARGES FOR ADVERTISEMENTS.

COMPETITIONS, CONTRACTS, ALL NOTICES ISSUED BY CORPORATE BODIES AND OTHER COUNCILS, PROSPECTUSES OF PUBLIC COMPANIES, SALES BY TENDERS, LEGAL ANNOUNCEMENTS, etc., etc.

Six lines or under 5s. 0d.
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Four lines (about thirty words) or under 3s. 0d.
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PREPAYMENT IS ABSOLUTELY NECESSARY.
* Stamps must not be sent, but all sums should be remitted by Postal Orders, payable to J. MORGAN, and addressed to the Publisher of "THE BUILDER," Catherine Street, W.C.

Advertisements for the current week's issue are received up to HALF-PAST ONE P.M. on THURSDAY, but "classification" is impossible in the case of any which may reach the Office after HALF-PAST TWELVE P.M. on the day before publication.
Outside Wrapper should be in by TWELVE NOON on WEDNESDAY.

ALTERATIONS IN STANDING ADVERTISEMENTS OR ORDERS TO DISCONTINUE same must reach the Office before TEN O'CLOCK on WEDNESDAY MORNING.

The Publisher cannot be responsible for DRAWINGS, TESTIMONIALS, etc., left at the Office in reply to advertisements, and strongly recommends that of the latter COPIES ONLY should be sent.

ADVERTISERS in "THE BUILDER" may have Replies addressed to the Office, Catherine Street, Covent Garden, W.C., free of charge. Letters will be forwarded if addressed envelopes are sent, together with sufficient stamps to cover the postage. Unused stamps are returned to advertisers the week after publication.
N.B.—The Reply Stamps are not intended for trace lists, circulars, and the like, should these be received, they cannot (if noticed) be forwarded.

AN EDITION Printed on THIN PAPER, for FOREIGN and COLONIAL CIRCULATION, is issued every week.

READING CASES { NINEPENCE EACH.
(By post (carefully packed) 1s.)

PRICES CURRENT OF MATERIALS.

* Our aim in this list is to give, as far as possible, the average prices of materials, not necessarily the lowest. Quality and quantity obviously affect prices—a fact which should be remembered by those who make use of this information.

BRICKS, &c.	
Hard Stocks.....	1 10 0 per 1000 alongside, in river.
Brough Stocks and Grizzles.....	1 7 0 " " " "
Picked Stocks for Facing.....	2 17 6 " " delivered.
Flettons.....	1 8 0 " " at railway depot.
Red Wire Cuts.....	1 14 0 " " " "
Best Farnham Red	3 12 0 " " " "
Best Red Pressed	" " " " " "
Redoubt Facing.....	5 0 0 " " " "
Best Blue Pressed	" " " " " "
Stoutdure.....	3 15 0 " " " "
Do. Bullnose.....	4 0 0 " " " "
Best Stourbridge	" " " " " "
Fire Bricks.....	3 14 0 " " " "
Glazed Bricks.....	" " " " " "
Best White and Ivory Glazed	" " " " " "
Stretchers.....	12 0 0 " " " "
Headings.....	11 0 0 " " " "
Quoins, Bullnoses, and Flats.....	16 0 0 " " " "
Double Stretchers.....	19 0 0 " " " "
Double Headers.....	16 0 0 " " " "
One Side and two Ends.....	19 0 0 " " " "
Two Sides and one End.....	20 0 0 " " " "
Splays, Chamfered, Squints.....	20 0 0 " " " "
Best Dipped Slated Glazed Stretchers and Headers.....	12 0 0 " " " "
Quoins, Bullnoses, and Flats.....	14 0 0 " " " "
Double Stretchers.....	15 0 0 " " " "
Double Headers.....	14 0 0 " " " "
One Side and two Ends.....	15 0 0 " " " "
Two Sides and one End.....	15 0 0 " " " "
Splays, Chamfered, Squints.....	14 0 0 " " " "
Second Quality White and Dipped Salt	2 0 0 " " less than best.
Thames and Pitt Sand.....	7 0 per yard, delivered
Thames Ballast.....	5 6 " " " "
Best Portland Cement.....	27 0 per ton, "
Best Ground Blue Lias Lime.....	19 0 " " " "

NOTE.—The cement or lime is exclusive of the ordinary charge for sacks.

Stourbridge Fireclay in sacks 27s. 0d. per ton at rly. dpt.

STONE.

Bate Stone—delivered on road wag. s. d.

goas, Paddington Depot..... 1 6s. per ft. cube

Do. do. delivered on road waggons.....

Nine Elms Depot..... 1 8s. " "

Portland Stone (30 ft. average).....

Brown Whittled, delivered on road waggons, Paddington Depot, Nine Elms Depot, or Pimlico Wharf..... 2 1 " "

White Bashed, delivered on road waggons, Paddington Depot, Nine Elms Depot, or Pimlico Wharf..... 2 2s. " "

Cons Stone—Edin. Hood Quality.

S applied random blocks..... 2 10 " "

1 in. sawn two sides land-

ings to sizes (under

4 ft. super.)..... 2 3 per ft. super., "

6 in. rubbed two sides

ditto, ditto..... 2 6 " "

3 in. sawn two sides slabs

random sizes..... 0 11s. " "

2 in. to 2 1/2 in. sawn one

side slabs (random

sizes)..... 0 7s. " "

1 1/2 in. to 2 in. ditto, ditto

0 6 " "

LARD YORK—

applied random blocks, 3

0 per ft. cube, "

6 in. sawn two sides land-

ings to sizes (under

4 ft. super.)..... 2 8 per ft. super., "

6 in. rubbed two sides

ditto..... 3 0 " "

1 in. sawn two sides slabs

random sizes..... 1 1/2 " "

2 in. self-faced random

sizes..... 5 s. d.

Hutton Wood (Hard Bed) in blocks 2

0 per ft. cube, deld. rly. depot.

" " " 6 in. sawn both

sides landings 2 7 per ft. super., deld.

rly. depot.

" " " 3 in. sawn both

sides random slabs..... 1 0

" " " 2 in. do. 0 8s. " "

SLATES.

2 s. d.

10 in. best blue Bangor 13

2 6 per 1000 of 1200 at r. d.

3s. 12s. 13 17 6 " "

2 1/2 in. first quality..... 13 0 0 " "

2 1/2 in. " " 13 15 0 " "

15 4 " " 7 5 0 " "

30x10 best blue Port-

madoc..... 12 12 6 " "

16x8 " " 8 12 6 " "

20x10 best Eureka un-

fading green..... 15 17 6 " "

20x12 " " 18 7 6 " "

SLATES (continued).

In. In.	£ s. d.
18x10 best Eureka un-	13 5 0 per 1000 of 1200 at r.d.
fading green.....	13 5 0 " "
16x8 " " " "	10 3 0 " "
20x10 permanent green.....	13 6 " "
18x10 " " " "	9 12 6 " "
16x8 " " " "	6 12 6 " "
TILES.	
£ s. d.	At per standard.
Best plain red roofing tiles.....	82 0 per 1000 at rly. depot.
Hip and Valley tiles.....	3 7 per doz.
Best Broseley tiles.....	50 0 per 1000 "
Do. Ornamental tiles.....	52 6 " "
Hip and Valley tiles.....	4 0 per doz.
Best Rubon red, brown, or	" " " "
brindled do. (Edwards).....	57 6 " "
Do. Ornamental do.....	60 0 " "
Hip tiles.....	4 0 per doz.
Valley tiles.....	3 0 " "
Best Red or Mottled Stafford-	" " " "
shire do. (Peaske).....	51 9 per 1000 "
Do. Ornamental do.....	54 6 " "
Hip tiles.....	4 1 per doz.
Valley tiles.....	3 8 " "
Best "Rosemary" brand	" " " "
plain tiles.....	40 0 per 1000 "
Best Ornamental tiles.....	50 0 " "
Hip tiles.....	4 0 per doz.
Valley tiles.....	3 8 " "
Best "Hartshill" brand	" " " "
3 plain tiles, sand-faced.....	50 0 per 1000 "
Do. pressed.....	40 0 " "
Do. Ornamental do.....	50 0 " "
Hip tiles.....	4 0 per doz.
Valley tiles.....	3 6 " "

WOOD.

Buildings Wood.	At per standard.
Deals: best 3 in. by 11 in. and 4 in.	£ s. d. £ s. d.
by 9 in. and 11 in.....	13 10 0 15 0 0
Deals: best 3 in. by 9 in. and 11 in.	13 0 0 14 0 0
Battens: best 2 1/2 in. by 7 in. and	" " " "
8 in. and 3 in. by 7 in. and 8 in.	11 0 0 12 0 0
Battens: best 2 1/2 in. by 6 in. and 3 in.	0 10 0 7 in. and 8 in.
Deals: seconds.....	1 0 0 less than best.
Battens: seconds.....	0 10 0 " "
2 in. by 4 in. and 2 in. by 5 in.	8 10 0 10 " "
2 in. by 4 in. and 2 in. by 5 in.	8 10 0 9 10 0
Foreign Sawed Boards—	" " " "
1 in. and 1 1/2 in. by 7 in.	0 10 0 more than battens.
3 in.	1 0 0
At per load of 50 ft.	" " " "

For timber: best middling Danzig or Memel (average specification)..... 4 10 0 5 0 0

Seconds..... 4 0 0 4 10 0

Small timber (8 in. to 10 in.)..... 3 12 6 3 15 0

Small timber (6 in. to 8 in.)..... 3 0 0 3 10 0

Swedish balks..... 2 10 0 2 12 0

Pitch-pine timber (30 ft. average)..... 4 0 0 4 15 0

JOISTERS' WOOD. At per standard.

White Pine—best yellow deals,

3 in. by 11 in..... 24 0 0 25 0 0

3 in. by 9 in..... 22 0 0 23 0 0

Battens, 2 1/2 in. and 3 in. by 7 in.

18 10 0 18 0 0

Second yellow deals, 3 in. by 11 in.

18 10 0 19 0 0

Battens, 2 1/2 in. and 3 in. by 7 in.

17 10 0 18 0 0

Third yellow deals, 3 in. by

11 in. and 9 in..... 13 10 0 15 0 0

Battens, 2 1/2 in. and 3 in. by 7 in.

11 0 0 12 0 0

Petersburg—first yellow deals,

3 in. by 11 in..... 21 0 0 22 10 0

Do. 3 in. by 9 in..... 18 0 0 19 10 0

Battens..... 13 10 0 15 0 0

Second yellow deals, 3 in. by 11 in.

16 0 0 17 0 0

Do. 3 in. by 9 in..... 14 10 0 16 0 0

Battens..... 11 0 0 12 10 0

Third yellow deals, 3 in. by

11 in..... 13 0 0 14 0 0

Do. 3 in. by 9 in..... 10 0 0 11 0 0

Battens..... 10 0 0 11 0 0

White Sea and Petersburg—

first white deals, 3 in. by 11 in.

14 10 0 15 10 0

Do. 3 in. by 9 in..... 13 10 0 14 10 0

Battens..... 11 0 0 12 0 0

Second white deals, 3 in. by 11 in.

13 10 0 14 10 0

Do. 3 in. by 9 in..... 12 10 0 13 10 0

Battens..... 10 0 0 11 0 0

Pitch-pine: deals..... 18 0 0 21 0 0

Under 2 in. thick extra..... 0 10 0 1 0 0

Yellow Pine—First, regular sizes

44 0 0 19 0 0

Oddments..... 32 0 0

Seconds, regular sizes..... 33 0 0

Yellow Pine—Planks, per ft. cube.

28 0 0

Kauri Pine—Planks, per ft. cube.

0 5 6 0 5 0

Danzig and Stettin Oak Logs—

Large, per ft. cube..... 0 3 0 0 3 6

Small..... 0 2 6 0 2 9

Waincoat Oak Logs, per ft. cube.

0 6 0 0 6 0

Dry Waincoat Oak, per ft. super. as

inch..... 0 0 8s. 0 0 9s.

3 in. do. do..... 0 0 7 0 7 6

Dry Mahogany—Hoardings—

basco, per ft. super. as inch..... 0 0 9 0 1 0

Selected, Figury, per ft. super.

as inch..... 0 1 6 0 2 6

Dry Walnut, American, per ft.

super, as inch..... 0 0 10 0 0 1 0

Teak, per load of 50 ft..... 17 0 0 22 0 0

American Whitewood Planks,

per ft. cube..... 0 4 0 0 5 0

Prepared Flooring, etc.—

1 in. by 7 in. yellow, planed and

shot..... 0 13 6 0 17 6

1 in. by 7 in. yellow, planed and

matched..... 0 14 0 0 19 0

1 1/2 in. by 7 in. yellow, planed and

matched..... 0 16 0 0 1 0 0

1 in. by 7 in. white, planed and

shot..... 0 12 0 0 14 6

LINCOLN.—For alterations to the Black Gosh Hotel, High-street, for Mr. J. H. Nowton. Messrs. Sheppard & Lockton, architects, Bargate, Newark-on-Trent.—
W. Wright & Son..... £908 0 0
C. Baines..... 885 0 0
S. & R. Horton..... 975 2 8
P. McGinnis..... 900 0 11
G. Brown & Son..... 883 5 0
Grimsby Contracting Co. £860 6 1
G. Henderson 542 11 0
H. S. & W. Close.....
Lincoln..... 833 0 0
Co-operative Society..... 800 0 0

LONDON.—For iron bridges at the workhouse, Ladywell, S.E., for the Bermondsey Board of Guardians. Messrs. Newman & Newman, 31, Tooley-street, S.E.—
Jones & Co...... £660
Spencer, Santo, & Co. 650
Hayward Bros......
Eckstein..... 635
Co. Ltd...... £601
J. A. Renwick..... 566
W. Reason..... 539

MALDON.—For water scheme, Mayland, for the Mayland Rural District Council. Messrs. Price & Belsam, engineers, 62, Queen Victoria-street, E.C.—
Rackings & Jackson..... £1,166 6 6
Griffiths & Co. 1,146 12 6
J. & F. May..... 1,145 13 6
W. Lewellen..... 1,007 2 0
D. Hea..... 985 0 0
E. B. Trussell 975 10 0
Jenkins & Sons..... 962 3 3
F. C. Thurman 941 2 0
E. P. Ball & Co...... 897 9 8
J. H. Jones..... 920 1 3
W. Westwood 892 13 6
Wilson, Border, & Co...... 890 7 6
C. H. Hughes..... 890 1 6
E. Tabor..... 873 17 7
G. Double..... 867 15 3
C. J. Eli..... £867 9 10
D. Young..... 809 11 0
King & Camping..... 855 1 0
Davis, Ball, & Co...... 829 13 0
A. Woodbridge 811 7 0
Buxton & Sons..... 809 12 0
F. Collingwood 802 0 0
Brick and Tile Co...... 800 0 0
W. Johnson..... 795 4 10
J. W. Dean..... 785 10 0
Ltd......
Beade & Sons.....
Westminster 764 14 0
James & Co...... 757 0 0
W. J. Morrell 690 0 0
Informal..... Withdrawn.

MEMBURY.—For alterations and additions to the Council school, for the Devon County Education Committee. Mr. P. Morris, architect, 1, Richmond-road, Exeter. Quantities by Mr. S. W. Haughton, 22, Courtenay-street, Plymouth.—
C. Turner..... £687 14 6
Parsons Bros. & Dunster..... 784 0 0

NEWCASTLE-ON-TYNE.—For new parochial building, St. Jude's. Mr. A. B. Plummer, F.R.I.B.A., Diocesan Architect, 13, Grey-street, Newcastle-on-Tyne.—
J. & W. Lowry, Newcastle-on-Tyne..... £2,690

PONTYCYMMER.—For erecting a school-hall, for the English Calvinistic Methodist Church. Mr. A. Lloyd Thomas, architect and engineer, Church-street-chambers, Pontypridd.—
T. Heathy..... £827 0 0
T. Roberts & Co. 727 0 0
G. Jones..... 620 0 0
T. & S. Jones..... 610 0 0
T. Longher..... £598 4 3
D. J. Davies.....
Blancogaw..... 574 0 0

RADSTOCK.—For alterations and additions to the riverside premises, for the Radstock Co-operative and Industrial Society. Mr. W. F. Bird, architect, Midsummer Norton, Somerset. Quantities by the architect.—
W. Webb..... £1,456 0 0
H. A. Ford & Sons 1,810 0 0
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W. A. Caley.....
Midsummer.....
Norton..... 552 0 0
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W. Hill & Co...... 1,443 0 0
H. Young..... 1,441 5 9
E. & E. Hes..... 1,396 0 0
G. Napier & Sons..... 1,290 0 0
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ILLUSTRATIONS.

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New Infirmary, Holloway Sanatorium	Mr. R. Weir Schultz, Architect.
Station-street Buildings, Huddersfield	Mr. J. Hatchard Smith, F.R.I.B.A., Architect.
Columbarium for the Borough of Hampstead	Mr. James J. S. Naylor, A.R.I.B.A., Architect.

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The Development of Iron and Steel Roof Design.—II.



TYPE of arched roof construction possessing distinct claims to recognition is that illustrated by the roofs of the Agricultural Hall and Olympia.

At the time of its erection, in 1862, the Agricultural Hall had one of the largest roof spans in existence. The central arch measures 125 ft. from centre to centre, and the two side arches are connected therewith, so that the whole forms a compound structure transmitting part of the thrust from the main arch through the side spans.

The roof of Olympia, designed by Mr. A. T. Walmisley, as joint engineer with Mr. Max am Ende, is worthy of special note, for the reason that the central span is an arch of greater width and height than is to be found in any other building in the metropolis with the exception of St. Pancras station. The central span measures 179 ft. between the columns, and the manner in which the horizontal thrust of the arch and the horizontal wind pressure are taken up is distinctly novel. The whole of the gallery on each side acts as an abutment, and, as the columns are fitted with ball and socket joints at top and bottom, these members are always under axial load whatever may be the wind pressure on the roof or the irregularity of the loads on the gallery at either side of the

building. This roof was described in the *Builder* for 1887, where illustrations and full details of the construction will be found.

Arched roofs of great span like those at St. Pancras and some others which have been mentioned undoubtedly represent the safest form of construction, because their stability does not depend upon a single member, as in the case of trusses whose ends are held together by tension bars. By their adoption large spaces can be covered without intermediate supports, and for this reason such roofs are particularly suitable for large public halls. For railway stations they are far less suitable owing to the unnecessarily heavy cost and to the impossibility of providing in a suitable manner for the lateral extensions which are almost invariably required sooner or later, however large a station may be at the commencement.

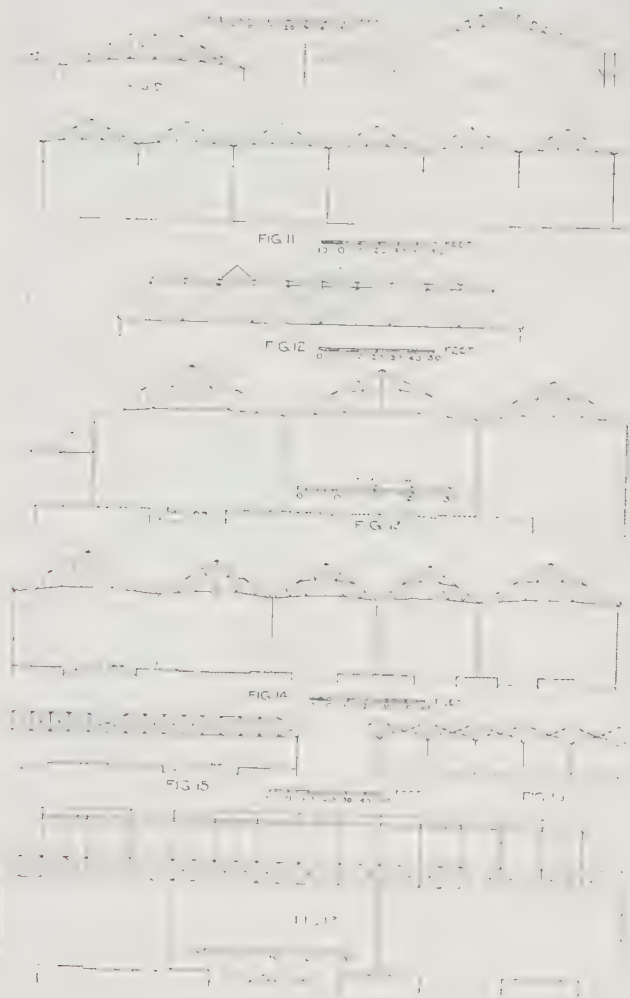
To secure unobstructed space in railway stations at the lowest possible cost is a problem that has exercised engineers for many years past. In some of the earlier stations that were built small spans were employed with intermediate supports between the running tracks, the disadvantage of this practice being the obvious danger that the derailment of rolling stock might displace one or more of the columns, and so bring down a considerable portion of the roof. Accidents of the kind have already occurred, and although the danger may not be very imminent in the case of terminal stations it is far more so at other stations through which trains pass at high speed.

As a compromise some stations have been built with roof spans of moderate width supported by intermediate columns in the middle of the platforms. Two examples of the kind are afforded by Broad-street and Liverpool-street stations.

Broad-street station, built in 1865, has roof principals which may be described as queen-post trusses surmounted by a cast-iron arched spandril ridge. The station includes two roof spans of 95 ft., intermediate support being afforded by cast-iron columns, as represented in Fig. 9. The main rib is built up of wrought-iron structural sections; the tie-bar is of cylindrical section in eight lengths, the ends of which are forged out to form eyes. The struts are secured by pins to lugs on the main rib, and by bolts at the tie-bar, the diagonals being connected by means of pins, and attached to cast-iron fourway sockets at the points of intersection.

Fig. 10 is a diagram representing part of the older portion of Liverpool-street station roof, designed by the late Mr. Edward Wilson. This is an example of cantilever construction with spans of 109 ft. between rows of columns rising from the platforms. The cantilevers are built up solid, and their extremities are connected by lattice girders. The subsequent extensions designed by Mr. John Wilson, the present engineer to the Great Eastern Railway, shows clearly that this method of construction lends itself very readily to enlargements required from time to time.

Another method of applying inter-



mediate supports for a large railway station is illustrated by the old roof of Victoria station (London, Brighton, and South Coast Railway), designed more than forty years ago by Mr. Jacob Hood, and now in course of replacement. Here, as shown in Fig. 11, continuous girders extend from one side to the other of the station, each with one intermediate column. These girders are 10 ft. 9 in. deep and form two spans of 124 ft. and 117 ft. respectively, and carry 50 ft. roof trusses of the queen-roof type, as represented in Fig. 11, which is a part longitudinal section. The use of girders in the manner described makes it possible to place supporting columns wherever they may be least inconvenient, and to carry out repairs or renewals at pleasure. Moreover, a station so built can be enlarged without demolishing any portion of the roof.

The Central station in Glasgow is spanned in a somewhat similar manner by seventeen deep latticed girders spanning the whole width from wall to wall, as shown in Fig. 12. The main

girders are 213 ft. 6 in. long by 20 ft. deep, and carry ten ridge-and-furrow roofs, of 35-ft. span, the ends of which rest upon the top flange of the main girders, so that the ridges are parallel with the longitudinal axis of the station.

There is a somewhat similar example at Derby, where the principals of the Midland Railway station are connected a little above the bottom flange of transverse girders. This arrangement has the advantage of shielding the greater part of the main girders from the deleterious gases given off by locomotive engines.

Among roofs of recent construction, that of Marylebone station is a good example. The platforms, lines, and promenade are covered with light steel roofing carried by built-up stanchions and arched girders of the Linville type. The total width of the roof is 155 ft., made up, as shown in Fig. 13, of two trussed spans of 50 ft. and 40 ft. respectively and a 15-ft. cantilever span. This roof is of unpretentious character, and, owing to the elegance of its construction and the absence of high walls, the station is one

of the most cheerful and best lighted in the metropolis.

The new roof now being built from the designs of Mr. Charles L. Morgan in connexion with the extensive widening operations at Victoria station (London, Brighton, and South Coast Railway), London, is an admirable illustration of sound engineering design, complying with the requirements of traffic and the safety of the public. The total width covered, from Buckingham Palace-road to the South-Eastern and Chatham Railway, is about 320 ft., the roof being divided into five spans of varying width and height. The main principals are spaced 16 ft. 8 in. apart; every third principal is carried on one of a series of cast-iron columns, spaced 50 ft. apart, and the others on latticed girders connecting the columns, the latter being arranged along the centre lines of the platforms, where they are safe from accidental injury. A portion of the new roof is illustrated in Fig. 14, the dimensions of the chief members in the roof trusses being as stated below:—The main rafters are formed of two 18 in. by 3 in. channel-bars; the main tie-bar consists of two 6 in. by 3 in. tee-bars in each side length and two 4½ in. by ½ in. flat bars in the centre length; in the bracing the struts consist of channel and angle-bars of different dimensions, single or duplicate according to position; the ties are flat bars of different dimensions, single or duplicate according to positions; and the vertical tie in the centre is a 1½-in. diameter eye-bar, provided with a screwed turnbuckle for purposes of adjustment.

A design presenting features of decided novelty is that proposed by Mr. A. T. Walmisley for the new Marine station on the Admiralty Pier, Dover. Figs. 15 and 16 represent respectively part transverse and longitudinal sections of the roof. According to the scheme contemplated by the designer the station is to be 800 ft. long by 200 ft. wide, but these dimensions are not yet finally settled. Three rows of cast-iron columns, spaced 26 ft. apart centre to centre, will carry the roof structure, the outer rows each supporting one end of the transverse lattice girders with the span of 100 ft., intended to meet at the centre row of columns placed in the middle of platform 60 ft. wide. These girders are 10 ft. deep, and are divided by vertical struts into panels 10 ft. wide, having a double system of diagonal ties. The height from rail level to the under side of the girders will be only 20 ft. The columns are continued above the bearings of the girders and incorporated into the ironwork of the double cantilever roof principals, which form 25-ft. spans, and somewhat resemble the cantilevers of the Forth Bridge in outline. The cantilever arms project 12 ft. 6 in., and their ends carry the roof gutters, which discharge through the centre rows of cast-iron columns. It is proposed that the seaward side of each roof ridge shall be covered with sheet copper laid over felt and boarding, and the other side by glazing. Timber has been selected for the purlins instead of iron, owing to its immunity from injury by the steam and gases emitted from locomotives, and for the same reason wrought iron is specified

stead of mild steel for the roofwork generally.

The three foregoing types of design are sufficient to demonstrate the reaction that has set in against roof spans of exceedingly large proportions, and the new roof designed by Mr. P. C. Tempest for Charing Cross will serve to emphasise the same characteristic.

The new covering for this station is shown diagrammatically by the cross section in Fig. 17, being designed on the ridge-and-furrow system, with ridges running at right angles across the station. The principals will be carried by latticed girders extending from side to side of the station, and these girders will be supported by the lowered side walls and by two lines of columns placed in the middle of the platforms. The total height of the roof will not be more than about 5 ft. to 40 ft. above rail level, and, owing to the reduced height of the side walls, abundant provision will be made for the admission of light, to say nothing of the other manifest advantages of the new structure.

The reason for adopting this type of design was that it will be possible to construct the transverse girders in such a way that the columns may be moved within reasonable limits to suit any rearrangement of the platforms that may become necessary, and thus to save any alteration to the structure of the roof in base widenings should be undertaken on either side of the present station. At the same time the new roof will conduce to the safety of the public, give increased facilities for maintenance, and provide for the ready escape of steam and gases.

The development of iron and steel roof design on a large scale forms a most interesting study, which is naturally too extensive for adequate treatment in an article such as this. Those who wish to pursue it further will find abundant material in the *Proceedings* of the Institution of Civil Engineers and in the pages of various engineering publications, but for readers who have not an extensive library at command the most convenient source of information is Mr. Walmisley's well-known work on iron roofs, which describes and illustrates many such structures erected up to the year 1887, and from which we have prepared the diagrams of some of the earlier roofs mentioned in this article.

The most recent examples of construction serve to demonstrate the fact that the monumental roof is no longer thought to be a necessary feature. It is certain that the railway station of the future will be of far less pretentious character than heretofore, and at the same time less costly and better adapted to its intended purpose.

It seems probable, in fact, that the desire to reduce initial expenditure, to avoid the unnecessary risks attached to large spans of certain types, and the great cost of maintaining those of other types, and to obtain facilities for extensions required from time to time, will finally lead railway companies back to the practice of simply covering the platforms of their stations, leaving open spaces between the lines for the free escape of steam and smoke and for the ready admission of light and fresh air.

In justice to the designers of railway-

station roofs, it must be pointed out that the fashion for ostentatious spans did not originate with them, but with traffic managers, who thought it desirable that the whole interior area should be absolutely unimpeded by column or interior supports. Fifty years of experience have served to dispel this notion, and we are now on the point of returning to the less ambitious ideal which possessed engineers in the early days of the railway system.

Important public buildings, of course, stand upon another footing, and naturally must be covered in a manner dictated by architectural requirements and the purposes to which they are destined.

NOTES.

A CORRESPONDENT of some influence has raised the question in the *Times*, "Is peaceable persuasion legal now?" The question has arisen out of an article contributed to the *Times* by Lord Lindley, in which the following passage occurs:—

"There is no law against peaceable persuasion or attempts to peacefully persuade—provided that the person persuading does not force himself on those whom he may address, and provided there is no recourse to threats of violence and no annoyance so serious as to amount to an actionable nuisance."

The correspondent in the *Times* finds the case of *Charnock v. Court*, decided by a Chancery judge in 1899, inconsistent with the statement of Lord Lindley. The facts in *Charnock v. Court* were that, a strike amongst journeymen carpenters being in progress at Halifax, the masters imported labour from Belfast. Two members representing the trade union were sent to Fleetwood to await the arrival of the steamer conveying the men who were under contract to work as non-union men for the employers at Halifax. These delegates, when the men arrived at Fleetwood, offered the men their expenses, also work, and in some cases a night's lodging, if they would go elsewhere and break their contract to proceed to Halifax and work there. The Court held that, under the Conspiracy and Protection of Property Act, sect. 7, the delegates were watching and besetting the place where the men happened to be with a view to compelling the masters to abstain from doing what they had a legal right to do, and that they were not there merely to obtain or communicate information, but to induce the men to go elsewhere. The writer of the letter to the *Times* asks someone to inform him how this case is reconcilable with Lord Lindley's statement, and the answer is not hard to give. It must be remembered that "peaceable persuasion" is a colloquial expression not found in the Act. Watching and besetting "with a view to compel any person to abstain from doing or to do any act which such other person has a legal right to do or abstain from doing" is the offence under the Act, the exception being "attending . . . merely to obtain or communicate information." In the above case there was watching and besetting for a prohibited purpose, and the object of the watching and besetting was to offer a pecuniary inducement to the men to break their contract, not to merely communicate information. We may

quote from the Majority Report of the Royal Commission on Trade Disputes in support of our argument as set out above. The Report says, "No man has ever been punished under this Act for merely peacefully persuading. What he has been punished for is watching or besetting a house, etc., with the view of peacefully persuading—a different matter."

Report of
Public Control
Committee.

THE Report of the Public Control Committee of the

London County Council contains statistics of general interest on many subjects, but only a few will appeal especially to our readers. It is interesting to note that accidents due to petroleum lamps are of less frequency than of late years. During the year ending March 31 only 116 lamp accidents were the subject of investigation, whereas in 1890 we find in the tables appended that there were no less than 1,548 such cases. The principal cause of such accidents appears to be upsetting of lamps, and therefore the Report contains a recommendation that strong metal reservoirs are essential to safety. Another subject of interest is smoke abatement. The County Council, under the Public Health (London) Act, 1891, can only act in default of action being taken by the Borough Councils, and during the year no case of persistent serious nuisance has occurred such as to cause the Council to act. The Report advises greater simplicity in procedure and also an amendment of sect. 24 (b) of the Act by the omission of the word "black" before the word "smoke," a qualification which prevents efficient measures to deal with some smoke nuisance being taken. The above enactment does not apply to private houses, and over these there is no control. The Report points out that in private houses much can be done in diminishing smoke by the use of modern grates, but that the majority of grates in use produce a minimum amount of heat with a maximum amount of smoke. Now that London covers such a vast area it is to be feared little can be done in improving the atmosphere by proceedings against public companies and commercial undertakings so long as millions of private chimneys taint the air with their smoke. Against railway companies penalties were recovered in 135 cases, but in other instances notification to the companies sufficed.

Official
Architecture.

THERE seems to have been a demonstration made by some of the architects of Bradford,

at a meeting held last week, against an official statement issued by the Bradford Corporation intended to show that a considerable saving had been effected by the establishment, five years ago, of the City Architect's Department, and the consequent carrying out of much architectural work by him instead of by architects in private practice. There is something more about the matter than we can gather from the report in the *Yorkshire Daily Observer*, as we notice that none of the architects whose names are mentioned as attending the meeting are members of the Institute, with the exception of one Associate (Mr. A. R. Hill); and it is mentioned that the Bradford Society of Architects had issued

a circular to its members asking them not to attend the meeting. There must have been reasons for this which are not within our knowledge; as to the general principle we think the objectors were in the right. The chairman of the meeting (Mr. T. C. Hope) said that they had a beautiful art gallery in the Cartwright Memorial Hall, but with a great deal of bare wall to cover; "was there any man in the Town Hall who would dare to suggest that we should create a picture department, and engage a municipalised painter who, with his assistants, should cover those bare walls with paintings?" If we are to regard architecture as an art and not as a mere ratepayer's business, the parallel is perfectly logical, and we agree with the speaker's position. Another borough, East Ham, seems also to regard public buildings only as a business, as we see that the Town Council Engineer has submitted a draft sketch of a plan and elevation for the Carnegie library there, which have been approved. That may save the ratepayers' money, but it is not the way to get the best architecture.

In a letter in our "Builders' and Contractors' Column" in this issue, "A London Builder" recites the objections of himself and (we gather) of builders and contractors generally to the action of architects in specifying that certain articles should be supplied by special firms. For the objections we may refer our readers to the letter; but we may remark here that an architect may have a very good reason for specifying the supply of work by a special firm; he knows the work of that firm, and knows that he will get what he wants from them. On one point, however, we are in agreement with "A London Builder"; we think the general contractor has a ground of complaint if arrangements are made with a special firm of which he has no cognisance; it is putting him in a false position. But as to the argument that things will be got cheaper if the builder is at liberty to obtain prices from a number of firms, and that "keener competition and consequently lower prices" are "a benefit to all concerned," we dissent from it utterly. It is keen competition and fine cutting of prices which is at the bottom of half the bad work that is done, and is a crying evil of the day rather than a state of things to be specially promoted.

In some respects the causes leading to the wreck of the Scotch express just beyond Grantham station were similar to those responsible for the Salisbury accident. The train was travelling at a speed far too high for the curve on which it entered. It commenced to rock, dashed into the parapet wall of a bridge, and broke into three sections—the engine overturning on the line, the front carriages rolling down a steep embankment, and the rear carriages remaining in a perilous position at the edge of the slope. At Salisbury, excessive speed on the proper road for the train was the cause of the derailment. At Grantham, the disaster was due to the non-stoppage of the express at the station, so that while travelling at high speed it entered a short and sharp curve

which is not safe for speeds of more than fifteen miles an hour. This curve is on the Nottingham branch, where the points were set open to let a train in and would have been closed before the departure of the North express. Whether the practice of working the points thus was a wise one is doubtless a matter that will receive consideration by the Board of Trade and the Great Northern directors. That their position contributed to the accident is certain, but in justice to the company it should be remembered that the continued progress of a train despite adverse signals and running orders is a contingency that could scarcely have been anticipated. In other respects no precaution seems to have been neglected by the railway company. The signals were against the train, the brakes were in perfect order, and so also was the engine. It is now generally agreed by those best qualified to judge that steam had been shut off before the train passed through the station, but, at the same time, that the brakes were not applied until the train was close to the south end of the platform. Even then, if circumstances had been favourable and the speed a little less, the train might have been pulled up before the fatal curve was reached. As it turned out the line was greasy owing to drizzling rain, the brakes were put on too suddenly, and the last hope was gone. The driver was one of the most trustworthy in the company's service. Whether he was trying to cut things too fine, or forgot all about the brakes until it was too late and then applied them suddenly in desperation, or temporarily lost his head, are questions which can never be answered.

Most legislation having for its object the amelioration of the lot of the workers of any country, especially when designed to increase their personal safety, tends to swell the ever-increasing army of officials. New laws and fresh safeguards inevitably mean more inspectors and other officials. The builder and contractor is surrounded by them—locally appointed and imperial—and the measures advocated by his employees and their Parliamentary representatives frequently tend to add to the number. That many of the appeals made to the Board of Trade by railwaymen have this tendency is undoubted, but at a recent meeting in support of the agitation for shorter hours for railway servants, a singular remark was made by one of the speakers (Mr. R. Bell, M.P.). After observing that he considered the railways over-officialised, he said that there were "too many subordinate inspectors in this country—men who were hiding behind hedges, behind bridges, watching the men going on with their work. It was not conducive to the safety of the travelling public when men knew that they were being watched, harassed, and worried in that way, and it might be responsible for some mental aberration." In view of the recent fatality, the inference is obvious; but, for the conscientious worker, lurking officials should have no more terrors than police-traps have for the law-abiding motorist. Sympathising as we do with any endeavour to secure a reduction of

excessive working hours, we may express a hope that Mr. Bell's fears are considerably exaggerated, and that this is not regarded as one of the leading arguments in the present movement. Board of Trade requirements, not less than considerations of economy, complicate increasing supervision, but in the remark quoted the speaker evidently had in mind the latter incentive only. "The safety of the travelling public" should be the first concern of railway officials and directors; and, while neither the Board of Trade nor the travelling public themselves will permit this to be lost sight of for a moment, the penalty attaching to neglect or indifference constitutes in itself an additional security.

ALMOST every fresh railway accident emphasises the desirability of stringent regulations for the prevention of fires in vehicles which as at present constructed are veritable death-traps. We have repeatedly pointed out the necessity for reform, and it is to be hoped that railway companies will soon cease from building passenger carriages of readily ignitable and combustible materials, and also that—by those who have not already done so—electricity will at once be substituted for gas as a material of illumination. The calamity at Grantham showed with dramatic effect the dangerous character of timber carriages, ready to burst into flame by contact with hot ashes or ignited gas; and it may be added that the use of gas instead of electric light greatly increases the probability of fire. Various eye-witnesses of the scene after the accident agree as to the rapidity with which the wrecked carriages were enveloped in flames. Scarcely a minute elapsed before the train was ablaze, the carriages burned furiously, lighting up the whole neighbourhood, and so fierce was the fire that rescuers were unable to aid hapless passengers pinned beneath the wreck. Water from the hose seemed to have no effect, and portions of the train were still blazing two hours after the accident. That railway companies should continue to favour combustible instead of fire-resisting carriage construction is most regrettable, but we fear there is little probability of reform until the Board of Trade, or Parliament, if necessary, take up the question in earnest.

At a time when tramway companies are being compelled to part with their undertakings to local authorities the decision of the House of Lords in the case of Manchester Carriage and Tramway Company v. Swinton and Pendlebury Urban District Council should be noted. The Tramways Act, 1870, by sect. 43 provides that the local authority can acquire these undertakings "or so much of the same as is within such district," and all "lands, buildings, works, materials, and plant of the promoters suitable to and used by them for the purposes of their undertaking within such district." The tramway company in question had two depôts about a mile outside the district of the urban district council. As to one the arbitrator found that it was not "suitable to such undertaking," whilst as to the other he found

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at it was used with and suitable to the undertaking. It was contended that the latter depot should not have been included in the award because it was outside the district of the local authority. The finding of the House of Lords amounts to this, that the words "within the district" apply only to the undertaking itself, not to the lands, buildings, &c., suitable to and used with it, and that when the arbitrator had found as a fact the questions of the use and suitability of the buildings for the purposes of the undertaking, they were rightly included in the award although outside the district.

A STRIKING feature of the extension to the Singer building at the corner of Liberty-street and Broadway, New York, will be a tower containing forty-nine stories, and rising to the height of 12 ft. above street level. Although only to measure about 63 ft. square, this structure will provide a floor area of 75 acres, which, with one exception, is greater than that of any other building in the city. From the structural standpoint the tower is of much interest, the most notable characteristic being the method of framing the steel skeleton to enable it to resist the enormous wind pressure against the sides of the building. The tower is also interesting for the reason that, while providing admirably for engineering requirements, it has been designed with due regard to architectural effect, a fact on which the architect and the engineers are to be congratulated. Briefly described, the structural idea is the association of four corner towers with a central tower containing the lift well, each tower having diagonal wind bracing running through the walls from base to summit, and all five being tied together in lateral planes at the various floors. The corner towers are about 12 ft. square, and between them is a recessed panel on each face extending to the capital, which is surmounted by a domed roof. The wind pressure was assumed at 30 lb. per square foot uniformly distributed over the face of the building, and the total overturning moment is calculated at 128,000 foot-tons. It will readily be gathered that the task of providing satisfactorily for the stability of the structure and of guarding against swaying in windy weather has involved constructional problems of no mean order.

BUILT in 1797, about eighteen years after the historic structure which gave its name to the town of Ironbridge, the cast-iron bridge crossing the River Teine at Stanford, in Worcestershire, deserved preservation as an interesting example of early engineering. No sentiment of this kind actuated the Worcestershire County Council when it was found necessary a year or so back to make more adequate provision for the passage of steam rollers and traction engines across the river. The Highways and Bridges Committee simply referred the question of repair or reconstruction to their consulting engineers, by whom it was recommended that the old bridge should be replaced by a new one in concrete-

steel. In these days, when county and other councils have little compunction in spending money upon many things that are not strictly necessary, the Worcestershire County Council would not have been blamed if they had decided to leave their historic bridge untouched and to find a place in its vicinity for the new work. If such a course had been adopted we should have had side by side two examples representing respectively the first and last new materials applied by modern engineers to bridge construction. The new bridge in itself is an elegant work, crossing the river in a single span of 98 ft. 6 in., and consisting of three arch ribs connected by transverse walls and open spandrels supporting the roadway. It is noteworthy as the largest span concrete-steel arch hitherto built in this country, although its dimensions have been considerably exceeded in similar structures in other parts of the world.

PROPOSALS are made for a restoration, upon conservative principles, of Dr. Johnson's birthplace. The house was built by his father, Michael Johnson, upon land belonging to the Corporation in the Market-square, at the corner of Sadler-street and Women's Cheaping; on July 13 1708, the Corporation agreed to grant him a lease of the encroachment of the property, for forty years, at a rent of 2s. 6d. per annum. After Michael Johnson's death in 1731 his widow carried on his business as a bookseller until shortly before her death in 1759. Upon the expiration of a second lease in 1767 the bailiffs and citizens resolved that it should be renewed to Dr. Johnson for a further term of ninety years, at the old rent, and without the payment of any fine. In the codicil to his will, executed four days before his death, Dr. Johnson devised the house and its appurtenances to his executors, in trust, for sale and disposal in favour of some relatives named in the codicil. In the first volume of Croker's edition (1848) of the Life by Boswell is an engraving by E. Finden, after a drawing by Clarkson Stanfield, R.A., of the house. In June, 1900, Alderman John Gilbert, of Lichfield, presented to the City Council a sum of 250*l.*, being the amount of the purchase-money, and a free conveyance of the property, the Council covenanting that the premises should neither be pulled down nor, indeed, be materially altered. The house had been offered to the Council for the nominal sum mentioned as part of the estate of the late Mr. J. H. Johnson, of Southport and Silverdale, who had bought it for 800*l.* in 1887, and re-instated the building to what it was when it formed Johnson's home. It was lately opened as a Johnsonian Library and Museum. The title-deeds bear the signatures of Michael and Samuel Johnson and of Sir Joshua Reynolds, Sir John Hawkins, and Dr. William Scott (Lord Stowell), who were Dr. Johnson's executors.

At a meeting held at Ayr, on Tuesday, in support of the scheme for preserving the "Auld Brig" at Ayr, Lord Rosebery made one of his best and most

eloquent speeches in favour of keeping old monuments such as this. Of course his advocacy of the cause was largely in relation to the association of the bridge with Burns's poems; but he made a general appeal also in regard to the historic interest of old monuments, though he admitted that they must be considered on their merits and in relation to modern requirements. But he is probably right in saying that if the old London bridge with the houses on it had survived to the present day, we should not now have the heart to pull it down; if it were inconvenient, we should build a new bridge alongside of it. But the metamorphosis has been gradual, and was commenced at a time when archaeology counted for little. Ayr bridge has lasted up to the present day as it has been for many generations, nor does it conflict with any modern convenience; "it is an excellent bridge for pedestrians," said Lord Rosebery; "I tested it myself to-day and it carried me quite safely." That the bridge should have "carried safely" so genial a personality and so eloquent a speaker, whom we could ill afford to lose, is another point in its favour; and at all events we have no doubt that Lord Rosebery's advocacy has assisted the cause.

NOTES ON MOSAIC AND MARBLE INLAY.—II.

At the monastery at Sinai are some mosaics of the VIth century. In the apse is a Transfiguration, and round the soffit of the arch are busts in medallions, and at Parenzo, in Istria, are important remains of mosaics of the same century, which are curiously like those at Ravenna, especially those at S. Vitale. The cathedral was consecrated about 535. The apse, vault, and a portion of the wall are covered with mosaic above a dado of *opus sectile*, as well as the external face of the triumphal arch, and there are some remains on the west façade of the church above the narthex. The ground of the vault is gold, and on it are strewn clouds of crimson and blue. In the centre are the Virgin and Child attended by an angel on each side, beyond whom are three large figures. On the left "Claudius," then "Ephraïmus" (the founder), with a small figure of his son, and then "Maurus" holding a jewelled urn. On the other side are three figures without names; one has a book, and the other two bear crowns. The bishop holds his church, a three-aisled basilica with one apse. The Christ Child is in white and gold, blesses with the right hand and holds a scroll in the other; the Virgin has a dark cloak and a white dress with golden embroidery; above her head a hand emerges from clouds holding a jewelled crown. On the wall below is an angel, with orb and jewelled wreath with ribbons fluttering. On the pier to the right is a saint with a casket in his hand. Another on the left has been much restored with paint. Beyond the windows, towards the nave, are the Annunciation and the Salutation. On the soffit of the arch are medallions with busts of twelve female saints, and at the summit a painted monogram of Christ. Sig. Natale Tommasi, who was in charge of the restorations in 1874, discovered other mosaics beneath later plastering on the triumphal arch. In the centre Christ is seated on the globe wrapped in a purple mantle and with a cruciferous nimbus. He blesses with one hand and with the other holds a book open on which is inscribed, "Ego sum lux vera." At each side of Him are six apostles in white tunics and pallia ornamented with crosses and letters; they hold books, scrolls, or crowns; S. Peter has the keys. The lower parts of the figures were much damaged. The ground was of gold with black inscriptions. He also found beneath the painted monogram, at the summit of the arch, a lamb with cruciferous nimbus on a blue ground starred with gold

in mosaic. The façade has three round arched windows, between which are the seven lighted candlesticks of the Apocalypse in mosaic. Outside of them are remains of a few figures clothed in white. The buttresses at each end have also been decorated with a pattern in mosaic.

The church of SS. Cosmo and Damian, Rome, was built by Felix IV. (526-30), on the site of a pagan temple, of which the circular *cella* has been preserved. The mosaics covered the upper part of the arch and the tympana as well as the vault of the apse. The ends of the arch were destroyed when the church was modernised. The subject is one of the visions of the Apocalypse. The Lamb is on a throne, and surrounded by a nimbus above the centre of the arch; at His sides are the seven golden candlesticks; then come two angels on each side and the symbols of S. John and S. Matthew; the angel and the eagle emerge from among the clouds. The subject was completed by the symbols of the other two evangelists and the twenty-four elders, as is shown by two arms supporting a crown at each lower extremity of the arch. The apse has large figures on a blue ground. In the centre Christ stands in front of clouds, blessing SS. Peter and Paul, who present SS. Cosmo and Damian, the Median doctors, to Him. They hold crowns of martyrdom in their hands. S. Theodore and S. Felix the Pope are at the two extremities. The portrait of Felix has a curious history. In the XVIIIth century, under Gregory XIII. it was replaced by a painted face of Gregory the Great. Alexander VII. restored the head of S. Felix in mosaic, but it is in the style of the second half of the XVIIIth century. Below is a strip upon which is represented a nimbed lamb on a golden hill, from which the four streams of Paradise flow, flanked by the twelve apostles in the form of sheep. Jerusalem and Bethlehem are behind them. The figures are all front face, Christ on a higher plane and much larger than the apostles, who themselves are taller than Cosmo and Damian. He has long waving hair, and is bearded, as are the other figures. The draperies are Roman; the figures are athletic and not ascetic except in the heads, which have harsh features. Christ and the angels have nimbi, and so has S. Matthew's symbol. Two palm-trees complete the composition, one at each side; a phoenix, with rays springing from its head, flies in the vault above Christ's extended hand; the summit of the vault has a sun surrounded by clouds. Here the tesserae are placed roughly on the wall for the first time, almost as if thrown upon it, and are no longer small and square. S. Lorenzo fuori was rebuilt by Pelagius II. (577-90). The mosaic on the arch now facing the altar (for Honorius II. extended the church westward and reversed the entrance and apse) is of his time. Here Christ is seated on the globe, blessing and holding a pastoral staff with a cross at the top. On his right are SS. Paul, Stephen, and Hippolytus; on his left SS. Peter, Laurence, and Pelagius. Behind are Jerusalem and Bethlehem. A garland of flowers and fruits tied by a riband fills the soffit, at the summit of which is the monogram of Christ. The nimbus of Christ is cruciferous, and all the figures have nimbi. This mosaic has been much restored; the heads of S. Hippolytus and Pope Pelagius are better than the rest. The last is clothed in cloth of gold with purple folds, richly as becomes a Roman archdeacon.

The figure of S. Sebastian above a side altar in S. Pietro in Vincoli is of this century, placed there after the plague of 680. The mosaic shows an old man with a long beard and white hair. He wears a chlamys brooch on his right shoulder, and carries a martyr's crown in his hand. The costume is that of a noble of Constantinople; his legs are clothed and his feet shod.

S. Apollinare in Classe, Ravenna, was consecrated May 12, 549, by Maximianus, but the extant mosaics are dated 671 and 677. The subjects on the wall of the apse are the Sacrifices of Abel and of Abraham, and Melchizedec offering Abraham bread and wine, and, opposite, Archbishop Reparatus receiving from the Emperors Constantine IV., Heraclius, and Tiberius a roll on which is inscribed "Privilegia," the exemption of Ravenna from papal jurisdiction. He made

the voyage to Constantinople to obtain the charter in 662. (On the tomb of Archbishop Maurus, however, is the inscription: "He freed his church from the Roman servitude.") There are also lifelike figures of four archbishops—Ursicinus, S. Ursus, S. Severus, and Ecclesius. On the jamb of the window are figures of S. Michael and another archangel holding a standard on which is inscribed ΑΠΙΟΣ, ΑΠΙΟΣ, ΑΠΙΟΣ, and wearing the Greek chlamys, adorned with golden patches of pattern. Above in the vault is a large cross with gilded stars on a blue ground with the Transfiguration; at the sides, Moses and Elias, with S. Apollinaris preaching to his flock below. On the face of the arch is a bust of Christ in the centre, at the sides the figures of the evangelists, and below them twelve sheep hastening from the towns of Jerusalem and Bethlehem to Christ. Silver tesserae are used in the ornaments, a mark of Eastern influence.

The basilica of S. Agnese on the Via Nomentana was rebuilt and ornamented with mosaic by Honorius I. (626-38). The vault of the apse contains figures on a gold ground, S. Agnes standing in the centre holding in her hands the book of truth, clothed in a rich Byzantine costume, and crowned with a jewelled diadem. At her feet are flames and a sword, and on her head the hand of God places the crown of martyrdom. On one side stands Honorius holding the basilica, and on the other another pope, Symmachus, with a book. A cross forms the central point of a rich garland of fruits and flowers which frames the composition. Above is a long inscription in gold letters upon a blue ground. The oratory of Venantius at the Baptistery of S. John Lateran was decorated with mosaic by John IV. (639-42). The evangelists' symbols are at the top of the arch of the tribune, two and two, in square panels with panels between, and Jerusalem and Bethlehem in longer panels at the ends, and four saints on each side below. The vault shows a bust of Christ surrounded by angels amid clouds; below is the Virgin in prayer flanked by SS. Peter and Paul. There are two more saints on each side, and then John, bearing a model of the oratory, and his successor, Theodore. All of them have the nimbus. The mosaics of the vault are inferior to those on the arch. At S. Stefano Rotondo is a vault above an altar dedicated to SS. Primus and Felician, whose bodies were transferred hither by Theodorus I. (642-9), which has decorations in mosaic. There are figures of the two saints; in the centre above them is a hand which holds the crown of martyrdom (or perhaps the hand of the Eternal blessing His Son); below is a bust of Christ and a great gemmed cross which descends to the flower-besprinkled earth. The Byzantine type is seen in the heads, the tesserae of which are not square but cut in shapes, and so closely fitted together that the beard of S. Primus looks almost as if painted with coarse brush-marks. The colours are much grained.

In the sacristy of S. Maria in Cosmedin are some fragments from the oratory of the Virgin in the ancient basilica of S. Peter, which was erected by John VII. (705-8)—the Virgin, S. Joseph, and an angel, and an arm bearing a vase, part of the Adoration of the Magi. Other fragments are in the crypt of S. Peter's (a figure of the Virgin, one of S. Peter preaching, and the portrait of John VII.), in the Lateran Museum (fragments of the Nativity and the Healing of the Blind Man), in a monastery at Orte (a head of a Madonna), and above a side altar in the church of S. Mark, Florence, is a figure of the Virgin. She stands praying in the Byzantine manner, and is clothed like an Eastern empress. The head has a circular aureole, and bears a jewelled crown; her girdle is studded with precious stones, and her robe decorated with embroidery and pearls. Its colour is a brownish red purple, like the dress of Christ in the VIth-century mosaics at Ravenna, where He is shown as a ruler on a throne. The mosaic is Greek in style but less hard; the cubes are hammer-cut and mixed of vitreous paste and natural stones. There are only three tones in the drapery, and the curiations are not modelled. The oratory was situated inside the basilica near the internal angle of the portico, where, on the occasion of the jubilee, in 1300, an opening was made called the "Porta Santa." After that the figure of the Virgin was

above this door. The original scheme was in two sections; the first had seven compartments showing subjects from the lives of the Virgin and Our Lord. In the midst of them was the Virgin, and by her side, but smaller, was Pope John VII., with a square nimbus and a little building in his hand. On the golden field was an inscription: "Beatus dei Genetricis servus Joannes indignus Episcopus fecit." Two columns in mosaic bounded the subject. The lower subject, a Virgin and Child, was taken away when the "Porta Santa" was opened, and the mosaics were dispersed in 1606, when that part of the basilica was demolished. The tesserae are set at angles so as to break up the light in all these fragments. At S. Teodoro, Rome, which was erected by Adrian I. (772-95) on the ruins of a Temple of Vesta, thought to have been the place where the Palladium was guarded, there is a hemispherical vault behind the altar, with the hand of God holding a crown above the head of Christ. Who is seated on a globe and blessing. At one side S. Paul presents a young man, who stretches forward his two hands, which hold a crown placed on some rich stuff. On the other S. Peter presents S. Theodore, who also extends the crown of oblation. Christ and the apostles have naked feet and sandals, the others have hose and shoes. This has been so much restored as to be practically new. The triclinium of the Lateran was decorated with mosaics under Leo III. (795-816). The arch and apsidal vault beneath it were moved to the Piazza S. Giovanni in Laterano between 1740 and 1758 under Clement VII. There are two groups on the sides of the arch of great historical interest, though the mosaics no longer show any of the original work, owing to several restorations. On the left, Christ, seated, holds two keys and a standard surmounted by a cross; kneeling figures of Pope Sylvester and the Emperor Constantine complete the group. On the right, S. Peter is shown giving the *pallium* to Pope Leo III, and the Emperor Charlemagne with a standard. In the vault below Christ appears to the eleven apostles after the resurrection, standing on a little hill with four streams issuing from it, and blessing. S. Peter carries a key and a long cross; the others have their hands hidden in their cloaks. The general design may be assumed to have been preserved, though the character has disappeared. Some fragments of the original (or of the later copy of it) are preserved in the Lateran Museum. The only French example, at Germigny-des-Prés, is of this period.

The Iconoclastic Edict of Leo the Isaurian, issued in 726, and confirmed by the Council of Constantinople in 754 which was attended by 338 bishops, must have had the effect of driving sculptors and mosaic-workers to Italy from the East, and thus increasing the already strong Byzantine influence which is observable in Rome. The Council of Nicaea, in 787 (attended by 350 bishops), on the other hand, declared that the veneration of images is conformable to the Scriptures, and placed mosaics specially under the protection of the Church; yet the line of Iconoclast Emperors only expired in 842 at the death of Theophilus. Notwithstanding the influx of Greek workmen, the Italian and Roman mosaics of the IXth century still remaining are more numerous than admirable. Leo III. rebuilt SS. Nereus and Achilleus, and of his mosaics a Transfiguration and an Annunciation remain on the triumphal arch; with a Madonna and Child. The ground is dark and cloud-besprinkled; Christ appears in the centre in a blue aureole; SS. Peter, Paul, and James are prostrate along the arch; between them and Christ are Moses and Elias. The whole is bordered with a waving line and a gemmed exterior border, and is much restored.

Paschal I. (817-24), rebuilt S. Maria della Navicella or in Domnica, and the mosaics remain on the upper part of the arch and the vault of the apse. A seated Virgin and Child, with Paschal kneeling and groups of angels on either side, occupy the vault; the Virgin here for the first time occupies the throne in place of Christ. Above the arch is Christ seated in an oval glory with an angel on each side and six apostles behind, all standing. The perspective of a crowd behind the angels is given by bits of nimbi, one behind the other, no heads showing. Two prophets stand at the sides of the arch

th extended arm as if preaching or exhorting. The whole is outlined in red. The gl'ry is first seen here and at SS. Nereus and Achilleus.

S. Prassede, said to have been on the site of the house of Pudens, removed by Adrian I., was rebuilt by Paschal I., and covered with mosaics. The design of the apse in the vault of the apse is similar to that of SS. Cosmo and Damian, and shows the complete design as it once was with twenty-four elders. At the summit of the vault is a hand of Deity; in the centre Christ stands by the river Jordan between lin-trees. Three persons are on each side; on the right, S. Paul, S. Praxede (with a crown), and Paschal (with a square nimbus), crying the church; on one of the palm branches is a phoenix, symbol of the resurrection. On the other side S. Peter presents Pudentiana with S. Zeno behind; above a hand with sheep and a central lamb, the triumphal arch shows the worship of the Lamb from the Revelation. An oval-enclosed enclosure contains the Servants of God. Christ stands in the centre with an angel on either hand; at His feet are SS. Praxede and Pudentiana. On one side is Pudens, on the other Noratus and Timotheus. In front are the Elect, six on the right, seven on the left, holding crowns of oblation. Those who are not yet the elect are without nimbi; an angel, assisted by S. Peter, is selecting; below are great numbers of people. The chapel of S. Zeno has on the soffit of the arch medallions with busts; in the centre Christ and the twelve apostles, six on each side. The interior is covered with mosaics; the medallion of Christ in the centre of the vault is borne by angels who stand on globes, recalling the vault in the Archbishop's Chapel, Ravenna. The richness of the general effect causes this to be the principal show church in Rome for mosaics, though the style shows great decadence. Paschal built the chapel of S. Zeno as a burial-place for his mother Theodora. The church of S. Cecilia, in Trastevere, founded by Urban I. (225-30) in the site of her house, was also reconstructed by Paschal I. The vault of the apse shows a very similar design; Christ surrounded by various saints and a strip of sheep below issuing from Jerusalem and Bethlehem. S. Mark's, at Rome, was decorated by Gregory IV. (827-44), and the apse mosaic is another imitation of SS. Cosmo and Damian. Venturi says it is probably the most barbarous mosaic in Rome. Above the arch are five circles containing a bust of Christ and the evangelists' symbols; below two figures with outstretched arm fill the spandril.

At S. Ambrogio, Milan, are some mosaics of this century. The apse vault of the chapel of S. Satirus is constructed, like that of the Baptistery of Ravenna, with pots, and excavations made in 1859, which disclosed substructions of a little basilica with three apses of which this chapel occupied the centre, it is believed that it formed part of the ancient Basilica Fausta, and dates from the Vth century. The cupola and pendentives are covered with gold mosaic, upon which are placed a central disc with a bust of S. Victor (to whom the chapel was originally dedicated) and a border at the base of the dome. On the walls between the windows on the two sides are six standing figures in groups of three: S. Ambrose, with SS. Gervasius and Protasius, and S. Maternus between SS. Delicatus and Nabor; these figures are costumed as Romans, and stand on a blue ground. On the pendentives are the symbols of the evangelists, and in the side lunettes medallions of apostles. The arrangement makes it probable that the centre medallion was once occupied by a bust of Christ. In the apse is a mosaic of Christ enthroned between SS. Gervasius and Protasius, and two flying angels. Below the throne are three medallions of saints, and at the sides, on the same level, are representations of the story told by Gregory of Tours of the soul of S. Ambrose attending the funeral of S. Martin of Tours while his body remained asleep in the basilica during the mass. The arrangement of the scenes is the same as on the *pala di argento* made by Magister Volusinus in 835 for Angilbert. Venturi, however, says that this mosaic is in the XIth-century Greek manner, that the palms have become mere ornaments, and

that the way in which the small scenes invade the field betrays the inexperienced designer.

In the Cathedral of Capua are some examples made at the end of the century. M. Gerspach says of these IXth-century mosaics: "The mosaicists have nothing but the feeling for colour of savage peoples. Colour without drawing, composition uniform and without inspiration, moral ideality replaced by rize and attributes. Such are the characteristics of this period, the saddest of all in the history of art."

At S. Mark's, Venice, above the door of entrance from the atrium, one still sees Christ between the Madonna and S. Mary, a subject which was placed there in the Xth century. The Doge Domenico Silvio (1071-84) placed subjects from the Book of Genesis in some of the little domes of the atrium and some figures in the vault of the great central dome. At Grotta Ferrata, near Frascati, is a Basilican monastery founded by S. Nilus of Rossano in 1004. The church was finished in 1025 and consecrated by John XIX. on December 17 of that year; but there are earlier fragments built into the walls, and Di Rossi has published an inscription which mentions a church there, ascribed by him to the IVth or Vth century. There are two mosaics in it, one over the door from the porch into the church and the other over the triumphal arch. In the first the colours are dull and dark; the faces have character and some modelling, but are rather of Xth than XIth century type. Christ is seated, blessing and holding an open book, with the Virgin on one side and S. John Baptist on the other, the Abbot Bartholomew appearing at the side of the throne on a lower level and very small. The draperies are stiff, and have no shading. The second is much more brilliant; the draperies are well cast, the heads have variety of type and a natural expression, but the details show decadence. The apostles are seated, six on each side of a throne, which is above the centre of the arch on a gold ground. On the front of the throne is a waved circle with a lamb within it holding a long cross and the book of life, on which is inscribed, "I am the door," etc. On the head of each apostle is a red flame with two points, and rays of light from a centre fall on their heads. S. Matthias appears in the place usually occupied by S. Paul. All have scrolls except SS. John and Matthew, who have books. The two end figures are in profile. The full strength of colour is in the shadow of the draperies, the lights becoming paler and colder by the admixture of white. The first of these mosaics is probably of the date of the consecration of the church, the other being later.

The monastery of Daphni, built in the XIth century, still preserves mosaic decoration which seems to be of that period. The ornamental bands have two red lines bordered with white surroundings and defining the gold ground, and the figures are also all on a gold ground. The costume shows antique tradition and the influence of the last Roman fashions. The modelling of the flesh is done by rule, and the position of the limbs makes no difference to the way the lighting is treated. The draperies are varied and finely cast, the gestures are simple and clear, and the heads have great variety of type. Contrast is always thought of in the compositions, and complementary colours relieve each other. The colours used are few; some three shades of red, five or six of blue, lilac, and brown, and a few more of green are rendered with vitreous pastes; the pale tones are marbles, white of Pentelicus, grey-blue of Hymettus, dull white, rose-coloured, and brown pebbles, black marble of Eleusis, and yellow tuff. In the drapery of Christ gold hatchings are used. The draperies are sometimes only outlined, sometimes two darker tints are used to express the modelling, sometimes broad half-tints and dead white lights gain effect by strongly-coloured shadows. The outline of the flesh is either green-brown, carmine-red, or black; the high lights are white, two carnations express the modelling in light, a half-tint green or blue a pale brown and two light greens are used in passing from half-tint to shadow.

At Nicea a small XIth-century church, dedicated to the Death of the Virgin, still remains with some mosaic decorations. In the vault of the apse stands the Virgin

Mother holding the child Jesus. On a gold ground her figure is detached in dark-blue drapery ornamented with gold. The Christ Child has a long gilded tunic; He blesses with the right hand and holds a scroll in His left. Both are nimbed, the Christ cruciferous. On the great arch at the entrance to the apse is a golden throne with a Book of the Gospels upon it in a blue circle; on the book is a Greek cross with an heraldic dove at the crossing with a cruciferous nimbus. Two angels stand on each side; on the right "archai" and powers, on the left lordships and "exousiai." They are richly clothed in long tunics of violet purple with broad orphrey of cloth of gold, girdle and purple boots, and have large white wings hatched with gold. They hold in one hand a standard with ΑΓΙΟΣ three times inscribed, as at S. Apollinare in Classe, and in the other a flowered disc on a brightly-coloured piece of stuff. They have golden nimbi, curled hair, and are young. In the vault of the cupola of the narthex before the principal door is a golden cross of eight arms inscribed in a circle. In the pendentives the four evangelists are seated, and between them are four medallions with busts of Christ, S. John Baptist, and two saints. Above the door is a half-length of the Virgin in adoration in a violet mantle bordered with gold and veil of the same colour. The type of head is fine, the modelling good, the execution simple, and the draperies excellent. There is considerable resemblance to that at Torcello.

At Kiev a mosaic of the XIth century exists which was discovered in 1839.

The monastery of S. Luke of Stiris, in Phocis, a Byzantine structure of the XIth century, preserves a number of the mosaics which originally decorated it, though in the great dome and one of the pendentives beneath frescoes have replaced mosaic, and there are none in the vaults above the galleries. The walls up to the string-course at the springing of the main arches are sheathed with marble, mosaic being reserved for the curved surfaces, and the tympana enclosed by the arches of the vaults. In the narthex the Twelve Apostles are placed on the soffits of the arches, and on the vaults are busts of saints. On the central vault is the Virgin in adoration, S. John Baptist, and SS. Michael and Gabriel. The wall surfaces beneath the arches bear—the Washing of the Disciples' Feet, the Crucifixion, a colossal half-length of Our Lord (over the door), the Descent into Hell, the Doubting of S. Thomas, and five medallions of saints. SS. Constantine and Helena are on each side of the window full length, and there are three other similar figures of female saints. Within the church the lower portions have figures of saints, and medallions are on the vaults. At the head of the Bema apse is a Virgin Mother and Infant Christ. In the dome is the Descent of the Holy Ghost, and the throne and dove in the centre, and the apostles seated round with beams passing to their heads. The pendentives of the great dome contain the Annunciation (fresco), the Birth of Christ, the Purification, and the Baptism of Christ. In the recesses of the great square are half-lengths of Fathers of the Church, and on the walls of the Diaconicon are Daniel in the Lion's Den and the Three Holy Children. Messrs. Schultz and Barnsley made some excellent drawings of this church for the British School at Athens, a selection from which have been published, and M. Ch. Diehl has also described it.

The most important of the convents on Mount Athos, those at Vatopodi and Agia Labra, were founded by S. Athanasius, and reconstructed and enriched by the Emperor Nicephorus Phocas in 985. In the tympanum of the door of the external narthex at Vatopodi is a Christ with the Virgin and S. John, just like that at Grotta Ferrata. An Annunciation in two panels is at the sides of the door, and the same subject is within. The dedication is to the Annunciation. On the tympanum of an inner door is S. Nicholas. The arrangement of subjects in all these monastery churches is as follows:—In the narthex there is always the Last Judgment, at the sides warrior saints armed and with sword in hand guard the entrance. In the interior narthex Old Testament subjects appear or the histories of martyrs. The Death of the Virgin is

often over the entrance door, and the Life of Christ on the side walls. The arms of the Cross are reserved for soldier saints and those who protected the youth of Christianity, isolated full-faced figures on a gold ground. In the centre of the cupola is a figure of Christ surrounded by archangels; little cherub heads fly above them. In the pendentives are the evangelists. The subjects are painted, but show the usual distribution, which may be usefully compared with that in the Sicilian churches.

The dome of the Cappella Palatina, Palermo, has a Christ blessing at the summit; four angels richly clothed and four archangels stand round below between the little windows. Lower still, on the drum, are David and Solomon, Zechariah, and S. John Baptist, and the evangelists are in the angle niches; below these are the busts of eight other prophets. The inscriptions are in Greek. A Great Christ is in the apse vault, the mosaics below which have been altered and restored. The triumphal arch has in the centre the throne with symbols of the Passion, and at the sides the Archangels Michael and Gabriel. In the transepts are scenes from the Gospel referring to the Twelve Great Feasts of the year. Above the triumphal arch are the Annunciation and the Purification; on the south wall the Flight into Egypt, the Epiphany, the Resurrection of Lazarus, and the Entry of Christ into Jerusalem; above the northern apse the Nativity; on the vaults of the side portions Pentecost and the Assumption. At the same level are figures of the Prophets Amos, Obadiah, Habbakuk, Hosea, Zephaniah, Malachi, Micah, Samuel, and Joshua, and Isaiah and Joel, who point out the prophecy, "Behold a Virgin shall conceive," etc., on a scroll. In the nave are scenes from the first thirty-two chapters of Genesis, and on the arch which separates nave from presbytery two angels, who offer prayers and offerings. On the west wall is a throned Christ with SS. Peter and Paul. A series of figures of the successors of the apostles, representing the Militant Church, are below; along the nave and transepts and on the walls of the aisles are represented the doings of SS. Peter and Paul. These mosaics are of several periods, and have been frequently restored. The inscriptions are sometimes in Greek and sometimes in Latin. The Greek is principally on the right hand, and where silver tesserae are used among the gold. The silver band of the cupola bears the date 1143.

At the Martorana, Palermo, founded by Georgios Antiochenus, Grand Admiral of Roger I., in 1143, and therefore originally called S. Maria dell' Ammiraglio, the summit of the cupola is occupied by a full-length figure of Christ seated on a throne surrounded by a choir of adoring angels. Around the drum are figures of prophets, and in the niches below the evangelists. On the vault of the first great arch are the Nativity and the Death of the Virgin. On the outside of the triumphal arch is the Annunciation and on the inside the Presentation. At the entrance to the sanctuary the figures of SS. Michael and Gabriel remain (as at S. Apollinare in Classe, Ravenna), the rest of the apse having been destroyed in the XVIIth century. On the nave walls are figures of SS. Peter, Paul, Andrew, and James, and other Greek saints, and in the smaller apses half-lengths of S. Anna and S. Joachim. The aisle vaults are blue with golden stars. Two mosaics of historical interest are preserved on the walls of what was once the vestibule. King Roger Crowned by Christ and the Admiral at the Feet of the Virgin, the latter much and badly restored.

Other excellent mosaics are in the Cathedral at Cefalù, founded in 1131 by King Roger. The semi-dome of the apse is filled with a colossal Christ, rather Jewish in type; the vault of the first bay bears four cherubim, and at the springing of the arches four half-figures of angels. Below the Christ is the Virgin in the traditional Byzantine attitude of prayer; an angel stands on each side of her. The Twelve Apostles stand below divided into groups of six by the pointed Eastern window. At the top of the north wall is a circle with a half-length of Melchizedek, flanked by Moses and Hosea, and below them the Prophets Joel, Amos, and Obadiah, below whom come two ranges

of saints; in the upper SS. Peter, Vincent, Laurence, and Stephen; in the lower SS. Gregory, Augustine, Sylvester, and Dionysius. The south wall has SS. Nicholas, Basil, Josephus, and Gregory Theologos facing them; above whom are SS. Theodore, George, Demetrius, and Nestor. Then come the Prophets Jonah, Isaiah, and Nahum; while David and Solomon, with Abram between them, finish the composition above. The columns of the sanctuary are also covered with mosaic and the corbels of the vaulting-shafts. The lettering is partly Greek and partly Latin, confirming the tradition that Roger imported designers from Mount Athos to execute them. The selection of the saints makes this all the more likely, as does the constant appearance of S. Basil in an important place. The treatment, costumes, and gestures of the earlier Sicilian mosaics are invariably Greek. The later ones show the Latin mode of blessing as well, the Latin cross held in the hand, and Latin inscriptions; but Greek costume still is most frequent. The Latin inscription below the range of apostles at Cefalù gives the date 1148, but the vault of the first bay of the choir is later, probably of the period of the destroyed portico mosaics, which showed portraits of Roger II. and William I. and II., Roger offering to the Saviour a little symbolic building and the others confirming the gifts with new offerings. Another showed Constance, and yet another Frederick II. on a throne, sending John Cicala, Bishop of Cefalù, as his legate to Damascus and Babylon.

At Monreale the costumes in the mosaics are Byzantine, and above the great arch, between nave and choir, is the image of Divine Wisdom (ΑΓΙΑ ΣΟΦΙΑ), before whom SS. Michael and Gabriel prostrate themselves. The vault of the apse is filled by a colossal Christ, as at Cefalù. In the two side apses SS. Peter and Paul, seated on thrones, bless and hold a book on their knees; these large figures their martyrdom is represented. The general subject of the mosaics is the Triumph of Christianity in prophecy, in fulfilment, and in the majesty of the Church founded by Christ. The walls of the transepts and of the nave show Old Testament subjects and the most important events in the life of Christ; while those of the sanctuary and the *sofea* are occupied by subjects from the Acts of the Apostles, and figures of angels, prophets, patriarchs, and saints of every kind magnify the triumphs of the Orthodox Church. These mosaics have been restored many times, the first occasion being in 1495, when a Monrealese, Masi di Oddo, with members of his family, worked for eight years at their restoration.

The best of the subjects, such as the Martyrdom of SS. Peter and Paul and the Entry into Jerusalem, show a purity of drawing and delicacy of type which prove that the designers must have been capable painters who studied from nature without striving to overpass the proper limits of decorative art. In some of the figures (as in a niche in the S. Aisle near to the eye) the tesserae are almost as small as in antique pictorial mosaic. These mosaics were executed one hundred years before the birth of Cimabue and two hundred years before the death of Giotto.*

F. H. J.

WORKING MEN'S COLLEGE, ST. PANCRAS.—The programme for the winter session, opened on September 28, embraces a University Extension course of lectures by Mr. J. Banister Fletcher, upon "The History of Architecture." A new class in "Studies in Sculpture, Painting, and Engraving" is established under Mr. John Scott's superintendence.

BATTERSEA POLYTECHNIC.—The present session began on September 11, and the day college and courses were reopened on September 17. In the evening classes department new classes are opened in architecture, enamelling, and art-metal work, and motor-car engineering (honours). Extended accommodation has been made for motor-engineering students, and for the secondary education of girls. On the day students' side there are classes in mechanical, electrical, motor-car, and chemical engineering, in courses of two and three years' duration for University and professional examinations, and in art, and secretarial and commercial work.

* To be continued.

ENGINEERING AND MACHINERY EXHIBITION.—I.

THE exhibition which was opened on September 15 at Olympia, and will remain open until the middle of October, contains a large and varied collection of engineering appliances and machinery, filling all available room on the ground floor of the main hall. There are many exhibits of interest to architects and building contractors, as well as to engineers, and it may fairly be said that the exhibition has achieved a real measure of success. Still, the fact remains that British engineering is very inadequately represented. Very few of our great industrial firms have supported the venture, and the exhibitors who have taken stands consist largely of those making or selling machine tools and sundry appliances and materials in general use by engineers and contractors. The bulk of the remaining stands relate to steam boilers and engines, gas engines, electric and gas-lighting apparatus, pumps, tubing, valves, and steam fittings. Structural materials, weighing machines, cranes and lifts, time-recorders, heating, ventilating and drying apparatus, and appliances for preparing and copying drawings are also exhibited in various parts of the hall.

Although, as remarked above, the exhibition affords a very incomplete index to the great engineering industries of Great Britain, the individual exhibits are of admirable character, and in numerous instances serve the useful purpose of demonstrating the successful application of machinery to the requirements of daily life.

Among the more noteworthy examples of British-made machine tools are those shown by Messrs. Armstrong, Whitworth, & Co., of Manchester; Bateman's Machine Tool Company, of Hunslet; Joshua Heap & Co., of Ashton-under-Lyne; John Holroyd & Co., of Milnrow; G. Richards & Co., of Broadheath; and John Strik & Sons, of Halifax. Two tools exhibited by Messrs. Armstrong, Whitworth, & Co., which illustrate the great capacity of high-speed steel for both turning and drilling, are respectively an 18-in. centre electrically-driven lathe capable of taking a cut 1½ in. deep by 4 in. wide at the rate of 30 ft. per minute, and finer cuts down to ⅜ in. wide at rates up to 400 ft. per minute. This machine is shown in operation, and the massive turnings pared off by the tool form an excellent object-lesson of the enormous saving of time effected by modern lathes and tool steel. Messrs. G. Richards & Co., in addition to air-compressors and auxiliaries, have on view several well-designed tools, including boring and turning mills, planing machines, and a slot-drilling machine, all driven by electric motors. A distinct advance in the construction of planing machines is marked by Bateman's high-speed planer, which performs work with the rapidity obtainable on the lathe by the use of modern tool steel. Two important improvements are embodied in this machine—one being an arrangement by which the motion of the table is reversed at the end of each stroke without perceptible shock, and the other is effected by the application of a heavy fly-wheel at either side of the machine so as to store up and give out energy at the moment of reversal. The machine is entirely self-contained, the electric motor and change-speed gear-box being fixed on a platform above the main framework. The gears give a range of cutting speeds varying up to 80 ft. per minute, and the return speed is constant at 210 ft. per minute, thus almost entirely abolishing the usual loss of time on the return stroke. To architects and building contractors the "Shaftometer" on the stand of Messrs. J. Strik & Sons will possibly be of more interest than the turning, boring, and slotting machinery exhibited by this firm. The "Shaftometer" is a special form of spirit-level with a tube 12 in. long, which is so graduated that readings are given in thousandths of an inch. Then the total variation of the shaft can be quickly converted into sixty-fourths of an inch by reference to the calculating scale provided on the instrument. However true a shaft may be when first erected it will not remain so for long, as the bearings inevitably chance their relative positions owing to unequal subsidence of the building upon which they are fixed. As the slightest deviation in a shaft from the level causes a considerable amount of friction, the use of an accurate instrument

which this enables coal bills to be reduced and the risk of breakdowns to be diminished. American and German machine tools are such in evidence at the attractive stands of Messrs. Buck & Hickman, Burton Griffiths & Co., C. Churchill & Co., Ludwig, Loewe, Co., H. Pels & Co., Schuchardt & Schutte, Selig, Sonenthal & Co., and Veilhardt & Co. To mention all the objects of interest in these exhibits would occupy more space than is available, and we must limit references to a few examples. A brass-finisher's turret-lathe, shown by Messrs. Buck and Hickman, deserves careful examination by all who are engaged in the production of valves, cocks, and other appliances on which several faces have to be machined. The lathe is fitted with a special form of automatic revolving chuck by which eight faces can be finished at one chucking and without stopping the machine. Messrs. Churchill & Co. show a selection of tools specially chosen as examples marking distinct advances or embodying novelties of design and construction. Three machines, exhibited by Messrs. H. Pels & Co., appealing specially to structural engineers, are a joint-shear, cutting any section from 2½ in. by 2½ in. up to 16 in. by 6 in. at an angle and a bar bevel cropper cutting angles and tees on the square up to 6 in. by 6 in. and at any angle (from 45 deg. to 90 deg.) up to 5 in. by 5 in. or 6 in. by 4 in.; and a notching machine capable of dealing with joists and channels up to 16 in. by 6 in. All these machines are driven by Westinghouse electric motors, and work smoothly without perceptible shock. One structural feature to which attention may be directed is that the framework is built entirely of steel, thereby insuring rigidity, reducing weight, and saving floor space.

A representative assortment of pneumatic and electric portable drills and tools will be found in operation at the stand of the Consolidated Pneumatic Tool Company, where may be seen hammers for stone and metal, drills, and appliances for tube-expanding and cutting, reaming, and an assortment of electric drills with magnetic drill-posts. The Howard Pneumatic Engineering Company, of Eastbourne, exhibit pneumatic drills, hammers, riveters, grinders, and a pneumatic deck-planing machine, all these appliances being shown in operation and actuated by air from a Howard compressor. Sheet-metal-working machinery is represented by an excellent selection on the stands of Messrs. W. Waller & Co. and Mr. L. Schuler, where box-making machines are strongly in evidence.

Various types of grinding and sharpening apparatus are to be found among the exhibits of machine tools, and in addition are brought prominently to the front by three or four firms. Messrs. Brunton & Trier show examples of Trier's patent grindstone, emery and carborundum wheel-dressers, which embody the principle of their ingenious stone-dressing machines, which have been fully described in previous issues of *The Builder*. The Carborundum Company make a comprehensive display of grinding-wheels, rubbing-blocks for foundrymen and stonemasons, carborundum powder and grains, carborundum paper and cloth, and carborundum discs for grinding machines. A most interesting exhibit is the automatic twist-drill grinding machine, shown at work by the Agenor Company, who also display a selection of Schmaltz's automatic sharpening machines for circular, hand, and frame saws, a cylinder grinding machine, and other grinding machinery.

Before passing entirely away from apparatus allied with the category of machine tools, we must mention two or three useful varieties of hoisting apparatus. One is the handy little portable crane of Messrs. Selig, Sonenthal, & Co., a machine standing about 6 ft. 6 in. high, and mounted on wheels so that after raising the load it can be run from point to point on any level floor. Another, by the same firm, is a portable crane with a gib that can be extended and withdrawn by means of a handle without moving the crane itself, and that can be revolved through a complete circle. Messrs. Jessop & Appleby Bros. confine attention to a strongly-built type of portable steam crane made in sizes ranging from 5 tons to 12 tons power to lift, slew, derrick, and travel by steam. The Temperley Transporter Company exhibit actual examples of their patent traveller and

patent grab, but are only able to show working models of their well-known transporters owing to the large dimensions of the apparatus. Among numerous examples of hoisting-tackle, the worm-gear pulley-block of the Mark Patent Pulley Block Company deserves special notice. This apparatus has a releasing gear which sets the worm free so that the lower block can be run down or pulled up rapidly whenever desired. Then, by pulling a hand-chain in either direction, the worm is instantly re-engaged for hoisting. The same device is also applied to blocks used on runways. Hoisting apparatus applied to domestic requirements is represented by the working models and gearing exhibited by Messrs. Joseph Richmond & Co. One model shows the principle of the Richmond-Carry automatic electric lift for both passenger and goods lifts, and another illustrates a newly-patented automatic electric push-button service lift.

We may here take the opportunity of referring to the improved type of steelyard embodied in the most recent form of weighing machines made by Messrs. David Hart & Co. The new pattern has been devised to prevent wear of the V-notches which fix the position of the large sliding weight. By means of large rectangular slots at the back of the steelyard and a corresponding tongue on the sliding weight, the latter can only be moved along the yard when it has been lifted high enough for the tongue to clear the face of the slot and the knife-edge to clear the face on which the V-notches are cut. The weight can only be lowered when the tongue has entered one of the slots, and the knife-edge will then fall exactly into the centre of the corresponding V-notch. This arrangement makes it impossible for careless users to damage the top of the steelyard and to reduce the accuracy of the machine by altering the form of the notches. The same firm have also a new type of multiple steelyard giving readings in three or four different systems of weights, but this device is not shown at the present exhibition.

(To be concluded next week.)

THE "OLD BAILEY" SESSIONS HOUSE.

THE large building from the designs of Mr. E. W. Mountford, which occupies the site of old Newgate prison, is now all but completed, although there seems to be some doubt as to its being actually opened next month.

The exterior is by this time familiar to all passers-by between the City and the central district. We gave an illustration of it at the time of the competition, which, with the plan, will be found in our issue of June 30, 1906. If it has not the gloomy grandeur of old Newgate, it is a fine and striking building, in the details of which some of the character of the old building is preserved. The ground story is treated with bold rustication, and heavy keystones to the square-headed windows under the arched openings. The two upper stories are decorated at the Newgate-street side with an order of pilasters, developing into a columnar order in the centre portion where the upper wall is recessed. Pilasters and the coupled columns are introduced also in the centre of the west front. The strongly marked cornice is continued all round the two fronts.

The principal entrance, over which is a sculptured group of three figures by Mr. Alfred Turner, is defended by massive gates of hammered iron, executed by Messrs. Ramsden & Carr, which, though simple in design, are very effective and well suited to their position and to the general style of the building. These give access to the lower hall, which extends the full length of the building; a wide area in the centre, while the right and left hand portions are divided by columns and arches into two aisles. The principal staircase, opposite the entrance, leads up to the great hall which is the principal feature of the interior, and forms a kind of *salle des pas perdus* in connexion with the courts. Over the centre portion is a dome the surface of which is panelled out into four sections, decorated with mosaics by Mr. G. Moira, the designs symbolising Truth, Wisdom, Knowledge, and Labour. A heavy cornice runs round the base of the dome, beneath which are four large arches

and pendentives, the spaces on the latter being decorated with bas-reliefs by Mr. Pomeroy, the subjects symbolising Justice, Mercy, Charity, and Prudence. The lower vaulted portions of the hall, on either side of the domed space, have large lunettes three of which, on the south side, have been filled with large decorative paintings by Mr. Moira, which represent Moses and King Alfred, as great lawgivers, and Homage to Justice. On the north side is a painting by Sir W. Richmond, a decorative landscape with a group of nude figures, representing the Golden Age; it is very effective in composition, though it is not easy to see what is its significance in a building of this kind, as it seems to recall (or prophesy) a time when justice and law were unnecessary for a people who were always happy and good. It may be as well, perhaps, to have some suggestion of this kind to call up happier associations than those generally connected with the exercise of criminal law. The lower portions of the walls are richly and effectively veneered with Pavenazzo marble in panels surrounded by a framing of Cipolino which makes an effective contrast. The floor is laid with a design in marble in large and simple lines. The whole effect is fine and dignified.

Two courts are approached from corridors at each end of the hall. Of these four courts, two are treated on a Greek cross plan with a segmental glass dome over the centre; the two others are longitudinally planned and barrel vaulted. We should have expected rather an echo from the glass in the domed courts, but the scale is not very large and the acoustic conditions do not seem to suffer. The fittings of all the courts are in oak, of a generally plain and solid character, decorated by mouldings more than by carving, and with a severe but sufficiently architectural character. This oak woodwork is used throughout the fittings both of the courts and the numerous rooms connected with them.

There is a special oak staircase for the mayor and the judges. There seems to be some uncertainty at present as to the ultimate disposal of the rooms; but those which were first planned as the judges' rooms, with a separate corridor of their own, and in immediate contiguity to the courts, seem very well suited for this purpose, and may probably be retained as such after all, though there has been a suggestion for placing the judges elsewhere; for what reason is not very clear. The rooms for witnesses are ample, including a large general room on the ground floor for witnesses in attendance, and rooms on the court level for those immediately wanted.

Though the new building is not, like old Newgate, a prison for the permanent detention of malefactors, there are a very large number of cells, in four stories, for temporary detention. These are arranged so as to be entirely cut off from all connexion with other portions of the building; the stairs leading up to the court docks being the only inter-communication. We feel rather surprised that the system of taking up prisoners into the dock by lifts has not been tried in any courts of modern construction; it would be a saving of space, as well as affording much better opportunity of controlling prisoners who were violent and refractory.

The arrangements for heating and ventilation form a great portion of the structural work of the building, the portion of the basement devoted to this function forming a whole labyrinth of chambers and passages. Mr. W. Key has had this part of the work in hand. The air is brought in and driven through the building by eight steam-driven fans; passing first through a screen of perpendicular glass tubes placed nearly close together and served with a small catarract of water running down them; this picks up the grosser particles of dirt. Inside of this are steam-pipe coils, not for the ultimate heating for the rooms, but to bring the air through in a fairly warm state in winter. Then it passes through the usual moist oakum screen for damping and further cleansing, and then past the steam coils which bring it up to the final temperature desired. There are separate ascending flues and heaters for each room, numbered or named and capable of being opened or closed as required. Two things strike one in going through such an installation;

first, how much of the mechanical force has to be expended in overcoming the resistance of the two successive cleansing screens; second, how much trouble ought to be considered necessary to keep all this length of air-passages themselves clean. That is one of the points against the plenum system of combined heating and ventilation, that there seems so much chance for the air to pick up dust and impurities in the passages themselves, after it has gone through the cleansing screens; and it seems doubtful whether the air chambers ought not to be lined with something smoother and more washable than brick walls. But this of course would add to the cost of what is a costly enough scheme in itself.

With the exception of the group over the principal entrance, before referred to, Mr. Pomeroy has modelled all the sculpture in the building. His figure of Justice which crowns the cupola was cast by Messrs. Singer, of Frome. Mr. G. Moira, besides his mural paintings, has designed the stained glass; the two windows on the grand staircase are very effective; they are treated in small square leaded panes which give a close texture, and with rich colouring and a large and full style in the decorative details, producing a style of window which is suited to a Renaissance building, while it has a kind of Medieval richness of effect, instead of the hard texture which one sometimes sees in modern stained glass in the Renaissance style.

Messrs. Holloway have been the general contractors. The principal sub-contractors are: for the marble columns and wall linings, Messrs. A. Lee Brothers; for the marble paving and staircase, Messrs. Anselm Odling & Sons; for the various lifts, Messrs. R. Waygood & Co.; for the fittings and furniture, Messrs. Hampton & Sons; for the decorated ceilings, Mr. G. Bankart. All the sanitary fittings and wall tiling have been done by Messrs. Doulton & Co. The glass mosaic is by Messrs. Rust's Vitreous Mosaic Company. Messrs. Ramsden & Carr have done the more elaborate electric light fittings, the entrance gates, and the balconies. The other electric light fittings were done by Messrs. Bainbridge Reynolds; they have also done the glass and iron hood over the Lord Mayor's entrance, and other metal work in the building. The electric wiring and light generally is by Messrs. Cash & Co., the courts being lighted entirely by reflection. Mr. Seale has done what may be called the architectural carving, also some of the ornamental plaster work. Mr. Scales has acted as clerk of works.

THE HOLMAN HUNT EXHIBITION.—The opening of the exhibition of the collected works of Mr. Holman Hunt, at the Leicester Galleries Leicester-square, is now fixed for Saturday October 6. With the exception of "The Light of the World," which is now in the Colonies, all the most important of Mr. Hunt's works will be shown. The City of Birmingham is lending "The Two Gentlemen of Verona" and "Christ in the Temple," and the Manchester Corporation "The Shadow of Death" and "The Hiredling Shepherd." Besides which there will be "The Triumph of the Innocents," "The Lady of Shalott," the portrait of himself intended for the Uffizi Gallery, and numerous other paintings and water colours. The exhibition will be open for six weeks.

TRAMWAYS THROUGH BLOOMSBURY.—The St. Pancras Borough Council have given their statutory consent, in so far as the borough limits are concerned, to the London County Council's proposed Bill for the construction of tramway lines through Tavistock and Russell squares. The new tramways will connect the northern and southern lines by means of the Kingsway subway, and will furnish a fresh route to Euston terminus. The London County Council's scheme provides for double lines from the subway, Southampton-row, to Russell-square, and through Tavistock-square and Upper Woburn-place to Euston-road and Seymour-street, with single lines along Tavistock-place, Upper Bedford-place, and Russell-square, and along Woburn-place, to be constructed for the conduit system, at an estimated cost of £2,450l., for the aggregate length of 2½ miles. They propose also to lay down branch lines from New Oxford-street, along Hart-street and Vernon-place, to the subway; and either along Bloomsbury-street, Bedford-square, Gower-street, and Francis-street, or along Tottenham Court-road, to Francis-street, to join the extension from Euston-road, at a cost of 51,000l.

BUILDING-STONES AND FROST.

By W. R. PURCHASE.

In your issue of September 15 there appeared a short article, entitled "Notes on the Resistance of Building-stones to Frost," by Professor J. Malette, of Paris. Will you kindly permit me to make a few remarks on this subject from a practical point of view, not in a cavilling spirit, but simply with the object of eliciting further truths which may be helpful in selecting a good building-stone.

I am aware of the boldness of venturing an opinion opposed to that of an eminent *savant*, but the ideas, crude perhaps as they are, emanating from practical observations, may make evident some trace of those principles which govern and recommend the more scientific productions.

A statement is made *re* Mons. Brard's process as follows:—"Although not enabling the problem to be solved in a direct and absolute manner, it furnished approximate results that were formerly accepted as sufficiently satisfactory."

Exception, however, has many times been taken to this process, and the fallacy of the plan was pointed out as long ago as 1840 by the late Mr. C. H. Smith in a paper on "Lithology," read before the Royal Institute of British Architects (*Transactions* R.I.B.A., Vol. I.), wherein he quotes from a Parliamentary Report and gives a list of well-known British stones treated by M. Brard's method; and according to these tests some of the best of our weather stones are those that will disintegrate the most, and, *per contra*, those stones of the most decomposable quality are standing high on the list which it is suggested will stand the weather.

For instance, among others, he gives the following as less likely to be good weather stones, viz., Taynton, Ham Hill, Chilmark, and Barnack; whereas Taynton stone is remarkable for its very perfect condition wherever it has been used at Oxford. The same may be said of Ham Hill, a stone extensively used in the "west country"; Salisbury Cathedral, built with Chilmark stone, is generally in a good state of preservation; Barnack is much used in the old buildings at Stamford and neighbourhood, including Peterborough Cathedral, and these are generally in a good state of preservation.

Mr. C. H. Smith states:—"However ingenious the plan recommended by M. Brard may be, the effect produced on the stone by his experiments is, in the greater number of instances, diametrically opposite to that which would result from the action of the weather on similar materials after having been exposed to its influence many years; consequently, such a mode of procedure is not to be depended upon, and will always be liable to erroneous conclusions."

Coming to the process recommended by Professor J. Malette, which is certainly very subtle, the treatment meted out to these small samples of stone seems drastic, unduly protracted, and altogether abnormal. It is based upon successive and rapid variations of temperature; that is to say, it undergoes twenty-five freezings and thawings in the course of a few days.

If we compare this mode of treatment with that of nature, whose physical forces and agencies, within and without, work silently and invisibly, we must at least confess that there is a difference in the two processes deserving the utmost consideration, for it will be found to vary materially, both in detail and result.

It is an axiom well known that the weathering power of a stone is dependent upon its physical structure, its composition, and the nature of the atmosphere in which it is placed.

The most destructive agent that the stone has to contend against is rain or a moist atmosphere, and also, in a minor degree, frost, wind, and smoke.

It may not generally be known that, although a stone may be very porous and absorbent and apparently open to frost, it may also be extremely durable, its durability depending on the cementitious material which holds the grains together being strong enough to resist the physical forces acting upon the stone, such as the rain, frost, wind, etc. Examples of this are found in the durability of the shelly oolites, such as

Ancaster, Casterton, Doulling, Ham Hill, Ketton, etc.

Again, the rainfall of the district in which a building is situated is an important factor in the capability of a stone to resist physical disintegration by frost; this is materially controlled by the structure of the stone and its power of resistance to chemical agents.

A factor which seems to have escaped the notice of scientists, and shows the potentiality of frosts, is that very hard, dense, and compact sandstones, with but little absorption, such as the Blue York from the neighbourhood of Bradford and Robin Hood from Wakefield, etc., are more liable to be affected by frost than are open or coarse lime or sandstones of a softer nature and two or three times as absorbent. It has come within my observation that large blocks have been split through and virtually spoiled by the action of severe frosts; these fractures would take place along the lines of lamination, although these lines were scarcely discernible to the eye, and never in a vertical direction across the bed.

Chemical tests to determine the quality of a building-stone for durability are admitted by practical men to be somewhat unreliable. The processes which are carried out with apparent success in the laboratory of the chemist are generally of doubtful value when brought into practical use. As laboratory-work these experiments are no doubt of an interesting character, for infinite pains seem to have been taken to produce results that may be termed unnatural, and the results so obtained are only at least an approximation to what the effects of the weather would be on the same material when extended over a long period.

Although much progress has been made of late years in scientific knowledge, owing to the researches of eminent scientists, such as Professors Geikie, Bears, and Unwin, who have done excellent work in this direction, it is doubtful whether any general principles or data can be deduced by which a correct judgment or estimate can be formed as to the weathering properties of any building-stone or its capability of resisting frost.

There is in the foregoing remarks no wish to depreciate or disparage the true value of tests by chemical analysis, but on the contrary. These, however, should be confined to ascertaining the component parts of the stone, its cementing material, the absorption of water, the homogeneity of its structure, and other useful data.

In fact, there is no detail in connexion with stone that one should not be familiar with.

Builders' and Contractors' Column.

THE BUILDING TRADE IN INDIA.

INDIA is an Empire fifteen times larger than Great Britain and Ireland, with a population of some 300,000,000. The building and allied trades are among those that will flourish in the near future, and those firms who get securely planted in the country now will reap their reward later on.

India is striving to become self-supporting, and the Government is encouraging local industries. With the expansion of the Indian Empire in all directions building on improved British methods, whenever possible, is being adopted. India follows Britain in fashion, which is an encouragement for British manufacturers to study the country with keener interest.

The old-fashioned method was for manufacturers and exporters to canvass commission agents or shippers, principally in London, who dealt with India for any orders they might have; but that is a method of the past. The buyer or actual user in India is the man now responsible for placing orders, and catalogues (not too bulky) should be posted out direct to him occasionally. Then the orders return through the various British commission agents or merchants for payment and shipment. Whenever possible, all goods should be quoted "free-packing" and free-on-board (f.o.b.) export steamer, or better still c.i.f.—i.e., cost-insurance-freight—to Calcutta, Bombay, Madras, Rangoon, Karachi, or Colombo, as required by the

ever, who then knows the actual net cost of the goods delivered from the steamer at the Indian port.

This is an expansive and rapidly expanding market to gather orders from, and it will take any exporter at least three years to understand the peculiarities of the country, all as it is of jealousies, suspicion, rivalries, and other Oriental peculiarities. Railways, municipalities, local boards, mills, gardens, states, schools, hospitals, clubs, hotels, barracks, harbours, public buildings, etc., are all being improved and added to, according to local requirements, after modern and up-to-date British ideas.

The railways have a total mileage of 7,565, with a capital outlay of 237,575,000., and employ a staff of 421,866, and within the next few years many millions are to be expended in extending the railway system. The municipalities number 765, with a population within the municipal limits of 16,750,316, with a total yearly income of 6,579,084, and a yearly expenditure of 6,414,010. Of this amount 2,296,000. were spent in water supply, drainage, conservancy, hospitals, dispensaries, markets, slaughter-houses, public gardens, roads, buildings, etc. The district and local boards number 1,085, with an annual income of 2,519,000. and expenditure of 2,493,900., spent on civil works, sanitation, education, hospitals, etc., the incidence per head of population of municipal rates and taxes being 2s. 9d., and of district boards 3d.

Among the ranks of native Indian workmen are—masons and builders, 341,662; carpenters, 979,543; iron and steel workers, 585,507; earth and stone workers, 1,036,682; excavators and well-sinkers, 253,575; railway and road labourers, 328,657; general labourers, 9,238,596; shopkeepers and dealers, 747,060, etc. Although the native workman's wage is poor, it corresponds with the quality of his labour, and British skill has to teach the illiterate native, often against his will, his case, and his hereditary trade peculiarities that have been handed down in his family from generation to generation. But with the technical education and scientific teaching that is now being pushed forward a more intelligent native workman will be found in the future, who will not be long in letting his employers know of it.

Last year 65 per cent. of imports into India were from the United Kingdom. Metals amounted to 505,869 tons, valued at 934½ lakhs (a lac or lakh of rupees being Rs.100,000), over 60 per cent. of which belonged to iron and steel, which is an indication of the industrial development, and it likewise emphasises the want of an iron manufacturing industry in India. The iron and steel imports consisted of bars, galvanised and tinned sheets and plates, hoop, angle bar, and rod, angle channel and spring, beams, pillars, girders, and bridge-work, pipes, and tubes, nails, screws, rivets, and washers. The competition with British manufacturers has been chiefly in the common and cheap articles, viz., angles, bar, plain sheets, nails, screws, and rivets. Tin comes almost wholly from the Straits Settlements; value of imports, 39½ lakhs. Building materials were imported to the value of Rs.35,30,727, as against Rs.28,70,853 the previous year. Glass represented Rs.112,57,101, as against Rs.99,20,759 the previous year. Painters' colours and materials, Rs.46,91,972. The value of machinery and mill-work reached the unprecedented total of 402½ lakhs, an advance of 20 per cent. over the previous year, which was likewise an advance of 20 per cent. over the year before that. Railway materials, which include rolling stock as well as materials for construction, represented the great importation of 561 lakhs, being 141 lakhs for private lines and 420 lakhs for State lines. The import trade in timber is growing, being valued at 37 per cent. greater than the previous year, two-thirds being teak from Siam, which is taking the place of Burma teak. This gives a faint idea of the yearly imports into India as affecting the building trades, and India is yet in its commercial and industrial infancy.

That agriculture is the foundation on which rests the whole economic structure of India is nowhere so plainly revealed as in its gigantic export trade, and the harbours, jetties, railway rolling stock, sheds, buildings, etc., are being enlarged and increased

to cope with the development of this branch of the country's commerce. Out of an area of 554,234,736 acres 67,136,162 acres are under forest. During last year 234 miles of roads in the United Provinces were planted with trees, and there are still 19,700 miles of roads without avenues. Road arboriculture shows a profit.

There is no false modesty in Indian trading, and a firm may have many interests at stake. There is likewise no commercial patriotism, and builders and contractors purchase from the manufacturer who supplies goods suited to Indian requirements, whether it be from Britain, America, Japan, or the Continent. Thus one European firm established in India announce themselves to be

architects, surveyors, builders, contractors, plumbers, and decorators. Another firm are gas-fitters, drainage and general contractors. Another builders, contractors, machinery agents, importers of high-class English and American tools and machinery, automobiles, and electrical specialities; whilst a fourth firm are builders, contractors, civil, mechanical, marine, electrical, and structural engineers, all kinds of architectural faience and mosaics for inside and outside decoration, colliery work, iron and steel roofs, bungalows, bridges, municipal and district board requirements. These illustrations give a general idea of the elastic commercial mind the successful trader in India may usefully possess; his mind and business grow with the requirements of the country, he does any thing and sells anything there is a local demand for. In a word, he has no more modesty than a co-operative store in Britain.

What is required in India is a man to make local investigations, and a builder and contractor of such capacity and breadth of view as to be able to adapt himself rapidly to local conditions. In order that the progress of the country shall not be thwarted British and foreign manufacturers are holding stocks of their goods in India, either at their own depôts, managed by their own salaried representative, or at commission agents'. Among manufacturers represented to-day may be classed nearly all those who are anxious to secure a portion of the local trade. A North of England firm holds a stock of 3,000 tons of beams of various sections and sizes; 1,200 tons of Carnegie rolled steel beams, angles, tees, plates, etc., are kept in Bombay; local agents have 10,000 casks of British cement on hand; 2,000 tons Westralian Jarrah wood scantlings are at a depôt; 2,000 tons corrugated iron in Calcutta, etc., and so on.

The Indian importer is frequently handicapped when buying from Britain in not knowing when the goods will arrive or what the exact cost will be delivered. By holding stocks on the spot these difficulties are overcome, and all orders are executed with businesslike celerity. Imagine waiting at least three months for goods to arrive at the present day of keen competition. Britain is not the only nation endeavouring to capture the Indian trade, and cargo steamers ply between the Indian ports and Adelaide, Melbourne, Sydney, New Zealand, Japan, Boston, New York, South African and South American ports, Hong Kong, West Indies, etc., to say nothing of Continental steamers from European ports. This points to the way the wind is blowing, and the expansion of inter-colonial trading is a new competitor which British makers will have to reckon with in the near future in Indian commerce.

In regard to finance, it may be said that the rupee in exchange can be taken at 1s. 4d. and the anna at a penny. Thus Rs.2-8 equal 3s. 4d. The general import custom duty on goods into India is 5 per cent. *ad valorem*, some are subject to 1 per cent. *ad valorem*, whilst some metals, manufactures of metal, railway material, etc., are on the free list. Detailed particulars may be had from the Customs authorities at Calcutta.

The industrial life of India in many instances is yet in its infancy when viewed through European spectacles, and already local industries represent cotton, jute, woollen, and paper mills, breweries and distilleries, coal mines, coffee works, flour, rice, oil, timber, and silk mills, tanneries, tile sugar, and indigo factories, iron and brass foundries, arsenals, gun-carriage, cordite, army clothing, rifle, gun-cotton, gunpowder, and ammunition factories, dockyards, etc., to

say nothing of wheat, rice, tea, tobacco, sugar, and other indigenous industries. With the expansion of these industries under modern control and according to the requirements of each locality, as no general principle holds good to the whole of India, owing to the enormous size of the Empire and various climatic and other conditions, then the building and allied trades will expand with the general expansion of the whole country. But it will be the British maker with his depôt established in India that will make progress, as he will be able to see locally, think locally, and act locally. Too much intelligence cannot be imported into Indian trading.

Many patentees in Britain are protecting their Indian rights, and the last annual record was 536 applications for inventions and designs at the Government office at Calcutta.

Large schemes and contracts are on hand at the moment, and many millions of pounds sterling will be spent during the next few years, and progressive manufacturers and exporters should follow up every rumour as to where an order is likely to lurk, and not forget that it is the man in India who buys.

ARCHITECTS AND ARTICLES SUPPLIED BY SPECIAL FIRMS.

SIR,—Why do architects specify that certain articles shall be supplied by special firms? The habit appears to be greatly on the increase, and it would be most interesting to hear the reasons for it. The disadvantages of the system are numerous, but are not perhaps thoroughly appreciated by the architects and their clients.

The final selection of the article should, of course, be at the discretion of the architect, but the builder should have the right to submit tenders from several firms in competition. The principal objection to the present system is that the merchant feels that he is independent of the builder, and has only to deal with the architect direct, and may, for example, occasionally go to him and suggest some variation without notifying the builder. The builder, on pointing out to the merchant that it has all been specified, is informed that it has all been settled by the architect. This naturally causes annoyance and in certain cases inconvenience to the builder.

The builder has no chance to make favourable terms as regards mode and time of delivery, as the architect usually says nothing about this to the merchant when accepting his offer, and when once the offer is accepted it is most difficult to arrange any further conditions.

The builder is held responsible for the due and proper completion of the contract within the contract time, and it is making an already difficult task still more so, and in cases practically impossible, if the arrangements with the merchants are not left to the builder, as one of the most important points in the successful completion of a contract is to see that all materials are ordered well ahead and delivered as and when required.

Another point which should not be lost sight of is the cost of the work, which is of considerable importance in these times of keen competition.

In cases in which a special firm is specified it often happens that this firm only has been asked for a price, or at most one or two only are asked, whereas if the builder is at liberty to obtain prices from a number of firms the natural result is keener competition and consequently lower prices, which is to the benefit of all concerned.

We have been told before now by an architect when suggesting that other firms might quote that he knows the firm specified, and wants them to do the work, as they can do it well and have taken a lot of trouble over the matter, and so on; but it seems hardly fair either to the client, who wants his work done at the lowest cost consistent with good work, or to the builder, who has himself to go into competition to obtain the contract.

A LONDON BUILDER.

ESTIMATING FOR EXCAVATION AND CONCRETE WORK.

SIR,—I should like to point out that in Mr. Dix's letter under this heading in your issue of September 22, replying to the article of September 15, he has missed one of my points, which was not perhaps quite clear.

I stated that the bulk occupied by the cement disappeared on mixing with the ballast, thus 6 yds. of ballast and 1 yd. of cement make 6 yds. of dry mixture, and, further, that this 6 yds. of dry mixture shrink 15 per cent. (average) on wetting and depositing. In other words, the total loss is

Loss of cement	Per Cent.
Shrinkage, 15 per cent. = 15	
Total loss	29 per cent.

which agrees very well with the figure 32 per cent. which Mr. Dix gives as his experience of the shrinkage in the latter part of his letter.

As regards my figure for labour and water, this was for 1 yd. of dry materials, so that the 15 per cent. has also to be added to this item, which, by the way, includes for use of all plant, water-pipes, etc.

Working out the same example in Mr. Dix's way, with his shrinkage figures, we should have—

6 yds. cub. ballast	6
1 yd. cub. cement	1
Shrinkage, 32 per cent.	1.92
Labour 1s. 6d. + 15 per cent. =	1.71
Total	9.63

which agrees with my figure, viz., 16s. 5d. I might, perhaps, add that the item 10 per cent. profit includes, say, 5 per cent. for establishment charges and superintendence.

THE WRITER OF THE ARTICLE.

Engineering Societies.

THE JUNIOR INSTITUTION OF ENGINEERS.—A party of members of this Institution, approaching 100 in number, availed themselves of the invitation given by the Associated Portland Cement Manufacturers to visit their Northfleet works on Saturday afternoon, the 22nd inst. Divided into small groups, they were shown round by Mr. H. K. G. Bamber, one of the managing directors and members of the staff. All the processes in the manufacture of Portland cement by the most modern methods were seen in operation, including the amalgamation of the raw materials, chalk, and clay, the slurry-mixing, the treatment in the rotary kiln, in the cooling cylinder, and the pulverising cylinders, the final product coming out in the form of very fine powder. Electrical power is largely employed at the works, and considerable extensions are being made.

WESLEYAN CHURCH, BARNE.—This building, with accommodation for 730 persons, was opened last week, the ceremony being performed by Mrs. East, of Woking. The structure occupies a commanding site in the Station-road, and is built of pressed brick with Bath stone dressings and tracery windows. The contract has been carried out by Messrs. T. J. Messon & Sons, of Twickenham, from designs by Messrs. W. J. Morley & Sons, London and Bradford.

WEIGHTS AND MEASURES OFFICE, CITY OF LONDON.—The new buildings at No. 18, Whitecross-street, E.C., were opened on September 19 by the Lord Mayor and Sheriffs in State. They were erected, instead of the temporary premises at No. 42, Whitecross-street, by Messrs. Johnson & Co., who tendered for £6,194l. after plans and designs prepared by Mr. Sydney Perks, City Surveyor. The building is in the Renaissance style, freely treated, and executed in red brick and plaster, dead white in colour, finished quite smooth. The ground floor is allotted to the sand-blast machine for stamping tested glass measures and to appliances for testing heavy weighing instruments. The second and third floors are reserved for the processes of testing, sealing, and stamping weights, weighing machines, and measures, and for the chief inspector's and assistant inspectors' offices. Motive power for driving the machinery is installed in the basement, and offices are provided for the shop-hours and the petroleum and explosives inspectors. All the appliances, together with the 15-ton weight bridge, embody the newest and best approved types of apparatus.

Correspondence.

ST. PANCRAS LIBRARY COMPETITION.

SIR.—By an error on the part of the publishers of "British Competitions" a design of ours, submitted for the St. Pancras Library, has been described as being by Messrs. Wimperis & Best, while their design has been described as being ours.

We should be obliged if you would kindly insert this letter in your next issue.

WILLS & ANDERSON.

BOOKS RECEIVED.

EMBROIDERY AND TAPESTRY WEAVING. By Mrs. Archibald H. Christie. (John Hogg.)
A MANUAL OF HISTORIC ORNAMENT. By Richard Glazier. Second Edition. (B. T. Batsford. 6s.)

COMPULSORY TAKING OF LAND (Wilson's "Legal Handy Books"). By Thomas Waghorn. (Effingham Wilson. 2s.)

RANGE AND STOVE FIXING AND OVEN BUILDING. (Cassell & Co. 6d.)

PAPERHANGERS' WORK. (Cassell & Co. 6d.)
BRICKS AND BRICKMAKING. (Cassell & Co. 6d.)

A GLOSSARY OF ENGLISH ARCHITECTURE. By T. D. Atkinson. (Methuen & Co. 3s. 6d.)

Illustrations.

PROPOSED NEW BUILDINGS, MERRION-STREET, DUBLIN.

THE illustration, which is reproduced from the large drawing exhibited in this year's Royal Academy, shows the interior of the quadrangle, and the front towards Merrion-street, of the combined College of Science and Government Offices now being erected in Dublin from the designs of Sir Aston Webb and Mr. T. M. Deane; at least, one half of it is being erected, as shown and stated on the plan.

It was a happy idea to blend the two departments into one architectural scheme, thereby securing a finer and more imposing building than either of them could have been if treated separately.

In our issue of October 13, a fortnight hence, we shall be able to illustrate the drawing of the cupola and portico towards the quadrangle, on a larger scale, which was also exhibited at the Royal Academy.

HOLLOWAY SANATORIUM: PROPOSED MALE INFIRMARY.

This building has been designed to meet the requirements for special accommodation for sick and paralysed male patients. The site is detached, but close to the main building. The idea is that the building shall be self-contained, having its own kitchen and administration, and quarters for one of the medical staff. There are three distinct

classes of patients to be housed in it, namely, (1) sick male patients, (2) sick male attendants, and (3) general paralytics. Spacious airing grounds are provided in front of the infirmary. The materials are local red bricks and tiles, Portland stone copings, etc., and teak joinery. The estimated cost, including engineering work, lighting, etc., is about 12,000l. The architect is Mr. R. W. Schultz, 14, Gray's Inn-square, W.C., and the consulting engineer is Mr. W. H. Massey, Twyford, Berks.

STATION-STREET BUILDINGS, HUDDERSFIELD.

THESE buildings have been erected in a prominent position in Huddersfield by Mr. T. Brook, contractor, of Huddersfield. The elevations are faced with York stone, and all floors are fireproof. Messrs. Abbey & Hanson, surveyors, Huddersfield, prepared the working drawings from the design of Mr. J. Hatchard Smith, of London, who periodically visited the work during progress.

PROPOSED COLUMBARIUM FOR THE BOROUGH COUNCIL OF HAMPSTEAD.

THE illustration is reproduced from the selected design of Mr. J. J. S. Naylor, architect, of London, and is the result of the open competition which was held in 1904.

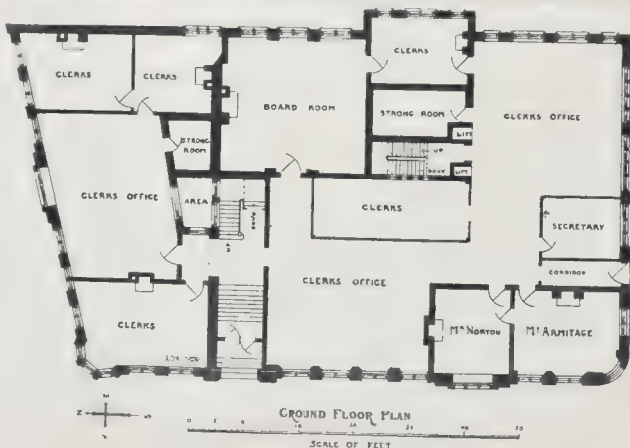
The building includes the columbarium, with its ornamental internal structures of marble for the storage of cinerary urns, and the mortuary in the rear. The centre structure, of white statuary and Sienna marbles, contains accommodation for 136 urns, and the Portland stone wall niches contain accommodation for 394 urns, the total accommodation being 530 urns.

The facings of the building and portico are to be of brown Whitbed Portland stone, the dome being constructed of reinforced concrete covered with copper, the lights in the dome of ½-in. hammered plate in copper frames.

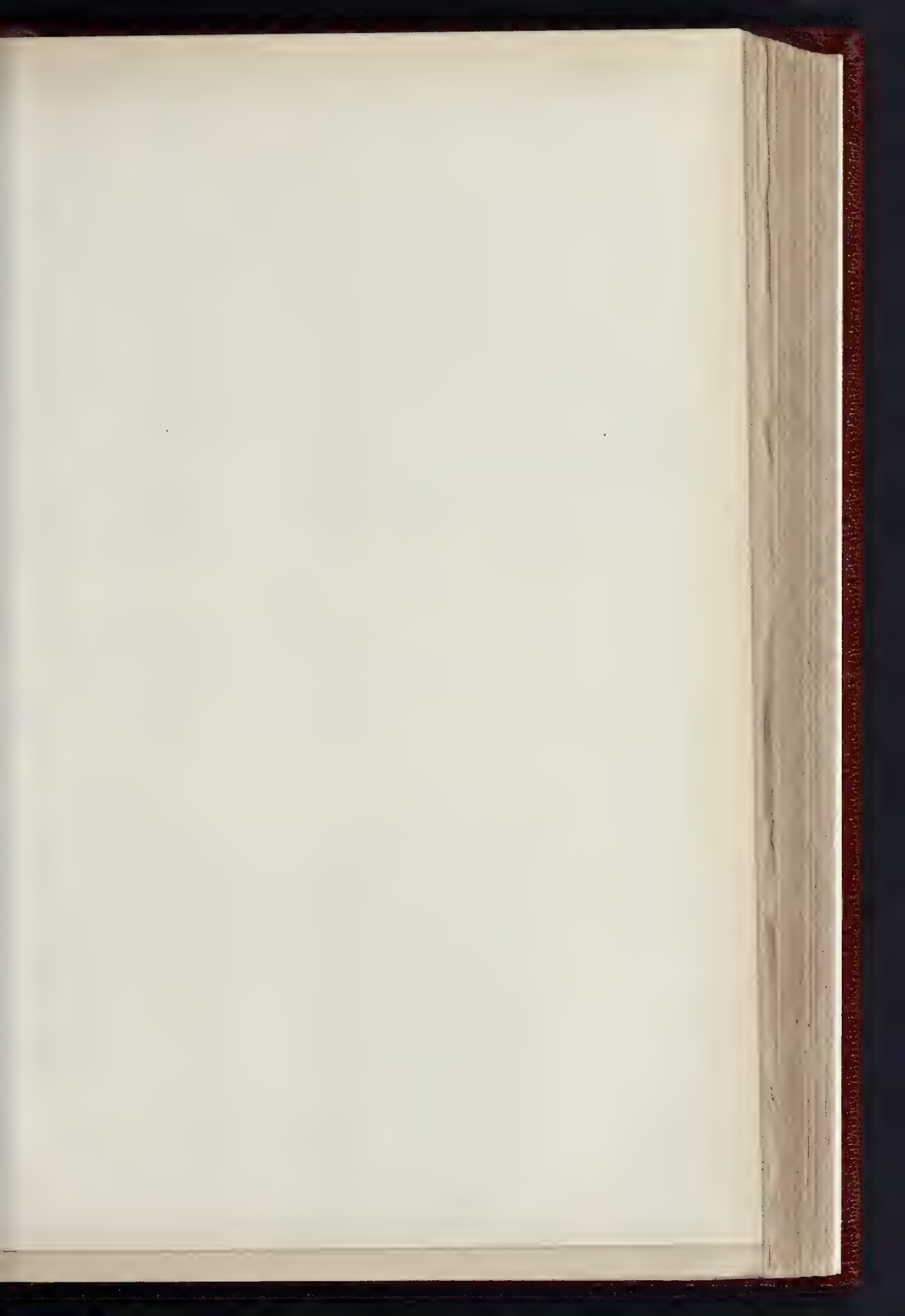
The doors are to be formed of wainscot oak.

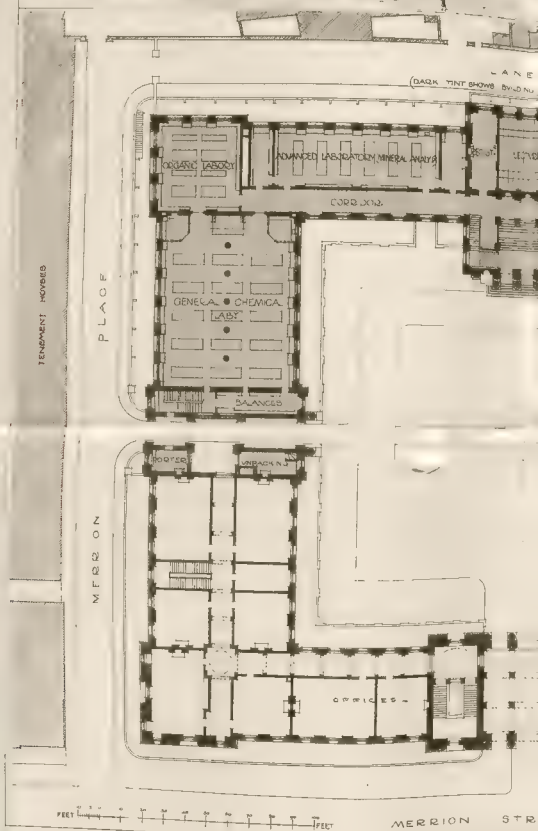
The lowest estimate amounted to 2,200l., including quantity surveyor's fees and lithography.

FACTORY, KINLOCHLEVEN, N.B.—The necessary engineering work is in progress for providing the water power for the working of a large factory, to be built at Kinlochleven. Drawings have been prepared by Messrs. W. J. Morley & Son, of London and Bradford, for this factory and for the various other buildings that will be required. These include workmen's cottages, blocks of flats, barracks for single men, institute and baths, schools, and sundry other larger houses for the accommodation of the staff. Forty dwellings and one block of barracks for fifty-two men are now being proceeded with, and the factory will be started shortly. The contractors for the work in hand are Messrs. McLoughlin & Harvey, of Belfast and London.

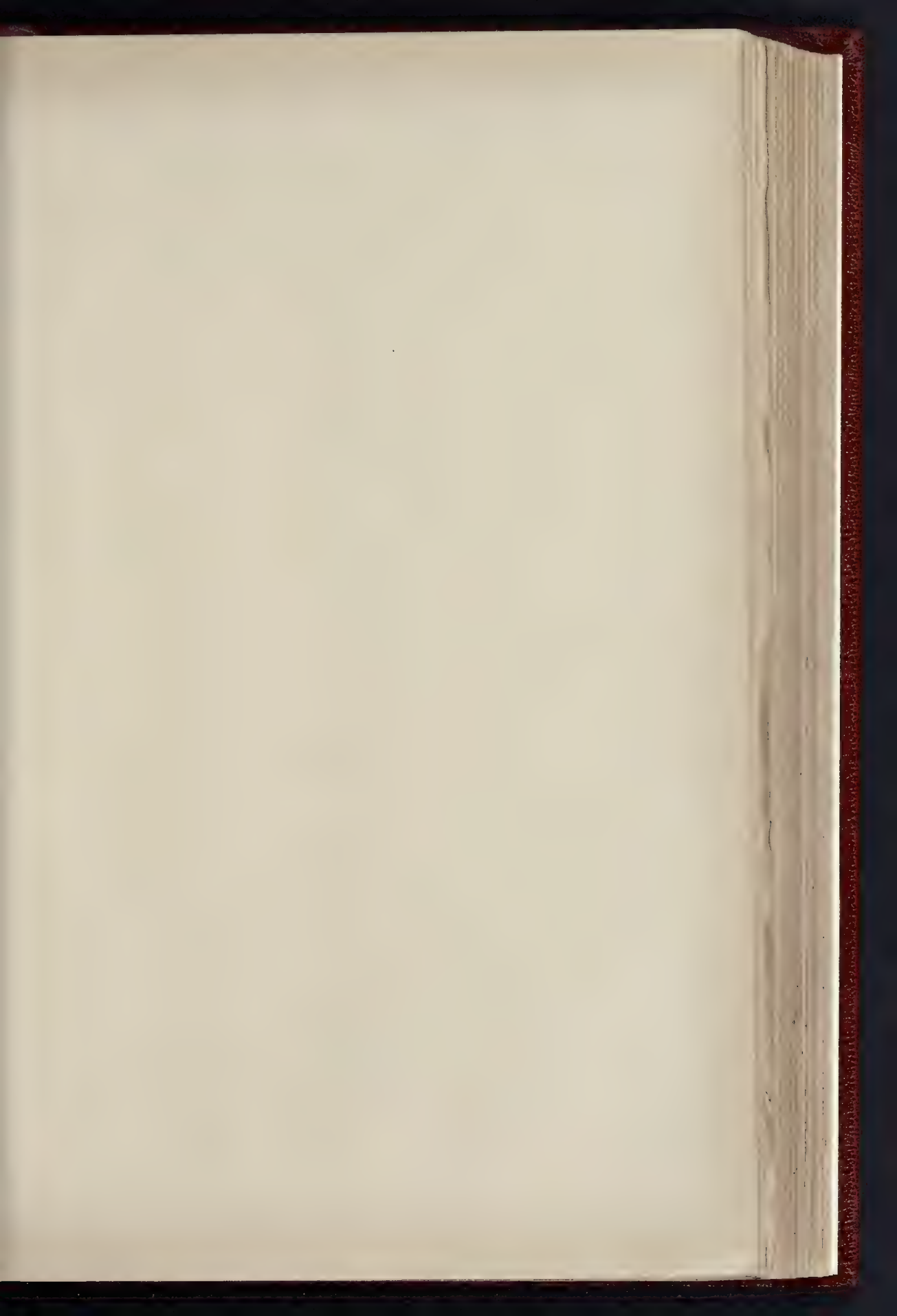


Station-street Buildings, Huddersfield

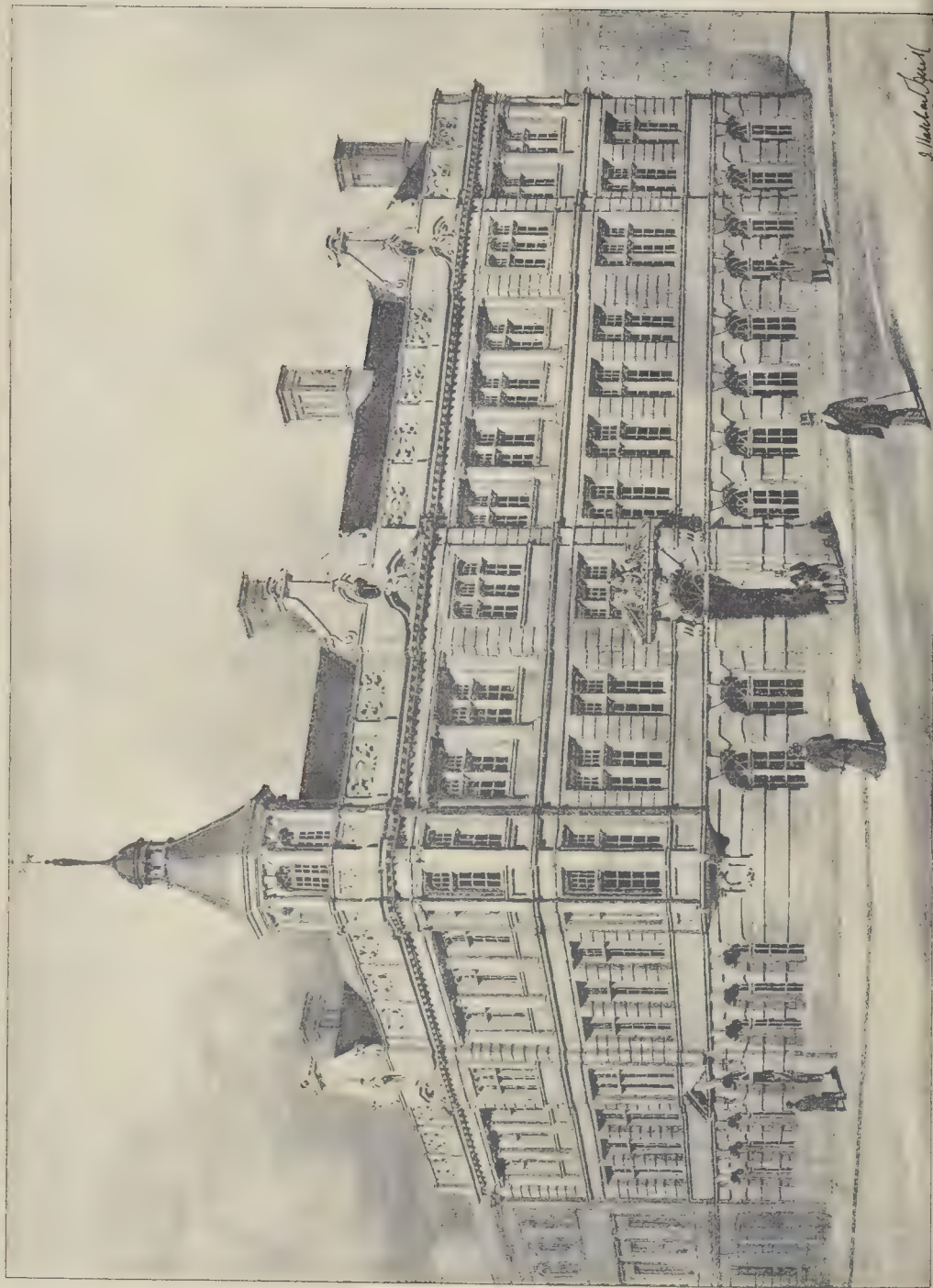




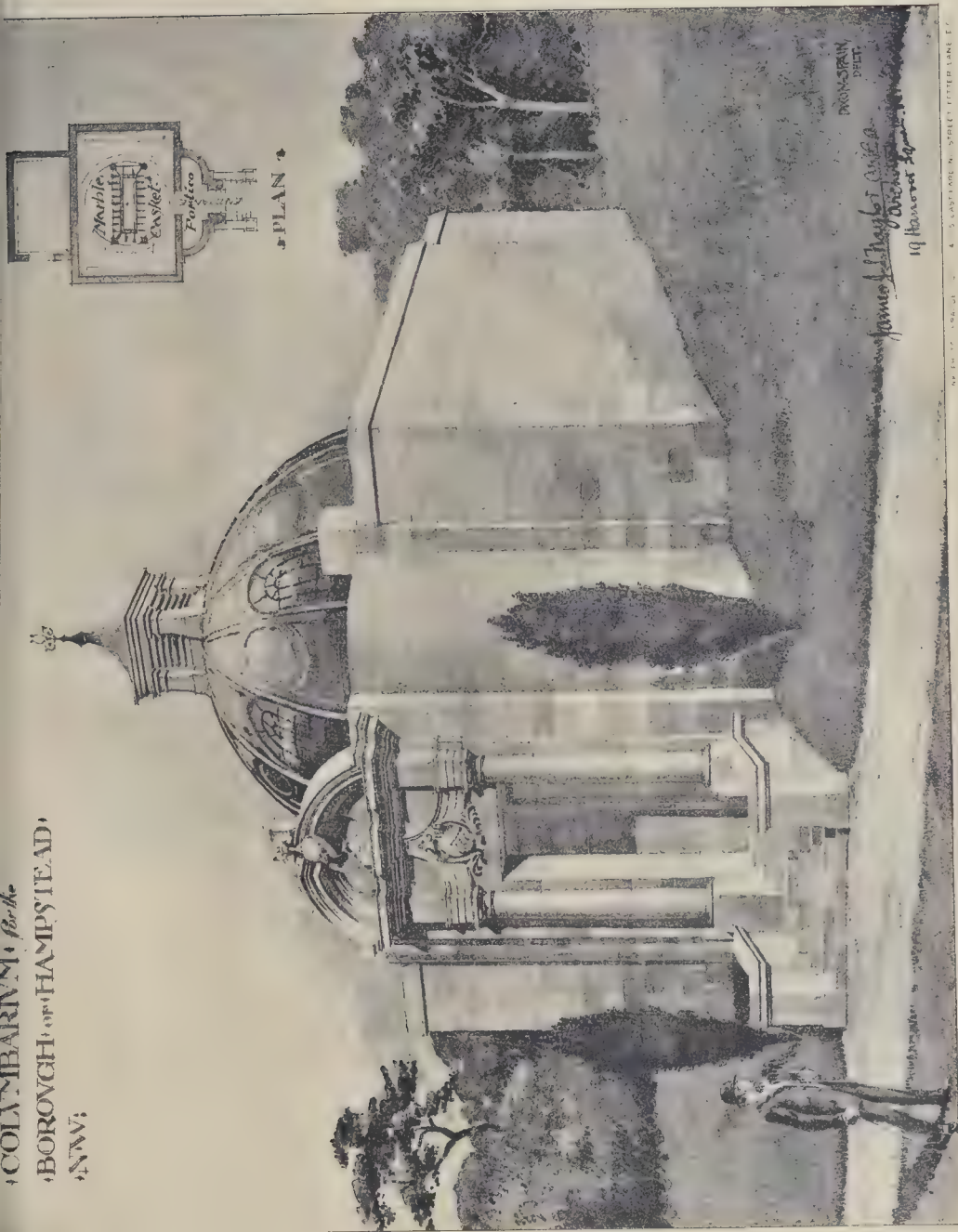




THE BUILDER, SEPTEMBER 29, 1906



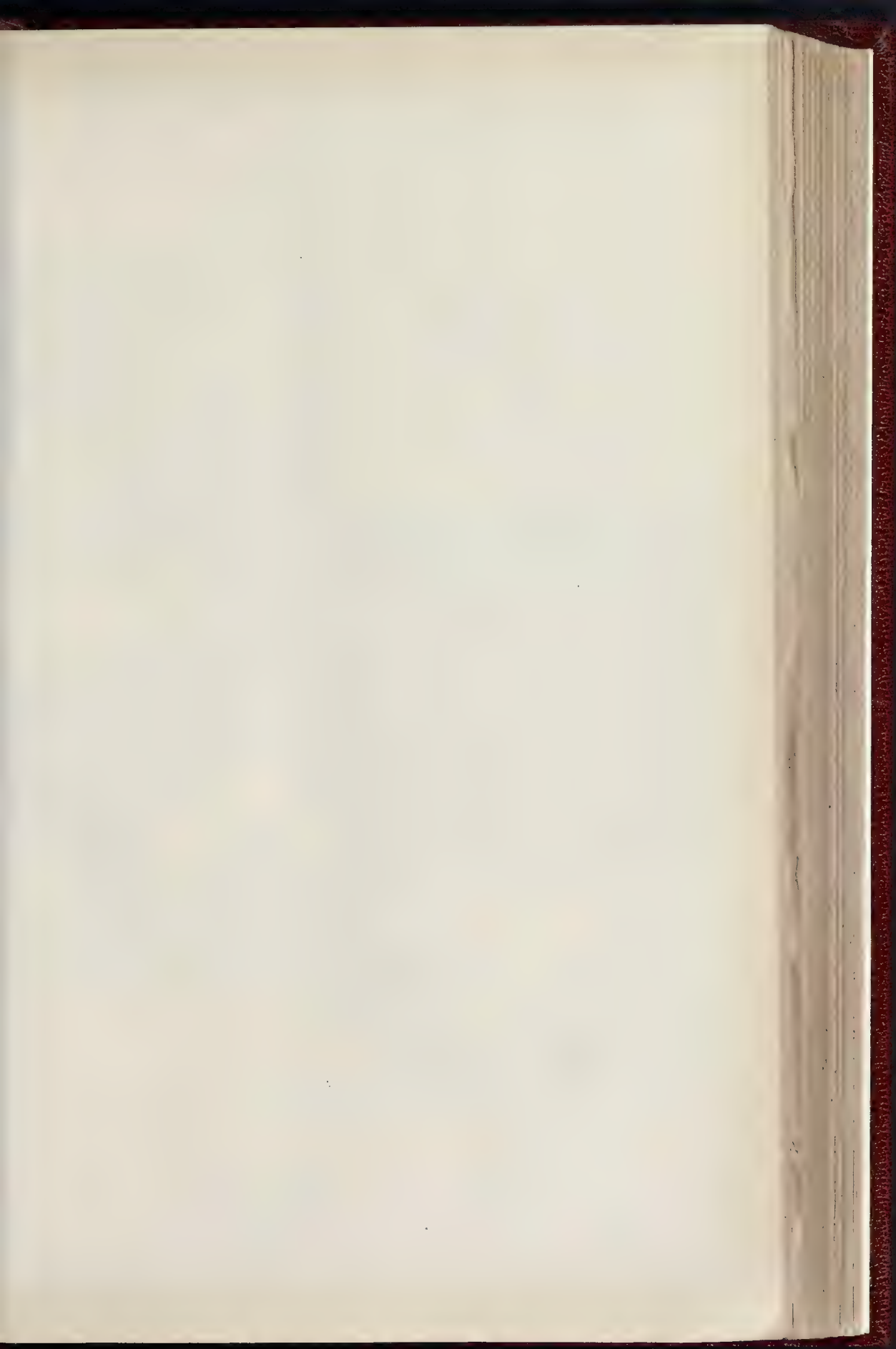
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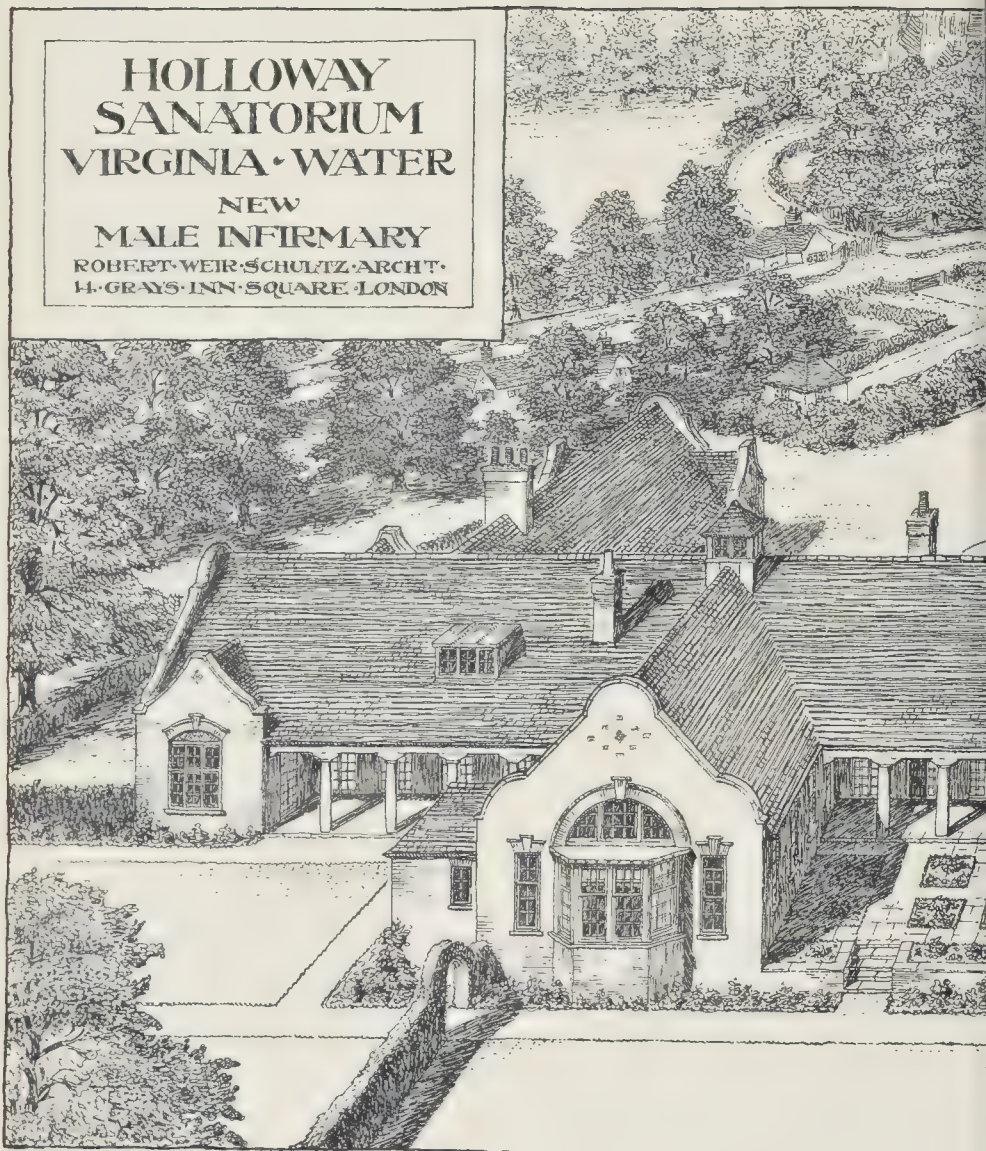
James L. May Jr. Esq.
19 Hamond Square

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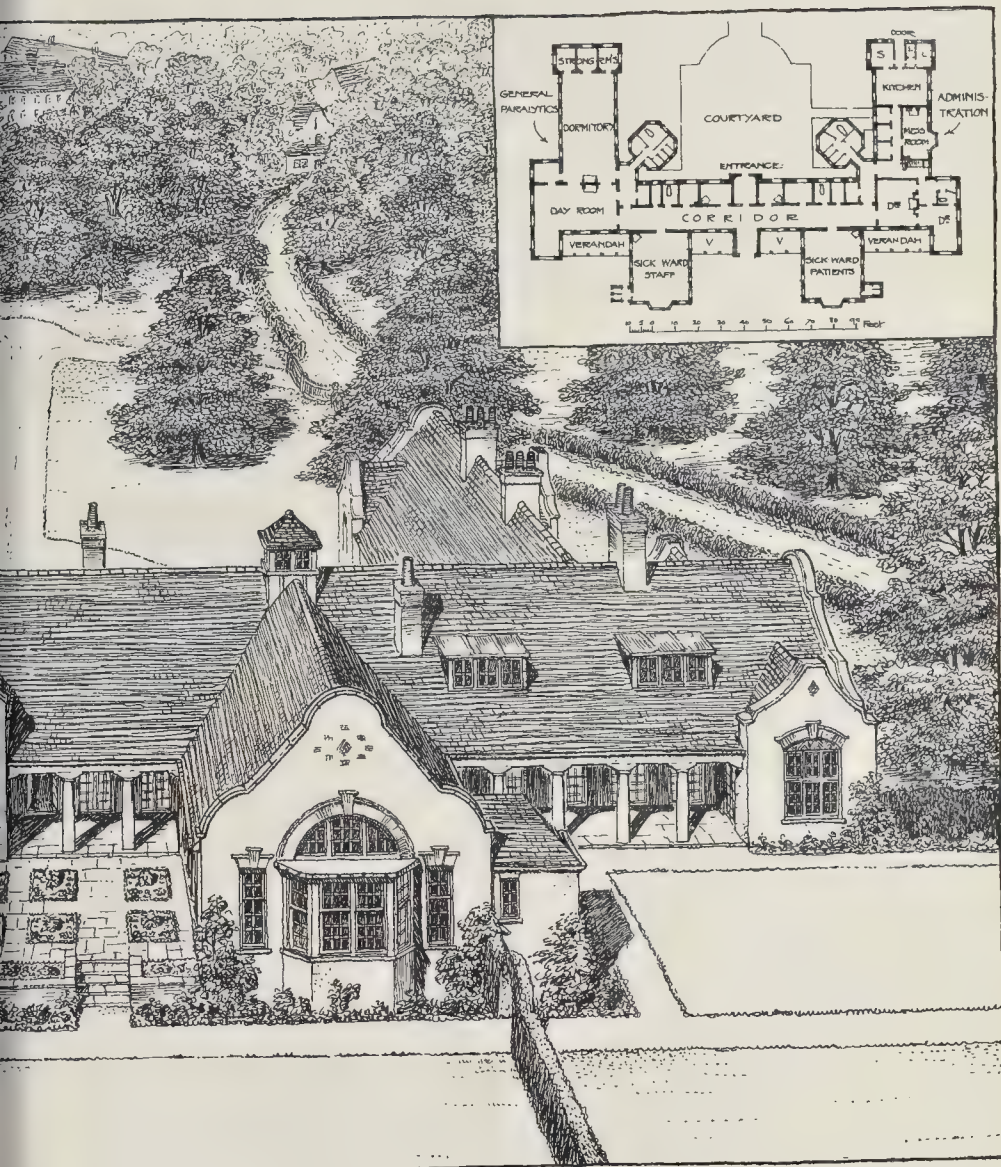


PHOTO BY SPRAGUE A. C. 125 EAST MADISON STREET - KETTER LAKE, ILL.

The Student's Column.

ROOFS: STRUCTURALLY CONSIDERED.—XI.

3.—Details of Simple Timber Roof Frames.

IN the most simple form of *lean-to* roof suitable for a shed of small span the only members of the framing are rafters built into one wall at intervals of from 12 in. to 15 in. part, and resting upon the other wall (see Fig. 101). Where such an arrangement is adopted the rafters do not constitute a *rane*, except when boarding is nailed upon them as a basis for the roof covering.

A more workmanlike method of construction is to notch the end of the rafters upon *wall plates*, securing them in position by nails. The rafters may be built into the brickwork at the upper end or simply nailed in place on the wall plate.

Fig. 102 shows two wall plates built into the brickwork, the upper end of the rafter being built into the wall and notched upon one plate and the lower end notched upon the other.

Fig. 103 shows the upper wall plate laid in a corbel and the lower wall plate laid in the top course of brickwork. The upper end of the rafter butting against the face of the wall is notched upon the wall plate, which should be bolted through the brickwork. The lower end of the rafter is notched upon the other wall plate and fixed by nails.

In the elementary form of construction mentioned above the gutter can either be dispensed with or attached to the ends of the rafters by nails or screws.

A lean-to roof of wider span may require the addition of a tie-beam, making the construction similar to that represented in Fig. 104. Here the upper end of the rafter is notched upon a wall plate let into the wall, and the lower end is secured to the tie-beam by an oblique tenon-joint, shown in detail by Fig. 105. The tie-beam is built into the brickwork upon a wall plate. If the front wall is carried above the lower edge of the roof to form a parapet, as shown in Fig. 104, it becomes necessary to employ a roof gutter differing from that suited to a roof projecting over the front wall.

Two alternative methods of guttering for a roof with parapet wall are illustrated in Figs. 106 and 107. In Fig. 106 the gutter consists of a strip of zinc or lead shaped to fit the angle between the inner surface of the brickwork and the upper surface of the roof, and carried up to a sufficient height at either side. In Fig. 107 bridging pieces are fixed at suitable intervals, being supported by a strut at one end and the rafter at the other. These supports are connected by longitudinal strips of timber carrying a zinc or lead gutter as shown.

For lean-to roofs of still wider span the framework consists of triangular trusses, usually spaced about 10 ft. apart, and connected by *purlins*, supporting *common rafters*, spaced from 12 in. to 15 in. apart, on which the roof covering is laid.

As will be seen by reference to Fig. 108, a roof truss of the kind now under consideration resembles half a king-post truss in appearance. The tie-beam is fixed in the manner previously illustrated; upon it, and secured by a *joggle* or *stub-tenon* to prevent lateral displacement, is a king-post. At the upper end of the post a fillet is attached against the bevelled edge of which butts the upper end of the principal rafter, the lower end of the same member being jointed into the tie-beam by an oblique tenon.

For the purpose of affording intermediate support for the principal rafter the diagonal strut is jointed to the under side of that member by an oblique tenon, and the foot of the strut is tenoned into the inclined shoulder of the king-post.

The *purlin* is a beam running longitudinally from truss to truss bracing the construction and affording intermediate support for the common rafters. The purlin is notched upon the upper face of the principal rafters and into the lower face of the common rafters, as shown in Fig. 109. The purlin receives further support from the cleat *housed* into or simply nailed upon the principal rafter.

The common rafters are let into the wall at the upper end, and nailed to the tie-beam

at the lower end. A better method of construction would be to provide a *pole-plate* connecting the outer ends of the tie-beams as usual in the case of king-post and other roofs.

In the most simple form of *couple roof*, Fig. 110, the rafters rest upon wall plates at the foot, being secured by nailing, and at the top are butted together and nailed, or crossed and nailed.

Improvements which can be effected at merely nominal cost are illustrated in Fig. 111, where the rafter shown is notched over the wall plate and projects beyond the front of the wall for the better discharge of rain, and a *ridge board* is added between the rafters.

In the *tied couple roof* (Fig. 112) the rafters abut at the upper end against and are nailed to a ridge-board, and at the lower end are securely nailed to the tie-beam, which is notched upon the wall plates. Timber is generally more convenient than a wrought-iron or steel tie for connecting the rafters, because of its suitability for the addition of a ceiling.

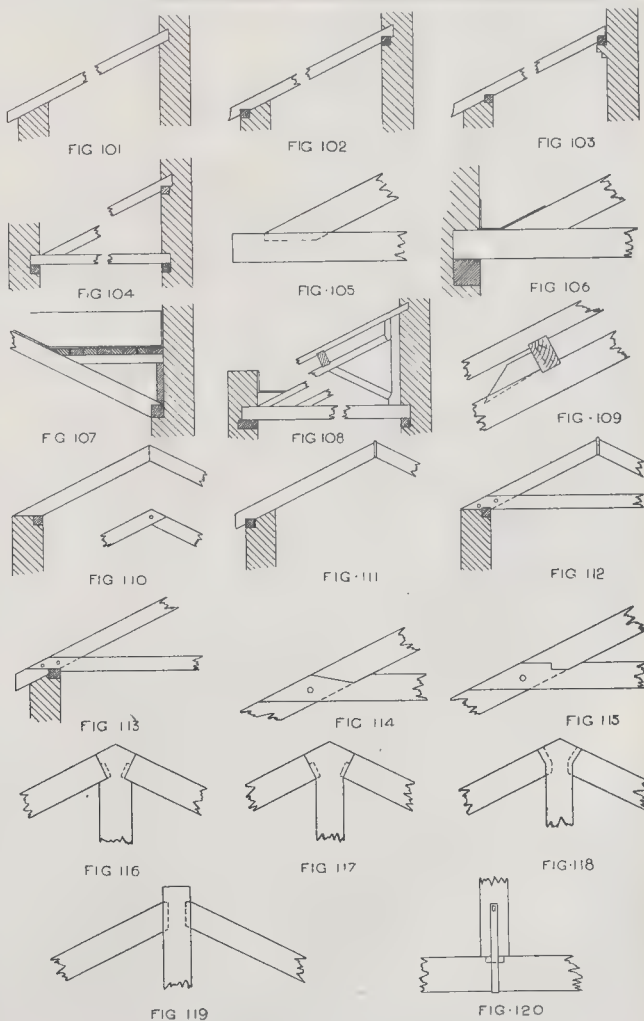
A preferable mode of construction for the tied-couple truss is shown in Fig. 113, where the rafters are extended so as to overhang the walls, thereby providing more adequately for the discharge of rain water from the roof covering.

The method of jointing the tie-beam with the rafters, as illustrated in the two preceding sketches, is open to the serious objection that the only resistance to tensile strain is afforded by the nails driven through the timbers. For the purpose of increasing the rigidity and security of the construction the members should be connected by some suitable form of joint. Fig. 114 represents an ordinary *dove-tail notch*, where the rafter is cut out sufficiently to afford a bearing for the tie; the latter is correspondingly notched, and the joint completed by a stout pin. It will be observed that the lower side of the joint is cut straight and the upper side at an angle.

The objection to any joint of this kind is that the shrinkage of timber across the grain is greater than that longitudinally with the grain. Hence a tie-beam so connected must tend to draw out after a time. Further, the joint is structurally weak at the angle formed by the upper line of the notch.

An improved type of notch similar to that recommended by Tredgold is shown in Fig. 115, but this is obviously less suitable for rafters and tie-beams than for joints where the timbers are at right angles to each other.

We next take up the case of a *tied-couple* with the addition of a king-post. In small span roofs with common rafters the head of



Illustrations to Student's Column.

the king-post is sometimes shaped to follow the inclination of the roof. Then to obviate unduly weakening the head of the post, as would be the case if joints were adopted like those in Fig. 116, one of the arrangements illustrated in Figs. 117 and 118 may be applied with advantage. In one case the tenon extends only about halfway along the joint so that the upper side of the mortise may form a strong check above the tenon. In the other case the tenon can be carried entirely along the joint, whose angular form provides against upward displacement.

A less costly and in every way preferable alternative is to let the king-post project as a ridge above the rafters, which are tenoned into the post indicated in Fig. 119.

In a simple roof of the kind now under consideration the king-post may be connected for suspension of the tie-beam by a notched joint, as already described and illustrated, or the post can be jogged into the tie-beam and the joint completed by the addition of an iron suspension strap, as in Fig. 120.

The addition of diagonal struts, by which the construction is developed into a complete king-post truss, is scarcely necessary for small and simple roofs such as form the subject of the present notes. The details of king-post trusses will be taken up in a succeeding article.

In a collar-beam roof the horizontal member should be fixed by means of a notched joint similar to either of those illustrated in Figs. 114 and 115.

Assuming the walls to be incapable of resisting the outward thrust of the roof, the collar-beam is usually placed one-fourth of the way up as a tie, and the joint should be made with special regard to the resistance of tension.

On the other hand, where the horizontal thrust is resisted by the walls the collar-beam is fixed as a strut about half-way up, and the joints should be made with shoulders of ample depth.

Among the foregoing examples we have illustrated only one roof (Fig. 108) where the trusses are applied as principals, being fixed at intervals and connected by purlins, on which common rafters are laid for supporting the roof covering.

It should be stated, however, that any of the trusses described which include tie-beams can be employed in the same way, providing the scantlings of the members are made adequate for the increased strains involved.

A further point worthy of note is that, even where the trusses are not applied as principals, a tie-beam need not be fixed between the ends of each pair of rafters. They may be placed at intervals of from 5 ft. to 10 ft. apart if the wall plates are of sufficient width to enable them to take the thrust between the ties, and if the foot of each rafter is properly notched upon the wall plate. The use of tie-beams in the way here indicated results in an economical form of roof construction, and one that is far more satisfactory from the structural standpoint than a collar-beam roof.

Tredgold's rule given below for the proportions of common rafters will be found generally useful in calculations relative to lean-to, couple, tied-couple, and collar-beam roofs:—

$$d = \frac{L}{\sqrt{b}} \times 0.72 \text{ for fir}$$

$$\frac{L}{\sqrt{b}} \times 0.74 \text{ for oak . . . (5)}$$

when

L = unsupported length in feet,
 b = breadth in inches.
 d = depth in inches.

Example (1).—Find the depth for a deal rafter, 2 in. thick, in a couple-roof of 12 ft. span with the pitch of $26^{\circ} 33'$.

Here the slope of the rafter represents the hypotenuse of a triangle, the length of whose base equals half the length of the roof span. Consequently by trigonometry the length of the rafter is $(12 \div 2) \div \cos 26^{\circ} 33' = 6 \div 0.895 = 6.7$ ft.

Substituting this and the other values in formula (5), we have

$$d = \frac{6.7}{\sqrt{2}} \times 0.72$$

$$= 5.32 \times 0.72 = 3.83 \text{ in.}$$

The rule can be simplified for application to the usual thickness of 2 in. adopted for common rafters as follows:—

$$\frac{L}{\sqrt{2}} \times 0.72 = L \times \frac{0.72}{1.26}$$

whence

$$d = L \times 0.571 \dots (5a)$$

Tables XXII. and XXIII., giving the dimensions of common rafters for various thicknesses and unsupported lengths, has been calculated by formula (5). The depths are stated in decimals, so that the calculated gradation of dimensions may be more clearly seen.

The proportions of collar-beams at any height above the level of the wall plate can be calculated by the rule

$$d = \frac{L}{\sqrt{b}} \times 0.72 \dots (6)$$

where L = the clear length of the under side of the collar-beam.

Example (2).—Find the depth of a collar-beam 2 in. thick placed one quarter of the way up a roof with the span of 12 ft.

Here L = 9 ft., and b = 2 in.

Substituting these values in formula (6) we have

$$d = \frac{9}{\sqrt{2}} \times 0.72$$

$$= 5.14 \text{ in., say, } 5\frac{1}{4} \text{ in.}$$

TABLE XXII.—SCANTLINGS OF COMMON RAFTERS IN FIR, OF VARIOUS WIDTHS AND UNSUPPORTED LENGTHS. (RAFTERS 12 IN. APART.)

Unsupported Length in Feet.	Width of Rafter in Inches.				
	1½	2	2½	3	3½
5	2.91	2.86	2.75	—	—
6	3.39	3.43	3.30	3.19	—
7	4.18	4.00	3.85	3.71	3.51
8	4.79	4.57	4.40	4.25	4.00
9	5.38	5.15	4.95	4.79	4.50
10	5.98	5.71	5.50	5.31	5.00

TABLE XXIII.—SCANTLINGS OF COMMON RAFTERS IN FIR FOR ROOFS OF VARIOUS SPANS, PITCH = $26^{\circ} 33'$. (RAFTERS 12 IN. APART AND WITHOUT INTERMEDIATE SUPPORT.)

Span of Roof in Feet.	Width of Rafters in Inches.				
	1½	2	2½	3	3½
8	4.07	3.55	3.45	—	—
10	4.25	3.70	3.62	2.96	—
12	4.61	3.92	3.88	3.55	3.35
14	4.68	4.46	4.40	4.15	3.91
16	5.05	5.10	4.92	4.75	4.40
18	5.34	5.65	5.52	5.05	5.29

TABLE XXIV.—SCANTLINGS OF FIR COLLARS (QUARTER-WAY UP) FOR COLLAR-BEAM ROOFS (RAFTERS 12 IN. APART.)

Span of Roof in Feet.	Breadth of Collar-Beam in Inches.				
	1½	2	2½	3	3½
8	3.58	3.42	3.30	3.19	2.95
10	4.18	4.28	4.12	3.98	3.75
12	5.07	5.14	4.95	4.79	4.50
14	5.27	5.77	5.57	5.29	5.29
16	5.77	6.83	6.60	6.37	6.00
18	6.01	7.71	7.42	7.17	6.75

TABLE XXV.—SCANTLINGS OF FIR COLLARS (HALF-WAY UP) FOR COLLAR-BEAM ROOFS (RAFTERS 12 IN. APART.)

Span of Roof in Feet.	Breadth of Collar-Beam in Inches.				
	1½	2	2½	3	3½
8	2.94	2.78	2.70	2.65	—
10	3.38	3.28	3.19	3.14	—
12	3.98	3.92	3.85	3.79	2.95
14	4.18	4.69	4.60	4.51	3.75
16	4.77	5.36	5.16	4.95	4.00
18	5.07	5.71	5.50	5.29	4.50

Example (3).—Find the depth of a collar-beam 2 in. thick placed half way up a roof with the span of 12 ft.

Here L = 6 ft. Substituting this value in formula (6) we have

$$d = \frac{6}{\sqrt{2}} \times 0.72$$

$$= 3.42 \text{ in., say, } 3\frac{1}{2} \text{ in.}$$

Tables XXIV. and XXV. have been calculated by formula (6) for collar-beams of different thicknesses for roofs of various spans.

Tredgold's rule for tie-beams gives results that would be unnecessarily high for tie couple roofs, even if the ties were applied at intervals of 10 ft. apart.

In its usual form the rule is

$$d = \frac{L}{\sqrt{b}} \times 1.47 \text{ for fir.}$$

$$= \frac{L}{\sqrt{b}} \times 1.52 \text{ for oak . . . (7)}$$

If modified by adopting 1.1 as the value for fir of the last factor, the dimensions thereby calculated will be found adequate for tie-beams spaced from 5 ft. to 10 ft. apart in light tied-couple roofs.

A point never to be overlooked is that due allowance must be made for loss of strength due to notched or other joints in rafters.

Tables XXVI. and XXVII. contain further particulars relative to couple and collar-beam roofs.

TABLE XXVI.—SCANTLINGS FOR COUPLE ROOFS IN FIR; RISE = $\frac{1}{4}$ SPAN, ROOF COVERED WITH SLATES LAID ON BOARDING.—(Wray.)

Span of Roof.	Rafters.	Ridge Board.	Ceiling Joists.
Feet.	Inches.	Inches.	Inches.
8	2 x 3	1½ x 7	2 x 4
10	2 x 3½	1½ x 7	2 x 5
12	2 x 4	1½ x 7	2 x 6
14	2 x 4½	1½ x 7	2 x 7
16	2 x 5	1½ x 8	2 x 8
18	2 x 5½	1½ x 8	2 x 9

TABLE XXVII.—SCANTLINGS FOR COLLAR-BEAM ROOFS IN FIR; PITCH UP TO 30°.—(Wray.)

Span of Roof.	Rafters.		Collars.	
	Thrust Taken by Walls or Ties. Compression Collar Half-way up.	Thrust Taken by Tension Collars Quarter-way up.	Quarter-way up.	
	No Ceiling.	With Ceiling.	No Ceiling.	With Ceiling.
Feet.	Inches.	Inches.	Inches.	Inches.
8	1½ x 3½	1½ x 3	2½ x 3½	1½ x 3½
10	1½ x 4	1½ x 3½	2½ x 4	1½ x 4
12	1½ x 4½	1½ x 4	2½ x 4½	1½ x 4½
14	1½ x 5	1½ x 4½	2½ x 5	1½ x 5
16	2 x 5½	2 x 5	2½ x 5½	2 x 5½
18	2 x 6	2 x 5½	2½ x 6	2 x 6

General Building News.

NEW CHURCH, THORNHAM.—The foundation-stone of a new church at Thornham, near Middleton, was laid recently. It is intended to build chancel, nave, and vestries, at a cost of about 4,500*l.*, leaving the completion of the edifice to a future period. Mr. R. B. Preston, of Manchester, is the architect of the work.

FREE METHODIST CHURCH, STAPENHILL.—BURTON-ON-TRENT. A new Free Methodist church is being erected on a site in Hill-street, Stapenhill. It has been designed by Mr. T. Jenkins, architect, of Burton and Swadincote. **R.C. CHURCH, TULLAMORE.**—A new Catholic church is to be opened at Tullamore on October 7. From the outside eastern wall to the west door the church measures 172 ft., and consists of nave, 36 ft. wide, and side aisles, 18 ft. each in width. The sanctuary is of apsidal shape, having on either side two chapels. The vestry and tribune are both veiled off from the high altar by pitchpine perforated screens. Over the altars the groined roof is of consists of nave, 36 ft. wide, and side aisles, and the great gallery over the nave consists of polished pitchpine panels. The clerestory windows and the window on the west end, as well as the windows on the side aisles, are glazed with cathedral glass, and were designed by Messrs. Clarke, church decorators, Dublin. In the west end of the church, on a station-plate gallery, stands an organ, built by Messrs. Telford & Telford, Dublin. Messrs. Malone, of Dublin, executed the high altar. The plans were prepared by Mr. M'Namara, architect, of Dublin, and the estimated cost of the building, including the tower and spire, internal fittings and furniture, is about 25,000*l.*

CHURCH RESTORATION, WINTARBING.—The work of restoring the parish church at Wintarbing has now been completed. The general contract has been carried out by Mr. W. H. Ludkin, of Banham; the stonemasonry by Mr. A. W. Perfit, of Long Stratton; the glazing by Mr. T. Horth, of Norwich; and the re-casting of the lead by Mr. J. T. Gibson, of Norwich. All the work was executed under the supervision of Mr. Arthur J. Lacey, architect and Diocesan Surveyor, of Norwich.

WESLEYAN CHURCH, PENZANCE.—A new Wesleyan church is being erected on the Richmond estate, opposite Toliver-place, Penzance. The plans were prepared by Messrs. Gordon & Gunton, of London. The structure was designed by Mr. Edward Pidwell, of Penzance. The church will provide accommodation for 550 persons, and the scheme, it is estimated, will cost about 6,000*l.*

BAPTIST CHAPEL, HENGEOED.—A new Baptist Chapel has been erected and will shortly be opened at Hengoed. The building is a native stone with rough ash face and Portland cement dressing. The heating is on the high-pressure system, and the apparatus was installed by Messrs. Baker, of Newport. The architect is Mr. George Kenshole, of Bargoed, Nelson, and Hengoed, and the builder is Mr. Richard Jones, of Maesgwynner.

GRAMMAR SCHOOL, OSSETT.—The formal opening took place on the 24th inst. of a new grammar school at Ossett. The building, which is not new, but was previously a large private residence, known as the Park House, has been converted, at a total cost of about 5,000*l.*, into a secondary school, providing accommodation for 120 scholars. Mr. F. W. Ridgway, architect, prepared the plans for the work.

SECONDARY SCHOOL, DEVIZES.—A new secondary school has been erected and opened at Devizes. The main entrance of the school is in the centre of the front elevation of the main building, and leads through a porch and entrance lobby into the assembly-hall, with small rooms on either side (approached from the hall) for the head-master, assistant masters, assistant mistresses, and caretaker. The

contractor being Mr. Charles Bryor, jun., of Bridgwater. The rooms are grouped round the large hall, which is entered from a porch at the corner. The building is of Bridgwater bricks, covered with Bridgwater tiles, and has five varieties of local stone in its decoration; while the teak, of which all the joinery and furniture is made, comes from Burma. The cost, about 3,500*l.*, has been defrayed by Mr. Andrew Carnegie.

NEWCASTLE CENTRAL STATION (PASSENGER TRAFFIC).—In a "Note" in our number of September 1 we adverted to the new goods station which the North-Eastern Railway Company have just erected in Newcastle-on-Tyne, after the designs of their chief architect, Mr. William Bell, of York. Mr. Bell is now carrying out some extensive alterations at the Central Station for that Company, to enable the traffic from King Edward Bridge to enter at the west end and to leave at the east end of the station, and *vice versa*. The improvements comprise the building of new offices, the lengthening and widening of some of the platforms from the west end, and the construction of a new "island" platform extending beyond the present roof for the Carlisle and westward traffic. Mr. Charles A. Harrison, chief engineer for the northern division of the company's system, has made designs for the permanent ways and junctions, as well as for the installation of the Westinghouse electro-pneumatic signalling, for which a new signal-box, fitted with 211 levers, has been built at the north approach of the new bridge. The contractors for the masonry work and for the roofing, etc., are Mr. Bolam, of Birley, co. Durham, and the Clyde Structural Iron Company, of Scotstoun, Glasgow, respectively. It is stated that the signal-box is the largest in Great Britain in which pneumatic or electric power is employed.

TOWN HALL, SUTTON COLDFIELD.—The new Town Hall in King Edward-square, adjoining the existing Council-house, was opened on the 19th inst. The building contains a large assembly-room, reception or supper room, entrance and crush halls, with cloak-rooms and lavatories for both sexes, dressing-rooms, and a green-room have been provided in connexion with the platform, which is also convertible to stage purposes. The clock-tower acts as a ventilating shaft. The style adopted has been Georgian, to harmonise with the character of the town, the materials adopted being red local bricks and Monk's Park stone, with Kentmere slates for the roofs. The system of ventilation and warming adopted is the Plenum. The general contractor was Mr. W. D. Plenum, of Birmingham. The stone was supplied by the Bath Stone Firms, Ltd., the fibrous and other plastering was carried out by Messrs. Mallin & Co., of West Bromwich; the leaded glazing by Mr. A. J. Dix, of London; the wrought-iron work by Messrs. Keeling, Teale, & Co., of London; the locks, door and window furniture, springs, etc., by Messrs. Ramsay & Brothers, of Birmingham; the clock in tower by Messrs. Evans & Sons, of Birmingham; the stone-carving by Mr. Gilbert Seale, of London; the granolithic paving by Stuart's Granolithic Company, of London; the sanitary fittings by Messrs. Twyford, of Hanley; the heating and ventilating engineering by Messrs. Ashwell & Nesbit, of Leicester and London. The electric wiring has been carried out by Mr. Vaughton, of Birmingham; and the electric fittings by the General Electric Company, under the superintendence of Mr. Trevor Dunsbury, the Borough Electrical Engineer. Mr. Arthur E. Mayston, of London, was the architect, and, as no clerk of works was employed, he was assisted in the superintendence by Mr. W. A. H. Clarry, the Borough Surveyor. The new fire-station, which really forms part of the building, was opened in November last.

Sanitary and Engineering News.

COMPLAINTS AS TO A LONDON COUNTY COUNCIL SEWER.—In a Report, issued on Saturday, the Public Health Committee of Kensington reported that the Medical Officer of Health had informed them of the receipt by him of numerous complaints of offensive smells from untrapped street gullies and surface ventilators, particularly those on the line of the new relief sewer of the London County Council serving the northern portion of the borough, which has become operative within the last month. One complaint, referring to effluvia proceeding from the sewer in question, took the form of a memorial signed by no less than sixty inhabitants of Cornwall-road and Clarendon-road. The Committee learned from the correspondence which had passed between the Medical Officer of Health and the Chief

Engineer of the London County Council that the sewer does not actually carry surface or house drainage until the water in the middle-level sewer rises to a height of 2 ft. 8 in. above the invert, but that during the recent dry weather it has been acting through a number of 2-in. circular openings as a ventilator to the middle-level sewer, and has thus apparently created a very serious nuisance throughout a considerable portion of its length. The Committee were given to understand that, as a result of representation made to the London County Council, all the surface ventilators of the sewer have been temporarily closed, as well as two ventilators on the middle-level sewer in Colville-terrace and Cornwall-road by Basing-road; but, inasmuch as the action taken is admittedly of a tentative character, the Committee had given directions for a communication to be addressed to the London County Council inquiring what steps it is proposed to take to effectually and permanently remedy the grave nuisance and danger to health to which attention had been called.

Stained Glass & Decoration.

MEMORIAL WINDOW, ALYTH.—A window has been placed in Alyth Parish Church to the memory of Mr. William Robertson, Alyth. It is the work of Mr. Stephen Adam, 188, Bath-street, Glasgow.

MEMORIAL WINDOW, ABEROATH.—A window was recently unveiled in High-street United Free Church, and dedicated to the memory of the late Rev. John Sandison, a former minister of the church. The window is 12 ft. by 3½ ft. It was designed by Mr. William Leiper, R.S.A., Glasgow.

Appointments.

INSTITUTE OF MINING ENGINEERS.—Mr. Maurice Deacon has been elected President for the session 1906-7, *vice* Sir Lees Knowles, retired.

RAILWAY COMMISSION, AUSTRALIA.—The Australian Commissioners for Railways have nominated Mr. T. Roberts, Chief Mechanical Engineer to the Government, South Australia, as consulting mining engineer for the continent of Australia, with offices in London. Mr. Roberts has been latterly employed in the works at Crewe of the London and North-Western Railway, and had previously been in the service of the Metropolitan Railway Company, for whom he designed and erected much of their structural ironwork.

Foreign.

FRANCE.—M. Dujardin-Beaumetz, the Under-Secretary of State for Art, has ordered the restoration of the Abbey of St. Jean-des-Vignes at Soissons, which is in a ruinous condition. It is a fine example of XVIII century architecture, said to have been built by Jean-de-Fontaine, an ancestor of the author of the *Fables*. The restoration is also to be undertaken of the church of St. Léger at Soissons; also of the church of Notre Dame-sur-l'Eau at Domfront, and of the ancient Château of the same city.—Important works have been undertaken for the restoration of the cathedral of Bourges, in the course of which traces have been found of the first building of the XIIIth century, also the sarcophagus of a bishop, containing various ecclesiastical ornaments, which have been placed in the museum at Bourges.

—The Municipality of Beziers have opened a competition for the construction of artisans' dwellings. The awards will be made at the end of next month.—The President of the Republic inaugurated last Sunday, at Marseilles, a monument to Pierre Puget, it is placed in the Square de la Bourse, and is the work of M. Henry Lombard, a Marseilles sculptor and a former Prix de Rome.

Next month the Académie des Beaux-Arts will proceed to the election of a successor to Jules Breton. Among the candidates are MM. Gervey, Chartrain, Raphaël Collin, Tony Robert-Flcury, and Gabriel Perrier.—The Société Nationale des Architectes Français has chosen, for the subject of its fifth annual competition, "A Railway Terminus"—M. Léon Guérin has left a legacy to the Ecole des Beaux-Arts for founding an annual prize for students who have gained distinction in the architectural school.—The Pont Notre Dame at Paris is to be rebuilt shortly; the stone arches will be replaced by steel girders. A statue of Buffon, by M. Carls, is to be placed in the Jardin des Plantes at Paris.—A new square, under the name "Square Carpeaux," is to be formed at Montmartre, on a site between Rue Marcadet, Rue Carpeaux,

and Rue de Maistre.—M. Delorme, of Lyons, has been commissioned to carry out a group of schools at Miribel (Ain).—The Municipality of Toulouse are about to open a competition for the building of a suburban hospital.—The Municipality of Lyons have voted a sum of 120,000 francs for the improvement of the Hôtel Dieu.—M. Pascual, architect, of Bourges, has been elected president, for the next two years, of the Association Regionale of architects of the centre of France.—M. Albert Charles Tissandier, a member of the Société Centrale des Architectes, has died at Pau at the age of 67. He was a pupil of André and of the Ecole des Beaux-Arts. Since 1867 he had frequently exhibited in the annual Salons, and received medals in 1892 and 1895, and a silver medal at the universal exhibition of 1900.—The death is also announced, at the age of 55, of M. Joseph Malézieux, architect, of Saint-Quentin, a former president of the Société des Architectes de l'Aisne, and Vice-President of the Société d'Assistance Confraternelle of French architects.

ITALY.—For centuries engineers have been occupied with the question of improving the Tiber for navigation purposes. In Roman times ships could sail up to Perugia, a distance of 320 kilometres. A century ago the current reached Orte, half-way to Perugia; and recently the damage done by floods has practically stopped navigation. The great flood of 1870, which rose 11.42 metres above normal level, and laid the lower parts of Rome under 4 metres of water, forced the authorities to take preventive measures for the future, to avert disaster. Another difficulty to be contended with in the Tiber is the amount of solid matter the water carries in suspension, which fills up the delta and causes the sea to recede. The old harbour of Ostia, built 633 a.c. by Ancus Martius now lies 4 kilometres inland. It has been estimated that in 1 cm. of water there are 1,460 gr. of matter in suspension, so that yearly the Tiber carries to the sea 5 million cubic metres of deposit. A proposal is now under consideration to further facilitate navigation between Orte and the sea by building a number of locks, by dredging the silted-up mouth at Ostia, and by making a new bed to carry off the surplus water.—The seventh International Art Exhibition will be held in Venice from April 22 to October 31 next year. It will be divided into Italian, foreign, and international sections, and the most distinguished artists will be invited to participate, but nothing which has already been exhibited in Italy will be accepted. The work of artists not personally invited will be submitted to the decision of a jury of admission, composed of five members. Except in the cases of collection or deceased, and in other special circumstances, no artist will be allowed to send more than two exhibits of the same class. Gold medals will be awarded to the best artistic and decorative works. Intending exhibitors must give notice in a duplicate form not later than January 1, 1907. Applications for forms and all subsequent communications must be made to "Segretario Esposizione, Artistica, Municipio, Venice, Italy." The exhibits must reach the exhibition building not later than March 25. Amplest facilities will be granted to foreign artists. With a view to improving the artistic taste of the public in their everyday life, the decoration and fitting-up of the exhibition will be undertaken by the best modern artistic house decorators, always provided the decorations are made to harmonise with the other works of art exhibited in the different rooms.

GERMANY.—Germany was the first nation to recognise, as early as 1749, that, in the interests of safety, navigation requires theoretical as well as practical education. But it was only last autumn that the first school was opened in Hamburg, where instruction is given in all the varied and ever-increasing branches of navigation. This important work was ably planned by Herr Zimmerman, and built at a cost of 477,500 marks.

SWITZERLAND.—In twenty-four hours 5,370,000 cubic metres of fresh air are forced through the Simplon Tunnel. The temperature of the air taken lately at the north entrance was 11½ deg. C.; half-way through this rose to 27 deg. C.; and at 15 kilometres it was 29½ deg. C. In order to cool the air, the sides of the tunnel are sprinkled with water pumped in from the north entrance.—On August 30 died Hans Auer, the designer of the new Houses of Parliament, Bern. Rarely does the work of an architect arouse, during his

lifetime, the amount of diverse and passionate criticism which this building evoked. It chiefly the younger school that condemn him, but future generations will be more kind to him than were his contemporaries. He published numerous works on architecture, wrote the *Encyclopædia of Architecture*, at the Bern University in 1890, besides receiving various honours from the Austrian Government.

EGYPT.—The Sudan Government will shortly dispose by tender of about 400 buildings at Port Sudan. The sites will be leasehold, the annual rents on building lease to be payable only from January 1, 1907. Rents will be payable only from date of acceptance of tender. The lease will be perpetually renewable at revised rents fixed in default of agreement by arbitration at the end of each 10 years. In fixing the revised rents the value of buildings erected by lessees will not be regarded as a ground for increase of rent. Offers are invited of premiums for the purchase of the above-mentioned leasehold sites. All offers must be made by tender, on forms issued by the Sudan Government, and must be received at Khartoum not later than January 1, 1907. Particulars of the sites offered, plan of the town, conditions of sale and sale, form of tender, specimen form of lease, etc., will, on and after October 1, 1906, be open to inspection at the following places during the usual business hours:—

Khartoum.—Office of Director of Agriculture and Lands, Khartoum.
Khartoum.—Office of Governor of Khartoum Province.
Sudan.—Office of Sudan Agent.
Port Sudan.—Office of Inspector (Government Office).

London.—Office of Colonel Western, Queen Anne's Chambers, Westminster, S.W.; the Sudan Co. Imperial Institute, S.W.

Copies of the documents will be obtainable after October 1, 1906, on payment of 5 piastres, or, in the case of the Sudan, on payment of 5 piastres. Further information will be obtainable after the publication of the above-mentioned documents on application in writing to the Director of Agriculture and Lands, Khartoum.—*Builder of Trade Journal.*

SOUTH AFRICA.—The new telephone exchange in Von Brandt's square, Johannesburg, 1,100 lines, will cost 24,000 rands. The building has been designed and constructed by the Public Works Department.—By the removal of the old block of buildings, known as Hofmeyr's chambers, which used to project into the frontage line of Adderley-street, Cape Town, the architectural appearance of the important thoroughfare has been greatly improved. The main building, a four-story one, built by Messrs. Hopkins & Co., from plans of Mr. M. B. Torstenson, is now in line with the rest of the buildings in the street, and the whole of the tower of the old Dutch Reformed Church is brought into view. The new building was arranged on structural English steelwork, supplied and set up by Messrs. Dorman, Long, & Co.

SIAMSE TEAK TRADE.—In his annual Report on the trade of Bangkok, just received at the Foreign Office, Mr. Acting-Consul Lytle states that teak, valued at 817,395L, represents 5 per cent. of the trade for 1905. The export of teak, 101,397 tons, exceeded even the figures of 1904 (77,531 tons, valued at 560,174L). Under these circumstances the five year average fell below the 1905 output by 45,115 tons and 434,515L value respectively. To various countries to which the timber was shipped, the quantity being given in tons: India, 66,788; Hong-Kong, 9,848; United Kingdom, 5,577; Singapore, 4,185; Japan, 4,877; Azores, 2,629; France and possessions, 2,592; Germany, 1,493; Denmark, 1,033; other places in Europe, 2,375; total, 101,397 tons.

The following remarks, gathered from an experienced source, explain (observes Mr. Lytle) the present unusual figures, and afford an insight into the future prospects of the Siamese teak trade:—"The past season, 1905-06, has been a record one as regards floating, and less than 151,000 logs arrived at Paknamphu. This number, with stocks of 60,000 logs carried over at that place from the previous season, gives a total of 211,000 logs for disposal, of these about 125,000 logs reached Bangkok. The three previous seasons, viz., 1902-03, 1904-05, gave arrivals at Paknamphu about 61,000, 113,000, and 138,000 logs respectively. As recorded in previous reports, these results have been due to the fact that an accumulation of logs worked during the old season which were lying in the side creeks and main rivers have been brought down by the extremely favourable waters experienced during the above mentioned years. Stocks in creeks will now show a heavy decrease, and the out-turn of logs at Paknamphu will, under the present rules as regards grading, never attain the above dimensions. Should the 1906-07 floating season again be an exceptionally good one there may possibly not be any very great falling-off in the actual arrivals at Paknamphu."

of this year, but the year 1905-06 will almost certainly mark the turning-point in the volume of the teak trade of Siam. There has been again a considerable falling-off in the quality of the teak between the year 1905-06 and the previous year 1904-05, possibly about 7 per cent. (10 per cent. in 1904-05) being of the quality necessary for shipment to Europe, and 35 per cent. being only fit to be broken up into small material before shipment. Prices for round timber of fair size and quality maintained a steady upward tendency during the year, rising from about 16 pikat at the end of 1904 to 19 to 20 pikat at the close of 1905. Local prices for Europe squares rose from about 102. to 121. (1904, 82. to 102.), and for Europe planks (1904, 92. to 117.) from 117. to 141. 134. The rise in price is response to a bad demand in all the consuming markets for teak both at home and in the East. As far as can be seen at present, the prospects of these prices for teak remaining at their present level appear to be good. Considerable activity is reported in shipbuilding and railway centres in most parts of the world, and it is not unlikely that further developments, both in China and Japan, may cause an increasing demand for teak of good prices. At present difficulties in means of shipment, caused by the war at the mouth of the river, considerably hamper the export trade, and continue to keep Siam teak at a disadvantage with timber from Burma, and there is no doubt that cheapening the means of transport would result in a wider sale for teak from this country. Mr. Consul stranger writes from Chingmai that the amount of teak exported from that consular district to Burma in 1905 was only 8,163 tons, as compared with 9,447 tons in 1904 and an average of 16,058 tons for the last five years. The value shows a decrease amounting to 13,050, as compared with the 34,962, as compared with the five years' average. This decrease in the export to Burma is probably due principally to stricter conservancy of the teak forests by the Siamese Forest Department and partly to increasing scarcity of teak trees and difficulty of working the forests on the Salween side. These forests are worked by a British firm and this and three other British firms and one Danish company practically monopolise the teak industry of the whole district. The thefts of elephants referred to in previous reports appear to be increasing. One of the British firms in Chingmai reports that they had twelve elephants stolen from their forest, and about the same number belonging to their contractors. Another firm reports that nine elephants belonging to them or their contractors were stolen during 1905, and that only three of these were recovered. As most of the elephants stolen are timber elephants employed in the teak forests, and the average value per head of such elephants is about 2000, or more, the persistent stealing of these animals which now goes on in the district results in heavy loss to the teak merchants and their contractors (most of whom are British subjects), since, in addition to the value of an elephant, the owner's forest suffers considerably, even if the elephant is stolen; and if it is not recovered he has to pay large sums in rewards to the captors, unless he has recovered it himself.

CHILE.—The Board of Trade are in receipt of information to the effect that the Chilean Government has under consideration the advisability of exempting building materials from import duty in order to facilitate the reconstruction of the city of Valparaiso, and that it is probable that Congress, at its approaching session, will be invited to pass a law granting such exemption.

Miscellaneous.

PROFESSIONAL AND BUSINESS ANNOUNCEMENTS.—Mr. E. W. Mountford has removed his office from 17, Buckingham-street, Strand, to Norwich House, Southampton-street, Bloomsbury, W.C.—Mr. W. F. Chubb, architect, and Engineer, has removed his offices from Waldorf-chambers to 7, John-street, Adelphi, W.C.—The Alliance Rubber Company are closing their City offices, and all business will, in future, be transacted at their works, Leswin-road, Stoke Newington, N.

WAR MEMORIAL, GLASGOW.—A memorial is being erected in Kelvingrove Park to the memory of the officers and men of the Highland Light Infantry who fell in the South African War. The monument occupies a triangular site, surrounded by shrubbery, at the east end of the Prince of Wales Bridge. The work of construction is under the supervision of Mr. A. Kelvingrove Park, the City Engineer, and Mr. James Whitton, the Parks Superintendent. The sculptor is Mr. Birnie Rhind, R.S.A., Edinburgh.

BREAKING-UP STREETS IN LONDON.—The Works Committee of Kensington Borough Council, in a Report issued on Saturday, stated they had considered a letter from the London County Council calling attention to the great inconvenience caused by the breaking-up of streets in London by companies and others having statutory rights to do so, and stating that the Spring-gardens authorities were of opinion that great advantage would result if arrangements could be made for works to be carried out by the different authorities having power to break-up streets simultaneously at certain periods of the year. The London County Council asked, would the Borough Council be prepared to support them if they promoted legislation to make regulations to govern the breaking-up of streets? The Borough Engineer, to whom the foregoing communication was referred, expressed the opinion that it would be undesirable that work done by statutory authorities in London should be carried out simultaneously, as many of the principal thoroughfares in the metropolis would be annually barricaded at the same time. He further pointed out that, if a certain period in the year were arbitrarily fixed during which any company or authority might open up streets, same saving clause would have to be inserted to provide for the opening-up of roads in cases of emergency, and that it would be found in practice that fully 90 per cent. of the work would prove to be "emergency" work. It was however, suggested by the Borough Engineer that useful legislation might be promoted to strengthen the hands of the metropolitan borough councils in supervising and controlling the works carried out by statutory companies, provision being made by such legislation for the framing of regulations to deal with the following matters, viz. :—(1) The position, depth, and direction of mains; (2) the maintenance of the surface at the expense of the company for a period after the surface has been disturbed by such company; (3) that the time during which intended works may be carried out after reasonable notice has been given by a borough engineer to a statutory company, of such council's intention to renew the surface of given streets. The Committee concurred in the views of the Borough Engineer, and a communication, embodying the substance of the Borough Engineer's report, is to be addressed to the London County Council in reply to their letter.

UNIVERSITY COLLEGE, LONDON.—A course of study and a scheme of examination in architecture is approved by the Senate, who have instituted that subject as a branch of the B.A. Honours degree for internal students. The Senate have resolved to expend 12,000l. upon the erection of buildings, after plans and designs by Mr. Reginald Blomfield, A.R.A., at Goldsmiths' College, New Cross, for the art school and training departments. The new buildings will form portion of a larger scheme which, it is hoped, will be ultimately accomplished.

NEW TOWN HALL FOR MARYLEBONE.—The General Purposes Committee of Marylebone Borough Council, in a Report circulated on Tuesday, stated that they considered an architect should be engaged to draw up a report, with preliminary sketch plans, as to the suitability and adaptability of various proposed sites in the borough for the erection of a building to include municipal offices, Council chamber, committee-rooms, etc., and to give an approximate estimate of the cost of same. They propose that the fee to be paid to the architect engaged be 100 guineas.

LEASEHOLDERS AND STRUCTURAL REPAIRS.—At the meeting, on Tuesday, of Kensington Borough Council the Public Health Committee reported that their attention had been drawn by the Housing Sub-Committee to recent action taken by freeholders of property in certain parts of the borough, in requiring the leaseholders to execute structural repairs to their holdings, with the result that the sanitary condition of the localities referred to was being gradually improved. The Sub-Committee further pointed out that, in their opinion, much good might be effected if this example were followed by other ground landlords in North Kensington, and they had suggested that they should be authorised to obtain reports from the officials of the Public Health Department as to the condition of premises in certain of the estates in the northern portion of the borough, with a view to their reporting on any special cases in which they might think it desirable that the Council, in the interests of public health, should bring the state of the property to the notice of the freeholders, and urge them to take action to bring about an improved condition of things in regard thereto. The Committee had approved of the suggestion made by the Housing Sub-Committee, and had, on the grounds

of public health, given them the authority asked for. The Report was adopted.

LIBRARY FOR EAST HAM.—At a recent meeting of East Ham Town Council, the Engineer (Mr. A. H. Campbell, M.Inst.C.E.) submitted a draft sketch plan of the site and elevation of the new Carnegie library, which was approved and directions were given for the work in connexion with the foundations to be proceeded with. The site of the library is about 50 ft. from the southern wall of the town hall, and the Engineer was directed to submit a draft plan, and report as to the probable cost of erecting offices for the accommodation of the Public Health and Educational Departments on the intervening site.

THE "AUTO-VALVE".—Mr. A. H. Marshall, electrical engineer, Leytonstone, sends us a sample of his "auto-valve," the object of which is to provide automatically for the stoppage of the water when a tap is removed for repair. The device is simple but ingenious. A small piston is placed loose in the pipe just behind the seating of the tap, with a short rod with cross-head projecting from its centre into the base of the tap. As long as the tap is in position the piston is held back by the back edge of the tap acting against the cross-head; when the tap is taken out the pressure of the water forces the piston forward, closing the water-way. It is an ingenious device which would save a good deal of trouble, as it does away with the necessity for turning off the water in order to take a tap out; and there is nothing about it that can get out of order, as the thing is quite loosely fitted. The only objection to be made to it would be that when not in use it impedes the water-way a little; but not to such an extent as to be a serious drawback.

Capital and Labour.

CONDITION OF THE BUILDING TRADES.—Employment continued dull, but was, on the whole, better than a month ago and a year ago. London: In London employment was better than a month ago, but not so good as a year ago. Returns received through the trade correspondent from thirty-seven London employers show that in the last week of August 7,841 workpeople were paid wages, as compared with 7,055 a month ago, and 6,607 in August, 1905. From trade union returns relating to carpenters and joiners it appears that the percentage of unemployed in London at the end of August was 53, as compared with 73 a month ago, and 55 a year ago. With plumbers the percentage for August was 75, for July 143, and was a year ago 87—a considerable improvement being shown as compared with a month ago. With bricklayers a slight decline was shown, but with all other branches, particularly with builders' labourers, a marked improvement took place as compared with July. The Provinces: Returns received from sixty-eight employers' associations in towns outside London show that in these towns employment was slack generally, and showed little change compared with a month ago and a year ago. The following information is based on returns received from the general secretaries of trade unions and from trade union reports:—Employment with bricklayers and masons was dull, and showed a decline as compared with a month ago. With carpenters and joiners it was still slack, but better than a month ago and a year ago. The percentage unemployed of trade union carpenters and joiners in the whole of the United Kingdom was 51, as compared with 53 a month ago and 65 a year ago; with plumbers the percentage was 75, as compared with 89 a month ago and a year ago. With slaters, plasterers, and builders' labourers there was a slight improvement as compared with a month ago; with painters little change was shown.—*Labour Gazette.*

Patents of the Week.

APPLICATIONS PUBLISHED.*

24,908 of 1905.—H. MERRYWEATHER, S. H. MERRYWEATHER, and H. MERRYWEATHER, JUN.: Door, Gate, and the like Furniture or Fittings.

This relates to a door, gate, and the like furniture or fittings, and consists in the combination with a hinge pin, latch, or the like bar for use with a door, of a movable bonding iron or bar. The bar is built into the brick-work or the like, and its projecting end carries the hinge pin or the like releasing or

* All these applications are in the stage in which opposition to the grant of Patents upon them can be made.

PATENTS.—Continued on page 383

List of Competitions, Contracts, etc.

For some Contracts still open, but not included in this List, see previous issues. Those with an asterisk (*) are advertised in this Number: Competitions, —; Contracts, iv. vi. viii. x.; Public Appointments, xix.; Auction Sales, xxx. Certain conditions, beyond those given in the following information, are imposed in some cases, such as: the advertisers do not bind themselves to accept the lowest or any tender; that a fair wages clause shall be observed; that no allowance will be made for tenders; and that deposits are returned on receipt of a bona-fide tender unless stated to the contrary.

Contracts.

BUILDING.

OCTOBER 1.—Great Corby.—HUTS.—Tenders are invited for building and finishing a house at Great Corby. Plans and specifications may be seen at 71, Broad-street, Carlisle, where tenders have to be delivered on October 1. Mr. James Leslie, architect.

OCTOBER 1.—Seaham.—CHURCH PORCH.—The Trustees of the Seaham Harbour Wesleyan Church invite tenders for the erection of a porch to their chapel at Seaham Harbour. Plans and specification may be seen on application to the architects, Messrs W. & T. R. Mulholland, 22, Fawcett-street, Sunderland. Tenders will be received not later than 12 noon on October 1.

OCTOBER 1.—Walbottle.—SCHOOLS.—Tenders for the erection of proposed new school at Walbottle Village, for His Grace the Duke of Northumberland. Nanks to Mr. J. Wightman Douglas, architect and surveyor, 1, St. Nicholas buildings, Newcastle, not later than October 1, when quantities will be supplied.

OCTOBER 2.—Blackrock.—REPAIRS.—The U.D.C. of Blackrock invite tenders for the following works in connection with the new assembly room, Town Hall, Blackrock:—(a) Overhauling and repairing roof; (b) extension and repair of present ceiling and plaster work; (c) construction of platform. Tenders for each of the several works to be on separate forms. Plans and specifications can be seen, and particulars obtained, at the Town Hall, Blackrock. Tenders, on forms supplied, must be lodged with Mr. R. Finlay Heron, Town Clerk, Town Hall, Blackrock, Co. Dublin, on or before 4 o'clock p.m., October 2.

OCTOBER 2.—Cardiff.—WORKHOUSE.—Tenders are invited for the erection of a warehouse in Millicent-street, Cardiff. Drawings and specification can be seen, and quantities can be obtained, upon payment of 11. 1s., at the office of Mr. John H. Phillips, F.R.I.B.A., Clive Chambers, Windsor-place, Cardiff, to whom sealed tenders are to be delivered on or before October 2.

OCTOBER 2.—Coventry.—STABLES, ETC.—Tenders are required for additions to stabling, etc., Cox-street, and Brewery street, Coventry, for the Coventry Perseverance Co-operative Society, Ltd. Plans and specifications can be seen at offices of Messrs. Harrison & Hattrell, architects, 23, Hertford-street, Coventry. Sealed and endorsed tenders to be delivered to the Secretary, West Orchard, Coventry, at noon on October 2.

OCTOBER 2.—Exeter.—OFFICE REPAIRS.—The Exeter Guardians invite tenders for certain plumbers' and builders' work at their offices. New-buildings, Exeter. Specifications may be obtained at the office of their architect, Mr. R. M. Challice, 14, Bedford-circus, Exeter. Sealed and endorsed tenders must be sent to Mr. Arthur Shell, Clerk to the Guardians, New-buildings, Castle-street, Exeter, on or before 12 o'clock noon on October 2.

OCTOBER 2.—Exeter.—WORKHOUSE REPAIRS, ETC.—The Exeter Guardians invite tenders for painting and general repair at the Workhouse. Specifications may be seen, and particulars obtained, at the office of their architect, Mr. R. M. Challice, 14, Bedford-circus, Exeter. Sealed and endorsed tenders must be sent to Mr. Arthur Shell, Clerk to the Guardians, New-buildings, Castle-street, Exeter, on or before 12 o'clock noon on October 2.

OCTOBER 2.—Orsett.—ALTERATIONS TO WORKHOUSE.—The Guardians of the Orsett Union invite tenders for alterations and additions to the above workhouse. Names and addresses to be sent to the architect, Mr. C. M. Shiner, 10, Hamilton House, Bishopsgate street Without, E.C., or at Gate House, High street, Grays, Essex, before 12 noon, October 2.

OCTOBER 2.—Penalltau.—VILLAS.—Tenders are invited for the erection of semi-detached villas at Penalltau, Ystrad-mynach. Plans and specification can be seen, and bills of quantities obtained, at the office of the architect, Mr. Geo. Kenshole, Station-road, Bargod, on payment of 21. 2s., which will be returned on receipt of a bona fide tender. Sealed and endorsed tenders to be sent to Mr. E. M. Hann, Aberaman, Aberdare, on or before October 2.

OCTOBER 2.—Treherbert.—SHOP ALTERATIONS.—Tenders are invited for carrying out alterations and additions to co-operative shop, Treherbert, for the Ton Industrial Co-operative Society, Ltd. Plans and specification may be seen at office of Mr. W. D. Morgan, M.S.A. architect, Red-street Chambers, Treherbert. Sealed and endorsed tenders to be delivered to the Chairman before 5 p.m. on October 2.

OCTOBER 3.—Plumstead.—INFIRMARY ADDITIONS.—The Guardians of the Woolwich Union require tenders for additions of kitchens and stores at the Woolwich Union Infirmary, Plumstead. The plans and specifications can be inspected, and copies of the quantities obtained, at the offices of the Board's Architect, Mr. J. O. Cook, 14, Eleanor-road, Woolwich. A deposit of 11. 1s. will be required for the bills of quantities. Tenders must be sent to Mr. Tom Cutter, Clerk to the Guardians, not later than 4 p.m. on October 3, at No. 30, Rectory-place, Woolwich.

OCTOBER 4.—Croyde.—MINISTER'S HOUSE.—Tenders are invited for the erection of a Baptist Minister's

house at Croyde. Plans, specification, and quantities may be obtained at office of Mr. J. C. Southcombe, architect, Barnstaple, and tenders to be sent to the Rev. A. F. Scudamore, Croyde, on October 4.

OCTOBER 4.—Lymington.—CUMINEY SHED, ETC.—Fibham Union invite tenders for the erection of a chimney shaft and alterations to a boiler house at the Workhouse, Lymington; also separate tender for taking out two boilers and fixing two other boilers and an economiser. Plans and specifications can be seen between 10 and 5 o'clock, except on Saturdays, when they can be seen between 10 and 1 p.m., at the office of Mr. R. Longcrang, Clerk, 11, Clifton-place, Folkestone, where tenders must be delivered before October 4.

OCTOBER 4.—Swadincote.—PUBLIC CONVENIENCES, ETC.—The Swadincote U.D.C. invite tenders for the erection of lock-up shop and public conveniences, and for the pulling down of and rebuilding existing public conveniences and shops in Midland-road, Swadincote. Drawing and specifications may be seen, and quantities and forms of tender obtained, at office of Mr. A. J. Mason, A.M.I.C.E., Town Engineer and Surveyor, Swadincote, on depositing 11. 1s. Tenders, enclosed in the envelopes provided are to be delivered at the Clerk's Office, Belmont-street, Swadincote, not later than 10 a.m. on October 4.

OCTOBER 4.—Swansea.—HOUSES.—The Swansea Harbour Trustees invite tenders for the erection of four dwelling-houses at Port Tennant, Swansea. Drawings and specifications can be inspected at the office of the Trustee's Engineer, Mr. A. O. Schenk, A.M.I.C.E., and forms of tender obtained from Mr. Taitford Strick, Clerk, Harbour Office, Swansea, to whom tenders, endorsed "Tender for Dwelling-houses," should be delivered not later than 10 a.m. on October 4.

OCTOBER 5.—Mallow.—LODGING-HOUSES.—The Mallow U.D.C. invite tenders for the erection of twelve working-class lodging-houses in the town of Mallow, in accordance with the drawings and specification prepared by Mr. D. J. Buckley, architect, 55, South Mall, Cork, at whose office they can be seen, and forms of tender obtained, or at the office of Mr. T. Wrixon, Clerk of the Council, Mallow U.D.C. Office, William O'Brien-street, Mallow, any day (Sundays excepted), between the hours of 10 a.m. and 5 p.m. A deposit of 201. must accompany each tender. Sealed tenders, endorsed "Working-class Lodging-houses," must be handed in at the meeting of the Council, to be held on October 5, between the hours of 7 and 8 p.m.

OCTOBER 5.—Mallow.—TOWN HALL IMPROVEMENTS.—Mallow U.D.C. invite tenders for the execution of certain alterations and repairs at the Town Hall, Mallow, in accordance with the drawings and specification prepared by Mr. D. J. Buckley, architect, 55, South Mall, Cork. Drawings and specification can be seen at the architect's office, and from Mr. T. Wrixon, Clerk of the Council, U.D.C. Office, William O'Brien-street, Mallow, any day (Sundays excepted), between the hours of 10 a.m. and 5 p.m. A deposit of 201. must accompany each tender. Sealed tenders, endorsed "Town Hall," must be handed in at the meeting of the Mallow U.D.C. on October 5, between the hours of 7 and 8 p.m.

OCTOBER 5.—Cwm.—CHAPEL.—Tenders are invited for the erection of a new Baptist Chapel, at Cwm. Drawings and specifications can be seen at the office of Mr. N. Gasmain Lewis, architect and surveyor, Oak-street, Aberllynny. Tenders, endorsed "New Chapel, Cwm," to be in the hands of the Secretary, Mr. Hy Howells, 9, Railway View, Cwm. Mon., by noon, October 5.

OCTOBER 6.—Deal.—SCHOOL.—The Education Committee of the Borough of Deal invite tenders for the erection of a new school, to accommodate 240 infants, together with boundary walls and other site works, to be inspected at the office of the architect, Mr. Chas. L. Crowther, Queen-street, Deal, from whom also a copy of the bills of quantities may be obtained upon payment of a deposit of 11. 1s. Tenders, on the form and in the envelope supplied, to be delivered to Mr. A. Brown, Clerk to the Committee, High-street, Deal, not later than October 6.

OCTOBER 6.—Hollywell Green.—HOUSES.—Tenders are invited for the mason's, carpenter's and joiner's, plasterer's and slater's, and painter's trades for the erection of four dwelling-houses at Hollywell Green. Plans and specifications may be seen and quantities obtained, at offices of Messrs. Chas. F. L. Horsfall & Son, architects, Lord-street-chambers, Halifax, from October 6 to October 10, when sealed tenders must be delivered not later than 12 o'clock.

OCTOBER 6.—Reddish.—PUBLIC BATHS, ETC.—Stockport Corporation invite tenders for the erection of public baths, freemasonry hall, and library in Gorton-road, Reddish. The plans, drawings, and general conditions may be inspected and a form of tender obtained, at the office of the architect, Messrs. Dixon & Co., 65, King-street, Manchester, and quantities will be supplied by them, on payment of a deposit of 21. 2s. Sealed tenders, endorsed "Reddish Baths Contract," must be delivered to Mr. Robert Hyde, Clerk, Town Clerk's Office, Stockport, not later than 12 o'clock on October 6.

OCTOBER 8.—Abergwyndol.—ADDITIONS TO HALL.—Tenders are invited for the erection of additions—

bullard and auto rooms—to the Workmen's Hall, Abergwyndol. Plans may be seen, and bills of quantities obtained, at the Institute on deposit of 2s. Sealed tenders to be delivered to the Secretary not later than October 8.

OCTOBER 8.—Carrick-on-Shannon.—POST OFFICE.—Board of Public Works invite tenders for the erection of a new Crown Post Office at Carrick-on-Shannon, co. Leitrim. The plans and specification may be seen at the Post Office, Carrick-on-Shannon. Forms of tender and bills of quantities will be supplied on deposit of 11. The separate envelopes containing the tender and the bill of quantities must be endorsed and sent to Mr. H. Williams, Secretary, Office of Public Works, Dublin, not later than 10 a.m. on October 8.

OCTOBER 8.—Sedgefield.—NURSES' HOME.—The Visiting Committee of Durham County Asylum, Sedgefield, invite tenders for the erection of a nurses' home. Plans and conditions of contract may be seen, and bills of quantities obtained, at the office of Mr. William Crozier, A.M.I.C.E., County Architect, Shire Hall, Durham, to whom sealed tenders are to be delivered not later than 1 p.m. on October 8, endorsed "Tender for Nurses' Home."

OCTOBER 8.—Skewen.—CHAPEL.—Tenders are invited for the erection of a Congregational Chapel at Skewen, Neth. Plans, specifications, etc., can be seen at the architects' office (Messrs. Lloyd & Martyn, Dynevor Post Office, Skewen), upon payment of 11. 1s. Tenders, on forms supplied, must be sent to Mr. W. G. Thomas, William Davies, Stanley-road, Skewen, Neth., on or before October 8.

OCTOBER 8.—Dublin.—COMPLETION OF GYMNASIUM.—Board of Public Works invite tenders for the erection and completion of a gymnasium at the Royal Hibernian Military School, Phoenix Park. Plans and specifications may be seen at the Office of Public Works, Dublin. Forms of tender and bills of quantities will be supplied on deposit of 11. The separate envelopes, containing the tender and the bill of quantities, must be endorsed, and will be received up to, but not later than, 10 a.m. on October 9, at the Office of Public Works, Dublin.

OCTOBER 8.—Ynysybwl.—HOUSE.—Mountain Ash U.D.C. invite tenders for the erection of a dwelling-house near Ynysybwl Cemetery. Plans and specification may be seen, and forms of tender obtained, on application to Mr. W. G. Thomas, Surveyor, Town Hall, Mountain Ash. Sealed tenders, prepaid, and endorsed "Ynysybwl Cemetery," to be lodged with Mr. H. H. Linton, Clerk, Town Hall, Mountain Ash, not later than 10 a.m. on October 9.

OCTOBER 10.—Bangour.—HALL.—The Edinburgh and District Board of Lunacy invite offers for the mason, steel and iron, plumber, plaster, slater, and glazier works in connexion with the erection of recreation hall at Bangour Village. Schedules may be obtained on application to the architect, Mr. Hippolyte J. Blanc R.S.A., 25, Rutland-square, Edinburgh, where the specification, plans, and the general conditions of contract will be exhibited. The carpenter and joiner work schedules will be issued on October 1. Schedules, priced and extended, must be lodged with Mr. James Kyd, Clerk and Treasurer, Chambers of District Board, Castle-terrace, Edinburgh, not later than October 10, along with the cash enclosed in a separate cover, to be supplied.

OCTOBER 11.—Monaghan.—BOUNDARY WALL.—The Joint Committee of Monaghan Asylum invite tenders for erection of a boundary wall in accordance with plan and specification which may be seen at the Board-room of the Asylum between 10 o'clock a.m. and 5 p.m. on any week-day. Tenders to be forwarded by registered post, endorsed "Tender for Boundary Wall," when they will be opened at the meeting of the Committee on October 11.

OCTOBER 12.—Monkwearmouth.—FACTORY AND OFFICES.—Tenders are required for the erection of a factory, offices, etc., near Fulwell road, Monkwearmouth, for Messrs. D. H. & C. Haggie. Plans and specifications can be seen, and particulars obtained, at the offices of Messrs. Joseph Potts & Son, architects, 57, Strand, London, W.C. Sealed tenders and quantities can be obtained on the payment of 21. 2s. Tenders to be sealed, endorsed, and delivered to the architect, not later than October 12.

OCTOBER 12.—Newport.—INFIRMARY BUILDINGS.—The Guardians of the Newport (Salop) Union invite tenders for the erection of new infirmary buildings, including the present Workhouse. Plans and specifications may be seen, and bills of quantities and forms of tender obtained, on application to Messrs. Fleeming & Son, architects, Bank Chambers, Wellington (Salop). 11. 1s. will be charged for copy of bills of quantities. Tenders must be delivered to Mr. R. P. Liddle, Clerk to the Guardians, Newport, not later than 9 o'clock a.m. on October 12.

OCTOBER 13.—Bridgend.—MORTUARY.—The Guardians of Bridgend Union invite tenders for erecting a mortuary, etc., at the workhouse. Plans, etc., may be seen, and all particulars obtained, at the offices of Mr. P. J. Thomas, architect, Bridgend. Tenders, endorsed "Mortuary," to be received by Mr. R. Harmar Cox, Clerk, Union Offices, Bridgend, before October 13.

OCTOBER 13.—Donisthorpe.—SCHOOL.—Education Committee of the Leicester Education Board invite tenders for the erection of a school at Donisthorpe, together with out-offices, drainage, etc. Conditions of con-

OCTOBER 1. **Dublin.**—PAVING.—The Paving Committee of the Dublin Corporation invite tenders for Jarrah wood paving blocks supplied and laid on the Corporation's foundation, the quantity to be about 806 yds. in Tara-street. The dimensions of the blocks to be 3 in. by 7 in. by 5 in. Tenders to be addressed to the Chairman, Paving Committee, City Hall, Dublin, and endorsed "Tenders for Jarrah"

Wood Blocks" to be received by Mr. Patrick Tobin, Secretary, Paving Committee, City Hall, Dublin, not later than October 1, at or before 4 p.m.

October 1.—Frimley.—ROAD WORKS.—Frimley U.D.C. invite tenders for the ballasting and metal-ling of 7½ miles of roads in the district. Plans, sections, and specifications may be seen, and copies of quantities and form of tender obtained from the Engineer and Surveyor, Mr. T. Clement Jones, C.E., Municipal Office, Camberley, on payment of 2s. Sealed tenders, giving the names and addresses of two sureties, are to be delivered at office of Mr. F. T. S. Marsh, Clerk to the Council, Municipal Office, Camberley, endorsed "Tender for Reconstruction of Roads," not later than noon on October 1.

October 1.—Hutton.—STONEWARE SEWER.—Bullicay R.D.C. invite tenders for the construction of about 400 yds. of stoneware sewer in the Parish of Hutton. Plans and specifications may be seen at the Offices of the Council's Engineers, Messrs. Jones, Parliament Mansions, Victoria-street, Westminster, S.W., where bills of quantities and forms of tender may be obtained, upon payment of 3s. Sealed tenders, on the form and in the envelope provided, must be delivered at the office of Mr. C. Edgar Lewis, Clerk to the Council, New Road, Brentwood, not later than 12 o'clock noon on October 3.

October 1.—Rolesby.—ALTERATIONS TO DRAINS.—The Guardians of East and West Flegg Poor Law Incorporation invite tenders for alteration to the drains at Workhouse, Rolesby, Great Yarmouth. Plans and specifications may be seen at the Workhouse on application to the Master at any time between the hours of 10 a.m. and 4 p.m. Tenders to be sent to the Master, Workhouse, Rolesby, by 12 o'clock noon on October 1, endorsed "Tenders for Drainage Works."

October 2.—Baling.—PRIVATE STREET IMPROVEMENTS.—The Town Council of this Borough invite tenders for the making-up of Lyneroff-gardens and parts of Wolverton-gardens, King's-road, and St. Kilda road. The drawings and specification may be seen, and form of tender, together with bill of quantities and other particulars, obtained from Mr. Charles Jones, M.Inst.C.E., Borough Engineer, Town Hall, Ealing, W., on payment of a deposit of 10s. 6d. for each road. Sealed tenders, in the envelopes provided, and endorsed, must be delivered at office of Mr. Geo. E. Bridges, Town Clerk, Town Clerk's Office, Town Hall, Ealing, W., not later than 9.30 a.m. on October 2.

October 2.—Handsworth.—STREET WORKS.—The Handsworth U.D.C. invite tenders for street improvement works in Wellington-road. All particulars may be obtained on application to Mr. H. Richardson, A.M.Inst.C.E., Surveyor to the Council, Council House, Handsworth, Birmingham, to whom sealed tenders, endorsed "Wellington road Improvement," are to be delivered on or before October 2.

October 3.—Beeston.—PRIVATE STREET WORKS.—Beeston U.D.C. invite tenders for making-up private streets at Beeston, known as Trafalgar-road, Victory-road and Rylands-road. Plans may be seen, and specification and quantities obtained from the Engineer and Surveyor, Public Offices, Beeston, on payment of a deposit of 2l. 2s. Sealed tenders, endorsed "Tender for Private Street Works," to be sent to Mr. W. H. Redgate, Clerk, Public Offices, Beeston, not later than October 3.

October 3.—Bury.—PIPE LAYING.—Bury and District Joint Water Board invite tenders for cutting and refilling track for, and laying and jointing, about 4,500 lin. yds. of 6-in. diameter cast-iron pipes, from Ringley-road, Outlook, to Prestolee; and other relative works. Particulars, specification, and form of tender may be obtained from the Manager, Mr. R. B. Rigby, Parsons-lane, Bury. Copies of specification and bills of quantities will be provided on payment of a deposit of 1l. Tenders, endorsed "Tender for Pipe Laying," must be delivered at the office of Mr. John Haslam, Clerk to the Board, Bank-street, Bury, not later than October 3.

October 3.—Elstree.—SEWERAGE-WATER SEWER.—The County Highways Committee of the Middlesex C.C. invite tenders for the construction of 2,600 ft. of 9-in. surface-water sewer, with inspection chambers, etc., along the main road, Elstree, in the parish of Middlesex. Plans and specifications may be seen, and form of tender obtained, at office of Mr. H. P. Wakelam, M.Inst.C.E., County Engineer, Middlesex Guildhall, Westminster, S.W., upon payment of a deposit of 2l. 2s. Sealed and endorsed tenders to be sent to Sir Richard Nicholson, Middlesex Guildhall, Westminster, not later than 12 o'clock noon on October 3.

October 3.—Titchhurst.—SEWERAGE.—Titchhurst R.D.C. invite tenders for the construction of about 155 lin. yds. of 6-in. and 9-in. sewers, with necessary manholes and junctions, at Church-street, Titchhurst. Plans and specifications can be seen at the office of Mr. W. E. Mitchener, Sanitary Inspector, Hurst Green. Sealed tenders should be sent to the office of Mr. J. C. Lane Andrews, Clerk, Council Offices, Wadhurst, not later than October 3.

October 3.—Willington Quay.—SEWERAGE PIPES, ETC.—Willington Quay U.D.C. invite tenders for laying about 260 yds. of 24-in. 21-in., and 9-in. pipes, with manholes, junctions, etc. Plans and specifications may be seen on application to the Surveyor, Mr. J. Fleming Davidson, at the County Office, Willington Quay. Tenders, endorsed "Tender for Sewerage," are to be delivered to Mr. W. S. Daglish, Clerk, 28 Sandhill, Newcastle-upon-Tyne, before noon on October 3.

October 4.—Cork.—LAYING OF SEWERS.—Cork R.D.C. invite tenders for execution of the following works, according to specifications which may be inspected at the Board-room, Cork Workhouse, viz.:—(a) Laying sewer at Touren, Passage West, (b) laying water pipes at Ballyfoolin, Monkstown (c) repairing pump at Correlling. Tenders will be received up to 12 o'clock noon on October 4.

October 4.—Presall.—TRIAL BORINGS.—The U.D.C. of Presall with Hackinsall invite tenders for trial borings in various parts of the district. Particulars may be obtained from the engineer, Mr. Walter J. Lomax, A.M.Inst.C.E., 11, Fild-street, Bolton. Sealed tenders, endorsed "Presall Sewerage," to be in the hands of Mr. Jos. Cumming,

Clerk to the Council, Council Offices, Presall, near Preston, not later than October 4.

October 4.—Woolston.—PAVING.—Hellen U.D.C. invite tenders for providing and laying complete concrete syneptic concrete pavement in the district of Woolston, near Southampton. Plans and particulars may be seen between the hours of 10 a.m. and 11 a.m. at the Council's Surveyor's Office, Portsmouth-road, Woolston. Sealed tenders, endorsed "Tender for Paving," to be sent to Mr. W. Henry Bell, Clerk to the Council, Bridge-road, Woolston, near Southampton, on or before 12 o'clock noon on October 4.

October 5.—Ashby.—ROADS AND SEWERS.—Tenders are invited for the construction of roads and laying sewers at Ashby, in the County of Lincoln. Plans and specifications may be seen at the office of Mr. W. H. Buttrick, Surveyor, Southorpe, to whom sealed and endorsed tenders are to be delivered not later than 12 o'clock noon on October 5.

October 6.—Leeds.—PRIVATE STREET WORKS.—The Highways Committee invite tenders for the paving and flagging of certain streets. Drawings may be seen at the City Engineer's Office, Municipal Buildings. Forms of tender and bills of quantities may be obtained, and copies of the documents forming the contract inspected, on application at the Highways Office, 153, Kirkstall-road. Sealed tenders, endorsed "Tender for Private Street Works," and addressed to the Highways Committee, must be delivered at the Town Clerk's Office, Town Hall, Leeds, not later than 12 o'clock noon on October 6.

October 6.—Lichfield.—ENLARGEMENT OF SEWAGE WORKS.—The Sanitary Committee of the Lichfield U.D.C. invite separate tenders for the following works:—(a) Excavating and removing the sewer, making and erecting wood carters, on brick piers, construction of human tanks, including brickwork, cast-iron pipes and valves, building sludge chamber, with elevator, and concrete and brickwork. Plans, specifications, forms of tenders, and other particulars obtained, on application to Mr. Emerson Brooke, City Surveyor, Lichfield. Sealed tenders, endorsed, to be sent in to Mr. Herbert Russell, Town Clerk, Lichfield, on or before October 6.

October 6.—Lamberwell.—KERING, ETC.—The Borough Council invite tenders for the following works:—(a) Excavating and removing the sewer, making and erecting wood carters, on brick piers, construction of human tanks, including brickwork, cast-iron pipes and valves, building sludge chamber, with elevator, and concrete and brickwork. Plans, specifications, forms of tenders, and other particulars obtained, on application to Mr. Emerson Brooke, City Surveyor, Lichfield. Sealed tenders, endorsed, to be sent in to Mr. Herbert Russell, Town Clerk, Lichfield, on or before October 6.

October 8.—Prestolee.—PRIVATE IMPROVEMENT WORKS.—The Bury R.D.C. invite tenders for the provision of water draining, forming, ballasting, kerbing, flagging, and paving for a length of 230 yds. or thereabouts at Prestolee, Outlook. Plans, sections, and specification can be seen, and quantities obtained, upon payment of 2l. 2s., on and after October 1, at the Council Offices, Bury. Tenders to be endorsed "Private Street Improvement Works," and delivered to Mr. James Isherwood, Solicitor, Clerk to the Council, Union Offices, Bury, before 10 o'clock on October 8.

October 8.—Rother.—CAUSEWAY.—Estimates wanted for laying granite or whinstone causeway at eleven crossings within the Borough. Specifications may be seen with Mr. Arthur Robb, Borough Surveyor. Offers must be lodged with Mr. G. Cumming, Town Clerk, Burnside-street, Rother, not later than 5 p.m. on October 8.

October 8.—Salisbury.—ROAD AND SEWER ALTERATIONS.—Tenders are invited for the reconstruction and widening of St. Mark's-avenue, the construction of sewerage, drains, manholes, and other incidental works, and the construction of classical Commissioners and their surveys, Messrs. Guitton, 5, Great College-street, Westminster Abbey, London, S.W. Plans, specifications, and bills of quantities, prepared by Messrs. Lemon & Bizard, M.M.Inst.C.E., engineers for the works, may be inspected at the Surveyor's Office, and copies of bills of quantities obtained, on payment of 2s. Sealed tenders to be sent to Engineers Office, 29, Market-place, Salisbury, on or before October 8, before 5 p.m.

October 8.—Skipton.—STREET WORKS.—Skipton U.D.C. invite tenders for the excavating, paving, and completing of the pavements in High-street, Skipton. Plans and specification may be seen, and schedule of quantities obtained, on application to Mr. John Mallinson, Engineer and Surveyor to the Council, at his offices in the Town Hall, Skipton, on payment of 1l. To whom sealed tenders, endorsed "High-street Improvement," are to be sent not later than October 8.

October 9.—Dewsbury.—PRIVATE STREET PAVING.—The Dewsbury Corporation invite tenders for the paving, flagging, etc., of John-street, off Leeds-road. Plans, specifications, etc., may be seen, and forms of tender obtained, on application to the Borough Surveyor's Office, Town Hall, Dewsbury, on or before 12 o'clock noon on October 9.

October 9.—London.—ROAD WIDENING.—The L.C.C. invite tenders for the execution of certain works in connection with the widening of the Lower Richmond road at the southern approach to Putney Bridge, in the Metropolitan Borough of Wandsworth. These comprise the demolition of the existing parapet wall and end walls of arches on the riverside of the footway and the removal of a portion of the present roadway, etc., surfaces; the construction of a new roadway, and the widening of the extension of the brick arches beneath the parapet-way; and paving and other works. Drawings, specifications, bills of quantities, and forms of tender, and other particulars may be obtained on application to the Chief Engineer, Mr. Maurice Fitzmaurice, M.C.E., at the County Hall, Spring-gardens, S.W., upon payment of 10s. 6d. to the Clerk of the Council of 3l. Tenders must be on the form, to be delivered at the County Hall in a sealed cover, addressed to "The Clerk of the

County Council, Spring-gardens, S.W., and marked "Tender for Alterations to Putney Bridge, Southern Approach," by 10 o'clock a.m. on October 9.

October 10.—Stockport.—CONSTRUCTION OF SEWERS, ETC.—The Highways and Sewers Committee invite tenders for the manual and team labour and materials required in the construction of about 3,500 lin. yds. of cast-iron sewers, varying in size from 3 ft. by 2 ft. to 4 ft. by 2 ft. 8 in.; 100 lin. yds. of cast-iron pipe sewers, 15 in. and 21 in. in diameter, and 6,125 lin. yds. of stoneware pipe sewers, varying from 12 in. to 36 in. in diameter; together with all manholes and ventilators; the construction of small detritus tank and screening chamber, and other incidental works for the severance of the above areas of Cheddle and Bramhall. Plans, sections, and details may be seen, and conditions, specifications of works and materials bills of quantities, form of tender, etc. may be obtained, from Mr. John Atkinson, A.M.Inst.C.E., Borough Surveyor, Borough Surveyor's Office, Stockport, on payment of a deposit of 3l. 3s. Tenders, addressed to The Borough Surveyor, Stockport, sealed and endorsed "Tender for Sewers in Aided Areas of Cheddle and Bramhall," to be delivered at or before noon on October 10.

October 11.—Rawtenstall.—SEWER PIPES, ETC.—The Corporation of Rawtenstall invite tenders for the construction in Cowp-road, Haslingden New-road, and Newchurch Old-road of 12-in. earthenware and cast-iron pipe sewers; together with manholes, lamp-frames, and other works in connexion therewith. Plans may be seen, and specifications, bills of quantities, and bills of materials may be obtained, on and after September 29, on application to Mr. James Johnson, C.E., Borough Surveyor, Municipal Offices, Rawtenstall, on payment of 2l. 2s. Sealed tenders, accompanied by bills of quantities, and bills of materials, to be addressed to Mr. James Whalley, Town Clerk, Municipal Offices, Rawtenstall, and sent in not later than 9 a.m. on October 11.

October 11.—Southend-on-Sea.—MAKING-UP STREETS.—The Corporation invite tenders for the making-up of the following streets:—Malden-road, Station-avenue, Priory-road, Cranley-road, and parts of Ambleside-drive, Coggington-road, Elderton-road, Cranley-avenue, and Beach-road. Plans, sections, and specifications may be seen, and bills of quantities and bills of materials may be obtained, on and after October 1 (on deposit of cheque for 1l. in respect of each street), upon application to Mr. E. S. Infield, Borough Surveyor, Southend-on-Sea. Sealed tenders (each street on separate form), endorsed with the name of the street, and marked "Tender for Private Street Works," to be delivered at the Office of the Surveyor, Southend-on-Sea, before 10 o'clock a.m. on October 11.

October 15.—East Grinstead.—DISTRESS ROAD WORKS.—The East Grinstead U.D.C. invite tenders for the construction of a new distress road at East Grinstead, according to plans and specifications to be sent at Messrs. Hasties, 65, Lincoln's Inn-fields, W.C. Copies of the specification and form of tender can be obtained on payment of 1l. Tenders should be addressed to Messrs. Hasties, 65, Lincoln's Inn-fields, London, W.C., and delivered before 4 p.m., on October 15.

October 22.—Evesham.—STONEWARE PIPE SEWERS.—The Corporation of Evesham invite tenders for the laying, and jointing of stoneware pipe sewers, together with manholes and lamp-frames, also the construction of liquefying tank, bacteria filters, and other incidental works. Particulars, specification, and specification prepared by the engineers. Drawings and specification may be seen, and bills of quantities and form of tender obtained, at the offices of the Engineer, Messrs. W. & A. G. 63, Temple-row, Birmingham, on or after October 2, on payment of a deposit of 3l. 3s. Sealed tenders, accompanied by bills of quantities, and bills of materials, to be supplied, endorsed "Badey Sewerage Contract No. 1," and delivered to the office of Mr. Edward Wadams, Clerk to the Council, Union Offices, Evesham, not later than 12 noon on October 22.

November 3.—Bolton-upon-Dearne.—SEWERAGE WORKS.—Bolton-upon-Dearne U.D.C. invite tenders for the construction of 6,300 yds. of 8-in. iron and 9-in. stoneware pipe sewers, together with manholes, lamp-frames and all appurtenant works, and erection of No. 2 septic tanks, bacteria beds, carriers, laying-out disposal site, etc., at Bolton-upon-Dearne, Yorkshire. The plans may be seen, and quantities and form of tender obtained, on or after October 1 at the office of the engineer, Mr. W. H. Radford, C.E., Alton Chambers, King-street, Nottingham, on deposit of 3l. 3s. A copy of the plans may also be seen at the Surveyor's Office, Station-road, Bolton-upon-Dearne. Tenders to be sent to Mr. J. Ledger Hawksworth, Clerk to the Council, Council Offices, Station-road, Bolton-upon-Dearne, Rothwell, on or before November 3, endorsed "Sewer."

No DUTY.—Brixworth, SEPTIC TANK, ETC.—Erection of septic tank, sewers, and other works on the Spraton Filtration Area, for the R.D.C. of Brixworth. Names to Mr. Arthur Lewis, surveyor, Hill 8 d.c. Brixworth. Quantities supplied.

No DUTY.—Stourbridge, PAVING.—Stourbridge U.D.C. invite tenders for providing and laying 400 yds. or thereabouts of 2-in. artificial stone paving. For particulars apply to Mr. F. Woodward, Surveyor, Town Hall, Stourbridge.

STONE, MATERIALS, AND STORES.

October 1.—Sandgate.—HIGHWAY MATERIALS.—The Sandgate U.D.C. invite tenders for the supply of various highway materials, to be delivered at the office of the contractor, on or before November 30 next. Forms of tender may be had upon application to Mr. J. Shere Atkinson, Clerk to the Council, Council Offices, 51, High-street, Sandgate, to whom bills of quantities must be sent, marked "Tender for Highway Materials," not later than October 1.

October 2.—Felixstowe.—GRANITE AND STEAM ROLLING.—Felixstowe and Walton U.D.C. invite tenders for the supply of granite blocks, delivered free, alongside at Felixstowe Dock. Tenders may also be invited for steam road rolling. Specifications

and forms of tender may be obtained on application to Mr. H. Clegg, A.M. Inst. C.E., Surveyor to the Council, Town Hall, Ealingstone. Tenders should be delivered not later than first post on October 2.

OCTOBER 2.—INDIA.—RAILWAY STORES.—The Secretary of State for India in Council invites tenders for the supply of (1) rails and fishplates; (2) bearing plates for rails; (3) dog spikes; (4) 100 and 150 lb. broken Clandon chalk flints; (5) 23-in. Quenest granite; Farnham Fino gravel screenings. Team labour and cartage, and the hire of a 10-ton steam road roller, that may be required in the year ending September 30, 1907. Particulars and forms of tender may be obtained on application to Mr. John S. Crawshaw, Surveyor to the Council, at the Council Offices, Weybridge. Sealed and endorsed tenders to be sent not later than 5 o'clock p.m. on October 3, addressed to Mr. Robert Elwood, Clerk to the Council, Council Offices, Weybridge.

OCTOBER 3.—WEYBRIDGE.—MATERIALS, CARTAGE, ETC.—U.D.C. of Weybridge invite tenders for the supply of materials, as may be required, of the following kinds:—(1) broken Clandon chalk flints; 23-in. Quenest granite; Farnham Fino gravel screenings. Team labour and cartage, and the hire of a 10-ton steam road roller, that may be required in the year ending September 30, 1907. Particulars and forms of tender may be obtained on application to Mr. John S. Crawshaw, Surveyor to the Council, at the Council Offices, Weybridge. Sealed and endorsed tenders to be sent not later than 5 o'clock p.m. on October 3, addressed to Mr. Robert Elwood, Clerk to the Council, Council Offices, Weybridge.

OCTOBER 8.—BROADSTAIRS.—ROAD MATERIALS.—Broadstairs and St. Peter's U.D.C. invite tenders for the following:—(1) Supplying and delivering 1,400 ft. run of 6-in. by 12-in. granite kerbing (straight), 50 ft. ditto (circular), and 650 ft. run of 12-in. by 6-in. granite channel; (2) supplying and delivering 250 tons of broken basalt or granite macadam 14-in. gauge; (3) 1,250 cubic yds. of broken pit flints. Sample truck of flints, carriage paid, to be sent to Broadstairs Railway Station, which will be paid for at the rate of the accepted tender. Those tendering for broken granite or basalt must forward a small sample of the material with their tender. Sealed tenders, on form to be obtained from Mr. H. Clegg, Surveyor, to be sent to Mr. Lionel A. Skinner, Clerk of the Council, Council Offices, Broadstairs, not later than noon on October 8.

OCTOBER 8.—COWES.—PORTLAND CEMENT.—The Cowes U.D.C. invite tenders for the supply of best quality Portland cement, to be delivered at the Town Quay, Cowes, I.W., in such quantities as may be required during the period ending September 29, 1907. Particulars may be obtained from Mr. J. N. Webster, Engineer and Surveyor to the Council. Sealed tenders, endorsed "Tender for Portland Cement," to be delivered at office of Mr. H. C. Darnall, Clerk.

High-street, Cowes, I.W., on or before October 8, not later than 4 p.m.

OCTOBER 8.—CROYDON.—STORES.—Croydon Borough Council invite tenders for the supply of stoneware drain pipes of various sizes for one year from November 9 next. The Council invite tenders for the supply of stores for one year from November 9 next. Samples of the stores required for the Roads Department may be seen at the Corporation Roads Dept., Factory-lane, Croydon, and the forms for tendering may be obtained at the Borough Road Surveyor's Office, Town Hall, Croydon. Samples of the stores required for the Sanitary and Waterworks Departments may be seen at the Waterworks Stores at Surrey-street, Croydon, and forms for tendering may be obtained at the Borough Engineer's Office, Town Hall, Croydon. Tenders, endorsed, to be sent to Mr. F. C. Lloyd, Town Clerk, Town Hall, Croydon, by 11 o'clock in the forenoon on October 8.

OCTOBER 8.—KINGSWINFORD.—CAST-IRON PIPES.—Kingswinford R.D.C. invite tenders for the supply and delivery on the works, as may be required, of about 715 tons of cast-iron pipes, varying in size from 16 in. to 27 in. in diameter. Plans, detailed drawings, and form of contract may be seen, and specifications, schedules, and bills of quantities obtained, at the offices of the engineer, Mr. William Fiddian, F.S.I., Old Bank Offices, Stourbridge, on payment of 2s. 6d. Sealed tenders, endorsed "Tender for Kingswinford Sewerage, Contract No. 9," to be sent to Mr. George Francis James, Clerk to the Council, The Council Offices, Worsley, Stourbridge, not later than noon on October 8.

OCTOBER 9.—INDIA.—STORES, ETC.—The Board of Directors of the Southern Mahratta Railway Company, Ltd., invite tenders for:—(1) Miscellaneous tools and stores; (2) 1,000 brass boiler tubes as per specifications and drawings which may be seen at the offices of the Company. The charge for specification No. 1 is 10s. 6d., and for No. 2 11s. 6d., each, which will not be returned. Tenders, endorsed, must be sent to Mr. Edw. Z. Thornton, Secretary, 46, Queen Anne's-gate, S.W., not later than 12 o'clock noon on October 9.

*** OCTOBER 9.—LONDON.—GRAVEL.**—The London C.C. invite tenders for the supply and delivery of fine binding gravel at parks, gardens and open spaces under its control. Specification, schedule of quantities, form of tender, etc., can be obtained at the Parks Department, 11, Becontree-street, S.W. Tenders to be delivered at the County Hall, in a sealed cover, addressed to the Clerk of the London C.C., Spring-gardens, S.W., and marked "Tender for Gravel, Parks and Open Spaces," before 10 a.m., October 9.

OCTOBER 10.—CREWE.—IRONMONGERY, ETC.—The Education Committee of the Crewe Town Council invite tenders for the supply of ironmongery and cleaning materials, and also chandlery for the various schools in the borough. Forms of tender and copies of specifications may be obtained from Mr. Henry D. Struthers, Director of Education. Tenders, with samples, marked as such, to be sent in not later than October 10, at the Municipal Offices, Earle-street.

OCTOBER 10.—INDIA.—RAILWAY STORES.—The East India Railway Company invite tenders for the supply and delivery of:—(1) Galvanised sheets, etc.; (2) laminated bearing springs, etc.; (3) spiral and volute springs; (4) steel axles for carriages and waggon; (5) steel tyres for carriages and waggon; (6) fittings for carriage and wagon underframes and buffers for locomotives; (7) brass boiler tubes; (8) inspection motor toolboxes; (9) wheels and axles for waggon; (10) workshop machines, as per specifications to be seen at the Company's Offices. Tenders are to be sent to Mr. C. W. Young, Secretary, Nicholas-lane, London, E.C., not later than 12 o'clock noon, marked "Tender for Galvanised Sheets, etc.," or as the case may be, for Nos. 1 to 7 on October 3, and for Nos. 8 to 10 on October 10. For each specification a fee of 11s. is charged, which cannot be returned.

OCTOBER 13.—BRIDGE.—GRANITE.—Brigg U.D.C. invite tenders for the supply of 200 tons of granite, broken from 18 in. to 24 in., to be delivered free at Brigg Station (Great Central Railway). The granite must be delivered before the end of June next, in such quantities and at such times as may be required by the Council. Sealed tenders, addressed to the Brigg U.D.C., must be sent to Mr. G. S. Sowler, Clerk, Brigg, on or before October 13.

OCTOBER 13.—GREENWICH.—GRANITE.—The Greenwich Union invite tenders for a cargo of about 350 tons Channel Island granite spalls for stone-breaking at the Grove Park Workhouse, Lee, S.E. Forms of tender can be obtained on application at the Clerk's Office, Woolwich-road, Greenwich, and must be delivered by noon on October 13.

No DATE.—HALIFAX.—FILTERING MEDIUM.—The Highways Committee of the Halifax Corporation invite tenders for about 22,000 cubic yds. of filtering medium for bacteria beds at Copley. Particulars may be obtained on application to Mr. James Lord, C.E., Borough Engineer, Town Hall, Halifax, upon payment of 11s.

No DATE.—WARRINGTON.—LEAD PIPING.—The Water Committee invite tenders for the supply of a quantity of lead water piping. Particulars may be had from Mr. James Deas, Engineer, Municipal Offices, Warrington.

Auction Sales.

Nature and Place of Sale.	By whom Offered.	Date of Sale.
*BUILDER'S STOCK, PLANT, AND MACHINERY, DOVER.—On the Premises	Worsfold & Hayward	Oct. do.
*BUILDER'S PLANT, ETC., WIMBLEDON-PARK, S.W.—On the Premises	Boyton, Sons, & Trevor	do.
*OLD BUILDING MATERIAL, STRAND.—On the Premises	Horne & Co.	Oct. 3
*JOINEY WORK, HENRY STREET, GRAY'S-IN-ROAD	Mox & Bowden	Oct. 9
*BUILDER'S STOCK, WANDSWORTH.—On the Premises	J. J. Skelton	Oct. 10
*BRICKS, BRICK MAKING PLANT, ETC., IPSWICH.—At the Brooks Hall Brickyard	Gardrod, Turner, & Son	Oct. 11
*NUBBERY STOCK, SOUTH WOODFORD.—On the Premises	Protheroe & Morris	Oct. 16
*FREEHOLD BUILDING SITE, ST. GEORGE'S-CIRCUS.—At the Mart	Debenham, Tewson, & Co.	Oct. 23
*FREEHOLD PROPERTY, WILLESDEN.—At the Mart	Debenham, Tewson, & Co.	Oct. 25
*BUILDING SITE, FULHAM.—At the Mart	Farebrother, Ellis, & Co.	Oct. 25
*FREEHOLD BUILDING SITE, CITY OF LONDON.—At the Mart	Edwin Fox & Bousfield	Oct. 31
*ANCIENT HOUSE ESTATE.—At the Mart	Chancellor & Sons	October.

PATENTS.—Continued from page 379

other device. The bar is preferably of a length to extend through the wall or its other end may be so bent as to engage with the bricks. The bent end or equivalent part offers a positive resistance to the bar being drawn out endwise.

2,115 of 1906.—F. W. ADAMS: *Door Springs*. This relates to a double-action door spring, comprising a casing, a spindle extending through the same, and adapted to be moved relatively therewith when the door is opened, a pair of sleeves loosely mounted upon the spindle and carrying a double helical spring, the ends of which are attached to the said two sleeves respectively, and means for turning either of the sleeves and holding the other against rotation when the door is opened.

3,627 of 1906.—R. J. CROWLEY and F. F. PAYNE: *Fireproof or Heat-resisting Surfacing Composition or Cement*.

This relates to a fireproof or heat-resisting surfacing composition or cement manufactured by grinding a fine powder and mixing with it corundum and graphite in certain proportions, and binding same with a solution of silicate of sodium.

3,351 of 1906.—A. SHAHRATT: *Brick-making Machines*.

This relates to a brick-making machine having a pug ring provided with a loose inner lining, and consists in forming the said inner ring with both upper and lower edges thereof bevelled to form a knife edge.

6,263 of 1906.—F. H. PICKSTOCK: *Window Catch Protector*.

This relates to a device for securing the locking arm of such fasteners, consisting of a bent bar lying adjacent thereto, and said bar having a socket which engages with a strut or

boss projecting from a plate secured to the front of the wooden sash bar, and fastened removably thereto by a pin or nut, or in any other suitable way.

10,179 of 1906.—C. T. GANN: *Chimney and Ventilating Shaft Top*.

This relates to a chimney and ventilating shaft top, and consists of a square hood of galvanised iron or other suitable material provided with automatic flaps, the hood being riveted on to a piece of sheet-iron tubing tapered at the bottom end and square at the top to receive the hood. The said hood has four wings, one on each angle which form recesses for the flaps, and serve to prevent the wind from acting upon the other flaps.

11,468 of 1906.—F. C. ROUSE and H. RUDDER: *Hinges for Doors and Gates*.

This relates to hinges for doors and gates, and consists in the provision of an adjustable hinge having a screwed part passing through a pivoting blank or bracket working in the eye-bolt or socket.

12,890 of 1906.—E. CRAVEN: *Water Heaters for Domestic and Similar Fireplaces or Grates*.

This relates to a domestic water heater adapted to be fitted to a kitchen or other similar domestic grate, the construction consisting of front and back horizontal pipes connected by an inlet and outlet connexion, and a series of parallel pipes extending between and attached to the said pipes.

22,292 of 1905.—H. J. HACKINS: *Joining Drain Pipes*.

This relates to joining drain pipes, and consists in forming ribs, blocks, or spurs on the inner face of the socket, so as to project inwardly therein. The socket has at each end an inwardly projecting flange or curtain which

does not extend so far from the internal face of the socket as do the ribs, blocks, or spurs above mentioned. Before jointing is completed the sockets are free to be slid axially over and on either side of the meeting planes of the pipe ends. This allows the pipes, when placed in the trench, to rest on the bottom of the trench, the part of the trench which receives the socket being hollowed out at the bottom to permit the socket to be slid axially. The abutting ends of the pipes, which are bevelled to allow for a small seal of gasket and clay, can be placed in true alignment, and the joints at the pipe ends are made round before the socket is slid in place. When the socket has been slid into place the joint is sealed with liquid cement, poured in through charging apertures in the socket, the cement being retained in the socket by the end flanges. The spurs between the pipe and the flanges are sealed with clay.

3,655 of 1906.—W. JEROCH and DEUTSCHER: *FERRIT-LENT GES. m.b.H.: Manufacture of Cement*.

This relates to a magnesia cement, consisting of a dry powder containing magnesia and sulphate of magnesium, and also a salt of lead free from chlorine, such as acetate of lead, which can react with the magnesium compounds.

6,483 of 1906.—W. HENMAN: *Reinforced Girders, Beams, Railway Sleepers, and the like*.

This relates to girders and the like for use in reinforced concrete, and consists in providing a length or strip of metal having thickened or ribbed edges or centres, or both, with slits in opposite directions on each side, with the longitudinal axis of the strip, and expanding the same to form a sheltered girder or beam.

SOME RECENT SALES OF PROPERTY

ESTATE EXCHANGE REPORT.

September 12.—By MADDOSON, MILLS, & MADDOSON (at Varnmouth).
Rusham, Norfolk.—Freehold market-gdn. and manse, 6 a. 3 r. 6 p. 4300
Stoke-by, Norfolk.—Four freehold houses 865
Bradwell, Suffolk.—1 to 8, Gipsy-lane, 805
By NICHOLAS, DENYER, & CO. (at Dennington, Hendon, Denbigh).—Portions of the Domes Estate, 234 a. 1 r. 10 l. 50. 5,795

September 13.—By SIMMONS & SONS (at Farham).
Bentley, Hants.—"Bury Court Farm," 410 a. 1 r. 10 l. 4,850

By W. LUDLOW & BRISCOE (at Birmingham).
Danzey Green, Warwick.—Danzey Green Farm, 55 a. 0 r. 27 p. 1, r. 1,721. 188. 8d. 1,600

September 18.—By BEALE & CAPPEL.
Regent-street, 80, Warwick-st. (n.), and 39, Glasshouse-st. (s.), n.t. 111 vms. gr. 1701. 400

By RUTLEY, SON, & VISE.
Hampstead road, 22, Ampthill-st., 433 gr. 750
Somers Town, 43, Park-st. n.t. 303 vms. gr. 91. 104. 8 r. 551 345

Islington, 87, Essex-rd. (s.), n.t. 181 vms. gr. 31. 3. 70. 400

By WYATT & SON (at Havant).
Havant, Hants.—6, Western-rd., s. y. 19. 10s. 250

By NICHOLAS, DENYER, & CO. (at Ashford).
Kennington, Kent.—"Kennington Grange" and 5 acres, 1 r. 1, 671. 10s. 6d. 1,395

Four freehold cottages and 1 a. 2 r. 39 p. 635
By FORBES (at Hitchin).
Hitchin, Herts.—48, 49, and 50, Radcliffe-rd. 520

57 to 57, Dore-rd., s. y. 671. 10s. 6d. 410

September 19.—By PRICKEAT & ELIAS.
Highgate, 18 and 20 Parol-rd., n.t. 74. 4 vms. 315

September 20.—By J. A. & W. THAIR.
Layton, 22 and 24, Park-st., n.t. 274 vms. gr. 101. 104. 8 r. 441. 48. 200

September 21.—By INMAN & CRIER.
Maida Vale—20 and 21, Elgin ter., n.t. 55. 12 vms. 660

By MAY & PHILPOT.
Sydenham—9, West-hill, s. y. 1701. 2,000

By NICHOLAS, DENYER, & CO.
Kidmore, Oxon.—A freehold enclosure, 5 a. 0 r. 30 p. 395

"Cross Farm," 90 a. 0 r. 18 p. 1,850

"Tolken Field," 3 a. 0 r. 23 p. 170

Rotherfield Grays, Oxon.—Two freehold buildings, 37 a. 3 r. 36 p. 1,510

Botherfield Poppard, Oxon.—"Dion Meadow," 2 a. 1 r. 2 p. 335

Concessions used in these sales.—f. gr. for freehold ground-rent; l. gr. for leasehold ground-rent; l. gr. for improved ground-rent; g. gr. for ground-rent; r. for rent; f. for freehold; c. for copyhold; p. for leasehold; p. for f. for freehold; r. for estimated rental; w. for weekly rental; q. for quarterly rental; y. for yearly rental; u. for unexpired term; p. a. for per annum; y. for years; l. for lane; st. for street; rd. for road; sq. for square; pl. for place; ter. for terrace; crm. for croquet; av. for avenue; gds. for garden; yd. for yard; gr. for grave; b.h. beerhouse; p.h. for public-house; o. for office; n. for shops; ct. for court.

TO CORRESPONDENTS.

NOTE.—The responsibility of signed articles, letters and queries read at meetings is theirs, of course, with the authors.

We cannot undertake to return rejected communications, and the Editor cannot be responsible for drawings, photographs, manuscripts, or other documents, or for models or samples sent to or left at the office, unless he has specially asked for them.

Letters or communications (beyond mere news items, which have been duplicated for other journals) are NOT DESTROYED.

All communications must be authenticated by the name and address of the sender, whether for publication or not. No notice can be taken of anonymous communications.

We are compelled to decline pointing out books and giving addresses.

Any communication to a contributor to write an article, or to execute or lend a drawing for publication, is given subject to the approval of the article or drawing, when received, by the Editor, who retains the right to reject it if unsatisfactory. The receipt by the author of a proof of an article in type does not necessarily imply its acceptance. The Editor cannot undertake to read and consider articles offered for acceptance unless they are type-written.

All communications regarding literary and artistic matters should be addressed to THE EDITOR; those relating to advertisements and other exclusively business matters should be addressed to THE PUBLISHER, and not to the Editor.

MEETINGS.

FRIDAY, SEPTEMBER 28.

Royal Sanitary Institute.—Dr. A. Wellesley Harris on "Elementary Statistics." 7 p.m.

SATURDAY, SEPTEMBER 29.

Northern Architectural Association.—Buildings' Sketching Club excursion.

Institute of Sanitary Engineers.—Visit to Engineering and Machinery Exhibition at Olympia.

Incorporated Association of Municipal and County Engineers.—Home district meeting at Windsor. 11 a.m. assemble in the Guildhall; 12 noon, visit to Windsor Castle; 1.30 p.m. luncheon in the Guildhall; 2.30 p.m. drive by brakes to inspect various buildings; 5 p.m., at the Guildhall.

TUESDAY, OCTOBER 2.

Institute of Sanitary Engineers.—Student's class, 7 p.m.

WEDNESDAY, OCTOBER 3.

Institute of Sanitary Engineers.—Seasonal meeting, Mr. W. Francis Goodrich on "The Romance of Waste." 8 p.m.

President Institution of Builders' Foremen and Clerks of Works.—Ordinary meeting of the members. 8 p.m.

Royal Sanitary Institute.—Dr. E. J. Steegmann on "Elementary Physics." 7 p.m.

THURSDAY, OCTOBER 4.

Royal Sanitary Institute.—Dr. E. J. Steegmann on "Elementary Physics." 7 p.m.

FRIDAY, OCTOBER 5.

Royal Sanitary Institute.—Dr. E. J. Steegmann on "Elementary Chemistry." 7 p.m.

TERMS OF SUBSCRIPTION.

"THE BUILDER" (Published Weekly) is supplied DIRECT from the Office to residents in any part of the United Kingdom at the rate of 18s. per annum (52 numbers) REPAID. To all parts of Europe, America, Australia, New Zealand, India, China, Ceylon, etc., 30s. per annum.

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PRICES CURRENT OF MATERIALS.

* * Our aim in this list is to give, as far as possible, the average prices of materials, not necessarily the lowest. Quality and quantity obviously affect prices—a fact which should be remembered by those who make use of this information.

BRICKS, &c.

£ s. d.
1 10 0 per 1000 alongside, in river.

Hard Stocks.....

Bough Stocks.....

Grizzles.....

Picked Stocks for

Facings.....

Flettons.....

Bed Wire Cuts.....

Best Farman Bed

Best Bed Pressed

Busbon Facing.....

Best Blue Pressed

Staffordshire.....

Do. Bulhouse.....

Best Stourbridge

Fire Bricks.....

GLAZED BRICKS.

Best White and

Ivory Glazed

Stretchers.....

Headers.....

Quoins, Bulhouse,

and Flats.....

Double Stretchers

Double Headers.....

One Side and two

Ends.....

Two Sides and one

End.....

Splays, Cham-

ferred, Squares.....

Best Dipped Salt

Glazed Stretch-

ers.....

Quoins, Bulhouse,

and Flats.....

Double Stretchers

Double Headers.....

One Side and two

Ends.....

Two Sides and one

End.....

Splays, Cham-

ferred, Squares.....

Second Quality

White and

Dipped Salt

Glazed.....

Thames and Pit Sand.....

Thames Ballast.....

Best Portland Cement.....

Best Ground Blue Lime.....

NOTE.—The cement or lime is exclusive of the

ordinary charges for sacks.

Grey Stone Lime.....

Stourbridge Fireclay in sacks 27s. 6d. per ton at rly. dpt.

STONE.

BATH STONE—delivered on road wag. s. d.

Gons, Paddington Depot.....

Do. do. delivered on road wagons.....

Nine Elms Depot.....

PORTLAND STONE (20 ft. average)—

Brown Whitbed, delivered on road

wagons, Paddington Depot, Nine

Elms Depot, or Fimlico Wharf.....

White Bedded, delivered on road

wagons, Paddington Depot, Nine

Elms Depot, or Fimlico Wharf.....

Do. do. delivered on road wag. s. d.

Ancoaster in blocks.....

Do. do. delivered on road wag. s. d.

Greenhill.....

Darley Dale in blocks.....

Bed Corehill.....

Closeburn Bed Freestone.....

Bed Mansfield.....

YORK STONE—Robin Hood Quality.

Scrapped random blocks.....

6 in. sawn two sides land-

ings to sizes (under

40 ft. super.).....

6 in. rubbed two sides

ditto, ditto.....

3 in. sawn two sides slabs

(random sizes).....

2 in. to 24 in. rubbed

side slabs (random

sizes).....

1½ in. to 2 in. ditto, ditto.....

STONE (continued).

HARD YORK— s. d.

Scrapped random blocks.....

6 in. sawn two sides land-

ings to sizes (under

40 ft. super.).....

6 in. rubbed two sides

ditto.....

3 in. sawn two sides slabs

(random sizes).....

2 in. self-faced random

slabs.....

Do. do. delivered on road wag. s. d.

Hopton Wood (Hard Bed) in blocks 20 per ft. cube, deld. rly. depot.

Do. do. delivered on road wag. s. d.

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Do. do. delivered on road wag. s. d.

WOOD (continued).

JOINERS' WOOD (continued).	At per standard.	£ s. d.	£ s. d.
Danzig and Stettin Oak Logs—		0 3 0	0 3 6
Large, per ft. cube		0 3 0	0 3 6
Small, " "		0 2 6	0 3 0
Wainscot Oak Logs, per ft. cube.		0 5 6	0 6 0
Dry Wainscot Oak, per ft. sup. as inch.		0 0 8 1/2	0 0 9 1/2
3 in. do		0 0 7	0 0 8
Dry Mahogany—Honduras, and bescor, per ft. super. as inch.		0 0 9	0 1 0
Selected, Figury, per ft. super. as inch.		0 1 6	0 2 6
Dry Walnut, American, per ft. super. as inch.		0 0 10	0 1 0
Teak, per load		17 0 0	22 0 0
American Whitewood Planks, per ft. cube.		0 4 0	0 5 0
Prepared Flooring, etc.—			
1 in. by 7 in. yellow, planed and shot	Per square.	0 13 6	0 17 6
1 in. by 7 in. yellow, planed and matched		0 14 0	0 18 0
1 1/2 in. by 7 in. yellow, planed and matched		0 16 0	0 1 0
1 in. by 7 in. white, planed and shot		0 12 0	0 14 6
1 in. by 7 in. white, planed and matched		0 12 6	0 15 0
1 1/2 in. by 7 in. white, planed and matched		0 15 0	0 16 6
1 in. by 7 in. yellow, planed and beaded or V-jointed brds.		0 11 0	0 13 6
1 in. by 7 in. " "		0 14 0	0 18 0
1 in. by 7 in. white " "		0 12 9	0 15 0
6 in. at 64. to 94. per square less than 7 in.			

JOISTS, GIRDERS, &c.

	In London, or delivered Railway Vans, per ton.	£ s. d.	£ s. d.
Rolled Steel Joists, ordinary sections		7 0 0	7 10 0
Compound Girders, ordinary sections		9 0 0	10 0 0
Steel Compound Stanchions		12 0 0	13 0 0
Angles, Tees, and Channels, ordinary sections		9 0 0	10 0 0
Flat Plates		9 0 0	10 0 0
Cast Iron Columns and Stanchions including ordinary patterns.		7 10 0	8 10 0

METALS.

	Per ton, in London.	£ s. d.	£ s. d.
Common Bars		8 0 0	8 10 0
Staffordshire Crown Bars, good merchant quality		8 10 0	9 0 0
Staffordshire " Hard Bars		10 10 0	11 0 0
Mild Steel Bars		8 15 0	9 0 0
Hoop Iron, best price		9 5 0	10 0 0
Galvanised		17 0 0	18 0 0
(And upwards, according to size and gauge.)			
Sheet Iron Black—			
Ordinary sizes to 20 g.		9 10 0	10 0 0
" " 26 g.		10 10 0	11 0 0
" " 28 g.		12 0 0	13 0 0
Sheet Iron, Galvanised, flat, ordinary quality—			
Ordinary sizes, 6 ft. by 2 ft. to 3 ft. 6 in. by 6 ft.		14 0 0	15 0 0
Ordinary sizes to 20 g. and 24 g.		14 0 0	15 0 0
" " 26 g.		15 0 0	16 0 0
Sheet Iron, Galvanised, flat, best quality—			
Ordinary sizes to 20 g.		17 0 0	18 0 0
" " 22 g. and 24 g.		17 10 0	18 10 0
" " 26 g.		19 0 0	20 0 0
Galvanised Corrugated Sheet—			
Ordinary sizes 6 ft. to 28 ft. 24 g.		14 0 0	15 0 0
" " 20 g. and 24 g.		14 10 0	15 10 0
" " 26 g.		15 15 0	16 15 0
Best Soft Steel Sheets, 6 ft. by 2 ft. to 3 ft. by 20 g. and thicker		11 10 0	12 0 0
Best Soft Steel Sheets, 22 g. & 24 g.		12 10 0	13 0 0
" " 26 g.		14 15 0	15 0 0
Cut Nails, 3 in. to 6 in., (Under 3 in., usual trade extra.)		9 15 0	10 0 0

LEAD, &c.

	Per ton, in London.	£ s. d.	£ s. d.
LEAD—Sheet, English, 3lb. and up.		21 0 0	21 10 0
Pipe in coils		21 0 0	21 10 0
Sold pipe		24 0 0	24 10 0
Compo pipe		24 0 0	24 10 0
ZINC—Sheet—			
Vicille Montagne	ton	33 15 0	34 0 0
Silesian		33 19 0	34 0 0
COPPER—			
Strong Sheet	per lb.	0 1 1	0 1 2
Thin		0 1 2	0 1 3
Copper nails		0 1 0	0 1 1
BRASS—			
Strong Sheet		0 1 0	0 1 1
Thin		0 1 1	0 1 2
Tin—English Ingots		0 1 10	0 1 11
SOLDER—Plumbers'		0 0 8 1/2	0 0 9 1/2
"Timmen's"		0 0 10 1/2	0 0 11 1/2
Blowpipe		0 0 11 1/2	0 0 12 1/2

ENGLISH SHEET GLASS IN CRATES OF STOCK SIZES.

	24 in. per ft. delivered.	£ s. d.	£ s. d.
15 oz. thirds		34 1/2	35 1/2
" fourths		34 1/2	35 1/2
21 oz. thirds		34 1/2	35 1/2
" fourths		34 1/2	35 1/2
26 oz. thirds		34 1/2	35 1/2
" fourths		34 1/2	35 1/2
32 oz. thirds		34 1/2	35 1/2
" fourths		34 1/2	35 1/2
Fluted Sheet, 15 oz.		34 1/2	35 1/2
" 21 oz.		34 1/2	35 1/2

ENGLISH ROLLED PLATE IN CRATES OF STOCK SIZES.

	24 in. per ft. delivered	£ s. d.	£ s. d.
Harley's		34 1/2	35 1/2
" fourths		34 1/2	35 1/2
Figured and Oxford Rolled		34 1/2	35 1/2
" Oceanic" Glass, white		34 1/2	35 1/2
Do. " tinted "		34 1/2	35 1/2

OILS, &c.

	£ s. d.	£ s. d.
Raw Linseed Oil in pipes	per gallon	0 1 9
" " in barrels		0 1 10
Boiled " in pipes		0 2 0
" " in barrels		0 2 1
" " in drums		0 2 2
Turpentine in barrels		0 1 10
" " in drums		0 1 11
Genuine Good English White Lead	per ton	33 10 0
Red Lead, Dry		0 12 0
Best Linseed Oil Putty	per cwt.	0 7 0
Stockholm Tar	per barrel	1 12 0

VAENISHES, &c.

	Per gallon.	£ s. d.	£ s. d.
Fine Pale Oak Varnish		0 8 0	0 8 0
Pale Copal Oak		0 10 6	0 10 6
Superfine Pale Elastic Oak		0 12 6	0 12 6
Fine Extra Hard Church Oak.		0 10 0	0 10 0
Superfine Hard-drying Oak, for seats of Churches		0 14 6	0 14 6
Fine Elastic Carriage		0 12 6	0 12 6
Superfine Pale Elastic Carriage		0 16 0	0 16 0
Fine Pale Maple		0 16 0	0 16 0
Fine Pale Durable Copal		0 18 0	0 18 0
Extra Pale French Oil		1 0	1 0
Eggshell Flattening Varnish		0 15 0	0 15 0
White Copal Enamel		1 4 0	1 4 0
Extra Pale Paper		0 12 0	0 12 0
Best Japan Gold Size		0 10 6	0 10 6
Best Black Japan		0 16 0	0 16 0
Oak and Mahogany Stain		0 9 0	0 9 0
Brunswick Black		0 16 0	0 16 0
Berlin Black		0 16 0	0 16 0
Knotting		0 10 0	0 10 0
French and Brush Polish		0 10 0	0 10 0

PUBLISHER'S NOTICES.

Nat. Tel., 612 Gerrard. Telegrams, "The Builder, London."

THE INDEX (with TITLE-PAGE) for VOLUME XX. (January to June, 1906) was given as a supplement with the issue for July 14.
CLOTH CASES for binding the Numbers are now ready, price 2d. each; also
READING CASES (Gilt) with Stripes price 9d. each
THE NINETEENTH VOLUME of "The Builder" (bound), price 1s. 6d. each
SUBSCRIBERS' VOLUMES, on being sent to the Office, will be bound at a cost of 1s. 6d. each.

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Advertisements for the current week's issue are received up to HALF-PAST ONE p.m. on THURSDAY, but "Classification" is made in the case of any which may reach the Office after HALF-PAST TWELVE p.m. on that day. Those intended for the OUTSIDE Wrapper should be in by TWELVE NOON on WEDNESDAY.

ALTERATIONS IN STANDING ADVERTISEMENTS or ORDERS TO DISCONTINUE same must reach the Office before TEN o'clock on WEDNESDAY MORNING.

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ADVERTISERS IN "THE BUILDER" may have Replies addressed to the Office, Catherine Street, Dorset Garden, W.C., free of charge. Letters will be forwarded if addressed envelopes are sent, together with sufficient stamps to cover the postage. Unused letters are returned to advertisers the week after publication.

N.B.—The Reply Boxes are not intended for trade lists, circulars, and the like; should these be received, they cannot (if noticed) be forwarded.

AN EDITION printed on THIN PAPER, for FOREIGN and COLONIAL CIRCULATION, is issued every week.

READING CASES NINEPENCE EACH. (by post (carefully packed) 1s.)

TENDERS.

Communications for insertion under this heading should be addressed to "The Editor," and must reach us not later than 10 a.m. on Thursdays. (N.B.—We cannot publish Tenders unless authenticated either by the architect or the building-owner; and we cannot publish announcements of Tenders accepted unless the amount of the Tender is stated, nor any list in which the lowest and the special reasons.)
Tender is under 100L, unless in some exceptional cases and for special reasons.
* Denotes accepted. † Denotes provisionally accepted.

ALTIVEN.—For erection of two shops, for Pontardawe Co-operative Society, Ltd. Mr. C. S. Thomas, architect, Herbert-street, Pontardawe—

Bennett Bros., £1,100 0 W. J. Griffiths £809 16 3
T. D. Jones, 1,000 0 Rees Morgan £10 0 0
Thomas & Jones, 975 0 E. Evans, 777 0 0
Thomas Bros., 939 0

BOAT OF GARTEN.—For the mason, carpenter, plaster, plumber, painter and glazier works of villa, to be built at Boat of Garten, for Mr. James Fraser, Nethybridge, Mr. J. A. Smith, architect, Glenurquhart-road, Inverness. Quantities by Mr. C. A. Hendry, Union-street, Inverness—

J. Robertson, South-street, Forres, £575 11 10

BRENTWOOD (Essex).—For siting up spray baths, etc., at High Wood school, for the Metropolitan Asylums Board. Mr. W. T. Hatch, Engineer-in-Chief—
Dent & Hellyer, £345 0 E. Taber £109 18
North British W. Dunlop 155 4
Sunderland Co., W. J. Sawyer, Vic-
Lid., 218 2 toria House,
A. H. Inns 215 0 Aldershot? 110 10

CHARTHAM HATCH.—For the enlargement of the Council school, for the Kent Education Committee. Mr. W. H. Robson, surveyor, 44, Redford-row, W.C.—
Gann & Co., Ltd., £675 W. J. Browner £550
T. H. Deane 800 C. Mount 533
C. Jordan 678 J. Browning, Canter-
bury? 631
Sturry Building Co.,
Ltd., 657

CHESHAM.—For private street works in Stanley-avenue, for the Urban District Council. Mr. P. C. Dorrer, Surveyor and Waterworks Engineer, Council offices, Chesham—
W. Y. Green & Co., £507 0 J. Gibbons £432 15
J. Jackson 507 0 A. E. Lee 419 0
F. Fowler 485 0 T. Free
A. Mead & Son 450 0 Maidenhead? 413 3

COWDENBATH.—For additional drainage works, for the Town Council. Messrs. Buchan & Bennett, C.E., 12, Hill-street, Edinburgh—
J. Martin £770 14 D. Adamson,
Coward & Co.,
beath? £758 12 11

CROYDON.—For erecting a school for 1,200 children, Davidson-road, for the Education Committee. Mr. R. Carter Pegg, F.R.I.B.A., architect, Thornton Heath. Quantities by Mr. Mansfield Price, Salaiton, Sutton, Surrey—
J. Appleby & Sons, Cornwall Works,
Lambeth, S.E., £15,000

DARRANLAS.—For the erection of mixed school to accommodate 400 children, for Mountain Ash Urban District Council Education Committee. Mr. W. H. Williams, architect, Town Hall, Mountain Ash—
E. Thomas & Sons, £6,670 0 A. R. John, £5,443 5 8
Jones Bros., 5,930 0 Knox & Wells, £493 0 0
G. Harris, 5,877 18 0 C. Leather &
J. Davies & Sons, 5,374 0 0
Hughes, 5,823 0 A. Richards, 5,355 10 0
Stirling, 5,675 0 T. W. Davies,
C. Jenkins & Sons, 4,902 17 5
J. H. James, 5,520 0 Ash? 4,900 5 0
W. D. Morgan, 2,470 0 J. A. Colborne, 4,927 14 10

GWAUN-CAE-URWEN.—For the erection of a new Calvinistic Methodist Chapel. Mr. A. S. Williams, architect, Llandilo. Quantities by the architect—
Moran Bros., £2,775 16 Thomas Bros., £2,550 10
J. D. Howells, 2,755 10 T. Edwards, 2,450 0
W. D. Morgan, 2,470 0 J. Williams, 2,425 0

HAVERFORDWEST.—For enlarging and reconstructing Lawrence non-provided school, Mr. H. J. T. Thomas, architect and surveyor, 9, Victoria-place, Haverfordwest—
Rees Phillips, £275 10 Thomas & Williams £215 6
Jones & Williams 250 10 L. Davies, Noy-
land? 194 10

HENDON.—For wood and corrugated iron shelter in the Hendon public park, N.W., for the Urban District Council—
Marchant & Hirst £208 0 0 T. J. Hawkins &
R. Isles & Co., 257 0 Co., 174 0 0
H. Parfett, 227 0 J. Harrow & Co., 160 0 0
J. J. Quarterman 225 0 Turpie Bros., 156 0 0
J. McManus, 273 0 F. King, Hendon,
F. Smith & Co., 190 0 N.W., 154 4
Wire Wave Roof-
log Co., 180 0

HEREFORD.—Alterations and additions to Marbury House, St. Owen-street, Hereford, for Mr. A. Thompson, Messrs. Grooms & Bettington, architects and surveyors, King-street, Hereford—
W. Precoe £390 10 E. W. Wilks £247 10
C. Cooke 365 0 T. Hies 246 10
R. L. Fripp 245 0 J. T. Jones 210 0
W. Rowbery 250 0 W. C. Bott? 169 0

KEIGHLEY.—For erecting a spinning-mill, shed, engine and boiler houses, chimneys, etc., South-street, Messrs. J. B. Bailey & Son, architects, 3, Scott-street, Keighley—
Masons and Joiners: Bird Bros. & Co.
Iron and Steel: Clapham Bros., Ltd.
Slater: W. Thornton.
Plasterer and Concretor: Wilson.
Painter and Glazier: J. Harrison.
Painter: J. A. Mullen.
[All of Keighley.]

KENDAL.—For building an Infants' Sunday school in Highgate, for the trustees of Zion chapel. Mr. J. Hutton, architect, Kendal. Quantities by architect—
J. Mason and Slater: R. & W. Dixon, Waller,
Felside, Kendal, £347 0
Joiner: N. Benson, Kendal, 318 10
Plumbers and Hot-water Apparatus: T. & W. G.
Garnett, New-road, Kendal, 210 0
Painter and Glazier: J. Wells, Collier, Croft,
Kendal, 31 0
Plasterers: Woodburn & Storey, Kendal, 72 0

LIANDILO.—For constructing a cattle market and auction mart adjoining the Liandilo Bridge Station, for Liandilo and District Cattle Market and Auction Mart Co., Ltd. Mr. A. S. Williams, architect and surveyor, Llandilo. Quantities by the architect—
C. Mercer £2,450 0 W. D. Morgan, £1,870 0 0
J. Jenkins 2,533 4 0 Gamant?
F. C. Williams, 1,900 5 6 Davies & 1,851 0 0
Morgan Morgan
& Son 1,970 0 Griffiths
[Iron work not included in the above amounts.]

The Builder.

VOL. LCI.—No. 3322.

OCTOBER 6, 1906.

ILLUSTRATIONS.

New Buildings, Marischal College, Aberdeen.....	Messrs. A. Marshall Mackenzie, A.R.S.A., & Son, Architects.
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2. View from Broad-street and View from Back.	
3. Interiors of Mitchell Hall and Court Room.	
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Concrete-Steel Construction.



GOOD old British axiom which many of us have heard from our fathers is "Never be the first in anything." Of course, the adjective here applied to this maxim is

a scientific side, a department which we are glad to know receives adequate attention in the present day.

No subject affords better proof of this view than the reception accorded by architects to concrete-steel as a material of construction. Leaving foreign architects out of the question, we find that the limited employment so far made in Great Britain of the new structural material is chiefly due to members of our own profession. Engineers, who pride themselves upon a readiness to receive and to apply new ideas, seem afraid to take up concrete-steel construction, and the transactions of the leading engineering societies indicate a very feeble interest in the subject. We admit there are a few exceptions, but only just enough to prove the rule.

Our columns served a year or two ago for the communication of the first consecutive series of articles published in Great Britain on "Concrete-Steel," and since then we have received sufficient evidence to indicate that the immediate future of reinforced concrete construction will be associated with building rather than with engineering works.

Until development in this direction shall have assumed more definite form and more characteristic features, no one will be able to refer truthfully to British practice in concrete-steel, for with one or two exceptions all methods adopted here are borrowed from the Continent, and usually under the advice and superintendence of Continental designers. Truly this is a most humiliating position for the professional constructionalists of a

great nation. If architects, and engineers too, for the matter of that, were asked why there is no such thing as free trade in reinforced concrete work, and why patented systems should continue to be regarded with so much deference, they would have some difficulty in finding satisfactory answers. The only explanation we can give is that the country which gave concrete and steel to the world, and in which the combination of these materials was first practised, has lagged behind in the march of progress, and has allowed her pupils to take the lead. There is unhappily only too much reason for believing that this represents the real position, and the only remedy is application to the lessons to be learned from other nations. French, German, and American technical journals are full of facts on the subject of this article, and some of them are organs specially devoted to concrete work. If information be preferred in more convenient form for study many excellent treatises on concrete-steel construction are available, at least two written in this country* and several others elsewhere. Among the latter class we may particularly refer to a recent work illustrating the principal features of reinforced concrete design in a useful manner.†

This book is intended primarily for the guidance of designing and constructing engineers in America, but it serves

* "Reinforced Concrete." By Charles F. Marsh, London, 1904. "Concrete-Steel." By W. Noble Twelvetree, London, 1905.

† "Reinforced Concrete Construction." By A. W. Buel and C. S. Hill, London: Archibald Constable & Co., Ltd., 1903.

only appropriate in the sense understood in references to the good "old times," which everybody may feel justly thankful have no counterpart in really civilised countries. Some little time since Professor Silvanus Thompson, in referring to electric traction, raised a well-merited protest against the old-fashioned obstinacy of refusing to admit the virtues of anything that "has yet to be tried, at any rate in this country," a state of mind described by him as being characteristic of too many British engineers, who shut their eyes to experience gained in other countries, and remain steadfast to ancestral practice, regardless of the progress of invention.

Architects, who are necessarily occupied to a large extent with art, are generally credited with retrospective proclivities. So long as these do not concern what may be distinguished as constructive design, the mental attitude is perfectly justifiable, for in the sense here intended art is an intellectual product that cannot be built up of fragmentary results given by material experiments or evolved by mathematical processes. But the architect's profession has also

to show the freedom possible to the designer who has the courage to think for himself, and in addition to examples of American practice it contains particulars concerning various methods in use on the Continent of Europe, and of some bold examples of reinforced concrete construction executed by French, German, and Austrian architects and engineers. Purely theoretical discussion occupies a comparatively small space in the treatise, the authors devoting attention chiefly to the statement of working formulae, descriptions of representative structures, and practical methods of workmanship and construction. The arrangement of the volume is a good one, comprising three distinct parts, in which the above-mentioned sub-divisions of the general subject are separately considered.

Part I., written by Mr. Buel, starts with a condensed statement of the properties of concrete and steel, and of data affecting the combined use of these materials. Many readers will doubtless think this introductory matter has been treated too briefly, in spite of the fact that all really essential data are included. Still, it must be remembered that the subject of concrete-steel cannot be discussed in a single volume of reasonable proportions if every ramification is to be gone into exhaustively. Something must be treated lightly, and in a manual devoted particularly to construction it is better that the main object should be preferred to the mere collection of data that can be studied elsewhere with equal advantage. So far we can approve the course pursued by Mr. Buel, but he has made a serious omission in neglecting to quote precise references to the sources of the data given in the first chapter, and indeed throughout the first part of the volume. For example, it is not of much use for the average reader to know that "Mr. Edwin Thacher has deduced formulas for the ultimate strength of concrete," or that "Mr. W. H. Henby has given forty-eight determinations of the modulus of elasticity," even if the "formulas" and "determinations" are quoted, unless it is also stated who these gentlemen may be, and where their writings are to be found. American readers may be familiar with the names of the authorities mentioned, but we doubt if they can without assistance turn up the original papers from which the author has drawn his information. The difficulty is aggravated in the case of English readers, to whom we assume this book is addressed, since it is published by a London firm.

One of the most perplexing features that strikes most people who commence the study of concrete-steel construction is the enormous number of theories with resultant formulae relative to flexure in beams. Almost every writer on the subject has attempted to evolve a new theory, or to manufacture a new brand of some existing theory, and to prove the reasonableness of his views by a new set of rules. Some of the theories floating on the sea of technical literature are based upon a limited number of experimental results, others rest upon a hypothetical basis, and none are absolutely accurate. The fact is that too few experiments have been made to justify

completely any existing theory, and until further data become available the complicated mathematical formulae evolved by theorists cannot give more trustworthy results than the simple rules preferred by practical engineers. Under these circumstances the author has followed a wise course in stating briefly the general principles underlying the most rational theories of flexure, and in giving a selection of the most practical rules for beam design in forms readily applied to the conditions encountered in practice.

Similarly simple treatment is followed in connexion with the design of columns, retaining walls, reservoirs, and arches. Taken as a whole, Part I. of the treatise is far more likely to be of service to the practising architect or engineer than a bewildering assortment of theoretical and mathematical matter such as may be found in one or two previously published text-books on the subject.

While theoretical study is essential for those who propose to employ reinforced concrete as a material of construction, the description and illustration of works already executed is of distinct value in directing the attention of professional men and the public to the wide applicability of the new material, as well as for the guidance of the designer. In view of the enormous number of buildings, bridges, water and sewage conduits, water-tanks and reservoirs, retaining walls, and other works that have been executed in all parts of the world, it is really extraordinary that so much doubt should be exhibited in Great Britain as to the merits of concrete-steel construction.

In a series of articles entitled "Typical Structures in Concrete-Steel" we have already placed before our readers some particulars more especially appealing to architects, and one or two engineering papers have published occasional articles describing works of more general character. In Part II. of the treatise to which we have referred in the present article Mr. Hill adds to the information so rendered available particulars concerning numerous representative structures of reinforced concrete, chiefly in the United States. This portion of the volume serves the purpose of recording actual practice in design, and, showing very conclusively the suitability of the new material to various forms and types of architectural and engineering works, is a really useful collection.

The practical side of concrete-steel construction in its own way is quite as important as theory. It is a comparatively simple task to determine the correct amount and position of the steel required as reinforcement, to specify the proportions and consistency of the concrete, but it is not so easy to insure the quality of the finished work. Contractors and workmen have been accustomed for so long to rough-and-ready ways of depositing mass concrete in foundation and other work that they are not likely, without special training and experience, to prepare and apply the materials with the care and skill which are essential in good reinforced construction.

The design and preparation of moulds and centring is naturally a matter for the architect or engineer, who must have a clear perception of what is best calcu-

lated to assist the contractors' men in placing the reinforcement, and in depositing, ramming, and tamping the concrete. In Part III. of "Reinforced Concrete Construction" Mr. Hill considers materials, workmanship, and constructive methods, paying especial attention to the question of moulds for ordinary use, and for the facing of exterior surfaces in such manner as to give a pleasing finish to the work executed.

One of the greatest difficulties to be overcome by the architect is to avoid the irregular surface and variable colour of concrete employed in building outer walls. Imperfections of the kind may disfigure a building of really good design to a serious extent, and it is clear that concrete-steel cannot be accepted as a completely satisfactory substitute for brick or stone in architectural work unless in conjunction with some suitable method of finishing exposed surfaces. Even when the concrete is packed and tamped closely against the sides of the moulds it is difficult to avoid irregularities, and even if a fine mortar facing be first deposited, every slight imperfection on the face of the timber must be reproduced, as well as an undesirably faithful representation of the grain.

To prepare the moulds so as to insure perfectly tight joints and a smooth inside surface, or to use lining material for preventing the appearance of grain marks and other blemishes, involves too much expense and trouble, and cannot obviate either efflorescence or discolouration. Leaving out from consideration such methods of finish as veneering the outer walls of a building with stone or brick, or treating them with a rough cast facing, the two most practicable alternatives are to float all exposed surfaces with semi-liquid mortar, rubbed before it has set hard, to give a smooth finish, or to incorporate specially-prepared slabs of concrete-steel of the desired finish and tint.

Every architect is familiar with the ordinary method of rendering exposed surfaces with mortar, but this is not to be recommended, as the thin coating is certain to scale off after the lapse of time.

For special methods of applying cement, mortar and grout, the reader is referred to the chapter in Messrs. Buel & Hill's treatise, wherein "Facing and Finishing Exposed Concrete Surfaces" is discussed in a suggestive manner. Reference is also made to the use of facing slabs, of which we have given particulars in a previous issue.* One manifest advantage of such slabs is that they form the front face of the wall mould, and become integral parts of the construction. Consequently the whole of the wall can be built of one material throughout, making the building, in fact, precisely what it professes to be, a structure of reinforced concrete.

In this respect concrete-steel construction accords much more completely than veneered steel construction with the principles governing true architectural design.

GURNEY MEMORIAL, NEWCASTLE.—A bust has been placed in the library of the Armstrong College, Newcastle, of the late Principal Gurney. The bust has been executed by Herr Christian Neuper, of Newcastle.

* *The Builder*, Vol. LXXXVIII., p. 416.

NOTES.

The Threatened Paris Exhibition. WE learn with great regret from the first paragraph of the "Letter from Paris" in another column, that the French Government are encouraging the idea of having another immense exhibition in Paris either in 1912 or 1915. Every exhibition of this kind leaves a kind of gigantic scar on the face of Paris; the disfigurement incidental to the 1900 exhibition is still not done away with; and a period of twelve or even fifteen years is not sufficient to give them their full value. A great exhibition once in a quarter of a century—practically, once in a generation—would be of some value, as summing up and illustrating the progress which art, science, and industry had made in that period. A shorter period does not allow full scope for development in the interim, while the practical result is that the city has hardly recovered from the disturbing effects of one exhibition before the process is commenced of again turning it upside down for a new exhibition. The decision, if it has really been taken, is a most unfortunate one.

Wages and Hours of Labour. THE Labour Department of the Board of Trade has just issued the annual report on wages and hours of labour for the year 1905. The balance of the changes in the rate of wages shows that a net decrease in wages has resulted, but a less decrease than in the preceding four years. The net decrease is about 114,000*l.* or 2,200*l.* per week. In 1904 the decrease was 938,000*l.*, and in 1902 2,300,000*l.* The net result of the changes in hours of labour was a reduction of 65,265 hours in the weekly working time of the workpeople affected, a consideration which should not be lost sight of in considering the above reduction in wages. When the changes in the rate of wages are considered for the period of ten years, an increase is shown at the end of 1905 of 209,000*l.* per week, and although the rise of wages in the years 1896-1900 applied to all trades, the subsequent reductions have been more partial. The year 1906 has begun well, showing a marked rise in nearly all trades except the building and quarrying trades, and the hours of labour continue to decrease. Two periods of five years each are covered by these statistics, the first five years being a period of activity, the second five years covering a time of depression. The figures are alone based on the changes effected in the rate of wages and the hours of labour, but they appear to show that the period of depression has yet left the working classes in a substantially better position than in 1896, both as regards the rate of wages and the hours of labour.

The Municipalities and Rates. THE municipalities are being driven by the policy of extravagance in which they habitually indulge to seek new devices for "raising the wind." As tramway proprietors their attention has very naturally been turned to their trade rivals, the omnibus companies, and three or four Borough Councils are advocating

the rating of omnibuses. The omnibus companies occupy a different position to the tramway undertakers, who, by Act of Parliament, lay their plant in the public roads, and, therefore, are rated on the same principles as gas and water companies. If vehicles using the roads by an undefined track are to be rated, where is the line to be drawn? The tradesman sends his carts over a defined area in regular sequence every day for the purposes of his business, and, therefore, might equally well be specially rated. The municipalities are already clogging trade in order to push their own trading enterprises, and the public will look askance at any attempt on their part to turn the public roads into a source of revenue for their own benefit. The highway rates are already sufficiently onerous, improved facilities of transit have been urgently needed, and are now being supplied, and the municipalities themselves have clamoured for cheap means of transport for all classes. The policy of these bodies seems, however, now to point to the creation of monopolies in the municipal tramways, and to penalising anyone using any other vehicle, or rating trade rivals out of existence. Recent disclosures as to the ultimate destination of municipal funds will surely open the eyes of the public to the dangers of this system of municipal trading.

The Holborn Viaduct Fire. THE useful character of the inquiries held by the City Coroner into the causes of all fires taking place within the City of London has already been mentioned in our columns. In the case of the serious fire that occurred two or three weeks ago on Holborn Viaduct, expert evidence tendered at the inquest showed that, although communication was possible by means of doors between the premises and the houses on either side, the facilities for escape in case of fire were inefficient. An emergency route considered to be unsafe was a parapet running beneath the windows of the top floors used as dormitories, and cross-examination by the foreman of the jury elicited the fact that no instructions had been issued to the occupants of the dormitories as to how they should act on the outbreak of fire. The district surveyor considered the buildings were undesirable for the purpose of accommodating so many people at night, and the jury, while unable to decide upon the actual cause of the fire, had no difficulty in coming to the conclusion that the means of exit from the building were unsatisfactory, and that steps ought to be taken at once to provide properly for the safety of the occupants. If non-fatal fires throughout the metropolis were made the subject of inquiry, as in the City of London, a good deal of assistance would be given to those who desire the prevention of fires and more loyal compliance with regulations intended for the protection of the public.

Report on the Salisbury Railway Accident. MAJOR PRINGLE's report to the Board of Trade confirms the generally accepted view that the Salisbury disaster was directly caused by the speed of the train, which was very much in excess of the maximum authorised by the company's instructions and timings. He expresses the further

opinions (1) that the accident was in no way due to any defect in the permanent way or rolling-stock, or to the length of the train, or the weight of the load behind the engine; and (2) that if the speed limit of 30 miles an hour through the station had not been exceeded the disaster would not have occurred. In conclusion, Major Pringle gives some general advice which is almost identical with that contained in our "Note" of September 9, 1905, on the Witham disaster. He says that railway companies have to contend with many difficulties which are the natural result of their lines having been laid out in early days before experience was gained, and when the present high speeds were never contemplated. Notwithstanding the improvements already effected, Major Pringle considers that further improvements in the way of alignment and inclination will certainly become necessary if companies desire to meet the demand for long-sustained high-speed travelling. This condition is one that has to be faced, and the sooner the companies turn attention to it the better for everyone concerned.

The Corrugation of Tramway Rails. ONE of the most troublesome phenomena exhibited on tramway tracks is the gradual formation of wavelike undulations. The subject has attracted a good deal of attention, and various theories—mostly incorrect—have been put forward to account for this peculiar form of damage. For example, it was suggested early this year by a well-known tramway official that the rails were probably turned out from the rolling-mill with a slightly waved surface, whose irregularity became exaggerated as the result of traffic. Hence he was induced to propose the obviously futile remedy of grinding the rails perfectly true before they were laid. Engineers who have studied the question in a more intelligible manner are fairly agreed that corrugation of the track is largely due to the oscillation of heavy vehicles of uniform length mounted on rigid frames, a view that is supported by the fact that the evil has become more pronounced since the weight and rigidity of tramcars have been increased. So far as present experience extends, it seems highly probable that the remedy is to be found in greater flexibility of the running gear, and greater elasticity of the rail bed, or alternatively in the employment of cars of different lengths on the same track, so as to break up the wave length established by heavy and rigid rolling-stock built to a uniform wheel base.

Electric Wiring. RECENT reductions in the price of the electric light have raised a demand for a cheaper system of wiring small shops and private houses. In this connexion the paper on "A New Method of Employing Twin Lead-covered Wire for Electric Light Wiring" read last week by Mr. E. L. Berry to the Electrical Contractors' Association will be found interesting by many. There are two methods in general use for wiring buildings. In one, the insulated wires are run in wooden casing, and if the casing be in no part of its length exposed to damp this method is satisfactory. In the other method, which is the more expensive, the cables

are run in metal tubing, and if the installation has been carefully carried out, this is undoubtedly the best. Unfortunately, however, in some cases it has not been properly installed. Moisture enters at defective joints, and the condensation of water in the tubes has led to breakdowns. A most important point also in connexion with this system is the necessity in some cases of making the protective tubing electrically continuous with the earth. Neglect of this precaution may lead to a section of the pipe being maintained at a relatively high pressure from earth, and this may give an unpleasant shock to anyone accidentally touching it when standing on a damp place, or touching a water or gas pipe at the same time. This possible danger does not exist with wooden casing. In Mr. Berry's system vulcanised rubber twin lead-covered wires are used. The difficulties hitherto experienced with lead-covered wires are in making joints and in "looping" the wires. Mr. Berry has designed a special junction-box to overcome these difficulties, and it certainly simplifies very considerably the mechanical operations necessary in wiring. It consists essentially of two blocks of porcelain, the base and the cover. In the cover are numerous terminals for the wires, and four saddles for cramping the lead sheathing to the earth-plate, and thus ensuring the metallic continuity of the covering of the four wires entering the box. This system of wiring will be cheap to instal. If no trouble is experienced from the lead being corroded by cement it ought in many cases to prove of great value.

A MATTER of great importance to Cardiff is the decision of Lord Bute to sell his entire interest in the dock and railway undertaking of the Cardiff Railway Company. Nearly all the ordinary shares are held by Lord Bute, who is said to feel that the responsibility for so large an undertaking ought not to rest upon the shoulders of one man. That is a very proper feeling, which we hope extends also to the land surrounding the docks, and necessary for their future extension. An offer of the shares has already been made to the Corporation, who have decided to open negotiations with a view to the possible formation of a public trust or harbour board. Several points in connexion with the matter will require most careful consideration. One is the question of the land mentioned above, for unless this is to be sold the proposed board would have no means of offering such terms as would attract large commercial concerns to the port. Another is whether the large amounts of money devoted within recent years to the development of the docks and railway have been wisely expended, and are likely to yield an adequate return. This point, of course, is intimately connected with the price Lord Bute may be advised to accept for his holding. A third question is whether any board largely controlled by the Corporation, and, therefore, subject to the uncertain vote of the ratepayers, would be supported by the commercial classes. In the interests of the port it is clearly desirable that the whole position should be considered on a

commercial basis, that any new authority to be created should thoroughly and fairly represent all parties concerned, and that the authority should be constituted so as to be able to pursue a continuous policy of development without risk of any interference arising from the fluctuations of local politics.

THE proposal of the Reading Corporation to borrow a sum of 5,000*l.* odd, to be expended on the purchase and laying out of a considerable space of ground on the banks of the Thames from Caversham Bridge to the town boundary, is of interest and importance. It is high time that the land not yet built on along the upper Thames should be purchased by some public body and kept in its present charming state. The Corporations of the towns on the Thames cannot be expected to do more than protect their own townspeople. We hope, however, this public-spirited action of the Corporation of Reading may cause the other Thames-side towns, and Thames-side residents, to realise that unless a collective effort is made at once to preserve the meadows and woods which border the Thames from the builder's hands it will be too late. Residents who already have houses on the Thames should do their utmost, if only from the point of view of keeping up the value of their property, to preserve such open space as still exists from being covered with houses. The beauty of the Quarry Woods, for example, below Marlow, has been not a little diminished by the fact that residences have been built on them. Most of these are by no means objectionable in themselves, but they change the character of the riverside. It ceases to be beautiful woodland in a natural state, and becomes a mere pleasant suburban waterside.

By a codicil to his will the late Earl of Leven and Melville, who died on August 21, gives a maximum sum of 40,000*l.* to his trustees for the reparation and restoration of the chapel for the Order of the Thistle. Lord Leven and Melville stipulates that Lord Balcarras (who is honorary secretary to the Society for the Protection of Ancient Monuments) and Sir John Stirling-Maxwell, or the survivor of them, shall see to the execution of the work, and that Mr. Thomas Ross shall be employed as architect. "I do not," he says, "give the money for the carrying out of the plans of any other architect." The Revolution frustrated King James II.'s project to establish, or revive, the Order of the Thistle with its chapel in the Abbey Church of the Holy Rood. The now ruined chapel was, we may observe, not built as the chapel of the palace, but represents the church of the religious house which King David I. founded for some Augustinian canons regular in 1128, and which formed the parish church of the Canongate. The title of "Chapel Royal of Scotland" belonged strictly to that in Stirling Castle, which gave way *temp.* James VI. to the chapel in the later Holyrood Palace, still known ordinarily as "The Abbey," built for Charles II. by Robert Milne, after the designs of Sir William Bruce, of Kinross. Having been thrice

burned by the English, and as often repaired, the Abbey Church was re-roofed with flag-stones in 1758, when but little more than the eight bays of the nave, the two aisles, and one tower had survived. On December 2, 1768, the roof fell down, doing great damage to the interior. In the north aisle were the tombs of several members of the Scottish nobility; at the east end of the south aisle was the royal vault, in which were buried Kings David II., James II. and his consort, Mary of Guelderland, James V. and his first Queen Magdalene, Henry, Lord Darnley, and others. Rizzio's grave is in the passage leading from the quadrangle.

THE works of three artists are now on view at Baillie Gallery. The most important are those of Mr. H. Raymond Thompson, who deals with the figure in decorative designs of some importance. His "Night" (1) is a fine design of a female figure with a sleeping infant in her arms. "The Annunciation" (4) is a group of an angel and the Virgin in which the subject is treated in a less conventional and ecclesiastical manner than is usual, and the Virgin's head has much beauty. "The Power of Music" (5) is a triptych with a long centre panel and square side panels, labelled "Orpheus, Homer, St. Cecilia." The Homer panel is a good composition of figures grouped in front of a landscape, listening to the bard who is on the left; it forms a kind of frieze, agreeable both in composition and colour. Mr. Thompson's imaginative works are more interesting than his studies of figure in real life. Mr. Westley Manning's works are landscapes of which the water-colours are better than the oils. Among the latter "The Quarry Parham" (39), the largest work, hung in a bad light, seems a good composition rather heavy in effect; "Summer Evening, Cley, Norfolk" (51), is a good work, the best of the oils. Among the water-colours there is much that is admirable, especially in the studies at Walberswick, that favoured hunting ground of landscape artists; Nos. 4, 9, 15, and 24 may be specially mentioned, also the "Suffolk Gold Field" (13). In the small room are small water-colours of West Sussex scenes, by Mr. H. L. Dell, which are rather in the old water-colour style, the school of David Cox. The two best in composition are "June Pastures" (9) and "Spreading Oaks" (15), which rather give the idea of being the same subject studied from opposite points of view; at all events they represent nearly the same composition reversed.

THIS Club, which we do not remember to have heard of before, though we see that its institution dates from 1894, fills two rooms in the Suffolk-street Gallery with an interesting collection of sketches and studies, chiefly landscape. Whether the black frame is merely adopted for the sake of a name, or whether the sketches are intended to be such as show up best in a black frame, is not quite apparent. Mr. Wallace's "Herring Boats at the Mouth of the Tweed" (9) and Mr. Haughton's "Autumn Evening" (10) are good examples of the kind of study aimed at: dark blue sea and sand in one

case, brown and golden tones in the other. Mr. Eastlake Leader's "A Breezy Day" (19) is an excellent landscape composition with a very well treated foreground. Mr. E. Borough-Johnson (the President) gets a good effect of sunlight interior in his little sketch entitled "Their Work" (22). Among others we noticed are Mr. Percy Gibbs's "The Top of the Hill" (8), a foreground figure in a landscape; Mr. Loveland Cock's, "A Stream" (30), a larger and more important work than most; Mr. Eastlake Leader's "An Autumn Afternoon" (37); Mr. Percy Gibbs's half-length figure "Roses" (40), and also "The Edge of the Village" (54), which shows that he can depend on landscape without figures; Mr. Schofield's "The North Devon Coast" (62) and "Saunton Sands" (79), both of them exceedingly true to the localities; also the same artist's "Apple Blossom" (113), a composition a little after the manner of Mr. H. W. B. Davis; Mr. Eastlake Leader's "On the Sand Dunes" (112); and Mr. F. G. Heath's "Below Cleve Lock" (126), a study of the massed colours of tree foliage. The small exhibition is full of good suggestions in landscape composition.

NOTES ON MOSAIC AND MARBLE INLAY.—III.

In the hall of William's Palace of La Zisa, near Palermo, is an ornamental mosaic with three circles in a row, and archers shooting, or peacocks standing at each side of trees. This motif is further developed above a door in the Royal Palace in the so-called Stanze di Ruggiero, with more trees and more animals and birds, and this development of the motif shows that they are of a slightly later date.

At Messina there are mosaics of about 1232 in the apses, restored under Frederick of Aragon and Pedro II. The principal vault shows Christ enthroned, with Michael and Raphael standing by him, and then the Virgin and S. John. Above his head is the gospel book on an altar surmounted by a cross, and cherubs. Three little figures are at his feet, Frederick of Aragon, Guidotto the Archbishop, and Pedro II. These were added at the time of the restoration.

In the left apse the Virgin is seated flanked by angels, and beyond S. Eleanor, wife of Frederick of Aragon, and S. Elizabeth, wife of Pedro, kneel. Above the Virgin's head the Holy Spirit hovers. In the right apse S. John the Evangelist is seated, S. Nicholas, and Bishop Mino. Two little figures are between them, the young King Louis and his tutor, John of Randazzo, Duke of Athens. All the figures are on a gold ground. The side apses are of the period of the restoration, which was some fifty years ago.

In S. Gregorio, Messina, is a fine mosaic of a Virgin and Child enthroned, on a gold ground in a niche, of the same period. At S. Sophia, Kiev (1051), Christ sits in glory in the cupola, surrounded by great figures of archangels, prophets and apostles. In the apse a colossal figure of the Virgin appears in prayer, and symbolises the church on earth. Lower down is the subject of the Last Supper, treated in what M. Kondakoff calls the Liturgical manner. Lower still are figures of the Fathers of the church. Above the central part of the church is the Saviour accompanied by the Virgin and S. John Baptist. An Annunciation appears as a divided subject on two pillars, and martyrs are in medallions upon the vault. The church is also much decorated with paintings.

The present cathedral at Torcello dates from 1008, replacing a previous church (or several) of an older period which had decayed. The great mosaic which covers the western wall is of the XIIIth century, and represents the Resurrection, the Descent into Hell, and the Last Judgment, the figures increasing in size towards the upper part. The composition is very like that of the painting of a similar subject in the church of S.

Angelo in Fornis, Capua, of the XIIIth century, the design of both showing Greek influence. Above the door is a half-length of the Virgin in prayer in the Greek manner. In the apse is a standing figure of the Virgin and Child on a gold ground; below is S. Elidorus, and beneath the window and on each side of it are six apostles. On the face of the arch is an Annunciation in two panels. The apse of the right aisle has a seated Christ on a sumptuous throne, blessing in the Greek manner, between SS. Michael and Gabriel. Four saints are below him on a green ground. At Murano, in the apse, is a Virgin on a gold ground.

Although S. Mark's, at Venice, was commenced early in the IXth century, and when the body of the Saint was brought from Alexandria and deposited in 829, the chapel of the ducal palace was enlarged, taking in the site of an ancient Vth century chapel of S. Theodore, portions of which still remain in the structure, the work was not completed till 1071, owing to the revolt against Pietro Candiano in 976 when the palace was burnt, necessitating great alterations to the church.

Venice being allied with, and having been subject to, Constantinople, the influence of Byzantine design is very evident. At this period the domes of the atrium and many of the great figures in the domes were executed by Byzantine artists. The mosaic above the left door of the atrium, showing the Consecration in 1111, is not earlier than 1205, since it shows the bronze horses brought from Constantinople in that year, when the Senate ordered the gilding of the cupolas and of the stone ornaments of the façade, and the decoration of the tympana of the arcades of both stories with mosaic. Only four of the second and one of the first were done, however, and these were replaced in the XVIIth century, as they were in a bad condition. The first great cupola shows the Holy Spirit inspiring the twelve Apostles and the four Evangelists arranged in a circle, beneath which, between the windows, are sixteen figures representing Pagan nations, and four great angels with outspread wings occupy the pendentives. This is work of the XIIIth century. The wagon vault next to it is devoted to the Passion. At the top of the central cupola Our Lord blesses beneath a canopy sustained by cherubim, the Christian virtues are arranged round him. The four Evangelists are on the pendentives, and lower still are four symbolical figures of the rivers of Paradise. This and the cupola of the choir are of the XIIIth century. In the latter the Virgin is surrounded by thirteen prophets under the blessing of Christ, and in the pendentives are the Apocalyptic animals. In the apse is a colossal Christ, seated and blessing, a work of 1502, signed Petrus, imitating the ancient Byzantine style; but, as there is one with the same signature and the date 1159 over the door to the palace, it seems probable that the whole thing is a copy. The chapels of S. Peter and S. Clement at the sides of the choir have mosaics of the lives of those saints. The cupola in the left transept has the life of S. John the Baptist, that on the right the cross and figures of saints. In the Cappella Zen is Christ in glory on a rainbow, surrounded by angels, and on the walls the twelve Apostles baptising the Gentiles. In the baptistery the Saviour in Jordan, with three angels kneeling in a row and the Holy Ghost descending on his head, several subjects from the life of S. John Baptist, and in the lunette at the bottom a crucifixion between the Virgin and S. Mark. These are all XIIIth century except the last, which is of the XIVth.

In the XIIIth century a fresh impulse was given to mosaic in Rome, and several churches were thus decorated. S. Maria in Trastevere, founded by Calixtus I., in a kind of convalescent home for sick soldiers given to the Christians by Alexander Severus, was the first public edifice in Rome consecrated to the new worship, if tradition may be trusted. In the XIIIth century the triumphal arch and the vault of the apse were covered with mosaic, as well as a portion of the façade (by Innocent II., 1130-43). The apse shows Christ and the Blessed Virgin seated on a throne (the first time she is shown on an apparent equality with him); at their sides Pope Calixtus I., whom the Virgin blesses, S. Laurence holding a long

cross, and Innocent II., S. Peter, the Popes Cornelius (251), and Julius I. (337-52), protectors of the church, and, finally, a priest named in an inscription "Calepodius." Christ's hand rests on the Virgin's shoulder. There are ornaments in the shell at the summit of the semi-dome, the cross, the lamb, and the divine hand holding a crown over the head of Christ. His nimbus is cruciferous and gemmed; the Virgin has a nimbus and the eagle and the angel among the Evangelists' symbols. A votive inscription is interposed between this subject and the band below, upon which are represented twelve sheep with the towns of Jerusalem and Bethlehem. At the top of the triumphal arch is a cross with the letters A and ω suspended from its arms, the seven candlesticks, and the symbols of the Evangelists; below, at the sides, are the prophets Isaiah and Jeremiah; lower still geniuses raise a flower-besprinkled veil, and two doves flutter round a vase. Of these mosaics M. Vitet says: "They show the beginnings of the revival 130 years before Cimabue." Drawing, colour, action, composition, casting of draperies, movement, expression, everything in this mosaic suggests a study of nature, a knowledge of the laws of antique style. This must be a Byzantine work; for if Desiderius could have obtained mosaicists from Rome for Monte Cassino he would hardly have sent to Constantinople in 1066. The façade shows in the centre the Virgin suckling the infant Saviour, and the wise and foolish Virgins. Five of each side, richly clothed. Five of them have crowns and carry lamps alight; three on the other side are like them, and two are without crowns, and their lamps have no flames. All have nimbi. The other mosaics of the façade are modern. The mosaics at S. Chrysogone and S. Francesca Romana are also of this century. In the apse vault of the former the Madonna appears between S. Chrysogone and S. James. In the latter the figures of the Madonna and Child between the Apostles SS. John, James, Andrew, and Peter are placed beneath a round arched arcade, above which a shell-shaped velarium fills the top of the vault. At the top the monogram of Christ is seen on a round moulding, with flowers and fruits. The similarity of design in the arcade to certain IXth century MSS. has caused some to ascribe this mosaic to that century, but there is no doubt that it is later.

A few mosaics remain in the churches of the Holy Sepulchre at Jerusalem and of the Nativity at Bethlehem. In the former there are some ornament and a figure of Christ from an Ascension. He is seated on a rainbow, blessing with one hand, while the other rests on a book of the Gospels. In the church at Bethlehem are more important remains; above the frieze which the nave columns support are, first, a row of half-length figures representing the genealogy of Christ; second, a series of acts of the principal councils separated by groups of fantastic foliage under an arcade much like XIIIth century Romanesque; third, a frieze of leafy scrolls between two rows of pearls; fourth, a row of angels between the windows; and fifth, a second similar frieze. The ground is gold, and the tesserae small. The colours employed are red, yellow, blue, green, and purple brown. The brilliant whites are mother-of-pearl, as are the fields of the inscriptions. On the other side are the acts of the councils beneath canopies, which look like sections of the churches in which they were held; a central arched nave with dome, two smaller arches at the sides with curtains and towers above. An altar stands in the centre, above which is the inscription. Three angels still remain above. Three subjects also remain, the Entry into Jerusalem, S. Thomas touching Christ's wounds, and a fragment of the Ascension. In the north transept is a figure of the prophet Elijah, a fragment of the subject of the Transfiguration. The style of all these mosaics is that of the Greek miniatures of the XIIIth century, more correct in drawing, more natural in pose than the Romanesque paintings of the West, more scientific in execution also. The modelling is obtained by concentric hatchings strengthened with gold, the folds are numerous and carefully indicated. The inscription in the choir gives the date 1169, and the name of Ephrem as the executant. They were commissioned by the Emperor Emanuel

Comnenus Porphyrogenitus according to John Phocas, but the scheme is Latin, the bishop at the time was a certain Raoul, and the king was Ananry I., fifth King of Jerusalem. They owe their preservation to the veneration which the Mussulmans professed for the Holy Virgin.

The tribune mosaics at S. Paolo fuori. Rome, were renado by Honorius III. (1216-27), and the arch was finished by Nicholas III. (1277-80). In the apse Christ is enthroned with SS. Paul and Luke on the right, SS. Peter and Andrew on the left; a palm terminates the composition at each end. Honorius kneels at the feet of Christ, and below is a frieze showing an altar with a cross in the centre and an angel on each side, then the twelve Apostles, six on each side, with palm trees between. It is believed that Gaddo Gaddi worked at these mosaics, and perhaps Pietro Cavallini, from whom the façade was commissioned in 1335. The mosaics of the triumphal arch were practically renado after the disastrous fire of 1823. Professor Frothingham says that the mosaics of this façade are now divided and placed in the interior on the face of the apse and the inner side of the triumphal arch. The alteration of place was due to the necessity for rebuilding the façade in 1823. The apse is dated 1836, and the triumphal arch 1840. The work was commenced by Innocent III. (1198-1216), and finished by Gregory IX. (1227-41). The former assigned 490 scudi for the purpose. Honorius III. wrote to the Doge of Venice for mosaicists for the apse. In 1218 he wrote again, thanking the Doge for those sent, and asking for two more. The external mosaic was restored by Cavallini under John XXII. (1316-34), who added the small figure of the Pope. Furietti mentions a bull of his providing for a general restoration of the mosaics.

In the apse of S. Clemente on the Cælian vault and the arch of the tribune are of this period. A conventional tree, of which the branches cover the whole vault with their scrolls, grows upon a hill from which the four Paradise streams flow. Upon it rests a great cross with the Virgin and S. John, upon the arms of which are twelve white doves, symbols of Simplicity. Two stags are drinking below, and birds and groups of emblematical figures are among the branches, as well as the four doctors of the church seated writing. The general design repeats that of the 14th century mosaic in the chapel of S. Rufinus. Round the lower part is a strip of the usual sheep, with a lamb in the centre. The arch has a bust of Christ in the centre, the symbols of the Evangelists, SS. Paul and Laurence, with the prophet Isaiah below on one side, and on the other SS. Peter and Clement, with Jeremiah below.

At Florence the baptistry was covered with mosaics from 1225 onwards. The structure probably dates from the 13th century, or even earlier. It was surrounded by ditches, and had staircases like the tomb of Theodorici at Ravenna. Till the beginning of the 13th century it was the Cathedral, but, as it was found too small, it was then united to S. Maria Reparata. The marble casing is due to Arnolfo del Cambio, who restored the building in 1295. The attic of the roof is of a later date. The most ancient mosaics are above the tribune and at the top of the cupola, a Last Judgment, Byzantine in style. At the top Christ stands, surrounded by orders of angels; cherubs and seraphs with four or six wings; Dominations, great angels with diadems on their foreheads and sceptres, in procession, clothed in dalmatics or robes enriched with jewels. The "Powers" are armed with lance and buckler, with helmet on head, and cuirass above floating draperies. Below, above the tribune, Jesus as Redeemer is seated on a throne; in a *mandorla*, a great figure of seven "braccia" high. He extends his hands to show the wounds. The usual groups and incidents are around: the treatment resembles that at Torrello. The other sides of the cupola have panels showing the Creation, the history of Joseph, the life of Jesus and that of S. John Baptist, and on the gallery and attic figures of prophets, made by Gaddo Gaddi in 1265, patriarchs, and saints. The tribune mosaics are signed "Jacobus Sancti Francisci frater." Andrea Tafi worked here in 1225. He was assisted by Gaddo Gaddi (1259-1312) and a certain Apollonius, who taught him how to make the enamel and

cement. He was a pupil of Fra Jacopo. In 1346 the mosaics had to be restored, as the cement had given way, and Agnolo Gaddi, the grandson of Gaddo, was commissioned to do it; fifty years later it had to be done again: Lippo undertook it, and also did the mosaic over the door, much appreciated at the time. About 1485 Baldovinetti did a good deal while he held the appointment of keeper at a salary of 100 florins.

Above the principal door of the cathedral is a Coronation of the Virgin by Gaddo Gaddi, commissioned by the Signory, and there is an Annunciation by Ghirlandajo over another, a weak performance conceived on pictorial lines. At S. Miniato the great mosaic on the façade shows Christ seated blessing, the Virgin and S. Miniato standing on each side, perhaps 13th or 14th century, but much restored. There is also a great mosaic in the apse: Christ seated in the centre blessing, the Virgin and S. Miniato (a King of Armenia) at each side; the symbols of the Evangelists are round the throne, and a pelican is below S. Miniato. Behind him is a tree in fruit, and behind the Virgin is a palm-tree; both have birds among their branches. A small figure of the donor is behind the palm-tree. This may very likely be the work of Gaddo Gaddi, repaired by Baldovinetti in 1491. The mosaic in the apse of the Cathedral of Pisa was begun by Andrea Tafi, Gaddo Gaddi, and Jacobus, and finished by Vicini in 1321; a colossal Christ seated, flanked by a large Virgin and S. John. He blesses in the Greek manner, and beneath his feet are the basilisk and dragon, the lion and the asp. On the border of his robe the text referring to this (Ps. xc. 13) is inscribed. The ground is gold and the style somewhat like Cimabue. In the right transept is an Assumption by Gaddo Gaddi, and at the end of the left transept an Annunciation by him, perhaps the best mosaic he produced. These were commenced in 1300, and, as he did not die till 1312, may have been completed by his own hand.

In returning to Rome the large mosaic by Solernus (1207) in the gable of the cathedral of Spoleto may be mentioned: a Christ with the Virgin and S. John.

Nicholas IV. (1288-92) ordered the apse of S. John Lateran and S. Maria Maggiore to be covered with mosaic. The Lateran was done by a Franciscan, Jacobus Torriti, whose name appears here for the first time, assisted by Fra Camerino. A bust of Christ of a large size, with a golden nimbus, is at the top, surrounded by eight half-length angels, with one cherub above in a half-circle on a blue sky with narrow clouds. Below is the adoration of the Cross. It is gilded and placed upon a hill lighted by the rays from the symbolic dove. From the side of the hill the four rivers of Paradise flow; stags and sheep drink from them. An angel guards the door of a fence which surrounds the hill. To the right is the Virgin (who places her hand on the head of a small figure of the Pope), SS. Peter and Paul, and Francis of Assisi on a smaller scale as a monk, are in adoration, standing; the Pope kneeling, marking his humility by his size. To the left are SS. John Baptist, Anthony of Padua (in monkish habit, and smaller) John the Evangelist, and Andrew. Several of the saints hold a scroll or a book with words from holy legends. The figures are placed on a narrow green bank, with birds and flowers; below the waters unite and form a large river, the Jordan; children with boats and aquatic birds play upon its quiet surface. The border of this part is formed by an inscription. Lower down, between the windows, are the Apostles SS. Judas, Simon, James the Greater, Thomas, James the Less, Philip, Bartholomew, Matthew, and Matthias. These figures are on a gold ground in a meadow sprinkled with flowers, and are framed by trees which grow between them. They are smaller than the saints around the cross. Among these are two little figures of monks kneeling and working; one holds the square and compass, the other the cutting hammer still in use in mosaic shops, and breaks the cake of enamel. These are the artist and his assistant. The signature runs: "Jacobus Torriti pict ch op fecit Fr Jacob de Camerino scoti magri opis recommend se . . . itis beati Jo-is."

Of this mosaic M. Clausse says: "The cross and the stags are found at S. Clemente,

the stags are of Pagan origin, taken by the earliest Christian artists. The Jordan is a reminiscence of the antique; on its waters and on the bank twelve children amuse themselves with sails and birds in cages, boat in light skiffs drawn by swans, fish and play sportively. Torriti knew the power of decorative mosaic, that it finds its strength in unity of effect, which results from the calculated division of space, in harmony in the arrangement, and in simplicity of execution. The humble Franciscan monk comprehended these immutable principles of great art, and applied them with a profound science." M. Eng. Muntz thinks that he worked up portions of an ancient mosaic into his design. He holds the head of Christ to be of the 7th century, though much restored, and says that if the lower part with the children is not of the 14th century it must be copied from one which probably existed in the same place. The children are life-size and well done. The figures of the Apostles, the Virgin, and S. John Baptist are of a fine style of work, and those of SS. Francis and Anthony, being so small, suggest that it was want of space which dictated the size, and that consequently the larger figures are more ancient. The second angel on the right from the bottom he thinks may be of the primitive epoch. John the Deacon (who wrote 1159-81, much before Torriti's time) says of the apse mosaic of S. Maria Maggiore: "Other figures and groups are the repetition of those which one sees in S. John Lateran, and there is also found towards the middle of the mountain of the enclosure of Paradise two stags answering to each other, quadrupeds, birds, fishes, representing the created things which people the air, the earth, and the water." M. Muntz says that there are two MSS. of the 13th century in the Bibliothèque Nationale which contain this description.

Torriti began the mosaic at S. Maria Maggiore under Nicholas IV., and finished it ten or twelve years later. It shows the coronation of the Virgin, repeating the motif of fifty years earlier in S. Maria in Trastevere, and several panels on a smaller scale between the windows below show events in her life. The latter are by Gaddo Gaddi, made after 1307. It is thought that the background of scrolls dates from the 7th century, they being so much like those in the chapel of SS. Rufinus and Secundus. Above the portion which repeats the motif of S. John Lateran, near the choir, of arch-angels, two pelicans kneel, Nicholas IV. on the left and Cardinal Jacopo Colonna on the right; behind the Pope three saints stand, SS. Peter, Paul, and Francis of Assisi (anonised in 1228); behind the Cardinal are SS. John the Baptist, John the Evangelist, and Anthony of Padua. Some think the date 1295 can be read here. All the saints have nimbi, and their size is graduated in proportion to their importance; Nicholas IV. has no nimbus. The two large figures are in a circular starred aureole, and if the surface of the mosaic be examined cracks and joints appear, which make it plain that Torriti must have destroyed the centre of the original mosaic which John the Deacon admired to insert his Coronation of the Virgin with the little angels and the votive figures. The six Apostles may very likely be ancient, being stiff and hard in style.

The upper part of the façade of the same church still shows mosaics of the same period (1290) by Rusuti under the later loggia; two rows of subjects, the lower of which relates in four pictures the story of the founding of the basilica. Above is Christ in a glory supported by angels; the Evangelists' symbols and figures of saints are below. The smaller subjects may be by Gaddi, as Vasari says. There is a mosaic medallion by Jacopo Cosmati above the door of the house of the Holy Trinity and of the captives on Monte Celio; the Redeemer seated drawing to him a white and a black man chained is the subject.

Pietro Cavallini made mosaics for the lower part of the apse of S. Maria in Trastevere—six subjects from the life of the Virgin, which show Byzantine tradition in their composition with a freedom suggestive of the coming revival in art. Above the episcopal throne behind the altar is another—circle surrounded by a trellis of red, blue, and white encloses a Madonna; "quite like a 14th century painting," M. Gerspach says. SS. Peter and Paul stand one on each side;

Peter rests his hand on the kneeling donor. Below the votive inscription is the vest of the Stefaneschi; between crest and figure is written "Bertoldus filius Petri." The mosaic is signed with a cross and "P." a circle, and dated 1291, and we know that Cavallini was in Naples in 1308, married by King Robert. The date of 1351 has been given for this mosaic, and Cavallini has been called a pupil of Giotto, who executed the "Navicella" at S. Peter's within the atrium called Paradisum (corresponding to the façade above the entrance portico) in 1298. It appears rather as if Cavallini may have been master and Giotto pupil. The "Navicella," though it still exists, has been so many times moved and so much restored that it has small value. Paul V. had it moved to the wall above the steps in 1617. In 1639 Urban VIII. moved it to the inside of the church above the great door. It was restored to its former situation by Innocent X. Alexander VII. made new porticoes, and it was again taken down. Clement X. had it restored and almost remade, and placed it in its present position, in the portico opposite the great door. Giotto received 2,200 florins for it. Cavallini also did the façade of S. Paolo fuori le mura, commissioned in 1326; some fragments are in the wall of the cloister vestibule. He was buried in the church.

A XIVth century mosaic may be seen at Naples in S. Restituta, the chapel of S. Maria del Principio, so called because the mosaic is reputed the most ancient in Naples. A Madonna and Child are beneath a canopy with twisted Cosmati-like columns, attended by S. Restituta and S. Januarius. It is a delicate and characteristic work. At Orvieto Cecco Vanni and Francesco, two monks, did mosaic work at this period, and Andrea, son of Mino, and (later) Michele Memmi worked in the cathedral of Siena. Of the South Italian mosaics the best are in the cathedral of Salerno. Above the central door of the nave is a half-length of S. Matthew, and in the space to the right of the high altar, restored by John of Procida, is a S. Michael with a nimbus of black and white tesserae holding the labarum and an orb, a fine figure, the head of which is only visible from immediately beneath it. Below S. Matthew is seated on a throne adored by a small figure of John of Procida, and at his sides SS. Fortunato and John, SS. James and Laurence. In the left aisle is a baptism of Christ, of which only the little angels above are mosaic, the rest being painting of the XIVth century. Charles IV. summoned several Italian mosaicists to work in his cathedral of S. Veit, Prague, and they went on to Marienwerder and Marienberg. At S. Giusto, Trieste, in the right apse is a Christ blessing between SS. Giusto and Servito, and in the left a Virgin and Child with two archangels with orb and sceptre, and a row of apostles in niches below, Venetian work of XIIIth century.

At the mosque of Kahrî-Djami, formerly the Church of the Saviour, Constantinople, are some excellent mosaics of the XIth and XIIIth centuries restored at a later date. The restoration is recorded by one of them, in which the donor, Theodore the Metochite, Great Logothete under Andronikos II. Palaeologos (1222-1328), is shown worshipping the Christ Pantokrator. The cupolas of the second narthex are fully decorated with mosaic, as are the lunettes below, and detached figures of saints occur here and there on the walls and soffits of the arches, and many medallions of saints and angels. The first cupola has in the centre Christ Pantokrator, with full-length figures of patriarchs in radiating compartments, with bands of diapers between. The pendentives have the subjects of the curing of the issue of blood, of the blind and deaf man, of the two blind men, and of S. Peter's mother-in-law, with angels in medallions between. The second cupola has a half-length Virgin and Child in the centre, and on the radiating compartments ancestors of Christ from David to Joseph, as well as on the drum, in which there are five windows. There are twenty-seven personages. On the pendentives are the subjects of the Annunciation, the high priest judging the Virgin, and Joachim keeping his sheep. The fourth is too much damaged for recognition. Below this cupola on the lunettes are the subjects of the enrolling

before the tax-gatherers at Bethlehem, the angel appearing to Joseph in a dream and the journey to Bethlehem, with the Visitation in the background; the Nativity, with angels singing behind the cradle and others appearing to the shepherds, and the parting of Joseph and Mary after betrothal. Beneath the other dome the lunettes show Herod and the Magi. He orders the massacre of the innocents. The birth of the Virgin, Christ curing the sick, and the Virgin given back to Joseph. Above the entrance door to the second narthex is a colossal Christ Pantokrator, half-length, and holding a book; the expression is dull and heavy. Above this on the vault is the miracle of the loaves and fishes, and on the other side the marriage at Cana. Other lunettes show the baptism of Christ and the temptation and the flight into Egypt, and on some small cupolas are the presentation of the Virgin and the Virgin as a child caressed by her parents, and the Virgin fed in the temple by an archangel as on the wall close by. One lunette shows the rare subject of the Virgin receiving the purple thread in the temple, foretelling her queenship to her companions, and smaller subjects of the soffits of arches are the resurrection of Lazarus, Joseph and Mary return to their house at Nazareth, and Zacharias prostrates himself before the rods of the Virgin's suitors. It will be seen that the subjects are quite as often legendary as historical. They may usefully be compared with those prescribed by the "Painter's Manual."

LETTER FROM PARIS.

It had been thought that the 1900 exhibition would be the last of these immense shows, the practical value of which is doubtful, and which on each occasion cause for six months a serious disturbance of the normal life of Paris. Apparently, however, it is not to be so; and the Government, which is uneasy about the slowness of work which will follow on the completion of the metropolitan railway system, wishes to find some other work for the labourers who have flocked to Paris from all parts of the country. On this account the public authorities are taking up the idea of having another great exhibition either in 1912 or 1915, and that it is reported a formal investigation of ways and means has been commenced with this object. If this is the case, it will be interesting to see what course the Government intend to take with regard to the vestiges of the 1900 exhibition which are still existent. Though six years have passed, the Champ de Mars has not yet been set in order. The banks of the Seine, in this portion of Paris, offer a melancholy spectacle: the conservatories of the Cours la Reine are falling in pieces; and the Municipality of Paris, in spite of its efforts, can get nothing done. The Galerie des Machines has to be removed and Gabriel's Ecole Militaire opened out to view, and houses built on each side of the Champ de Mars; in short, the quarter which has been the victim of the last exhibition has to be entirely transformed, and nothing towards this end has been undertaken, on account of the procrastination of the Government bureaucracy.

Another example of this inertia of the Government departments is shown in the case of the metropolitan railway. For several months the street of the Avenue de l'Opéra has been turned inside out for the construction of line No. 7. The terminus of this line was at first to be established under the courtyard of the Palais Royal. On the refusal of the Government to this scheme, the Municipality proposed to form a terminus under the Cour de Carrousel; but no, it was argued that this might prejudice the stability of the Louvre. The Municipality then suggested a new route, by which the line was to terminate at the Place de l'Hôtel de Ville, near the Rue des Pyramides and the Rue des Tuileries, but to this again the representatives of the Government take exception, with the result that the works are stopped pending an agreement between the State and City authorities, to the great inconvenience of traffic and of the general public interests.

During the vacation, and while the Vieux Paris Committee is not meeting, the State engineers have been silently preparing an

* To be continued.

act of vandalism which will raise a storm of objection unless the Municipal Council is able to intervene in time. Under the pretence of enlarging the Pont des Saintes Pères, they have projected the removal, if not the destruction, of the four stone statues which since 1845 have decorated the two entrances to the bridge. These statues, which represent respectively Abundance, Industry, The Seine, and The City of Paris, are the work of Petitot (not of Pradier, to whom they have been wrongly ascribed), and are sufficiently good to be worth preserving; they are part of the artistic patrimony of Paris. They are quite as good as most of the many recent public statues in Paris. Probably the Vieux Paris Committee will have something to say on the subject.

In contrast to these iconoclams is the action of M. Redon, architect to the Louvre, in endeavouring to restore the palace, in one important respect, to its original appearance. When Claude Perrault rebuilt the Louvre, he surrounded it with excavations or "fosses" which left the basement walls exposed to view, giving a much grander and more monumental appearance to the building. These dry moats, as they may be called, the traces of which M. Redon discovered last winter, he proposes to re-establish in the Rue de Rivoli, the Place St. Germain d'Auxerrois, and the Quai du Louvre, bringing the massive foundations of the building into view as they were originally seen.

An interesting exhibition is being organised in the basement galleries of the Petit Palais. The Conseil Général of the Seine twenty years ago founded scholarships in the arts of painting, sculpture, architecture, engraving, and medal work, for the benefit of students in those arts whose merits were established and whose poverty stood in the way of their artistic career. In order to illustrate the services rendered to art by this means the Conseil has determined to hold an exhibition of the work of the students who have held these scholarships, and the public will be able to judge, in a few days, what have been the actual results of this liberality. There will probably be some disillusion, but there will no doubt be some good work to be seen among the exhibits of the ablest of these students.

It is announced that the Hôpital Beaujon, founded in 1780 and covering about 25,000 square metres of ground, which is now insufficient for its purposes and is in a dilapidated and unhealthy condition, is to be shortly demolished. It will be replaced by a new hospital built on a site adjoining the fortifications, near the Avenue des Ternes, and furnished with every modern improvement.

It has also been determined, according to a resolution of the Municipal Council, to cover in the Canal St. Martin between the Faubourg du Temple and the Avenue de la République. This work will practically constitute a prolongation of the Boulevard Richard Lenoir, which already covers the canal as far as the Place de la Bastille. There will be in the new street six openings for the ventilation of the canal. At the same time, the bridge of the Faubourg du Temple will be enlarged.

BUILDING IN GLASGOW.—At the Glasgow Dean of Guild Court on the 27th ult. Lord Dean of Guild King presented his annual statement. He said that after the falling-off during the previous year they would not be surprised to learn that the improvement which had taken place had been comparatively small. The total valuation of the work passed by the Court during year to August 31 was 1,440,387l., against 1,303,502l. for the previous year—an increase of 136,885l. The average for the fifteen years from 1891-2 till 1905-6 was 1,693,634l., so that last year's work was less than the average of the fifteen years by 253,247l. Last year there were 2,863 houses sanctioned, as against 2,078 the previous year. Of these 505 were houses of single apartments as against 280. While it was to be regretted that the necessity for single apartments existed, on the other hand it was a cause for satisfaction that the miserable hovels in the congested parts of the city were being replaced by new and better-ventilated and more sanitary houses. The increase in two-roomed houses during the year had been 548. Only six linings were granted for public buildings against 21 last year, but they were more important, the valuation being 66,450l., against 73,180l. There were 7,345 lineal yards of new streets passed, against 3,018 last year.

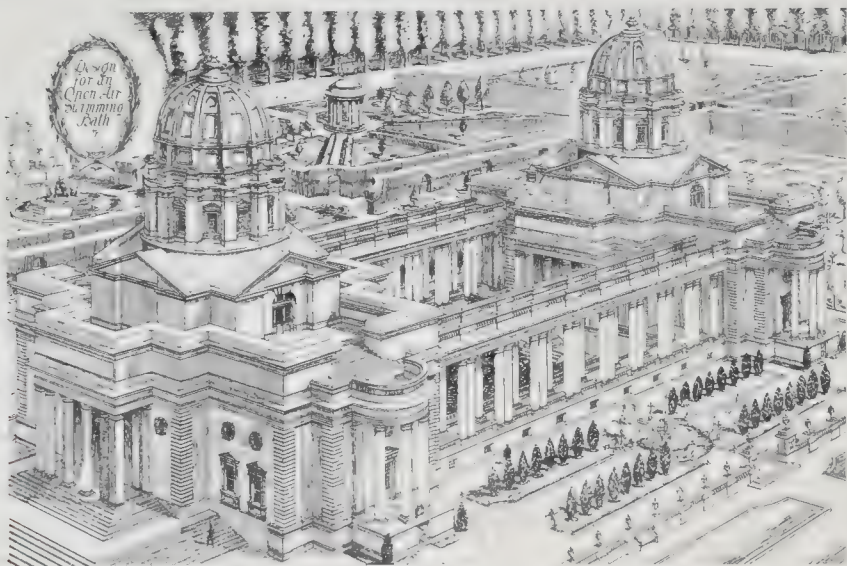


Fig. 1. Design for an Open-air Swimming-bath. (Liverpool School of Architecture.)

THE LIVERPOOL SCHOOL OF ARCHITECTURE

THE two illustrations annexed represent the work of two students of the School of Architecture in Liverpool University, and are given as examples of the work done by students at this school. As some of our readers will recognise, they were sent in competition for the last Tite Prize at the Institute of Architects; a prize the subjects given for which generally afford a good exercise in the study of Classic forms of architecture. Fig. 1 is by Mr. L. K. Adams; Fig. 2 by Mr. Maurice Lyon—both of them second year students in the school.

There are two regular courses of study open to students—the Degree course and the Diploma course. A certificate may also be awarded to students unable to complete the Diploma course.

The degree at present awarded is the degree of B.A. in the Honours School of Architecture. But there is under consideration a revised scheme of degrees in architecture, which may involve substantial changes in the scheme. At present, candidates preparing for any degree in the University are required before beginning their course to have passed the Matriculation examination, or to have obtained exemption therefrom, and thereafter to have attended approved courses covering not less than three years.

During the first year's course, as at present arranged, the student, in addition to a certain amount of work in the architectural studio, is required to pass a form of the Intermediate examination for the degree of B.A. in three subjects—(a) a language, (b) either History or English Literature, and (c) either Mathematics or Physics. Should the new scheme come into force, the amount of work required in general subjects will probably be materially increased and the amount required during this year in the architectural studio proportionately diminished.

Graduates of this or any other recognised University in arts, science, or engineering may be excused from these non-professional studies.

During the second and third years the whole time of the student is spent in professional work and in the kindred arts. At the end of the third year he undergoes an examination which consists of (a) a design prepared under specified conditions of a projected building, and carried out with all necessary working and detail drawings; (b) a set of measured drawings of a building

approved by the professor and a dissertation, to be completed before the examination begins; (c) two papers on the History of Architecture, and two on the construction and planning of buildings; (d) an oral examination; (e) a test of proficiency in two of the following:—Applied Mechanics, Drawing, Modelling, Decorative Design, Art and Theory of Painting, Art and Theory of Sculpture. In the last two subjects candidates are required to present a thesis on some school of painting or sculpture.

The course for a Diploma falls into two periods, each of two years. In the first period the student's time is devoted to professional studies in the school, on the lines of the course laid down for the second and third years of the degree course, but less advanced in character. The second period is spent in an architectural office, while the student continues his studies either in the school itself or in some other architectural school recognised by the University. Two examinations must be passed, one at the end of each period.

The school, as most of our readers are aware, is under the able direction of Professor C. H. Reilly, A.R.I.B.A.

MILAN INTERNATIONAL EXHIBITION.

COMPARATIVELY LITTLE appears to be known in this country of the important exhibition which is being held at Milan, and which was organised for the purpose of celebrating the opening of the Simplon Tunnel, by which an additional line of railway connects European systems with those of Northern Italy. The importance of the exhibition may be inferred from the fact that many of the architectural works are represented; that many of the buildings, which are isolated as a protection against the spread of fire, are of considerable size and are well-designed, showing careful arrangement and planning; and that the area covered by the exhibition is about one million square metres. The exhibition is under Government and municipal patronage, and is supported by a State grant, and 3,000,000 lire have been raised by a State lottery. The original project was to limit the exhibition to land and sea transportation as these are the two great industries chiefly affected by the opening of the tunnel; but though one of the features of the exhibition is the section relating to transportation by land and sea, the various arts and industries are all represented. About one-third of the

space allotted is covered with buildings which, apart from private pavilions, are from designs by the architects Locati, Bianchi, Magnani, Rondoni, and Bongi, and some smaller buildings were erected under the immediate directions of the committee's technical office.

The site of the exhibition is not far from the Castle, in the north-west of the city. It is in two parts, i.e., portions of the public park and the Piazza d'Armi, and these are connected by an elevated railway, the journey from one part to the other occupying about three minutes, trains leaving both stations at short intervals; the intermediate space consists of roads, etc. This arrangement is rather misleading to visitors unacquainted with the Italian language or unable to follow the plans issued in the official guides, and one heard of people who had travelled long distances to see the exhibition who did not get beyond the Park section, which they concluded was the whole of the exhibition, and who were not very enthusiastic about an "international exhibition" thus limited, although the Park section contains some fine buildings and exhibits, including the Simplon Tunnel building, the Retrospective Exhibition for Transportation by Land and Water, fisheries, modern decorative arts and architecture, providential institutions, fine arts (Italian), City of Milan, Swiss Pavilion, and the large and imposing Festival and Congress Hall. This building, which has seating capacity for 3,000 people, is the principal structure in the Park, if not in the whole exhibition; it is covered by a large dome, and on either side of the entrance is a tower.

It was in the Park that the fire occurred earlier in the year. Though the conflagration was a serious one, the buildings containing the British exhibits do not appear to have been affected, and those structures which suffered have been or are being rebuilt.

In the Piazza d'Armi part of the exhibition, starting in front of the elevated railway station, is a light railway, which carries visitors to the various buildings and places of interest; and in this part there are six entrances, there being three in the Park. The convenience and comfort of visitors appear to have received the special attention of the organisers of the Exhibition, baths and douches even being provided in the Piazza d'Armi.

Among countries taking part officially in the exhibition may be mentioned Austria, Belgium, Bulgaria, Canada, China, Cuba,

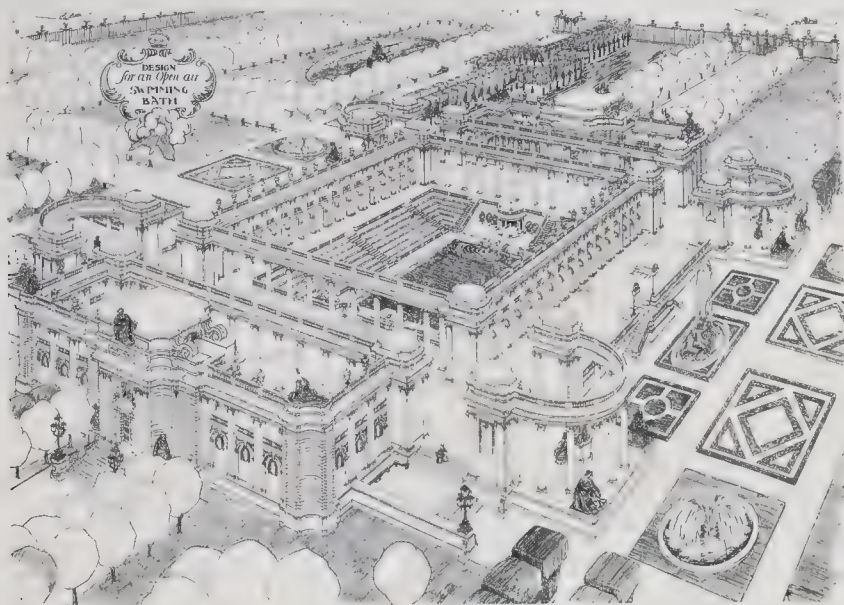


Fig. 2. Design for an Open-air Swimming-bath. (Liverpool School of Architecture.)

Denmark, France (largely represented in most industries, and with a fine devoted in the Piazza d'Armi specially devoted to the decorative arts of France), Germany (also well represented in several industries), Japan, Great Britain, United States, Holland, Portugal, Switzerland, Hungary, etc. Several countries have their own special pavilions, some of them very large and most well designed; and the various nations are represented more or less thoroughly in the different sections of industry into which the exhibition is divided. In the galleries situated in the Park, British exhibits occupy positions in the following sections:—Retrospective, fisheries, decorative arts, and social economy. The more important British contributions to the exhibition in the Piazza d'Armi are to be found in the following sections:—Land transportation, mensuration and aeronomics, sea and river transportation, working hall for industrial arts, agriculture, and hygiene. In addition, there are the following pavilions and kiosks in which British exhibits are to be found:—Ansaldo Armstrong (Sir W. G. Armstrong, Whitworth, & Co., Ltd.; a very fine exhibit), Terni Odero (Vickers, Sons, & Maxim, Ltd.), and H. J. West & Co., Ltd. (refrigerating machinery). Some of the British exhibits are thoroughly representative, and among firms which may be mentioned are: Messrs. Armstrong, Whitworth, & Co.; Vickers, Sons, & Maxim, Ltd.; Doulton & Co., Ltd.; and Waring & Gillow, Ltd. It may be of interest to add that the British Government made a grant of 10,000*l.* in order to assist in organising the British section, and, though British firms, with some notable exceptions, are not well represented in the sections of hygiene and the decorative arts, it may be said that this country is well to the fore in the marine and land transportation and agricultural machinery sections, and that, taken as a whole, Great Britain has reason to be satisfied with the enterprise shown by British firms. Some countries have done better. France, Austria, and Germany, for instance, so far as one could tell from a rather hurried inspection of the exhibits of these countries—but the British exhibits are receiving a good deal of attention from Italian visitors. It may be said generally, and so far as machinery is concerned, that the heavy, durable goods shown are of British manufacture; comparatively little attention appears to have been given to the lighter and cheaper goods. It is to be regretted that a better

display is not made by this country in the hygiene section and, though not to the same extent, in the decorative arts section. The exhibits here are comparatively meagre, though what there is is good. Of course, the Italian exhibitors, including the Government, occupy a large part of the space given up to exhibitors, but other countries are well represented, the following figures showing approximately the amount of space occupied by some countries:—France, 250,000 sq. ft.; Austria, 180,000; Germany, 150,000; Belgium, 108,000; Great Britain, 75,000; and Hungary, 32,000. Many of our steamship lines show models of their vessels, and marine engineering and shipbuilding are well represented. There are also interesting exhibits by the Admiralty and Lloyd's.

Some of the principal buildings on the parade-ground (Piazza d'Armi) are: Industrial Arts, Water Transportation, Land Transportation, Agriculture, Public Health, Hygiene, etc., and French Decorative Arts; while a few of the special pavilions are: Austria, Belgium, Bulgaria, Armstrong, Krupp, City of Milan, Working Hall for Italians Abroad, Silk Industries, and others. The British chalet is a picturesque little building, which was erected by Messrs. Humphreys, Ltd., and furnished by Messrs. Waring & Gillow, Ltd., in competition for the King of Italy's prize of 400*l.* for the best and most tastefully furnished suite of rooms for a gentleman's house in the modern style. The rooms are decorated with a soft green canvas on the walls, divided by white splats into panels, the frieze being left white. The building is furnished with the furniture exhibited at the St. Louis World's Fair. The sanitary fittings and decorative pottery in the veranda were supplied by Messrs. Doulton & Co., Ltd.

The contents of the exhibition are divided into ten principal sections, nine of which are international, and there is also a short-period exhibition, lasting from June 15 until November 15. The extent of the exhibition may be inferred from the fact that the nine sections are divided into 267 groups, which are further divided into 1,186 classes.

An international jury has been appointed for the purpose of dealing with prospective awards, which will consist of diplomas, medals, hon. mentions, etc. The prizes offered by the King of Italy in the various international sections amount to 4,000*l.*, with an additional prize of 4,000*l.* for national

fine arts. The following are some of the prizes to be awarded:—400*l.* for the best and most original exhibit of machinery for manufacturing processes, 400*l.* for the best set of furnished rooms in a modern gentleman's dwelling, 400*l.* for the best type of popular dwelling adapted to the climate of Northern Italy, 200*l.* for automatic safety couplings for railway rolling stock, 200*l.* for the best method of testing high-voltage electric currents without danger to the operator, and several other prizes in industries which do not concern our readers.

It would be impossible in one article to mention all the matters of interest in such a large exhibition, or to deal critically with the exhibits which are directly or indirectly connected with architecture and building. A week spent in the exhibition would not be sufficient for the purpose, and we shall limit our remarks to a brief reference to the British exhibitors in some of the arts and industries relating to building, etc.

The Park section of the exhibition is nearest to the city, and on entering by the principal entrance the building that at once attracts attention is the Galleria del Sempione (Simplon Tunnel Gallery), which suggests the occasion of the exhibition. The building shows two tunnel-like openings separated by a rough-hewn colossal group representing miners struggling against rock and inert matter. The pavilion has a central turret and two side ones, on which are symbolical figures, and on the right of the pavilion is the fish culture pavilion, and on the left the retrospective building. The retrospective exhibits include a fine collection of old coaches and means of transport by land, and to be seen here are exhibits by the Corporation of London illustrating a few of the municipal works carried out by them, as well as views and models showing bridges and other structures; a commemorative panel sent by the Institution of Civil Engineers, emblematic of the work of that body in the past, and dedicated to the engineers of Italy; books and photographs sent by the Institution of Mechanical Engineers, and a collection of historic rails; books and models from the Iron and Steel Institute, and pieces of steel rail; framed drawings from the Board of Education showing historical locomotives; and models, photographs, pamphlets, etc., from the British Fire Prevention Committee.

Adjoining the large Festival Hall, already referred to, is the exhibition of fine arts and of architecture, and close by is the decorative

art pavilion, in which are a number of British exhibits. The British court occupies an area of 10,440 sq. ft. and it contains some interesting exhibits. Messrs. Waring & Gillows are well represented. They show the Prince of Wales' suite of rooms which were originally on board *H.M.S. Ophir*. In the Prince's sitting-room the oak furniture is reproduced from old XVIIIth century models, and the various rooms are tastefully furnished and arranged. The firm also show selections of furniture—dining, drawing, and bedroom pieces in various styles.

The exhibit by the International Society of Sculptors, Painters, and Gravers includes works by Messrs. F. Brangwyn, Alfred East, Sir C. Holroyd, J. Pennell, and L. H. Shannon.

The Arts and Crafts Society exhibits include some clever and interesting works, and also some showing that archaic tendency which we have referred to on previous occasions. The following are some of the exhibitors: Mr. R. A. Bell (cartoons for stained glass windows), Mr. T. T. Blacklock (stencilled prints), Mrs. Julia Bowley (carved settee), Miss K. Button (embroidery), Canterbury Weavers (banner, bullion ornaments, bell-pulls, etc.), Miss N. Casella (wax miniatures and bronze plaquette), Mr. G. H. Clarkson (medallion), Mr. J. P. Cooper (silver fruit dish), Mr. Walter Crane (groups of original designs for printed cretonne hangings and block printed wall-paper), Mr. Lewis F. Day (tile panel, etc.), Mr. C. H. L. Emanuel (silver and metal work), Mr. H. George (altar frontal), Mr. A. Romney Green (furniture), Guild of Handicraft (pieces of silver work and jewellery), Mrs. E. Mills (enamels), Mr. R. M. Nance (furniture), Mr. L. Pisarro (designs for illustration of standard author works), Maria E. Reeks (carved mirror frame), Royal School of Art Needlework (art needlework, etc.), and Mr. W. H. Taylor (Ruskin pottery).

The British Museum Trustees have sent a selection of electrolytes of ancient coins and British historical medals forming part of the collections in the Museum, as examples of modern reproduction of art coins and medals for decorative purposes.

Pilkington's Tile and Pottery Company, Ltd., Clifton Junction, near Manchester, show their tiles in various colours for interior decoration, and also some decorative vases. The colours and designs are in most cases very good.

Sir Albert K. Rolitt, LL.D., President of the British Commission for the Exhibition, has sent a complete series of commemorative medals struck by the Lord Mayor and Corporation of London to mark events in the City's history, and a collection of medals connected with occasions of public interest.

The Welsh Industries Association of London show specimens of Welsh pottery: Mr. Hector Montani, of Manchester, exhibits some carved cameo vases in superposed layers of different coloured clays; Sir E. Elton, Bart., Clevedon Court, Somerset, shows some "Elton ware," which is formed of local clay; and the Cloisonne Glass Company, London, have sent a good collection of their coloured glass ware.

In this section are a number of lace and book-binding exhibits; and outside the building are some large blocks and polished slabs of marble exhibited by the Verdi Antico Marble Company, Ltd., London.

In the Social Economy section, also in the Park, the British exhibitors include the Guinness Trust (plans, photographs, and drawings of model dwellings erected by the Trust), Rowton Houses, Ltd., Improved Industrial Dwellings Company, Garden City Association, and Messrs. Joseph & Smith (drawings, etc., in connexion with the Guinness Trust).

The hygiene exhibits are shown in the building provided for the purpose in the Piazza d'Armi, and, as already mentioned, the British exhibits are not at all comprehensive. The excellent display made by Messrs. Doulton & Co., Ltd., Lambeth, is, as far as we could see, the only exhibit of its kind in the British court. The ground space occupied by the firm is 400 ft., and it is divided into three parts, two representing complete bathrooms and the third and larger space miscellaneous sanitary fittings. The exhibit includes specimens of the firm's enamelled ware (baths, urinals, closets, sinks, etc.), and it gives a good idea of the excel-

lence of British workmanship in such goods. Messrs. Doulton are to be congratulated on their exhibit, and it is to be regretted that other firms in this class of work are not represented.

The Richmond Gas Stove and Meter Company, Ltd., show their well known gas stoves in the British court.

Among other exhibitors are the Mining Department of the Home Office (a collective exhibit relating to British mining during the last thirty years as dealt with under the Mines Regulation Acts), the Metropolitan Asylums Board (model of ambulance steamboat, carriages, etc., and excellent models of Messrs. T. W. Aldwinckle's Brook Fever Hospital, Shooter's Hill, and the temporary fever hospital erected in 1892 in six weeks; the models are by Mr. J. B. Thorp); and the Birmingham Water Department (model of the Corporation's watershed in Wales, and photographs illustrating various stages in the construction of the reservoir, dams, aqueducts, etc., in connexion with Mr. Mansergh's water scheme for the Corporation).

Drawings are also shown of various hospital buildings by Mr. H. Percy Adams and Mr. E. T. Hall.

In the Sea and River Transportation section are exhibits by the Worthington Pump Company, Ltd.; Babcock & Wilcox, Ltd. (boilers); the Steel Company of Scotland, Ltd., Glasgow (steel plates, sectional material, castings, and forgings and tyres and axles); the Glenboig Union Fire Clay Company, Ltd., Glasgow (gas retorts, bricks and blocks for furnaces, and bricks for coke oven construction, boiler setting, etc.); White, Child, & Beney, Ltd., London (machines, etc., constructed by the following firms—Bayliss, Jones, & Bayliss, London, manufacturers of bolts, nuts, etc.; Reavell & Co., Ltd., Ipswich, manufacturers of air compressors; Davidson & Co., Ltd., Belfast, manufacturers of the sirocco ventilating fans; and the Underfeed Stoker Company, Ltd., London, manufacturers of mechanical stokers, etc.); the Whitecross Company, Ltd. (wire ropes); Weaver Navigation (model and photographs of swing bridge over the river Weaver at Northwich; Mr. T. A. Sauer, engineer); Swan, Hunter, & Wigham Richardson, Ltd. (model of Bermuda floating dock built for the British Government); Stirling Boiler Company, Ltd. (boilers); J. Stephens & Son., Ltd., Falmouth (wire ropes); the Frictionless Engine Packing Company, Ltd., Manchester (packing and belting); Mr. J. M. Dobson, M.Inst.C.E. (models of docks, warehouses, etc.); Trustees of Clyde Navigation (cartoons, plans, photographs, etc.); Beldam Packing and Rubber Company, London (packing), etc.

Messrs. J. G. Stein & Co., Bonnybridge, Scotland, show an assortment of fire-bricks and silica bricks. It is claimed that the fine grinding of the fireclay, combined with the shapeliness of the bricks, enables the brickwork to be built with very close joints, and thus adding to the life of the furnace.

The Farnley Iron Company, Leeds, show specimens of ore, pig iron, etc., and specimens of finished iron of different shapes.

Mr. W. Clarke, Ayr, shows models of steel piles for coffer damming and for use in building piers, breakwaters, quay walls, docks, bridges, mine shafts, etc. The models exhibited are of two kinds—for permanent and temporary work. The Channel Models show a flush face, and are used for permanent work. The proposed work is enclosed by these piles and when the space between the dovetails is filled up with sal ammoniac and iron dust, an air and water-tight joint is obtained. The water can then be pumped out and the piles backed by concrete. For temporary work, the piles can be removed when the work is finished and re-used any number of times. These piles are driven in the usual way with the ordinary piling hammer. They can be made in any length and up to 3 ft. broad. They are dovetailed at the joints, and an aperture is left between the dovetails to be filled in with oakum, pitch, cement, clay, sand, in Sweden, thus making an air and water-tight joint.

In the Land Transportation, Aeronautics, etc., section we noticed the following exhibitors:—The Armorduct Manufacturing Company, Ltd., London and Newcastle ("Armorduct" conduit system); Aveling & Porter, Ltd., Rochester (road rollers, etc.);

British Electric Transformer Company, Ltd., Hayes (transformers); Coventry Chain Company, Ltd. (various kinds of chains); Darling's Patent Automatic Coupling, Ltd., Glasgow (coupling apparatus); Glenyards Fireclay Company, Ltd., Bonnybridge (fire-bricks); E. J. Hill, Westminster (patent automatic coupling and tightening gear for railway and other vehicles); Mellows & Co., Ltd., Sheffield (roof glazing); Perrins, Ltd., Warrington (gas, water, steam, and hydraulic pipes); Simplex Steel Conduit Company, Birmingham (steel conduits, etc.); Vale of Neath Dinas Fire Brick and Cement Company, Ltd. (fire-bricks), etc.

A good many British exhibits of machinery are shown in the Working Hall (machinery in motion), and in the Agriculture section, but with these and a large number of other exhibits we have no immediate concern. Sufficient has been said to indicate that the Milan International Exhibition of 1906 is an important and interesting one even from the British point of view; in its entirety it is one of the best exhibitions of recent times, which worthily celebrates an important national achievement and reflects great credit upon its organisers.

THE ENGINEERING AND MACHINERY EXHIBITION.—(Concluded.)

CONSTRUCTIONAL engineering is almost entirely unrepresented at Olympia. Messrs. A. Findlay & Co., of Glasgow, exhibit some sections of pressed steel trough flooring-plates for bridges and fire-resisting buildings, built steel columns, and steel-pressed gutters, and the Sheepbridge Coal and Iron Company show specimens and sections of bar-iron, angle-bars, and tee-bars. In a measure structural materials are further illustrated by the excellent samples of castings of the Northamptonshire Direct-Castings Company, of Wellingborough, and some well-made steel-castings exhibited by the Roc Steel-Castings Company. Of course, there are numerous examples of material in small forms which enter into structural work, but these belong more strictly to mechanical engineering. In this connexion, however, we may appropriately refer to the model of a dock-gate bridge shown by Mr. F. L. Ames, of Eastbourne. The arrangement in question has been devised for the purpose of affording safeguards for persons crossing from one side of a dock to the other by the provision of an extensible hand rail on each side and a folding-floor surface of increased width. The hand-rail can be withdrawn when the dock-gates are opened, and extended across them when closed, detachable or folding uprights being added if necessary for intermediate support. The flooring is made of flexible material laid on cross-bars so that it can be unrolled when the gates are closed, and the ends coupled by some convenient means. No doubt both these ideas are ingenious, but it may be doubted whether they will be adopted to any great extent. In most cases a fixed hand rail as commonly used is quite sufficient for all practical purposes.

The "Eddystone" cement-tester, among the other interesting exhibits of Messrs. W. H. Bailey & Co., of Salford, is a machine appealing directly to those engaged in building and engineering construction. The characteristic feature of the apparatus is that at the end of the lever, by which tension is communicated to the specimen in the shackles, there is a weight consisting of a long can, into which water can be delivered without causing the slightest vibration. The height of water in the can is indicated by a glass gauge, and as soon as the specimen has been broken the supply of water is automatically cut off.

Messrs. F. Jones & Co. present to notice various examples of slag-wool as prepared for fire-resisting construction, the interception of sound, and the insulation of pipes. The great utility of slag-wool and the various forms in which it is produced by this firm are so well known to our readers as to render superfluous any detailed comment. Architects, builders, and others will find some simple but most useful exhibits at the stand of Messrs. J. H. Heathman & Co., who make a speciality of ladders, steps, trestles, and similar articles in varied forms. Their extension, tower, and escape ladders are well worth inspection. Two firms making a speciality of apparatus for use on the out-

break of fire are the Expansion Sprinkler Syndicate and Messrs. John Barker & Co. The fire-alarm of the former firm is operated by compressed-air; the pneumatic system consisting of thin metal tubing and the detector of a small glass tube which is automatically broken when sudden or undue increase of temperature takes place in any room in a building where the apparatus has been fitted. Fire-gongs then ring, indicators show what part of the building has been attacked, and warning is simultaneously given at the nearest fire-station. In a special building outside the hall at Olympia there is a combined installation of the expansion fire-alarm and automatic sprinkler. Demonstrations are given in this building showing that within a few seconds after a fire has been lighted the alarm-gong rings, water is released and distributed through the sprinkler pipes, and the fire is speedily extinguished. The Hawthorn fire detector exhibited by Messrs. John Barker & Co. is an electrical apparatus, which, on the outbreak of fire, rings alarm-bells, indicates the position of the fire in the building and the length of hose required to reach it. In case of need it rings up the nearest fire brigade and communicates by Morse code the full address of the building.

Messrs. John Barker & Co. also exhibit a serviceable form of watertight switch-case for electric lighting and an ingenious interchangeable conduit-box, supplied with covers suitable for any wall or ceiling fitting used in wiring buildings. The stand of the Simplex Steel Conduit Company, of Birmingham, is one of special interest to those concerned in the application of electric light and power. Apart from these and a few other exhibits, of which those of the Thames Ironworks and Messrs. F. A. Glover & Co. should be specially mentioned, electrical engineering is only represented at Olympia by a few makers of prime movers and firms who employ electrical energy for the operation of machinery and tools. The only full-size exhibit of steam-generating apparatus is the Davies water-tube boiler supplying steam to the Thames-Reavell generating set, which furnishes power for much of the machinery in motion at the Exhibition, this boiler being fitted with a Hudson fuel economiser and feed water-heater. Concerning the remainder of the great boiler-making industries of Great Britain, the visitor to Olympia will find nothing beyond some drawings, models, and fittings exhibited by the Stirling Boiler Company, of Motherwell, and Messrs. Cochran & Co., of Annan. A few kindred exhibits are to be found, such as those of Messrs. Green & Son (fuel economiser models and fittings), Messrs. Ross, Hotchkiss, & Co. (automatic circulators), Messrs. McPhail & Simpson (superheaters and dry-steam apparatus), Messrs. Holden & Brooke (steam-dryers and traps), Mr. J. B. von der Heyder (Munsie's steam-dryer), Messrs. Lancaster & Tonge (steam-traps and steam-dryers), the Mica Boiler-Covering Company (non-conducting material), and Messrs. F. Jones & Co. (slag-wool boiler-covering). There are also numerous stands more or less devoted to apparatus and fittings connected with the use of steam in various ways, and many other interesting collections containing examples of steam-packing and lubricating appliances and materials. Among the more prominent of the exhibits coming within this category are those of Messrs. W. H. Bailey & Co., the Crosby Steam Gauge Company, Holden & Brooke, Price's Candle Company, James Walker & Co., W. H. Wilcox & Co., and Charles Winn & Co.

Pumps in considerable variety are exhibited by more than a dozen different firms, from small hand-power pumps to power-driven machines with a discharge of nearly 3,000 gals. per minute. Several examples of high-speed pumps are shown by the Excelsior Engineering Company, of Stroud, the high efficiency of these machines being largely due to the Gutermuth patent valve with which they are fitted. This valve is so sensitive and quick in action that there is no practical limit to the speed at which it can be worked. One of the pumps, driven directly by an electric motor at 350 revolutions per minute, exhibits in a conclusive manner the advantage of the new valve. Among other types of pump on view may be mentioned those of Messrs. W. H. Bailey & Co. (boiler-feed), W. H. Allen, Son, &

Co. (medium lift centrifugal), T. and E. Waanbacher (centrifugal, rotary and piston), the Albany Engineering Company (water-sealed rotary), Holden & Brooke (pulsating steam-pumps), James Keith & Blackman (cellar and organ-blowing), E. Green and Son (economiser and boiler), G. J. Worssam & Son (rotary and piston), and of Positive Rotary Pumps, Ltd.

Steam and other tubing is shown by several firms, but the large makers are conspicuously absent. Ingenious pipe bending machines are exhibited by Messrs. E. Le Bas, John Barker & Co., and M. A. Hughson & Co., these machines being equally suitable for flat or round steel-bars or for small rolled steel sections. Examples of flexible metallic tubing, for high-pressure steam, water, air, and various fluids, are exhibited by the United Flexible Metallic Tubing Company and Mr. Ch. Rudolph, and some extremely handy portable work-benches are shown by the Union Standard Machine Company, who are one of the many firms exhibiting screwing and other tools for engineers and pipe-fitters. The Alldays and Onions Pneumatic Engineering Company have on view a selection of tools and apparatus for smiths, including gas and oil hearths for hardening, annealing, and tempering steel and for melting small quantities of metal.

Only about half-a-dozen stands are specially devoted to power transmission appliances. Among these the most interesting is that of Messrs. Charles Wicksteed & Co., where several applications of the Wicksteed flexible shafting may be seen in operation. This shaft consists of universal joints connected by short spindles, each joint running in a ball-race to reduce friction, and the whole enclosed in flexible metallic tubing which forms an oil-bath in which the shaft revolves. Shafting like this that can be led round corners and bent while at work just as easily as a piece of hose is of great convenience for use in special situations, and has been applied with considerable success for driving, drilling, grinding, screwing, and kindred machines, and portable tools generally. Two exhibits of roller-bearings for shafting high-speed machinery and vehicles of all kinds are provided by the Empire Roller Bearings Company and the Hyatt Roller-Bearing Company. To illustrate the advantages of their device, the last-mentioned firm show a bearing which has been in regular use on the North-Eastern Railway for nearly a year, and was oiled for the first time after it had been in service for six months. The British Helic-Shaft Clutch Company exhibit several varieties of clutches and couplings for line shafting, motor vehicles and launches, and electric motors, while a varied assortment of power-transmission appliances may be seen on the space occupied by Messrs. A. Warden & Co. Apart from the firms mentioned and two or three others, mechanical apparatus for transmitting power is not represented.

Steam-engine builders have evidently treated the exhibition with apathy, for only five or six noteworthy examples of such machines are on view. Two of these, among the other exhibits of Messrs. W. H. Allen & Co., of Bedford, are a three-crank three-cylinder compound vertical enclosed quick-revolution engine fitted throughout with forced lubrication and capable of developing 450 brake horse-power at 400 revolutions per minute, and a two-crank engine of similar type, capable of developing 220 brake horse-power at 450 revolutions per minute. Both engines are of admirable design and workmanship, and are specially suitable for driving electrical machinery. Other objects of interest on the same stand are a three-throw air-pump capable of dealing with 20,000 lb. of steam an hour, and a three-throw crank taken from one of the firm's engines after continuous use for seven years. Messrs. Easton & Bessemer have selected for exhibition three different types of their engines ranging in capacity from 45 indicated horse-power to 110 indicated horse-power, and the Thames Ironworks show a Thames-Reavell generating set, comprising a Scott compound three-crank engine and a Thames dynamo with the capacity of 220 kilowatts at 385 revolutions per minute. A new type of rotary engine is exhibited by the Roto-motor Syndicate, who claim that the defects inherent in previous forms of the rotary engine have been successfully eliminated. Among internal combustion motors Messrs.

Crossley Bros. exhibit two very fine high-speed electric lighting gas engines operated by gas from an adjoining suction plant burning anthracite coal. The National Gas Engine Company show two of their gas engines and suction gas plant, the capacities of the engines being 9 and 10 brake horse-power respectively, and two newly-designed petrol engines of 2 and 3 brake horse-power respectively. Messrs. Kynoch exhibit a compact 14-kilowatt generating-set, comprising a suction gas producer and engine direct-coupled to a dynamo by Messrs. Dick, Kerr, & Co. A further example of suction-gas plant is given by Messrs. T. H. & J. Daniels in the form of a "Daniels" producer, furnishing fuel for a new type electric lighting engine driving a Westinghouse dynamo, and an old type "Trusty" engine converted for suction-gas. The stand of Messrs. John Barker & Co. includes a suction gas-producer of $7\frac{1}{2}$ horse-power by the Industrial Suction Gas and Engineering Company, the chief feature of novelty in the apparatus being the extremely simple character of the charger in the coal hopper. Here also may be seen a Wade & Jones oil dynamo of 6 brake horse-power, arranged so that it can be started by petrol. A small suction-gas plant of 4 horse-power capacity connected with a $2\frac{1}{2}$ horse-power engine is shown by the De Laitte Gas Machine Syndicate, whose exhibit also comprises three De Laitte air gas lighting plants suitable for from thirty to seventy lights driven by hot air, water, and electric motors respectively, and a fourth apparatus operated by weights like an old fashioned clock. High-pressure gas lighting is illustrated by Messrs. James Keith & Blackman, whose stand is brilliantly illuminated on the Keith system. The United Kingdom Lighting Trust make a special feature of the Kitson high power system of oil-gas incandescent light, and the Ramie Company, claiming to be the only firm in the world producing gas-mantles from the raw materials, initiate visitors into the mysteries of incandescent-mantle manufacture. The Thorn and Hoddle Acetylene Company, who have no competitors at Olympia, exhibit apparatus for the generation and purification of acetylene-gas and its application to lighting purposes. The Oxy-Acetylene process of autogenous welding, of which demonstrations are given at the same, is one that deserves careful examination.

Heating, ventilating, and drying apparatus form the subject of a most comprehensive display by Messrs. James Keith & Blackman, whose electric fountain and air-circulator, a structure 33 ft. high, is used for circulating, humidifying, cleansing, and cooling the air in the exhibition hall at the rate of about 20,000 cubic ft. per minute. Among the manufactures of the same firm we noticed two entirely new types of fans, represented by enclosed Keith pressure blowers and reversible Blackman fans, both exhibited for the first time. The Sturtevant Engineering Company show various types of their well known fans and apparatus for ventilation, drying, dust-exhausting, and other purposes. Smaller exhibits of air-propelling and heating apparatus are those of the Standard Engineering Company, Messrs. W. G. Walker & Co., and M. Fouche (Paris). Some purely domestic methods of heating are illustrated by Mr. James D. Prior, who shows in operation a patent heat-distributor for heating bedrooms by waste heat from the sitting-room fire, an improved fire grate, with draught regulating canopy, adjustable bars for controlling the admission of air, a smoke-consuming back, and a damper. Other exhibits of special interest to our readers are the Cromil white washing and painting machines to be found in the exhibit of Messrs. Crosier, Stephens, & Co.; the refrigerating apparatus by Messrs. G. J. Worssam & Co.; examples of vacuum-cleaning machines, in sizes suitable for private houses and hospitals, by the British and Colonial Atom Syndicate; the ingenious sheet-steel and expanded metal-lockers and adjustable steel-shelving by Messrs. Merritt & Co.; time-recorders by Messrs. Howard Bros., Recorders, Ltd., and J. J. Stockall & Sons; numerous types of apparatus for preparing and conveying drawings; and scientific instruments for the drawing office and professional use generally.

Exhibits coming under the two last-mentioned heads crop up in every part of the hall, and are of such importance that we cannot close our notice without some brief

reference to them. Three of the most complete stands are those of Messrs. Norton & Gregory (photographic copying apparatus, improved drawing tables, drawing, surveying, and other instruments), Messrs. J. Halden & Co. (photographic copying apparatus, drawing machines and instruments), and Messrs. B. J. Hall & Co. (electric copier, a new copying process, drawing instruments, and appliances). Messrs. John Davies & Son, on a less prominent stand, show several excellent forms of calculating instruments and improved drawing tables, and among kindred exhibits are those of Patschke's improved drawing boards by Mr. E. C. Koop, calculating instruments by the British Calculators, and print-copying appliances by Mr. L. Shaw. The Starrett Company devote attention chiefly to tools of precision used by machinists, but have two extremely light and simple forms of a surveying level, particularly suitable for builders and contractors.

The Cambridge Scientific Instrument Company exhibit apparatus appealing particularly to those who are interested in the exact measurement and registration of temperatures and pressures in engineering work. Messrs. Sanders, Behders, devote their stand chiefly to testing and recording appliances for boiler installations, gasworks, ironworks, and mines, and the Hohmann & Mauner Manufacturing Company show special thermometers and gauges for purposes too numerous for mention.

From the notes in this and the preceding article it is clear that many interesting and instructive exhibits have been gathered together at Olympia, although it certainly is the fact that various important branches of engineering industry are insufficiently represented, while others are not represented at all.

The modest proportions of the show in comparison with the gigantic interests involved are the more remarkable in view of the facts that this is the only Exhibition exclusively devoted to engineering as a whole since the year 1885, and that the undertaking has received the official support of all the leading engineering institutions and societies.

THE ASSOCIATION OF MUNICIPAL AND COUNTY ENGINEERS.

A MEETING of the Association of Municipal and County Engineers, arranged by the Home Counties district, was held at Windsor on Saturday last, and brought together a large number of members belonging to the Metropolitan and Home Counties districts.

The business meeting was held in the Guildhall. Mr. J. Patten Barber (Islington), President, was in the chair, and there were present Messrs. W. Weaver (Kensington), J. Rush Dixon (Woolwich), R. H. Dorman (Armagh), T. W. A. Hayward (Battersea), R. J. Thomas (Aylesbury), Hon. Secretary, T. Cole, Secretary, H. T. Wakeham (Middlesex), Norman Scorgie (Hackney), P. Dodd (Putney), W. Fairley (Westminster), C. J. Jenkin (Finchley), R. G. Killick (Finsbury), E. B. Newton (Paddington), J. P. Norrington (London), J. P. Spencer (Newcastle-on-Tyne), J. Parker (Hereford), J. A. Webb (Stammore), R. Williams (Bridgend), H. T. Mather (Surbiton), and others.

Sir Walter Shipley, Deputy Mayor, in welcoming the Association, expressed his regret that the Mayor was not well enough to be present.

The President, in acknowledgment of the welcome which had been accorded, explained that the Association was primarily for the development of engineering science as applied to municipal work. He was pleased to say that throughout the Association there was a feeling of brotherhood which led them to tell each other what their difficulties had been, and how to get over them, and in that way the whole work of engineering was perfected. On behalf of the Association he thanked them most sincerely for the hearty welcome they had given them to the town of Windsor.

On the proposition of Mr. C. H. Cooper (Wimbleton), the sympathy of the Association was conveyed to the Mayor in his illness with sincere wishes for his recovery to health.

Mr. Cooper (Wimbleton) proposed the re-election of Mr. R. J. Thomas, County Sur-

veyor of Buckinghamshire, as Hon. Secretary for the Home Counties district.

The proposition was unanimously carried, and Mr. Thomas promised to do his best for the Association.

Municipal Works of Windsor.

Mr. A. E. Stickland, M.Inst.C.E., Borough Engineer, read a paper on "The Municipal Works of Windsor." Having given a short historical sketch of the castle and the town, he said the population in 1901 was 13,958. The rateable value was 85,070*s.*; a penny rate producing less than 290*l.* It might be of interest to state that Windsor Castle was exempt from rating with the exception of a small portion occupied by the Dean, the military knights, and choristers. The castle dealt with its own sewage, refuse, etc., and had a separate water supply. In the borough there were two barracks occupying some 27 acres of ground; these premises, again, were not rateable, but the Crown authorities made a voluntary contribution towards the rates. Within the last few years the War Office authorities had purchased a number of houses and other property, including one road, for the purpose of extending the infantry barracks; up to the present time the only action taken had been to turn out all the tenants and board the site up. The closing of this property meant a loss of 927*l.* on the rateable value of the borough.

In 1898 the author was instructed to prepare plans for a store-yard and depot. The work had been carried out at a cost of 8,058*s.*, viz., land, 2,463*s.*; buildings, 4,332*s.*; and horses and carts, 1,263*s.*

The total length of roads repairable by the Council was about twelve miles. On one half of this length Enderby granite was used, and for the other half local gravel. The Berks County Council contributed towards the maintenance and repair of 3 miles 7 furlongs of roads and footpaths, the average annual contribution for the last eight years being 2,372*l.* The actual expenditure on roads, kerbs, channels, and footpaths during the last five years had been over 27,600*l.*

Windsor was one of the first towns in England wholly to adopt electricity for street-lighting purposes. In March, 1899, the use of gas was discontinued, and all the streets and passages were lighted with the electric current. Ten 2,000 candle-power lamps, nineteen 500 candle-power lamps, and 260 double 16 candle-power lamps are now in use, the actual annual cost being 1,412*l.* The standards carrying the twin lamps were arranged on alternate sides of the roads, and about 60 yards apart. The electric light was supplied by the Windsor Electrical Installation Co., Ltd.

The Corporation for many years considered the question of erecting a refuse destructor, but, whilst recognising that fire was the most efficient means for the disposal of refuse, the great difficulty was the provision of a site. In 1900 an application was made to the Local Government Board to borrow money to erect a destructor on a piece of land belonging to the Council at the back of the infantry barracks. Unfortunately, that was opposed by the War Office; consequently the Local Government Board withdrew their consent, and the ground was afterwards purchased by the War Office.

In November, 1902, the Corporation applied for compulsory powers to purchase a site adjoining the surveyor's depot, and, as a matter of fact, a Provisional Order was drafted by the Local Government Board sanctioning this site but certain representations were made, and it was struck out of the Order. For years past the Corporation had been depositing the town's rubbish in a field at Clewer, situated one mile west of the borough boundary. As was only natural, complaints were made by the Rural District Council, as well as residents in Clewer, of the nuisance arising from the tip. However, in July, 1903, a letter was received from the Local Government Board inquiring if there was any objection to the erection of a refuse destructor on the land at Clewer; and upon receiving this the Council decided to proceed without further delay in the erection of their destructor. After the most careful consideration the Town Council decided to erect a Horsfall destructor, and the sanction of the Local Government Board was obtained for this purpose.

The cells are two in number, constructed on the improved patent back-feed type, the

clinker doors being in front and feed-holes at back; the grate area was 30 ft. per cell, with forced draught, controlled by separate valves to each cell. Provision was made in the arrangement for increasing the capacity of the plant by two additional cells. The boiler was a water-tube boiler of the Babcock & Wilcox type, with a working pressure of 120 lb. to the square inch. The patent centrifugal dust-catcher was 13 ft. in external diameter and 12 ft. in height from ground-line to springing of dome. An overhead railway on Cox & McTaggart's system was provided, together with two strong skips hung on trunnions to facilitate the quick removal and tipping of the clinker.

There was also a mortar mill, driven by a steam-engine direct.

The whole cost of the work, including the formation of the inclined roadway, tipping platform, etc., was 6,258*l.* 12*s.* 7*d.* Messrs. Horsfall's contract was 3,890*l.* 5*s.* 7*d.* The works had been in operation about fifteen months, and during the first year the amount of refuse destroyed was 2,523 tons, representing 2,773 loads.

The clinker had been used for various purposes. Mortar was made and sold to builders in the neighbourhood at a price of 7*s.* 6*d.* per yard delivered. The ashes were also used for making the bottoms of gravel footpaths; they were also sold to farmers in the district. The author hoped to obtain the consent of his Council at an early date to make paving flags of the material.

The tins collected in the refuse were picked out and sold to the Electron Works Company at 15*s.* per ton. Light scrap-iron was sold to the same firm at 10*s.* per ton.

In the years 1850 and 1851 the Windsor of that day was provided with a complete drainage scheme, the sewers ranging from a 9-in. pipe to a 4 ft. by 3 ft. brick oval sewer. The whole of the surface water and sewage at that time passed into the Thames; the outfall, through the Crown property, emptied itself about one mile due east from the centre of the town.

In 1875 a 4 ft. 6 in. brick circular outfall sewer, about 3,720 yards in length, was constructed, extending from a point where the existing sewer entered the Crown property on its way to the Thames to the new sewage farm at Old Windsor. This sewer, when broken into some eighteen months ago, was found to be in first class condition.

The sewage works and farm lie to the south-east of the borough on an island called Ham Fields, formed by a bend in the river Thames and the new cut. The total area of land available for sewage disposal was 39*a.* 2*r.* 53*p.*, which was farmed by the Council at a profit. This area did not include corners, banks, land occupied by pumping-station, cottages, etc., but was the area that could be placed under irrigation, the substratum consisting of gravel, and at no time was there any difficulty in getting rid of the sewage. The actual quantity dealt with averaged 1,355,000 gals. per days. No complaints had been made of this method of treating the sewage or of the character of the effluent either by the County Council or any other authority. The total cost of the 4 ft. 6 in. brick sewer, together with the sewage farm, buildings, etc., was over 51,000*l.*

In the early months of 1904 the author was instructed to prepare plans for a new police and fire station to be erected on a piece of ground in St. Leonard's road. The plans were prepared, and a tender was accepted at the price of 15,926*l.* The works were now nearly completed.

Windsor, with its Home Park, Long Walk, and other attractions connected with the Castle, was fortunately situated as regards the provision of pleasure grounds. For many years the Council had been endeavouring to improve a stretch of ground lying between the point where the Great Western Railway Viaduct crosses the Thames and Windsor Bridge. A year or two since, owing to the generosity of Sir Francis Tress Barry, who was at that time M.P. for the borough, the Corporation were able to deal with this land. The ground for the gardens was purchased and presented to the borough by the member, the Council bearing the cost of making the roads and paths, and laying out the site. A large amount of work had already been done, over 6,000*l.* having been spent, and a great deal more remained to be done to carry the scheme to a successful issue.

Windsor Waterworks.

Mr. C. Sanity, M.Inst.Mech.E., Waterworks Engineer, gave a short description of the Windsor Corporation Waterworks. These works, he said, were purchased by the Windsor Corporation from the "Windsor and Eton" Waterworks Company in the year 1888 (after a long and tedious arbitration), the authorised capital being 194,780*l.*, of which sum 160,000*l.* was paid over, including the fees and costs. The Corporation took them over as a going concern, and, like many other municipal undertakings in this country, an exorbitant price was paid for the works. At that time there was the present water wheel, which was in existence in the year 1850, and two of Cutler's (the original proprietor of the works) balanced outward-flow turbines, each turbine working two 9-in. pumps with a 2ft. stroke. These two turbines were erected in the year 1875.

There was also a small steam engine of the old grass-hopper type working a set of 7½-in. 3-throw pumps with 12-in. stroke, and an old-fashioned horizontal steam engine driving a set of 12-in. 3-throw pumps with a 20-in. stroke, and two old Cornish boilers. Needless to say, after a very short time the steam boilers were condemned by the Boiler Insurance Company, and they and also the two engines named were sold as scrap-iron.

Upon his advent there, in March, 1891, the author found the water-wheel in a very bad state, so that it cost over 100*l.* to repair. The Cornish boilers were taken out, and a new loco-type one put in; also there were two new turbines just set on their beds, and the pumps for them were ready to be erected. These were put in and started in November of that year; also a compound jet-condensing Worthington engine, made by Messrs. James Simpson & Co., their capacity being 400,000 gals. in twenty-four turns against 250-ft. head.

In 1899 a new steel Cornish boiler, 18 ft. by 5 ft. 6in., with 2 ft. 9 in. fine tube, was supplied and fixed by Messrs. Taylor & Sons, Marsden; also a new compound duplex 12½ in. and 19 in. by 12 in. in pump engine was supplied and erected by Messrs. Hayward, Tyler, and Co., London. This engine ran in 1903 for three months day and night, without a stop, and pumping against a 150-ft. head all the time—quite a record, in his opinion, for this class of pumping engine.

In 1903 a new well, 20 ft. internal diameter, cased with cast-iron cylinders, was sunk at a depth of 35 ft., being 10 ft. into chalk.

In 1904 a new 12½ in. and 19 in. by 12 in. in compound condensing engine, by Messrs. Hayward, Tyler, & Co., was put down—a duplicate of the one before named, except that in the condenser the steam power was used when the river was in a state of flood or when the river was below the normal level, as it had been for several weeks this summer owing to the very dry season.

Not having storage of any kind, they were entirely dependent upon their pumps, day and night, which was a great anxiety to the one in charge, as Eton College, Eton Wick, The Cloisters, Windsor Castle, and Clewer, as well as the borough of Windsor, were all supplied from these works.

When the Corporation purchased the works there were about ten miles of mains in the districts; now there were twenty-five miles and about 22,000 consumers, besides water used for street-watering and flushing purposes in Windsor and Eton.

The supply was very little used for trade purposes, as the brewers in the district had their own wells.

The water was analysed every three months, and the reports were always excellent.

There were five wells on the works; four were 8 ft. internal diameter and the new one 20 ft.

Mr. T. W. A. Hayward, in moving a vote of thanks to the authors of the papers, said that these meetings and the visits to works enabled them to obtain information which otherwise they would not be able to obtain. He would like to ask Mr. Stickland his opinion of the Ames Crosta's patent gully, which was used in Windsor. He had used the gully for ten years, and held a strong opinion as to its utility.

Mr. J. Parker (Hereford) asked as to the

amount of water evaporated per lb. of refuse consumed by the destructor.

Mr. Brown (Southall) advocated the use of oil tar on the roads as a cheap and efficient preventative of dust. It was a cheap material, costing only 4d. per square yard for each dressing, while four dressings a year were sufficient. He contended that it would be cheaper to use such a material than to go to an excessive cost with watering. The exemption of the Crown property from rating was a very unfortunate thing for Windsor.

Mr. C. H. Cooper (Wimbledon) stated that the tar-dressings which had been advocated after a short time turned into a nasty, dirty, greasy mud, which a district like Windsor would not put up with.

Mr. W. Calder (City Engineer, Prahm, Victoria), speaking as an Australian member of the Association, was quite in accord with Mr. Stickland in saying that Westrumite and other preparations of crude oils—at least in his experience in Melbourne—had proved a failure. Their beneficial effect was only temporary. The dust evil was a very patent one in Melbourne, more so than in this country, where, if he might judge by this summer, they had scarcely any wind. In Australia they had high winds and long droughts, and dust was a great trouble. The most efficient preparation they had used was distilled tar—not the oil from distilled tar on the lines of the Westrumite. This distilled tar would last for a year, and made a clean surface in winter.

Mr. F. R. Phipps (Basingstoke) congratulated the Council upon running the sewage farm at a profit.

The President, in closing the discussion, said it seemed to him the Windsor Corporation were very careful indeed to keep their streets clean, because they cleaned them on Sunday. The money was well spent in keeping streets clean and adequately watered.

Mr. Stickland, in replying, said they scavenged the whole of their roads constantly and thoroughly. He had always found the Ames Crosta gully very satisfactory.

The party then went over the State apartments of Windsor Castle and St. George's Chapel, and, by the kindness of Lord Esher, were permitted to go over the Albert Memorial Chapel.

The Mayor entertained the members to luncheon at the Guildhall, Sir Walter Shipley presiding.

The afternoon was devoted to visits to the new police and fire station, the destructor, the town depot, and the waterworks. At the conclusion of the visit Mr. Stickland entertained his colleagues to tea at the Guildhall.

Builders' and Contractors' Column.

ESTIMATING FOR CONCRETE WORK.

SIR.—In dealing with this subject it should be remembered that it is an estimate which is being made, and therefore it is no use being ultra-exact in one part of the calculation and making a guess in another. Nobody, for instance, can quite tell what the labour is going to cost. Obviously, the price in this particular will vary according to the number of times the materials are to be turned over when dry and when wet, and some architects are very particular in this respect. Also, the price will vary according to the nearness or remoteness of the mixing platform from the storage sheds and the trenches. The labour may therefore be anything from 1s. 3d. to 1s. 10d. per yard as measured in the hole. Then, although the materials will shrink somewhat when wetted and rammed in the trenches, the loss of bulk in this respect is not nearly so much as given by your correspondents. The presence of the cement neutralises this shrinkage considerably, and it should also be remembered that the materials when mixed are still in a very loose state. The subsequent ramming in the trenches reduces the bulk about 5 per cent., as near as can be judged by the eye, supplemented by the actual figures at the end of the job.

Next, as to the quantity of cement required to make a yard. The cement is delivered at the rate of eleven sacks to the ton, and if the cement weighs, as it usually does, about

112 lb. per bushel, there are twenty bushels to the ton. Now, a yard contains 27 ft. cube, and a bushel contains 1·28 ft. cube. A little calculation shows that a yard contains 21·1 bushels, so that practically twenty-one bushels are required. Taking every-day figures, the cost of a yard of cement should be calculated as follows:—

1 ton cement as delivered in vans	£ s. d.
Add ½ to make a yard	1 5 0
Labour, unloading 1½ sacks at 3d.	1 3
Merchant's charge for use of sacks, 1½ at 1d.	11 3
Cost per yard	1 7 8

The calculation for a yard cube of concrete would therefore be as follows, remembering that water is already priced in another part of the estimate:—

1 yd. ballast	s. d.
1 yd. cement	6 0
Add 5 per cent. to the last two items as allowance for shrinkage	4 7½
Labour, average	1 5
10 per cent. profit	12 7
Cost per yard	1 3
Cost per yard	13 10

I think Mr. Dix overlooks an important point in connexion with the addition for shrinkage, as given by the writer of the original article. The allowance is made to enable 6 yds. of loose ballast and cement to make 6 yds. in the hole. Therefore, the divisor should be six and not seven.

AN ESTIMATOR.

SIR.—I have largely studied this question, and have made practical experiments in connexion therewith, and at the express request of several of your readers I venture to add my opinion on the subject, which is one of the greatest importance, and often results in a contractor's loss instead of a profit.

The shrinkage must, of necessity, vary according to the voids in the aggregates and cementing ingredients, but on the ordinary method of mixing and user of London hand made concrete (not honeycombed), I think 37 per cent. would not be too much to allow for such average shrinkage.

In my opinion, however, it is impossible thoroughly to incorporate the ingredients by the shovel for 1s. 6d. per yard. Not one London labourer out of ten takes the trouble to spread the material by a proper turn of the wrists in turning over, and if they spent three times the amount (or 4s. 6d.) in labour, the ingredients would not be thoroughly incorporated.

The most effective and, at the same time, economical method is separately to mix the sand and cement (preferably by a mixer), and then amalgamate the product with the washed and graded gravel. The Metropolitan Water Board adopt some such specification, and I believe it to be the most economic system in use in London; further, I am sure the engineers and contractors for their Cricklewood reservoirs would confirm this opinion if asked. There can be no comparison as regards the quality of the set concrete; its advantages are numerous. The limitation of water in the mixing, together with the more rapid and thorough slaking of any free lime in the cement, alone should determine the practical engineer or architect to follow this practice, apart from considerations of better amalgamation and cost.

There are many forms of mixers; Harding's patent sand and cement mixer, with its double rotary movement, can be made at sums varying from 7*l.* 10*s.* and upwards, according to size, and a boy can turn a low-gear one of the smaller sizes; while, on a large contract, more particularly where the sand and cement can be handled by crane direct from truck, the saving of labour is very considerable.

I think a contractor loses most in the buying of his aggregates by measure instead of by weight; whatever his system of estimating may be, clearly his foreman should follow it up in the purchase of his material—this is not done as a rule, certainly not by means of the yard cart; when buying by the truck he has the railway weight to compare with his estimate statistics.

The contractor sells his set concrete to his clients through the architect or surveyor (always supposing it not to be honey

combed) in the solid. He therefore should also endeavour to purchase in the solid, and to do so it is better to depend on the weight rather than measure, because, while the voids do not add to the weight, they certainly have to be reckoned with in the measure; and, unless a contractor had a circular banker of a large surface and hydraulic or similar pressure to assist consolidation, it is very clear he cannot hope to compare with weight purchase, more particularly as regards washed and graded gravel. Even with sand, where the interstitial moisture may make a slight difference, it is nothing compared with the increase in void caused by the capillary attraction of one grain to another, by such interstitial moisture. This will explain why a measure of very dry sand will weigh heavier than the same measure filled in the ordinary way with damp sand, the attraction being sufficient to create more voids than the corresponding moisture. Of course, it is well known that sand will consolidate slightly more in water, but the contractor does not buy his sand that way, and it need not therefore be considered.

On page 19 of the enclosed pamphlet, entitled "The Advantages of Graded Aggregates in Concrete" (unfortunately at present out of print), are given sufficient statistics on voids to enable contractors fairly to estimate the shrinkage. If you care to publish this page, you are at liberty to do so.

HENRY J. HARDING.

. The following is the page of statistics referred to by our correspondent:—

THE MESHES GIVEN BELOW ARE ALL CIRCULAR, AND REPRESENT DIAMETER IN INCHES.

No.	Description and Grade.	Weight per strike 1 bushel rondly in pounds.*		Percentage voids bear to the compacted sand and gravel.
		Filled in the usual way from hopper or shovel not compacted.	Compacted, i.e., the measure shaken and the material consolidated.	
1	Sand (very dry) all in up to and through 1/2 in. mesh	128	143	28.91
2	Sand (very dry) all in up to and through 3/4 in. mesh	141	145	29.56
3	Sand (damp) all in up to and through 1/2 in. mesh	119	141	27.34
4	Shingle through 1/2 in. retained on 3/4 in. mesh	114	141	26.12
5	Shingle through 3/4 in. retained on 1 in. mesh	116	136	21.57
6	Shingle through 1 in. retained on 3/4 in. mesh	127	131	3.45
7	Gravel through 1 in. retained on 3/4 in. mesh	125	130	7.59
8	Gravel through 3/4 in. retained on 1 in. mesh	126	133	7.50
9	Combination of Nos. 3, 4, 5, 7, and 8, in equal parts with 3 parts sand added	135	135	31.25
10	Combination of Nos. 3, 4, and 5, in equal parts	122	161	18.75
11	Combination of Nos. 3, 4, and 5, in equal parts, with 2 parts sand added	122	128	31.25
12	Crushed gravel through 1/2 in. retained on 3/4 in. mesh ..	115	152	15.62
13			121	37.50

ARCHITECTS AND SPECIAL FIRMS.

SIR.—I should like to reply to "London Builder's" letter in your last issue.

It is owing to the "keener competition and consequently lower prices" that he speaks of that the practice is becoming so general now for architects to specify certain firms for certain work, well knowing that they get better work.

Most architects state in their specification, "Builder to add his own profit to all P.C. figures for special work." Many builders add nothing, and then do their best to squeeze 10 per cent. out of the firm mentioned for special work. What I would like to see all architects adopt when inviting estimates from firms for special work, would be to request such firms to add 5 or 10 per cent. discount for the builder. It is done in some towns.

I have a case in point now. I tendered with two other specialist firms for constructional steelwork and fireproof floor to a certain building, and, upon inquiry, was distinctly told to quote net, as the builders would add their own profit. The builder who secured the contract added nothing, so he states, and is now pressing us to allow him a discount, which we cannot afford to do.

The fact that one particular firm is selected for special work does not prevent the builder from regulating deliveries. It is to the interest of the firm doing such work to work smoothly and amicably with the builder.

Take, for instance, artificial stone, which is daily growing in favour owing to its durability, resistance to atmospheric changes, and

its cheapness. The architect can, after inviting prices, place the order, with his client's approval, before the builder has been selected, it being necessary to do so, as naturally it takes some four or five weeks for the artificial stone to mature before it can be delivered. The same remarks apply to steelwork, which cannot be delivered at a moment's notice, and, if ordered some weeks before required, is sent straight from the rollers and not handled twice and sent from stock, and thus is obtained at about 11. per ton less than if taken from stock.

Architects are right in specifying certain firms for special work. What all should do is to add a percentage for the builder. We ought not then to have any grumbling.

A SPECIALIST FIRM

Fifty Years Ago.

FROM THE *Builder* OF OCTOBER 4, 1856.

SANITARY STATE OF SHOREDITCH.—The population of Shoreditch is one-twentieth of that of all London, or 125,000 out of 2,500,000. The mortality from all causes in Shoreditch during the quarter ending June 28 last was 629—from epidemics 158—a proportion considerably exceeding that of all London. Such is the return given in the first quarterly Report on the health and sanitary condition of Shoreditch by the medical officer of health for that district, Dr. Barnes (recently printed by the Vestry). In this Report.

which treats of various points, urged again and again in our columns, the state of the water supply and the air supply of the district is particularly dwelt on. The water supplied both by the New River and by the East London Companies is regarded as essentially and equally impure: both are impregnated with organic matter, and both are hard. As respects the air supply it is rightly observed, that it is not only necessary to dilute the aerial poisons as they arise by free ventilation, but imperative also by all possible means to get rid of the materials from which they are generated. This is to be effected mainly by improvements in sewerage and drainage. It is even more important, as the reporter remarks, to have a constant supply of air, than a constant supply of water, low fevers being a sure result of stagnant air. Many dwellings in the district are perversely constructed in defiance of both common sense and decency, as in Parsons-square and Bowl-court. They are built back to back in confined situations, with untrapped closets under the staircases, small, close rooms, and a sad want of water. Bowl-court is accordingly one of the most prolific nurseries of fever in the whole parish, but the district abounds in courts, rows, and nests of houses little better in a sanitary point of view.

DENTAL HOSPITAL, EXETER.—Premises situated upon Southworthy have been converted into a new hospital for the Devon and Exeter Dental Hospital under the direction of Mr. James Jerman, architect. The general contractor was Mr. A. E. Eveleigh, whilst the painting was entrusted to Mr. Edwin Algar.

Illustrations.

NEW BUILDINGS, MARISCHAL COLLEGE, ABERDEEN.



THE University of Aberdeen was founded by Bishop Elphinstone, who obtained a Papal Bull in 1495 at the instance of King James IV.

This document is still preserved in the Muniment Room, and is a beautiful piece of Gothic penmanship of the period. The new foundation was called King's College, styled in Acts of Scots Parliament "our Sovereign Lord His College and University." In 1593 the fifth Earl Marischal founded another University, and gifted to this purpose the property formerly belonging to the Greyfriars Friary in Aberdeen. In 1860 these two Universities were united into one, and in 1891 a large scheme of University buildings extension was set on foot to cope with the modern requirements of science teaching, especially in the medical school. Since that date various extensions have been made. The one now finished may be said to be the completion of the scheme, and for the time being the College may be regarded as finished; but such an institution is never really completed, as new ideas and new requirements come up from time to time that have to be satisfied.

The architects are Messrs. A. Marshall Mackenzie, A.R.S.A., and Son, of Aberdeen and London. The cost has been over 200,000l. With the exception of 46,000l. contributed by the State, the whole of this large sum has been raised by voluntary subscriptions. Some of the donors have been very generous, Dr. Charles Mitchell and his son, Mr. C. W. Mitchell, having given about 40,000l.; Lord Strathcona, 25,000l.; Mr. Andrew Carnegie's gift of 2,000,000l. to the four Scottish Universities has not been available as yet for buildings, but in other ways has helped the University work. The number of students attending is over 800. The subjects taught are classified under five faculties—Divinity, Arts, Medicine, Law, Science, and accommodation for the recently established College of Agriculture. The Divinity Faculty, a part of the Faculty of Arts, the General Library, and University Chapel are situated at King's College, and the other faculties at Marischal College.

The Mitchell Tower, which dominates the whole of the building, is 40 ft. square and 260 ft. high from the lower quadrangle. It is built of granite, including the central spire. The Mitchell Hall (Graduation Hall) is 116 ft. long, 42 ft. wide. The interior walls are built of rose-coloured granite, dull polished and jointed in gold. The ceiling, floor, and gallery panelling are all constructed of oak; no lath and plaster work is employed. The windows are filled with heraldic glass commemorating the history of the University.

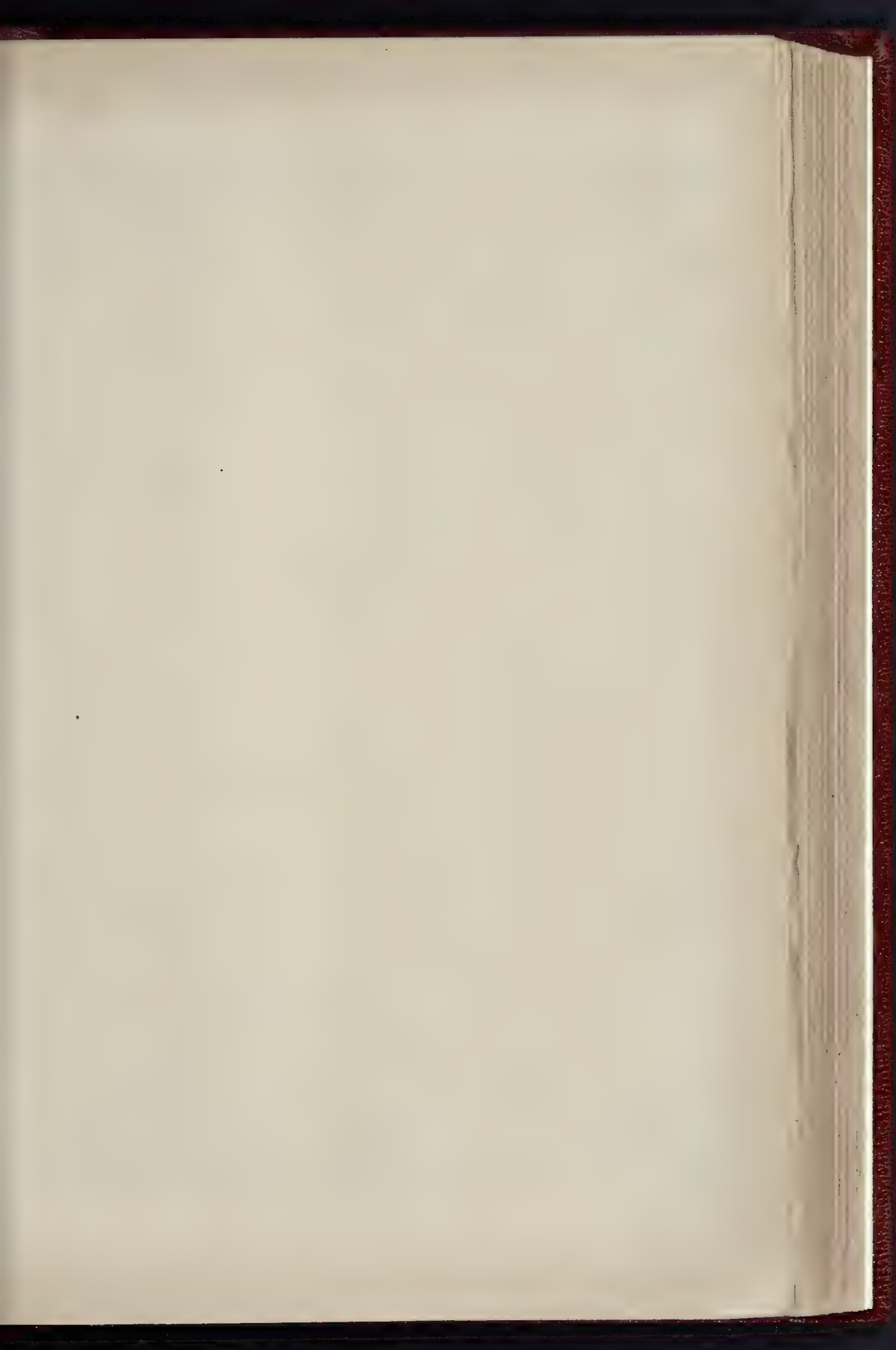
The new buildings, which were opened by the King and Queen on September 27, measure 400 ft. in length, 60 ft. in width, and an average height is 60 ft., built entirely of light-grey granite. The style of architecture is Perpendicular Gothic of the period of Henry VII. The new buildings accommodate the Administrative Department, consisting of meeting-room for the University Court, Faculty room, Principal's room, and Secretaries' offices. There is also the Science Library, consisting of Students' Reading-room, Professors' Reading-room, Law Library, Librarian's room, Lady Assistant's room, work-room, and book stores. The library fittings are constructed of the new fireproof enamelled steel, made by the Art Metal Construction Company, New York. The south window of the Students' Reading-room contains the Cruickshank memorial window in stained glass.

The rest of the building is devoted to Medicine, Physiology, Geology, Education, Comparative Psychology, Modern Languages, and the College of Agriculture.

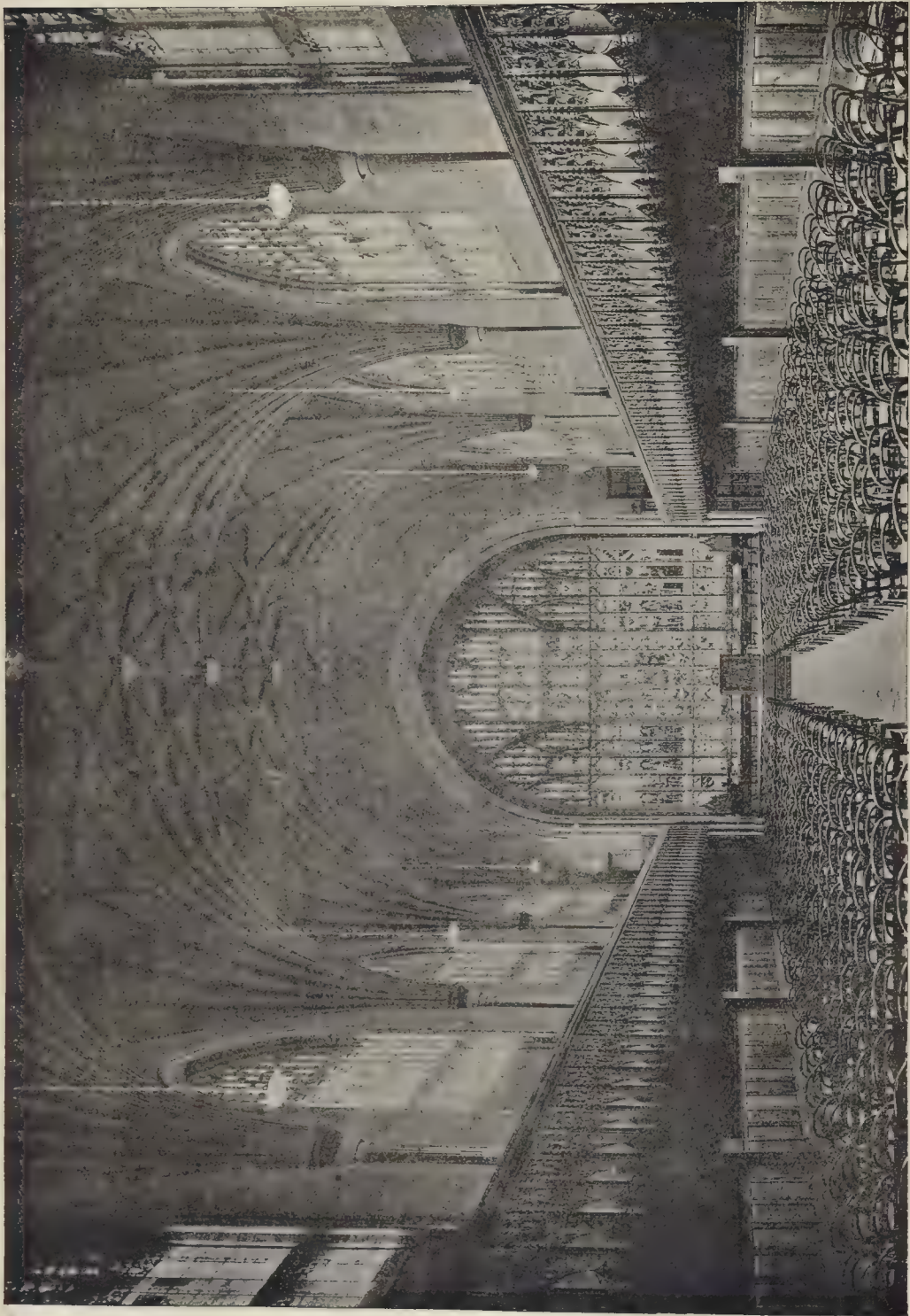
The corridors and laboratories have dados of white-glazed tiles. The lighting is by electricity. The ventilation is the plenum system of mechanical ventilation and warming, by which fresh air is forced into the building by fans driven by steam engines after being cleaned of all impurities by screens and warmed by steam pipes.

The floors are of fireproof construction, laid with pitch-pine flooring, solid on the

* Multiply by 21.73 to arrive at weight of cubic yard.
* This includes weight of moisture contained by capillary attraction, probably some 12 or 13 lb.

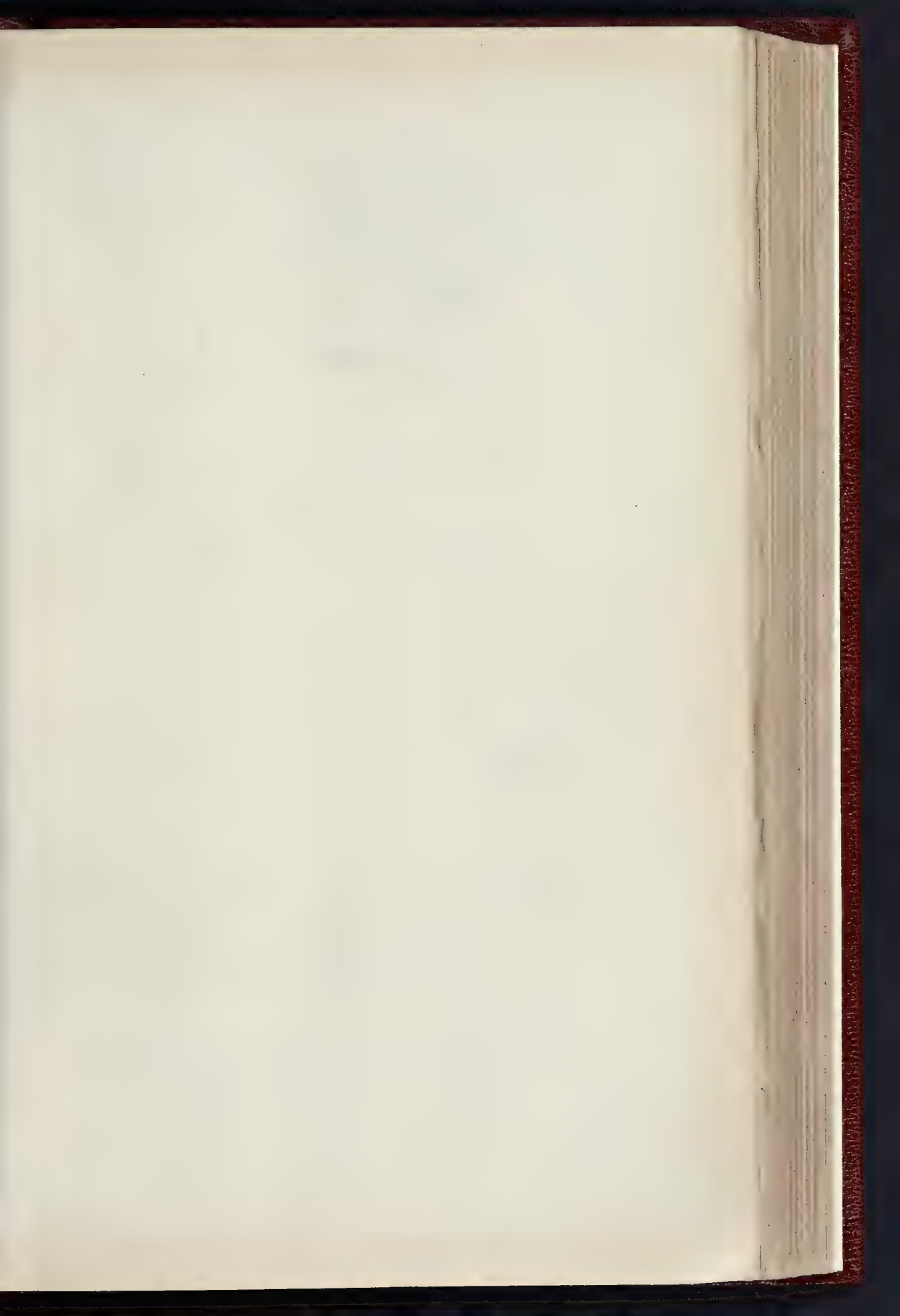


THE BUILDER, OCTOBER 6, 1906





COURT ROOM.
NEW BUILDINGS, MARISCHAL COLLEGE, ABERDEEN.—MESSRS. A. MARSHALL MACKENZIE, A.R.S.A., & SON, ARCHITECTS



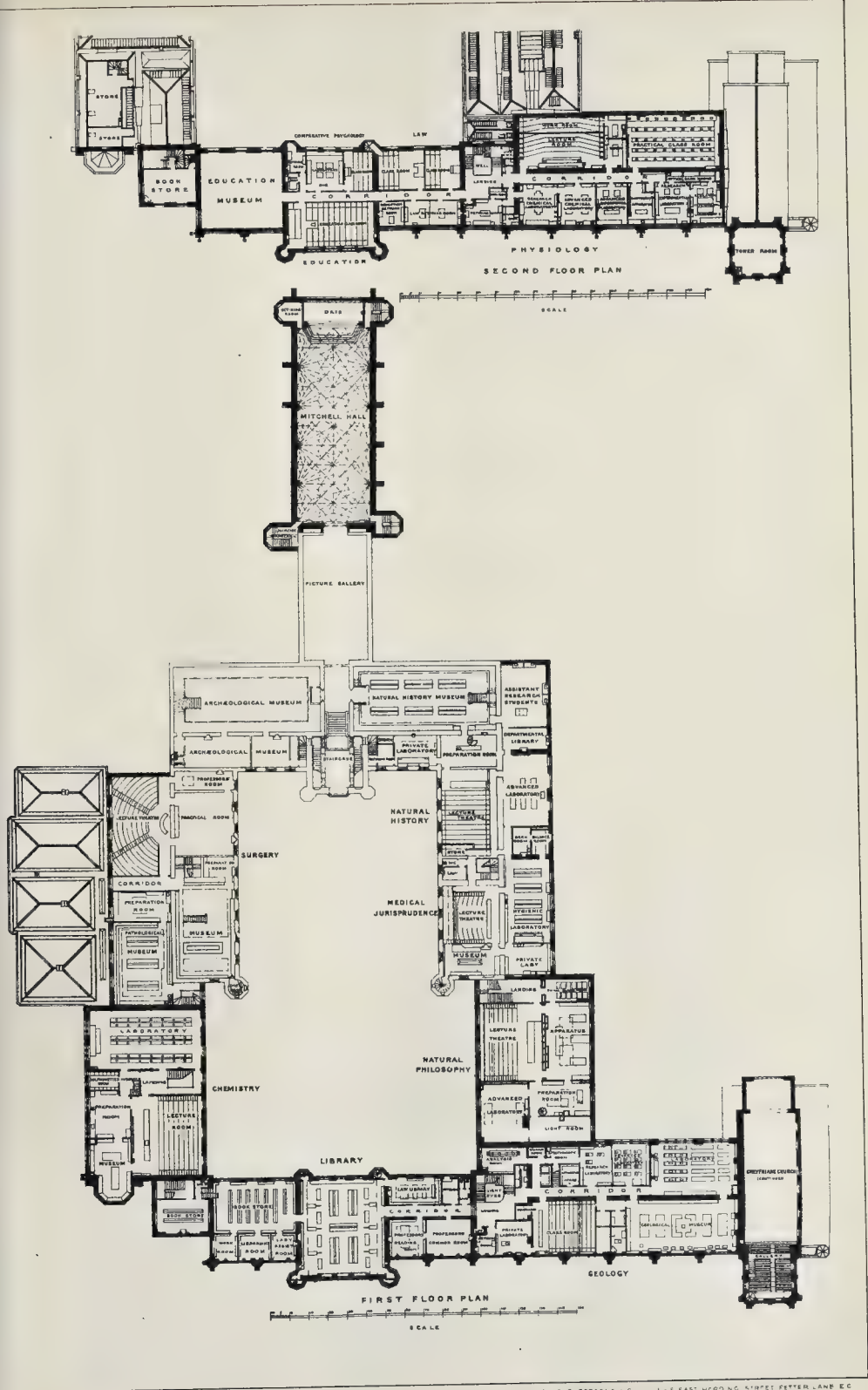


PHOTO LITHO. SPRAGUE & CO. L. 4 x 5 EAST HENDON STREET FETTER LANE E.C.

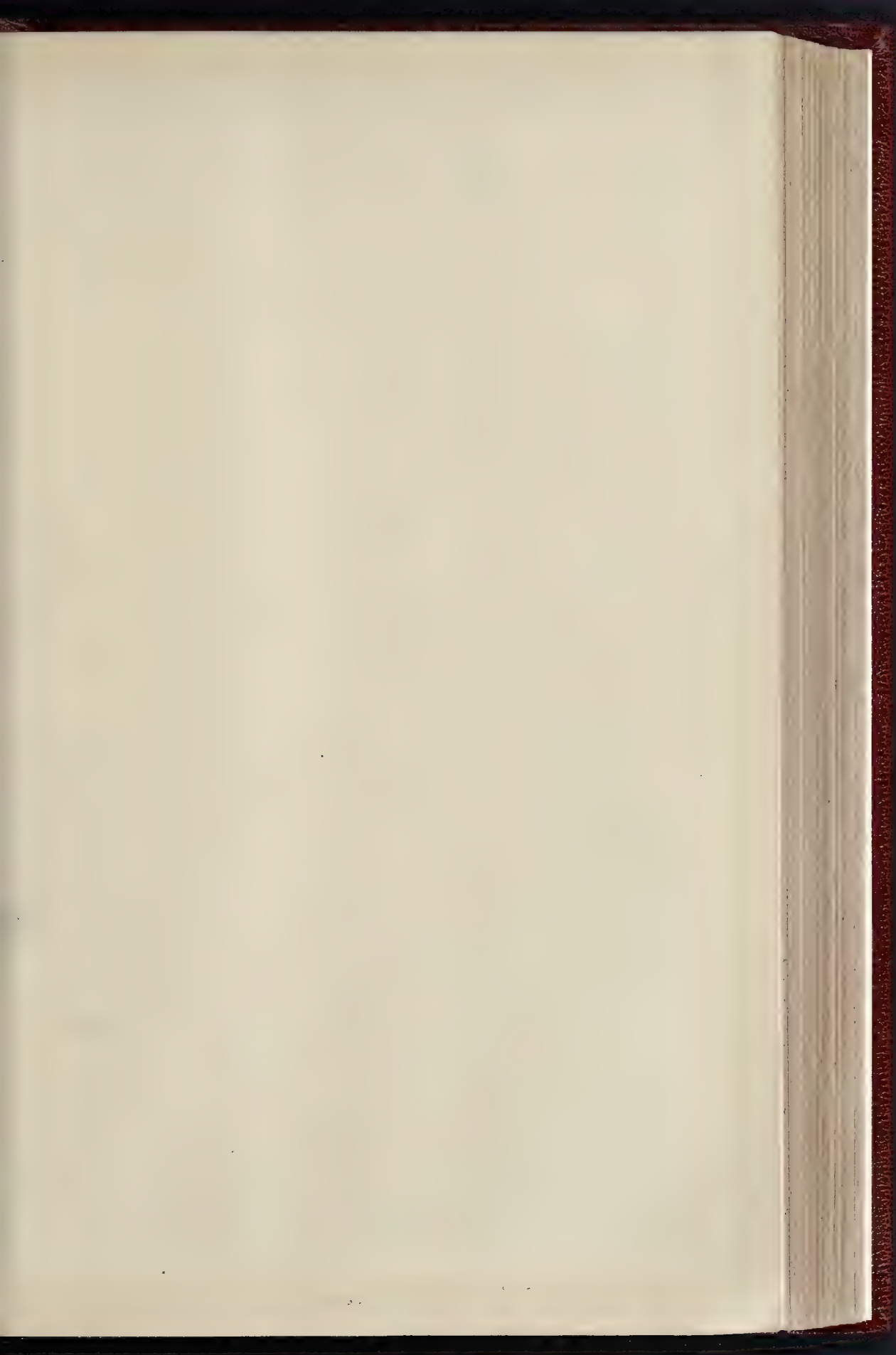


VIEW FROM BROAD STREET



VIEW FROM BACK

NEW BUILDINGS, MARISCHAL COLLEGE, ABERDEEN—MESSRS A MARSHALL MACKENZIE, A.R.S.A., & SON, ARCHITECTS





NEW BUILDINGS, MARISCHAL COLLEGE, ABERDEEN



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SKS A MARSHALL MACKENZIE, A.R.S.A., & SON, ARCHITECTS.
IEW.

concrete to prevent noise. All the rooms are amply lighted by daylight, and in the basement patent luxur glass has been used with good results. The fittings in the various laboratories and lecture theatres are of the most modern and approved type.

The contractors for the various works were as follows:—Mason—Mr. John Morgan (Aberdeen); carpenters—Messrs. D. Macandrew & Co.; slaters—Messrs. Alex. Adam & Co.; plasterers—Messrs. J. Scott & Son; plumbers—Messrs. J. Blaikie & Son; painter—Mr. J. Whyte; iron-work—Messrs. Jas. Abernethy & Co.; electric lighting—Messrs. A. B. Robertson & Son; electric lifts—Messrs. Archibald Smith & Stevens (London); warming and ventilation—Messrs. Shirras, Laing, & Co., with Mr. James Smith as consulting engineer.

The fittings and furniture of the various departments have been executed by the following firms:—Messrs. J. & A. Ogilvie, Clark & Donaldson, Jas. Allan & Co., Brown & Thomson, J. R. Wishart, Hendry & Keith, and the Art Metal Construction Company (Jamestown, New York). Mr. George Reid acted as clerk of works, and Mr. A. Dawson as the architect's surveyor during the carrying out of all the works.

Archaeological Societies.

NEWCASTLE SOCIETY OF ANTIQUARIES.—A meeting of the Newcastle Society of Antiquaries was held on the 26th ult. in the Castle, Mr. Richard Welford in the chair. Mr. F. W. Dendy read some notes on the Adderley MSS., relating to the Tyne foreshore. Mr. W. H. Knowles, architect, Newcastle, called the attention of the Society to the excavations in connexion with the building of the new county offices at the Moot Hall, Newcastle, and said these had revealed some ancient walls, foundations, and arcade pillars. They were, he said, part of the great hall, in which Bialot of Scotland did homage to King Edward I. in 1292, and of date 1237. He proposed that the Duke of Northumberland be asked to make a communication to the County Council regarding the care of these and any future discoveries that might be made. This the meeting agreed to.

Engineering Societies.

INSTITUTION OF CIVIL ENGINEERS.—The Council of the Institution of Civil Engineers have, in addition to the medals and prizes given for communications discussed at the meetings of the Institution in the last session, made the following awards in respect of other papers dealt with in 1905-06:—A Telford gold medal to Mr. G. A. Denny (London); a George Stephenson gold medal to Professor W. E. Dalby, M.A., B.Sc. (London); Telford Premiums to Messrs. W. R. Baldwin-Wiseman, M.Sc. (Southampton); G. N. Abernethy (London); H. R. C. Blagden (Alexandria, Egypt); M. R. Collins (Jersey); and James Kelly (Preston). A Crampton prize to Mr. P. T. Gask (Peru). For student papers the awards are—Miller prizes to Messrs. Ralph Freeman (London); A. F. Harrison, B.Sc. (Manchester); A. J. Grinling (Derby); T. R. Grigson (London); J. W. D. Ball (London); A. Morris (Manchester). Mr. A. F. Harrison also gained the James Prescott Joule medal.

Trade Catalogues.

We have received the new catalogue of Messrs. Gillett & Johnston (formerly "Gillett & Bland"), of Croydon, makers of clocks, bells, and carillons. The business was first established in 1844, by Mr. W. Gillett, for the manufacture of small clocks only. A few years after he was joined by Mr. Bland, when the business of turret clocks was started; and when in 1877 Mr. Johnston became a partner, the business was extended by the development of a bell foundry, and the firm obtained a renown for their carillons, for which, if we remember right, they invented a new system, keeping the hammers raised and only allowing them to drop on the bell when the key was touched; by this

means the carillon tune was kept more under control than under the old system, when the hammer had to be raised as each key was struck, producing the odd stammering effect of the old carillons, as the larger hammers were slower to respond to the mechanical action than the smaller ones. The catalogue shows that the firm are still carrying on all the departments of the business—small clocks, turret clocks, quarter-chime clocks, bells, and carillons. It is a boast of the firm that no inferior materials are employed; no brass is used in the turret-clock movements. The wheels and bushes being of a special mixture of hard gun-metal. The catalogue gives, incidentally, a good deal of information as to the manner in which bells and clocks are fixed and worked. Among the larger clocks made by the firm is that of the Toronto City Hall, with a dial face of 20 ft. diameter, said to be the largest striking-clock in the new world. We could wish that the designs for the "drum clocks"—dials projected from a building and worked from a movement inside—were a little more architectural in style; the one marked "No. 6" is a good one, and we think has been illustrated in our pages, but the others that are shown are very poor from an artistic point of view; they are supposed to be ornamental in the treatment of the iron-work, but the ornament is wanting in character and simplicity. As what are called the "Westminster chimes" are quoted in full in the catalogue, we may point out that the bar-lines are in the wrong place and give a false idea of the musical accent, so much so that at the first glance we did not recognise the familiar chime tune which they were intended to represent. Probably it is not the doing of Messrs. Gillett & Johnston that the hour bell is made to sound on G while all the quarter chimes belong pronouncedly to the key of D; that is the fault of whoever first made up the Westminster chimes; but it is an absurdity, nevertheless, to go into another key for the hour-bell.

The Cambridge Scientific Instrument Company, of Cambridge, send us a copy of their recently-published catalogue on technical thermometry, a branch of scientific work whose importance is now generally recognised by manufacturers and others. In the earlier pages of the list many practical applications of electrical thermometers, electric-resistance thermometers, thermoelectric thermometers, and Tery radiation pyrometers are described and explained in detail. The list proper is divided into two sections, dealing respectively with the commercial application of pyrometers and research work, and there is also an appendix devoted to the theoretical aspect of the instruments. One of the tables in the appendix to which attention should be directed is that of melting and boiling points—furnished by Dr. Harker, of the National Physical Laboratory—wherein the values differ very materially from those generally published in text-books and works of reference. One distinctly novel adjunct applicable to thermoelectric thermometers and radiation pyrometers is the "thread recorder," an instrument tracing lines on the revolving drum by means of an inked thread periodically depressed by means of a galvanometer boom. An interesting application of electrical thermometry is that of measuring the temperature in cold stores. Instead of being obliged to send a man round the establishment to read a mercury thermometer fixed in every chamber, it is now possible for the engineer in charge to read the temperatures throughout a large building from the engine-room. In the case of one large cold store fitted with the apparatus, it is stated the time saved amounts to fully six hours a day. This is only one example of the benefits to be derived from the employment of the varied appliances described in the price-list, which is gratifying as an indication of recent progress in the production of high-class thermometric instruments, and still more gratifying as a proof that such appliances are increasingly demanded by those engaged in British industries.

Messrs. Edward Wood & Co., of Manchester, send us a handbook entitled "Structural Steelwork," which places at the disposal of architects, engineers, and contractors yet another serviceable collection of tables, data, and formulae calculated to economise time in the design of steel structures. Com-

plete and accurate data are given relative to the various properties of British Standard Sections when used as girders and stanchions, and tables are included stating the properties of numerous compound girders built up of joists or channels and plates. In another section will be found tables giving the properties for simple and compound stanchions. Some useful notes and formulae are included referring to steel grillage and piled foundations, steel roofwork and fire-resisting floors, and the volume is completed by a selection of mathematical tables and an index. Apart from other merits the tasteful manner in which the book has been produced, and its moderate dimensions, will conduce to its popularity as a pocket companion.

Messrs. John Brotherton, of Wolverhampton, send us a neatly got-up illustrated price list of tubes and fittings, such as wrought-iron and malleable iron tubes for gas, water, and steam, special branch fittings, tubes for high-pressure hot-water heating, iron and steel boiler tubes, and tubes for artesian wells, steam ovens, hydraulic work, oil pipe lines, and electric light wires and cables. The catalogue also illustrates numerous applications of tubing in the form of coils, hand-rails, fencing, poles for various purposes, steam, water, as well as gas cocks, valves, and fittings, and tools for screwing pipes and bolts. Altogether this is a useful book for the architect's office.

Correspondence.

THE ROTUNDA, BRITISH MUSEUM, AND OTHER NATIONAL MONUMENTS.

SIR.—The Smirkes' fine room was finished in 1857. Is it too much to expect that money may now be found to spend on a suitable scheme of decoration in its jubilee year?

Great elaboration of ornament is not desirable, as being likely to distract attention; but its present condition is certainly not creditable to a wealthy nation.

I came across a recommendation of yours in a Note (*Builder*, January 7, 1899), "How They Do Things in France." You were referring to the New Paris Opéra Comique and its decorations, and remarked: "All this paid for by the Government, for the public good and for the encouragement of national art." When shall we see such a thing in England?

What hope is there when important features are cut out of chosen designs, such as the towers in Scott's Foreign Office, and the Embankment pedestals have waited forty years for their groups of sculpture?

Yet we may be impatient. We did get Landseer's lions (by payment), and some rich American may give the British nation some statuary out of his abundance to add to Cromwell, Boadicea, Albert Grant's Shakespeare, and other private gifts of this nature which the nation is apparently too poor to pay for or too indifferent to demand of its Government. It is not the French alone who might show us the way. It ought to be humiliating to an Englishman to walk through many large cities of Europe, when he thinks of the paucity of noble works in those of his own country.

E. W. HUDSON, A.R.I.B.A.

BOOKS RECEIVED.

BUILDING CONSTRUCTION. By Professor Henry Adams, M.Inst.C.E. Part I. (Cassell & Co. 3d.)

CARPENTRY AND JOINERY. Edited by Paul N. Hasluck. Part I. (Cassell & Co. 3d.)

ENGINEERS' HANDBOOK. By Professor Henry Adams, M.Inst.C.E. Part I. (Cassell & Co. 3d.)

INEXPENSIVE RURAL COTTAGES. By Samuel Taylor, F.S.I. (Office of the Land Agents' Record. 12s. 6d.)

SUNDAY SCHOOL, SEACOMBE.—A new Sunday-school is being erected by the Seacombe Primitive Methodists in Poulton-road. The building which is being erected by Mr. J. Hall, of Liverpool, from the plans of Mr. H. Harper, architect, Nottingham, will accommodate about 100 worshippers. The material chiefly used will be red Rusbon bricks, whilst the interior will be of pitch pine. Round the lecture-hall there will be galleries, on to which will open six class-rooms. Altogether there will be ten class-rooms.

The Student's Column.

ROOFS: STRUCTURALLY CONSIDERED. XII.

19. Details of King-post Trusses.

THE following notes we deal with the essential members of a king post truss, consideration of the members by which the trusses are connected together so as to form a complete roof framework being left for the succeeding article.

Principal Rafters.—As illustrated in Fig. 121, the principal rafters (PR) are connected at the upper end with the king-post (KP), at the lower end with the tie-beam (TB), and at the middle with the diagonal struts (S).

Details of the two former joints will be found under the head of "King-post" and "Tie-beam."

The struts are jointed into the principal rafter by an oblique tenon as shown in Fig. 122. It will be observed that the strength of the joint does not depend solely upon the resistance of the tenon, but is increased by the triangular notch, in virtue of which the head of the strut takes a bearing against the principal rafter, and the tenon has little more to do than to prevent lateral displacement.

The purlins (P) connecting adjacent trusses are carried by the principal rafters. The manner in which they are fixed will be described under the head of "Purlins."

To calculate the dimensions of the principal rafters for king-post roofs in which the trusses are spaced 10 ft. apart, centre to centre, the following formula may be used:—

$$a = \frac{S^2 T}{50 R} \dots \dots (8)$$

where

a = cross-sectional area (bd) of the rafter in inches.

S = span of the roof in feet.

T = distance of the trusses apart in feet.

R = rise of the roof in feet.

The ratio of breadth to depth for the principal rafters should be approximately as 7:10, but it is frequently necessary to vary the proportion in order to secure uniformity in the breadth or thickness of the chief members of the truss.

Example (1).—Find suitable dimensions for the principal rafters of a roof with the pitch of $26^\circ 33'$, and the span of 24 ft., the trusses being spaced 10 ft. apart.

Here $R = 24 \div 4 = 6$, and substituting the other values in formula (8) we have

$$a = \frac{24^2 \times 10}{50 \times 6} = 19.2 \text{ sq. in.}$$

Calculating the dimensions in accordance with the ratio 7:10, we find that

$$\sqrt{70} : \sqrt{19.2} :: 7 : 3.66.$$

Whence $19.2 \div 3.66 = 5.25$.

Adopting the nearest practical dimensions to 3.66×5.25 conforming with the required proportion, we have $3\frac{1}{2}$ in. \times $5\frac{1}{4}$ in. as the scantling of the rafter. Or, if more convenient, the breadth of the rafters can be made 4 in., thus giving $19.2 \div 4 = 4.8$, say 5 in., as the depth.

Tie-beam.—Considering only its duty as a member of the truss, the tie-beam has to withstand nothing but tensile stress.

But if, as frequently happens, it has to support the ceiling joists, the designer should satisfy himself that the depth of the unsupported lengths is sufficient to prevent sagging.

Support for the tie-beam is provided by the king-post which is tenoned into it, and to which it is secured by a wrought-iron or steel suspension strap, as described under the head of "King-post."

The feet of the principal rafters are connected with the ends of the tie-beam. Several different methods of connexion are available, as briefly described below.

Fig. 123 shows an oblique tenon joint with the rafter notched into the tie-beam, and secured by means of a bolt passing through both members in a direction perpendicular to the upper side of the rafter.

Fig. 124 shows an oblique tenon joint notched into the tie beam as before, but formed with a double abutment, and secured by a heel-strap instead of a bolt. This form of strap is held in place by a bridge-plate

passed from side to side of the rafter through the eye-holes of the strap, and fixed by wedges.

The type of tenon joint here illustrated possesses the disadvantages that it is difficult to fit, and that shrinkage of the timber may cause the entire strain to come against one of the two abutments.

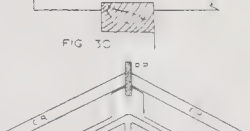
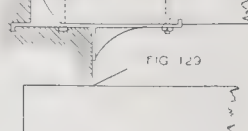
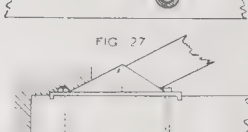
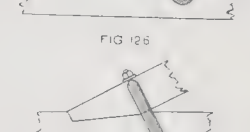
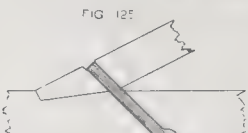
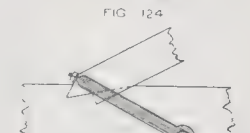
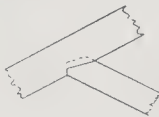
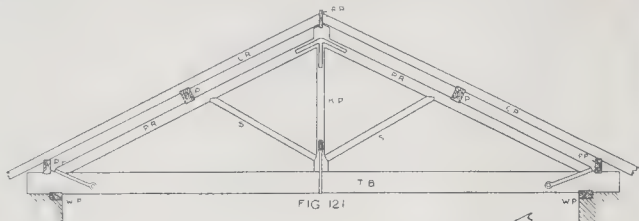
The bridle joint, illustrated in Fig. 125, is practically an inversion of the oblique tenon, having the tenon on the beam, and the mortise in the rafter. The heel strap shown is of a type that cannot be adjusted when once fixed, and necessitates the boring of a hole through the rafter. Fig. 126 illustrates a

modification of the strap, which removes one objection, although still requiring a hole through the beam. When made as in Fig. 126 the strap consists of two separate parts with screwed ends connected at the top by a bridge-plate secured by nuts.

Fig. 127 illustrates another method of applying a heel-strap by placing it in a notch cut in the rafter.

Fig. 128 shows a heel-strap with adjustable bridge-plate, secured by nuts, and provided with a bearing plate at the bottom for the purpose of preventing injury to the bottom of the beam.

Fig. 129 represents a cast-iron shoe for



Illustrations to Student's Column.

ceiving the end of the tie-beam and rafter, detail which protects the timber from damp, obviates the necessity for joints and traps, and affords an extended support for the tie-beam.

The heel-straps, fixed as in Figs. 125 and 26, are intended to resist the thrust of the rafter. Those fixed as in Figs. 124 and 128 are intended to prevent the upward displacement of the rafter, and for this reason are sometimes distinguished as *kicking-straps*. The strap illustrated in Fig. 127 is placed so as to offer resistance against horizontal thrust as well as against an upward movement of the rafter, and the same effect is produced by the shoe represented in Fig. 129. For structural reasons the tie-beam and rafter connexions should be over the walls of the building, but, with a view to economy, these joints are frequently situated between the walls, the idea being to obtain a maximum amount of space with a minimum expenditure of timber. When the connexions are so placed, corbels or brackets should be provided in order to reduce the unsupported length of the tie-beam. Otherwise its dimensions must be increased.

The tie-beam is either notched (Fig. 130) or coggled (Fig. 131), and nailed to the wall-plate.

Nothing involves reduction in the thickness of the beam at the point of support, and for that reason is less desirable than coggling. The depth of tie-beams for any width can be calculated by formula (7) ante.

As a general rule the dimensions given by formula (7) are adequate to guard against undue deflection in tie-beams of which the unsupported lengths do not exceed 15 ft.

It should be noted in using the formula that L represents the unsupported length of the tie-beam. Thus, in the case of a roof where a king-post forms the only intermediate support, the length equals half the span.

Example (2).—Find the depth of the tie-beam of a roof with a span of 24 ft., the beam to be 5 in. broad, and supported in the middle by one king-post.

Inserting the necessary values in rule (7) we have

$$d = \frac{12}{\sqrt{5}} \times 1.47 = 10.37 \text{ in., say, } 10\frac{1}{2} \text{ in.}$$

King-post.—As the king-post is a tension member, the name by which it is distinguished is scarcely appropriate, for the word "post" is generally used to denote a prop or support.

Fig. 132 is a sketch showing the usual form of king-post and the various members connected with it.

The head and foot of the post are enlarged so as to provide abutments for the upper ends of the principal rafters and the lower ends of the diagonal struts, all these members being connected by tenon and mortise joints extending across the full depth of the rafters and struts.

It is always advisable to fit the principal rafters so that the upper ends of the joints are slightly open in order that they shall be able to close up without injury as the roof settles under its full load. A similar precaution should be taken with regard to the joints between the king-post and the diagonal struts.

For the purpose of binding together the joints at the head of the king-post, and of relieving the post of excessive compression, wrought-iron straps, about 2 in. wide and of suitable thickness, are fixed on each side of the post and the principal rafters by means of bolts and nuts passing through the timber.

In the absence of straps, the head of the king-post is apt to become so seriously compressed that the post settles slightly, permitting the tie-beam to sag in the middle.

Even when straps are used it is impossible to prevent the settlement which follows shrinkage of the timber, and for this reason the tie-beam is generally cambered to allow for sinking in the middle.

The foot of the king-post is joggled into the tie-beam to prevent lateral displacement, and to compensate for settlement of the roof generally the length of the king-post is such that the shoulders of the joggle shall be a short distance about the upper surface of the beam. The joint is completed by the application of a wrought-iron suspension strap,

about 2 in. wide, and of suitable thickness, made with eye-holes for the reception of gibs and cotters. Then, after the roof has fairly settled into position, the cotters are driven further in to bring the tie-beam up to its bearing.

The head of the king-post is slotted to receive the ridge-plate, as shown in Fig. 132, and bevelled parallel to the under surface of the common rafters where these come over it. In other places the head can be left square at the top.

For calculating the sectional area of the king-post, formula (9) will be found useful as a general guide.

$$a = L \times S \times 0.12 \text{ for fir} \\ = L \times S \times 0.13 \text{ for oak} \dots (9)$$

Example (3).—Find the sectional area and dimensions of the king-post in fir for a roof with the span of 24 ft. and the pitch of 26° 33', taking the thickness of the post at 3½ in.

As the pitch of 26° 33' gives the rise of quarter the span, we have

$$L = 24 \div 4 = 6.$$

Then

$$a = 6 \times 24 \times 0.12 = 17.28,$$

And

$$17.28 \div 3.5 = 4.94.$$

Therefore the practical dimensions of the king-post will be 3½ in. by 5 in.

Struts.—The object of the diagonal struts in the king-post truss being simply to afford intermediate support for the principal rafters, it is desirable that their heads should come immediately beneath the purlins, which have to sustain a considerable proportion of the roof loads.

Fig. 133 is a diagram showing that, as the pitch of a roof decreases from 45 deg., the strut, terminating immediately below the purlin placed at the centre of the prime rafter, gradually assumes a less favourable angle for supporting vertical stress. Hence it is frequently necessary for the head of the strut to be connected above the junction of the rafter with the purlin.

To allow for transverse shrinkage of the rafters and king-post, and for longitudinal shrinkage of the struts themselves, the fullest possible length should be taken for the latter members, and the timber must be thoroughly well seasoned.

The proportions of the struts in a king-post roof can be calculated by formula (10), which, by insertion of the proper values, is applicable to the computation for struts and braces generally.

$$d = \sqrt{L \times \sqrt{P} \times 0.8 \text{ for fir}} \dots (10)$$

where

d = depth of the strut, the breadth of which should be 0.6 d in inches.

L = length of the strut in feet.

P = length in feet of principal rafter to which intermediate support is given by the strut, or of that part of the rafter to which intermediate support is given by one or two or more struts. The breadth of the strut should be 0.6 times the depth, or $b = 0.6 d$.

Example (4).—Find the dimensions for the diagonal struts of a king-post roof, as in Fig. 121, with the span of 24 ft., and the pitch of 26° 33'.

Here the length of each principal rafter equals $(\text{span} \div 2) \div \cos 26^\circ 33'$, or $12 \div 0.895 = 13.4$ feet. The length of the strut, placed so as to intersect the principal rafter in the middle, is $L = 13.4 \div 2 = 6.7$ inches.

Then by formula (10) we have

$$d = \sqrt{6.7 \times \sqrt{13.4} \times 0.8} \\ = 4.95 \times 0.8 = 3.96$$

Taking this result at 4 in., the breadth of the strut is $4 \times 0.6 = 2.4$, say, 2½ in., giving 2½ in. by 4 in., as the required dimensions.

Table XXVIII., containing the dimensions of the chief members in a king-post truss, has been calculated by formulae (7), (8), (9), and (10) for spans ranging from 18 ft. to 30 ft., the dimensions being stated in feet and decimal parts to show the gradations more clearly. In some cases, however, the proportions and dimensions have been adjusted so as to make the members of uniform width.

TABLE XXVII. — SCANTLINGS OF CHIEF MEMBERS IN KING-POST TRUSSES IN FIR, OF DIFFERENT SPANS FROM 18 FT. TO 30 FT.; PITCH, 26° 33'. PRINCIPALS, 10 FT. APART.

Span of Roof.	Principal Rafters.	Tie-Beam.	King-Post.	Struts.
Feet.	Inches.	Inches.	Inches.	Inches.
18	3½ × 4	3½ × 9	3½ × 3	3½ × 2
20	4 × 4	4 × 9	4 × 3	4 × 2
22	4 × 4½	4 × 10½	4 × 3½	4 × 2½
24	4½ × 4½	4½ × 11	4½ × 4	4½ × 2½
26	4½ × 5	4½ × 12	4½ × 5	4½ × 2½
28	4½ × 5	4½ × 12½	4½ × 5½	4½ × 2½
30	4½ × 5	4½ × 13	4½ × 6	4½ × 2½

Obituary.

MR. LONG.—The death at his residence near Walmer is announced of Mr. Charles Long, a member of the firm of Messrs. Wylson & Long, of No. 16, King William-street, Strand. Of the more important architectural works for which the firm prepared the plans and designs we may mention, and in their fairly chronological order, the following: "Hunnam's" hotel and "Ridley's" bar, Covent Garden, 1886-7; the Eagle Tavern, Farringdon-road; the new Oxford Music Hall, Oxford-street, having a seating capacity of about 2,000 persons, with subsequent extension and improvements, including a re-arrangement of the dressing-rooms block, re-arrangement of the seating in the auditorium, and the redecoration (just completed by them) of the interior; No. 76, Fitzjohn's-avenue, West Hampstead, for the late Mr. R. S. Parker, head of the present firm of Messrs. Patman & Fotheringham, contractors; buildings in Carlton-grove, Brixton-rise; Theatre of Varieties, Dalston; the hall, Blackpool Winter Gardens, and, for Alhambra (Blackpool) Limited, the buildings on the Promenade, comprising the variety theatre, circus, restaurant, ball-room, etc., in 1897, at a cost of 89,000l. for the general building and constructional ironwork; cement kilns at Northfleet, Kent, for Messrs. Robins & Co.; the Bunch of Grapes public-house, No. 45, Brixton-rise, in 1897-8, with subsequent alterations and improvement of the interior; the White Hart tavern, King-street West, Hammersmith; the Euston Theatre of Varieties, Euston-road, opened on December 19, 1900, with room for an audience of about 3,000 persons; the South London Palace of Music Hall, London-road, Southwark, 1899, with subsequent improvements, and fire-resisting curtain; alterations and improvements, with re-decoration of the interior, London Pavilion, Piccadilly-circus, 1900-3; the Chelsea Palace of Varieties, King's-road, Chelsea, having seats for about 2,200 persons; improvements and fire-resisting curtain, Canterbury Music Hall, in Westminster Bridge-road, S.W.; East Ham Variety Palace; the Theatre and Palace of Varieties, Walthamstow; and the Pavilion Theatre in Westgate-road, Newcastle-on-Tyne, opened in January, 1904. Messrs. Wylson & Long acted as consulting architects for the erection (on the site of the Theatre Royal) of the Kilburn Palace of Varieties, 1899, designed by Messrs. Palgrave & Co.

MR. DAVIES.—The death is also announced of Mr. John H. Davies, in his seventy-sixth year, senior partner of Messrs. John H. Davies & Sons, of No. 14, Newgate-street, Chester, architects and surveyors. The firm were architects of the New Railway Hotel at Shotton, County Flint, and the police-station there; the English Presbyterian Church at Saltney Ferry, 1897; the board-room, offices, receiving-wards, etc., for the Holywell Board of Guardians, 1901-2; the free library for the Buckley U.D.C., County Flint; the police-station and quarters at Caergwre for the Flint County Council; the enlargement of the work-house, for the Chester Guardians; and the additional buildings, including the infirmary, nurses' home, receiving-wards, laundry, etc., at Clatterbridge Workhouse for the Wirral Union Guardians, for which the tenders, averaging about 9,000l., were submitted in last November. Messrs. J. H. Davies & Sons were architects of some schools in Chester and for the Buckley U.D.C. School Board; and of the Wesleyan Methodist Chapel, South Ellesmere, designed after the Gothic style, of which the foundation-stones were recently laid, as recorded in our columns.

MR. ROBERT TELFORD.—We regret to announce the death of Mr. Robert Telford, Assistant City Engineer of Newcastle, which took place at his residence, 30, Holly-avenue, Newcastle. Mr. Telford was a native of North Tyne, and was a son of the late Mr. John Telford, of Redmire, Birmingham. He was educated at Jedburgh Grammar School, and served his apprenticeship with the late Mr. John F. Toms, M.Inst.C.E., of Newcastle. During his period of service with Mr. Toms he was engaged, among other works, in the Border Counties section of the North British Railway, in the construction of the Blyth and

Tyne Railway, and in the Whittle Dene Waterworks, and also in the projected Bristol and North Somerset Railway. Thirty-eight years ago he entered the service of the Newcastle Corporation, when the late Mr. Fulton was City Engineer. Since then he had served as Assistant City Engineer under Mr. Fowler, Mr. Laws, Mr. Edger and Mr. Kirkpatrick.

General Building News.

CHURCH OF HOLY TRINITY, NORTHAMPTON.—In terms of the will of the late Rev. J. Beck Wickes, rector of Boughton, his executors have undertaken to devote about 20,000*l.* out of the estate to the erection and endowment of a new church of the Holy Trinity in Northampton.

BAPTIST CHURCH, EYNSFORD.—The new Baptist church at Eynsford was recently opened. The building is constructed of Kentist rag, with Bath stone dressings, and Broseley tile roof. The inside is lined with bricks. Seating accommodation is provided for about 400, which is extended by the removal of a wooden partition, which shuts off the upper floor of the schoolroom. Messrs. Tait & Hobbs, Dartford, were the architects, and the contractors Messrs. Somerfield & Sons, of Orpington and London. The cost has been about 22*l.*

ST. JOHN'S CHURCH, UPPER HOLLOWAY.—The repairs and improvements to this church have now been completed. The old plaster fronting of the galleries has been demolished, and new oak panelling has been substituted all round, and electric lighting has been introduced. The architects were Mr. Hammond and Mr. Schmidt. The cost has been 1,700*l.*

PAROCHIAL HALL, DERBY.—The Bishop of Southwell recently opened the new Parochial Hall and Men's Institute, built in connexion with St. Anne's Church, at Derby. The building, situated at the rear of the church, is of red brick, with terra-cotta facings. The mission-house comprises six bedrooms and three sitting-rooms. At the back of the hall are the billiard and reading rooms to serve the purposes of an institute. The building has been erected by Messrs. J. Parker & Son, Derby, under the superintendence of the architects, Messrs. J. Bodley & Co., Manchester. The local light has been given in the buildings by Mr. Edwin Haslam, Derby. The hall is capable of holding 500 people.

CHANCEL, HOLY TRINITY CHURCH, STOCKTON.—The Bishop of Durham on the 27th ult. consecrated the new chancel of Holy Trinity Church, Stockton. In addition to the new chancel, an organ chamber and further vestry accommodation on the north side of the chancel have been provided. Mr. C. S. Errington, architect, Newcastle-on-Tyne, prepared the plan of the extension, whilst the contractor has been Mr. J. Bowron, of Stockton. The new chancel is twice the length of the old one, and well lighted. The memorial east window of Munich glass has been refixed in the new east gable, but at a higher level, so that at a future date a reredos can be erected. The roofs internally are of pitch pine, with carved bosses and battlements in the main cornice. Wood blocks are laid in the choir space, the passages having red tiles with green tile borders. The sanctuary floor is of polished Dove marble, with Rouge Royal steps and Fosterley borders.

CHURCH, RUSHDEN.—The foundation-stone has just been laid of the new Church of St. Peter, at Rushden. The cost of the whole building will amount to 4,423*l.*, and the contractor is Mr. R. Marriott, of Rushden, and the erection of the nave and aisles as at present intended will cost about 2,779*l.*, the amount which has been raised or promised. The new church, which will be situated between Midland-road and Station-road, will be built outside of Leicestershire brick, and the interior will be of Bath stone, while the roof will be slated. A nave, north and south aisles, north porch, chancel, sanctuary, morning chapel, and clergy and choir vestries will make up the building. The plans provide for a chancel screen of oak 20 ft. high. The choir-stalls, lectern, altar, and rails will be of the same kind of wood. There will be four arcades on either side of the aisles. Seating accommodation will be made for 500, and chairs will be used. The window will be of stone tracery. The church will rise to a height of 80 ft., and will possess a bell-turret at the angle of the morning chapel, and the porch entrance to the north aisle. There will be three entrances to the church, including one from each street. Gas will be the illuminant of the church, and the heating will be on the Grundy hot-air principle. Messrs. Talbot Brown & Fisher, Wellingborough, are the architects.

ROMAN CATHOLIC CHURCH, EASTBOURNE.—The foundation-stone of a new Roman Catholic Church at Eastbourne was laid on September 28. Mr. P. D. Stonham is architect, and Mr. A. E. Kullick the surveyor of the work.

NEW CHURCH, PERTH.—The memorial-stone of St. Mark's Church in Feus-road, Perth, was laid recently; the architect was Mr. John W. Smart; the measurers being Messrs. Stephenson & Scott, and the contractors Messrs. Fraser & Morton.

PRESBYTERIAN CHURCH, BARROW.—The foundation-stone of a new Presbyterian church, which is being built on a site in Baden-Powell-street, Vickerstown, was laid a short time ago. The building will provide accommodation for about 400 persons, and the estimated cost is 2,300*l.*, not including the site. The plans were prepared by Mr. W. Moss Settle, and Messrs. W. Grudwell & Co. are the contractors. The building is of buff terra-cotta and rough cast, and the roof will be composed of mottled red tiles. The wood work is pitch pine. All the windows have terra-cotta quoins and leaded lights.

WESLEYAN CHAPEL, WOODSTOCK.—A new Wesleyan-Methodist Chapel is being erected on a site in Oxford-street, Woodstock. The chapel is being built by Messrs. H. A. Tolley & Son, of Bladon, from the designs of Mr. S. Watson, and when completed will have seating accommodation for about 200 people. It will be of stone with free stone dressings. The ground has been purchased for 350*l.*, and the cost of the chapel will be about 1,000*l.*

BIBLE CHRISTIAN CHAPEL, QUENCHWELL, NEAR TRURO.—A new Bible Christian Chapel has been opened at Quenchwell, near Truro. The dressing of the building (40 ft. by 25 ft.) is of granite and buff brick. There is a vestry, an organ loft, and seating accommodation for 170. The interior is of pitch pine. The contract for the erection of the building was carried out by Mr. W. H. Moyle, Chacewater, and the architect was Mr. Sampson Hill, of Redruth.

SCHOOL, BULWELL, NOTTINGHAM.—On the 27th ult. the new school erected in Albert-street, Bulwell, by the Nottingham Education Committee to accommodate 772 scholars, was opened by Mr. J. H. Yoxall, M.P. The building has been constructed in the rear of the existing infants' school and technical school. Mr. E. B. Lewis, the City Architect, prepared the plans.

SCHOOL, YARMOUTH.—The new Edward Worledge School at Yarmouth has just been opened. It is divided into two blocks, which will accommodate in all 820 children. The senior school, which is for boys and girls, will accommodate 420, and has two entrances towards Lichfield-road. The junior school, which is also for boys and girls, will accommodate 400, and is approached from the Lichfield-road by two passages at the ends of the senior school. Entrances to the junior schools are on the east front, into the corridors, which lead to the hat lockers, lavatories, stores, teachers' rooms, etc. The junior hall is placed centrally, and is 66 ft. by 23 ft. 6 in., and lighted by lofty east windows. Approached from this hall are two classrooms, 25 ft. by 20 ft. 6 in., and from the corridors are five classrooms, 25 ft. by 24 ft. 6 in., four of which can be turned into large rooms by glazed sliding partitions. On the north side of the junior school is the carpenter's shop, about 50 ft. by 16 ft., for twenty-four boys, with wood store, etc. The schools are built with hard red Somerleyton brick facings, with dressings and copings of terra-cotta. The roofs are covered with slates, and the whole of the floors are laid with encaustic of red colour. The dadoes are glazed tiles, the colours differing in the various rooms. The walls and ceilings are finished with plaster above dadoes, except in the cookery centre, which has white glazed walls above the darker toned dado. The schools are warmed by hot-water pipes and radiators, there being two boiler-houses, one for each school; electric lights provide illumination. The contractors were Messrs. Spencer, Santo & Co., Ltd., Mr. White acting as works manager, the contract being for about 11,700*l.* The sub-contractors were:—Hot-water plant, Messrs. Werner, Pfleiderer & Perkins, Peterborough; terra-cotta work, Hathern Station Messrs. Hobman & Co., Bournemouth; paving Messrs. Dawber, Townsley & Co.; the floor, Mr. Joseph Ebbett, London; electric lighting, Messrs. Mann, Egerton & Co. The architects were Messrs. Olley & Hord.

GRAMMAR SCHOOL, HERTFORD.—The new building Grammar School have just been opened. The additions consist of an assembly hall 70 ft. by 30 ft., which can be converted into two classrooms. It is also provided with gymnastic fittings and is furnished in such a way that it can be employed as an art room or a lecture room. The external appearance of the old school has not been changed, but the building has been converted into two classrooms with a corridor between. This corridor is continued and connects the old and the new parts of the school, and on each side are placed lavatories, cloakrooms, and lockers for the boys' books and other articles. The school playground has been asphalted and a bicycle shed erected. The total cost of the alterations was close upon 3,000*l.* Messrs. Joseph & Smith, of London, were the architects, and Messrs. Ekins & Co., of Hertford, the builders.

NEW SCHOOL, HOLMER, HEREFORD.—A new infant school has just been opened at Holmer, Hereford. The school is built of local bricks. The roof is boarded and felted, and covered with Bangor slates. The interior walls have a glazed brick dado 4 ft. 3 in. high, with black Adamian panel let in same for the use of the scholars. Above this the walls are coloured. The accommodation provided in the building consists of four classrooms (grouped on the south side of the building), hall, lavatory, and cloakroom, boys' stores, and headmistress's room. Each of the classrooms is designed to accommodate fifty children. The playground is asphalted, and there is also a covered play-shed. The contract for the building was secured by Mr. E. W. Wilks, the heating and lighting being carried out by Mr. J. Hiles. The preparation of the plans and the carrying-out of the work was done under the supervision of Mr. John Parker, City Surveyor.

SCHOOL FOR MENTALLY DEFECTIVE CHILDREN, BECKENHAM.—The school erected by the Beckenham Council for the accommodation of mentally defective children has just been completed. The Beckenham Council has built a small mixed school in the centre of their district. There are separate entrances for the boys and girls, each child is provided with a separate desk to avoid personal contact, and a bath-room with hot and cold water is provided. The designs are those of Mr. J. A. Angell, the Engineer and Surveyor to the Beckenham Council.

PUBLIC SCHOOL, COPLAWHILL, GLASGOW.—On the 28th ult. the Sir John Neilson Cuthbertson Public School, which has been erected by the Glasgow Board, was opened. The school has a frontage to Cuthbertson Street of 156 ft., with a depth from back to front of 110 ft., and is three stories high. On each of the floors there are eight classrooms. Eighteen of these are designed to accommodate 60 pupils each, four accommodate 56 pupils each, and two rooms for infants provide 124 places, giving a total accommodation of 1,428. The main entrances for girls and boys are placed on the right and left of the main front respectively. The rooms are arranged round two large central halls, the one over the other. The ground floor hall is 60 ft. long by 32 ft. wide, and is lighted by a window extending nearly the whole width of the hall. It has a height of 28 ft. 6 in., being the combined heights of the ground and first floors. At the first-floor level, running round three sides of the hall, is a gallery 10 ft. wide at the end and 6 ft. at the sides. The gallery is for the purpose of giving access to the various classrooms on the first floor. The other hall referred to is at the second-floor level, and is of similar dimensions to the lower hall, and has an average height of about 20 ft., the roof being an open timber one. This hall is also lighted by a large window in the end with large roof lights in addition. The building is heated by means of low-pressure hot water. Outlets from the various classrooms are provided leading into ducts, through which the vitiated air is drawn by the fans, the air escaping to the open by means of boxwood ventilators at roof level. A janitor's house and the usual children's offices and play-sheds have been provided within the playground. The estimated cost of the buildings is 20,260*l.* The school was built from plans prepared by Mr. James Miller, architect, Glasgow. Mr. William Lightbody was principal contractor for the whole of the works.

TECHNICAL SCHOOL, CHORLEY.—The new technical school at Chorley faces Union-street, and is of brick, with terra-cotta ornamentation. There are three stories. On the sub-ground floor will be a weaving shed, 40 ft. by 42 ft., cookery room, manual-instruction room, physical laboratory, lecture-room, plumbing-room, and the usual offices, including a bicycle-room. The weaving and cookery rooms are both lighted by shed top-lights. On the ground floor all the theoretical and lecture classrooms are situated. There is a large lecture-room, 40 ft. by 26 ft., committee-room, male teachers' room, and a large hall and vestibule. On the first floor is an art-room, chemical lecture theatre, science and drawing rooms, and a principal's room. A playground which adjoins Hollinshead-street is now in course of preparation. The various rooms are reached by corridors 8 ft. wide, with staircases at each end of the building. Messrs. Cheers & Smith, of Blackburn, have been the architects. The lighting is by the Keith high-pressure system. Altogether the cost of the school and equipment has been 14,920*l.*

CONGREGATIONAL COLLEGE, COTHAM, BRISTOL.—The Western Congregational College at Cotham has just been opened. The architect of the work was Mr. H. Dare Bryan, of Bristol, the general contractors being Messrs. Jacob Long & Sons, of Bath. Mr. W. H. Lewis was clerk of the works.

SCHOOL, PONTYPRIDD.—A new boys' school has been erected by the Pontypridd Education Authority at Pont-Shon-Norton. The contractors were Messrs. E. R. Evans & Brothers, Cardiff. Mr. W. P. A. Willoughby, A.M.I.C.E., Surveyor to the Council, designed the building. The new school, which has been built of Newbridge stone, with Cattybrook red brick and forest stone

essing, will accommodate 250 children. There are five classrooms, each accommodating fifty children, which open into a large central hall. The cost of the building and covered playground is 3,600l.

CHURCH INSTITUTE, HORNSEA, HULL.—The foundation-stone of the new Church Institute in connexion with Hornsea Parish Church was recently laid. The walls of the new building will be of white stock bricks. The lecture-hall will be 35 ft. by 19 ft., and will have communion with the parish-room. There will be a reading-room, and also a smoke-room. Mr. E. Rodrick is the architect of the work.

A CONCERT HALL FOR MARYLEBONE.—Proposals have been made to the Borough Council in respect of the acquisition of the site of St. Paul's church, on the west side of Great Portland-street, for the erection of a block of buildings, with shops on the ground-floor and a concert hall above. The plans and designs have been prepared for the promoters by Messrs. Joseph & Smith, and the cost is estimated at 200,000l. The site is in the hands of the Corporation, and was formerly that of a reservoir. The church, which was lately closed, was built after the classical style some eighty years ago, and contained 600 sittings.

IMPROVEMENTS, BOURNEMOUTH.—On September 26 were opened the new recreation ground at Winton, the new cricket ground at Winton, and the golf and sports pavilion near the links in the park. The improvements have been carried out by the Corporation (of which Mr. F. W. Lacey, M.Inst.C.E., is Borough Engineer and Surveyor) on lands belonging to Lord Malmesbury and Mr. Cooper. Deeds, who generously consented to the scheme. Lord Malmesbury made a gift of the Winton recreation ground, some 15 acres in extent, together with land for the drive, Mr. Cooper Dean giving land for another drive between King's Park drive and Queen's Park. The works have cost a sum of about 14,500l. in all, exclusively of the cost of the buildings.

HOUSING SCHEME, HULME.—It has been decided by the Sanitary Committee to recommend the Manchester City Council to sanction the erection of a block of tenement buildings near Hulme Barracks as the first portion of a scheme which, with land and buildings, is ultimately to cost 36,000l. For the purpose of the first block the Local Government Board is to be asked to sanction the borrowing of 7,500l. The sanction of the Board was given last February to the borrowing of 6,867l. for the purchase of lands in Barrack-street and Tatton-street, Hulme, for the purposes of part three of the Housing of the Working Classes Act, 1890, on the condition that the Council should proceed to demolish the existing houses on the land to be acquired without consulting the Board in the first place. It is in order to comply with this condition that the committee has determined to recommend the erection of one of the four blocks that are ultimately to be placed there. The first block will consist of five groups, each group containing one on the ground floor four single room tenements, and on the upper floors a two-roomed and a three-roomed tenement. Accommodation will be provided in the block for 120 persons, and a large portion of the most expensive part of the street work will have to be carried out with this block.

NEW HALL, CARDIFF.—A new hall has been erected and opened in Monthermer-road, Cardiff, in connexion with the Forward Movement in that town. The building has a seating capacity for 1,200, and cost over 2,000l. The contract was let to Messrs. E. Turner & Sons, Cardiff, and carried out under the superintendence of the architect, Mr. W. H. Scott, Cardiff.

COTTAGES, BISHOP'S STORTFORD.—Eight small residences known as the "King's Cottages" have been built in South-road, Bishop's Stortford, for Sir Walter Gibbey, who is conveying them to trustees to be let to the aged and deserving poor. The cottages were erected from the plans of Mr. J. S. Cooper, by Mr. C. Martin. They are arranged in a single story structure, in sets of four, each set containing two double and two single cottages, alternately placed.

MUNICIPAL OFFICES, BARRY.—The Barry Urban District Council have now resolved to proceed with the construction of the front portion of the new offices, and have accepted the tender of Mr. D. W. Davies, of Cardiff, amounting to 7,488l., subject to the approval of the Local Government Board. The architects are Messrs. C. E. Hutchinson & E. Harding Payne, of London, whose designs were awarded the first premium in competition by Mr. T. E. Colclough, the assessor.

Y.M.C.A. PREMISES, DUFFIELD.—On the 27th ult. the new baths and reading-room of the Duffield Y.M.C.A. were opened. Mr. J. R. Naylor has been the architect, and the alterations were carried out by Mr. Joseph Smith.

CENTRAL FIRE STATION, MANCHESTER.—The block of buildings at the junction of London-road, Whitworth-street, and Fairfield-street, Manchester, which is to be used mainly as a Central Fire Station, was opened on the 27th ult. The buildings include, besides the fire station, accommodation for testing gas meters, a police and

ambulance station, and a coroner's court. The designs were prepared by Messrs. Willoughby, Woodhouse & Langham, of Manchester, and the work has been carried out by Messrs. J. Gerrard & Sons, Limited, of Swinton. The original estimate was for 120,000l. In consequence of extra provision this has been increased.

HOSPITAL ENLARGEMENT, HORNSEA.—The new additions which have been made to the Hornsey Isolation Hospital, Coppett's-road, Muswell-hill, were recently opened. The newly-erected buildings include the extension of the administrative block, the erection of a new ward block, and the alteration of one of the existing ward blocks. The total cost of the extensions and alterations will amount to about 13,000l. The buildings were designed and erected by the Borough Surveyor, Mr. E. J. Lovegrove, in consultation with Dr. Coates, medical officer of health, assistance being given by Mr. W. H. Adams and Mr. W. Winn was clerk of works. The gas-cooking apparatus, hot-water service, and heating were carried out by Messrs. Russell & Co. Wrought-iron fencing and gates by Messrs. Gardiner, Sons & Co., of Bristol. Electric lighting by Messrs. Wright & Jones, the clock by Messrs. Kendall & Dent, wood-block flooring by Messrs. Goddard & Sons, of Farnham; mosaic paving by the Mosaic Manufacturing Co., of London; fittings by Messrs. Birt & Tatlock, tiled dados by Messrs. Rust's Vitreous Mosaic Co., lift by Messrs. Waygood & Co., fireplaces by the Teale Fireplace Co., sanitary fittings by Messrs. F. Winkle & Co., Ltd., iron escape stairs by the St. Pancras Iron Co. The general contractor for the ward block is Mr. J. Parsons, of Walsworth-road, London. The heating of the building was carried out by Messrs. Wenham & Waters, of Croydon, and the doors by the Gilmour Door Co., Ltd.

PUBLIC LIBRARY, ISLINGTON.—The North Library of the Islington Borough Council, at Manor Gardens, Holloway-road, is now opening, and is the first of a system of five libraries—central library and four branches—to be built with the aid of Mr. Carnegie's gift of 40,000l. The building, erected by Messrs. Patman & Fotheringham, is of red brick with white stone facings. The entrance hall and main staircase are lined with Hopton wood stone. The fittings throughout are of oak, and the heating is by steam radiators and electric radiators. Mr. Henry T. Hare was the architect, and the cost of the building and fittings will be about 9,000l.

HOSPITAL ENLARGEMENT, THIRSK.—On the 25th ult. the new wing of the Lambert Memorial Hospital was opened by Viscount Halsbury, M.P. The addition is being erected from the plans of Mr. T. Stokes, and provides accommodation for male and female wards, operating-room, and apartment for the district nurse.

NEW THEATRE, SUNDERLAND.—The foundation-stone of the New Empire Theatre at Sunderland was laid on the 23rd ult. Messrs. W. & T. F. Milken, architects, have prepared the plans and Mr. J. W. White is the builder. The building will provide sitting accommodation for about 3,500.

REBUILDING IN OXFORD-STREET.—Mr. J. Slater has made plans and designs for the new premises to be erected on the site of Nos. 116-32 (even), Oxford-street, with a return frontage on the site of Nos. 1-5, Wells-street. The block on the south side of Oxford-street, with frontages to Dering and Tenterden streets, has been acquired for the building of a concert-hall, after designs by Messrs. E. Runtz & Ford.

TOWN HALL, SUTTON COLDFIELD.—The new Town Hall which has been erected at Sutton Coldfield was opened a short time ago. The buildings have been designed in the Georgian style, the materials used being red bricks and Monks' Park stone, with green slate roof. The entrance hall is lighted by circular windows, and has a semi-circular ceiling. On the left is the gentlemen's cloak room and ticket office, and on the right the Mayor's reception room, or supper room. This apartment is 41 ft. by 28 ft., with accommodation for seventy or eighty persons, and is lighted by three leaded glass windows. Beyond this room are the kitchen and service rooms. The assembly hall is 78 ft. by 42 ft. 9 in., and has a height of 30 ft. It has seating accommodation for 650 persons. For use in case of emergency there are two exits from this room direct into the Council House grounds. A proscenium arch frames the stage or platform, which is fitted with wings and flies, drop curtain, and a series of scenes. The room is lit by a range of clearstory windows on both sides, and also by lunette windows in the ceiling. The ventilation is on the Plenum system, and the artificial lighting is by electricity, supplemented by gas. The architect is Mr. Arthur R. Mayston, London. The total cost is between 11,500l. and 12,000l., of which sum the hall accounts for 8,000l., furnishing 1,000l., fire-station 2,000l.

ASSEMBLY HALL, LIVERPOOL.—The improvement of the Bevington-hill end of Scotland-

road has now been almost completed. The old front of the market has been taken down, and a new frontage made 13 ft. 6 in. further back, this land being added to the street, which is now 60 ft. wide. On the ground floor of this new portion are seven shops facing Scotland-road, and above them is a hall, available for meetings, concerts, etc., giving accommodation for 1,000 persons, there being seating for 600 in the body of the hall and 500 in the gallery, and standing room for about 100. There are also dressing and retiring rooms for the artists and speakers, cloak-rooms, and other conveniences. The length of the hall is 80 ft. by 54 ft., exclusive of the stage. The building throughout is lighted by electricity. The frontage is faced with Darley Dale and Grinshill stone and red-dressed bricks. The cost of the St. Martin's Market part of the Scotland-road improvement has been 15,165l., and the work has been carried out under the supervision of the City Surveyor by Messrs. Thornton & Sons, of Liverpool.

ASSEMBLY ROOMS, FOREST HALL.—The new Forest Hall and Beuton Assembly Rooms which have been erected at Forest Hall will shortly be opened. The building comprises on the ground floor, four shops, with the entrance to the Assembly Rooms in the centre, and two houses at each side. On the first floor are the Assembly Rooms, which consist of a hall, dining-room, artists' retiring-room, cloak-rooms, etc., all entered from the crush hall. The dining-room, which is also accessible from the hall, is 35 ft. by 33 ft., and 17 ft. high, and will also be used as a Freemasons' lodge. There is a kitchen at the back. The building has been lighted throughout by electricity, and gas has also been laid. The whole building has been designed and carried out under the superintendence of Messrs. White & Stephenson, architects, of Newcastle, the contractor being Mr. W. Jackson, of Gosforth.

NEW OFFICES FOR THE ECCLESIASTICAL COMMISSIONERS.—On September 24 the Ecclesiastical Commissioners for England removed from No. 10, Whitehall-place to their new offices at the corner of Millbank and Great College streets, Westminster. The block of buildings, the first to be erected under the Westminster Improvement Act, were built for the Commissioners on their own land, after designs by their architect, Mr. W. D. Caroe, which were illustrated in our number of April 30, 1904, the contractors being Messrs. Johnson & Sons, of Leicester, for the superstructure, and Messrs. G. Trollope & Sons for the foundations and basement story. At the time of rebuilding Millbank-street was widened, and the Commissioners, acting in the public interest, set back their frontages in Great and Little College streets.

FLOUR MILL, MANCHESTER. A new mill has been erected for the Hovis Brad Flour Company, Ltd., in Trafford Park, Manchester. The building was designed by Mr. J. Clarke, architect, of Liverpool, and the builder was Mr. W. A. Peter, Rochdale.

Sanitary and Engineering News.

BIRKENHEAD'S WATER PROBLEM.—The Birkenhead Gas and Water Committee met on the 21st ult., and decided to proceed with the Pont-y-Alwen gravitation scheme, by Mr. G. F. Deacon, for providing water to the municipality, the initial cost in connexion with which will amount to three quarters of a million sterling.

DUBLIN MAIN DRAINAGE.—The opening of the new main drainage system of Dublin took place on the 24th ult. "The system of intercepting sewers on either bank of the Liffey," says the *Belfast News Letter*, "with a siphon under the Liffey from Eden Quay to Burgh Quay, conveying the northern contribution into the southern main, traversing the southern quays at a low-level, to Ringsend, and thence to the outfall, was designed fifteen years ago by a distinguished Irishman, Mr. George Chatterton, while the contractors were Messrs. H. & J. Martin, Ltd., of Belfast and Dublin. The outfall works are at the Pigeon House. On May 28, 1900, the Lady Mayoress, wife of Sir Thomas D. Pile, Bart., Lord Mayor, laid the foundation-stone of the outfall works. There are 7½ miles of sewer, most of which is at a depth of 24 ft. below the street level. Messrs. S. Pearson & Son carried out the contract for the high level sewer and outfall works at the Pigeon House. The site, above sixty acres in extent, was acquired from the War Department. Mr. H. H. Helline, M.Inst.C.E., was the resident engineer during the construction of most of the contract, and he was succeeded by Mr. George D. Gray, M.Inst.C.E. The pumping station, comprising precipitation tanks and sludge pumping machinery, is a wonderful sight. The pumps have a working capacity of 40,107,000 gallons per day, equal to 5,123 cubic feet per

minute, besides a stand-by plant in reserve. The entire scheme has been carried out at a cost of £14,000.

SEWAGE DISPOSAL WORKS, STRATFORD-ON-AVON.—The opening ceremony in connexion with the new sewage works at Stratford-on-Avon took place on the 27th ult. The site for the new works, comprising 17 acres, adjoins the south-east side of the Great Western Railway about midway between Stratford and Milcot stations. A loan of 23,500l. was sanctioned by the Local Government Board for the purpose of the scheme, which was commenced in September, 1904, under the supervision of Mr. F. W. Wright, the then resident engineer. Although it was found possible to utilise the existing tank sewer and engine house, the increased height of the new works and the greater distance to which the sewage has to be forced rendered it necessary to replace the old pumping plant by entirely new machinery consisting of three gas-engines, each 30-horse-power, together with three sets of double-acting piston-pumps 13 in. diameter and 16 in. stroke. Each set of engines and pumps is capable of raising a volume of sewage equal to twice the dry weather flow through about 2,200 yds. of 15 in. rising main, the total lift being about 100 ft. In order to prevent the growth of solids and floating garbage from the sewerage it is necessary to pass it through screens before it reaches the pumps, and as the cleaning of the screens cannot be conveniently accomplished by manual labour, a specially designed apparatus has been installed for this purpose, which consists in a series of rakes attached to endless chains which are caused to travel along the face of the screen, so that any matter intercepted by the screen is automatically scraped off and deposited in a water-tight tumbler cart provided for the purpose. On leaving the pumping station the sewage is conveyed for a distance of about 1 mile through a 15-in. cast-iron rising main laid across the racecourse and under the River Avon by an inverted siphon thence under the Great Western Railway to the highest point of the site of the outfall works. On reaching the outfall works the sewage is first of all treated in liquefying tanks, and afterwards on bacteria beds worked on the racoon system, or percolating system, provision being made for the treatment of filtered effluent on specially prepared land filters, while some 10 acres of land is also laid out to receive the filtered effluent, the storm sewage being dealt with by means of a silt tank.

KIRKCALDY HARBOUR EXTENSION.—A meeting of the Harbour Committee of Kirkcaldy Town Council was held recently for the purpose of considering plans which had been submitted by the engineers, Messrs. Rendel & Robertson, for the further extension of the harbour and dock. The scheme consists of (1) a dock formed partly on the site of the present dock and commercial part of the harbour, and partly on the sand immediately outside them; (2) a south pier built on and partly outside the south pier of the Parliamentary plans; (3) further extension of the east pier for a length of 50 ft.; (4) construction of a spur 30 ft. long to the east pier, inside of it, opposite to the end of the south pier; and (5) an approach to the end of the south pier, by a tidal basin forming a protected approach to the dock. The engineers' estimate for this work is 78,610l., while the contract for the extension of the east pier at present being carried out by Messrs. C. Brand & Son is 26,000l. Sir Alex. Rendel was present at the meeting, and after he had explained the plans he strongly recommended that the contract for the new work should be placed in the hands of the present contractors, Messrs. Brand & Sons. After full consideration, the Committee unanimously agreed to recommend the Council to accept the advice of their engineer, and place the whole contract in the hands of Messrs. Brand, at prices which had already been privately submitted to the engineer. A plan was also submitted for a graving dock, to cost 10,000l., but as the engineer stated that there was no immediate necessity to come to a determination in regard to this dock, it was decided to delay the matter for further consideration.

SMELLS FROM LONDON SEWERS.—The Medical Officer of Health for the Borough of Kensington, in his Report for the four weeks from August 12 to September 8, gives a number of cases of complaints in his district in regard to noxious emanations from sewer ventilators and untrapped street gullies. He quotes a Report of a committee of the late Vestry in 1897, one clause of which ran:

We recommend that the Works and Sanitary Committee be informed—

1. That they are bound to prevent the Vestry sewers, gully holes, and traps, from being a nuisance, and make all precautions to avoid the same, otherwise the Vestry may be liable at the suit of any one showing injury, or the Vestry may be ordered to comply with their statutory duty by mandamus.

2. With regard to the London County Council sewers, the Vestry may, upon a flagrant case of nuisance being proved, through the Attorney-General, proceed against the London County Council by information, or in the alternative apply for a mandamus to compel the Council to comply with Section 135 above referred to.

It has been suggested that a Council sewer (looking to the width of the definition clause) may come within

the term 'premises' in Section 2 of the Act of 1891; but, without giving a contrary opinion, we consider that a recent decision leaves it in considerable doubt whether the nuisance section in this Act alters or adds anything to the previous law as to sewers.

Before taking action against the Council, the Works Committee would probably recommend that a further communication be addressed to the Council pointing out the gravity of the nuisance, and the obligation the Vestry feel themselves to protect residents by any means which they may be advised are available.

In regard to this the medical officer remarks—

"At the date of the Works Committee's Report there were upwards of 8,000 untrapped gullies in the parish, liable at any time, to emit offensive smells, besides an unknown, but very large, number of ventilating openings at street level. It would be interesting to learn precisely how many of these gullies, and how many of the surface ventilators, have been dealt with in the 60 years that have elapsed since the Report was adopted by the late Vestry."

Foreign.

GEOLOGICAL SURVEY, INDIA.—In order to meet the increasing demand for highly-skillful experts in geology and mining, a re-organisation of the Geological Survey Department has recently been effected. The staff, as enlarged, and more highly remunerated, now consists of a director, with a salary of Rs. 2,000 per mensem; three superintendents, Rs. 1,000-1,400; fifteen assistant superintendents, Rs. 350-1,000; one chemist, Rs. 500-1,000; and one assistant chemist, Rs. 250-350. The acting palaeontologist at headquarters will be paid a local allowance of Rs. 150. The department is to be recruited by probationary appointments made each year on the nomination of the Secretary of State; candidates must be not more than twenty-five years of age, and should qualify by previous practical training in laboratories or in mines.

THE IMPROVEMENT OF RIO DE JANEIRO.—Mr. Chapman, British Consul-General in Brazil, gives a glowing account of the progress of sanitary and other improvements in the capital. The extent of the alterations and works of construction carried out in the town of Rio de Janeiro during the last three years is, Mr. Chapman says, most remarkable. It has been the aim of the authorities to improve the sanitary conditions of the town and remove from it the stigma of yellow fever; to improve means of communication and transport; to relieve congested traffic; and to beautify the city. To carry out these objects drastic measures were necessary. Effective and radical steps have been taken by the health authorities, both Federal and Municipal, and the town and dwellings have been thoroughly disinfected. With regard to the work of demolition and re-construction at present progressing, it was decided to cut main thoroughfares through the tortuous network of narrow streets, which at the same time would act as ventilators by allowing a free passage of air; to widen and alter other streets, foully and undesirable quarters that had become foci of disease; and to increase the number of open spaces in the town. Of the work accomplished some 600 houses have been demolished, the Central-avenue is opened to traffic, several other avenues or thoroughfares widened, some 100,000 square metres of asphalt of sea wall have been constructed, 210,000 square metres of foreshore have been reclaimed, several public spaces and gardens have been laid out and planted, and some of the public buildings are nearing completion. The Central-avenue was opened to traffic in November last. It runs in a south-westerly direction from the Praia to the Beramir, and thus affords a free passage to the sea breeze from one portion of the bay to another. The extent of this avenue is 1,800 metres long by 33 metres broad. This street is well lighted by electricity, and many of the buildings are finished show windows, give the street a very modern appearance. The Beramir-avenue, or esplanade, skirts the shores of the bay at the base of the Central, branching off inland round the Morro Vuvo to Botafogo. A sea wall runs along its length, of which 2,000 metres are finished, and 200 metres have still to be built. The average width of the wall, including the coping of one metre, is 6 metres, and its height is 7-80 metres. It is in connexion with this work that some 210,000 square metres of foreshore have been reclaimed, and there are some 30,000 square metres yet to be filled in. It is intended eventually to connect the Beramir Esplanade with the quay wall under construction at the other end, and to extend this street beyond Botafogo to Laranjeira on the open sea. The construction of the municipal palace or town hall is progressing. Little building has been done in regard to the new market for the sale of the laying of the foundations. The Brazilian Pavilion from the St. Louis Exhibition has been erected on the Central-avenue. A large municipal theatre, capable of accommodating some 1,500 to 2,000 people, is under construction. It is to be fitted with all modern improvements, and it is expected it will be finished in the course of twenty months. Up to February, 1906, some 138,500l. has been spent on

this building, and when finished it will represent a very large amount of capital. A new public library is to be built. The New Episcopal Palace, erected on the Central-avenue, is approaching completion. The Botanical Garden Tramway Company, which serves an important and populous district, is erecting a large terminal station in the Central-avenue, a convenience to the public that has been much needed. The Government are considering the competing plans for the new House of Congress building, the site for which has not yet been decided on, and the project is also under consideration for the erection of workmen's dwellings; meanwhile a certain number are being built by the Municipality. Many large private buildings are completed, and various clubs and large buildings for offices are in course of construction.

SWITZERLAND.—It appears from an inquiry held by experts on the disastrous fall of the Bern Theatre store-house a year ago, that this was due to avoidable causes. The roof girders, 12-40 metres in the clear, crashed down with the ferro-concrete roof when the centring had been partially removed and caused regrettable loss of life. The inquiry held shows that the plans were insufficiently annotated and figured so that the architect and the contractors had been in explicable steps; without consulting the architect, certain sections were altered in order to simplify the work, and thereby the construction was materially weakened; the centring was taken out too suddenly and too soon, only twenty-five days having been allowed for the concrete to harden, instead of the minimum thirty days; neither iron nor concrete were tested, with the result that, on testing the concrete after the accident, none of it yielded the minimum resistance required, i.e., 160 Kg/cm², while some showed only a strength of 82 Kg/cm²; finally, the concrete was not movable supports to the main girders were rigid, and, as the concrete further adhered to the supporting walls there was no possibility of free expansion and contraction. In order to preserve the old characteristics of the town of Bern, the Society for the Preservation of Monuments proposes that in the main streets bow windows, balconies, etc., shall only be allowed when they do not interfere with the street vista; that Mansard roofs be prohibited except in special cases, and that no oil coat be applied to stone facades.

AUSTRIA.—On September 26 was unveiled the memorial fountain to the Arch-Duke Karl Ludwig, erected in the Oktogonplatz, Vienna. The marble obelisk, surmounted by a bronze sphere on which a griffin is seated, is flanked by wings, stands on a base bearing in relief the portrait of the Archduke. On the four sides stand figures 3 metres high symbolical of Art, Science, Peace, and Unity. The sculptor is Edmund Hofman von Aspernberg. The new municipal offices in Graz were erected from designs prepared in the Public Works Department under the direction of Herr Saal. The buildings cost 196,000 marks, exclusive of fees and fittings. They are built of sandstone with red tile roofs, and affect the simple German Renaissance style.

ITALY.—An Italian engineer, Signor G. B. Biadego, has published a most interesting work on the boring of large tunnels, entitled "I Grandi Trafori Alpini, Prejuri, etc." He compares the immense advance of the Simplon Tunnel method over those used in the construction of the Mont Cenis, and gives exhaustive details concerning the St. Gothard, the Arlberg, and many smaller undertakings. Biadego's work is a first-class manual of instruction and book of reference for these engaged on tunnelling in mountainous districts.

BELOIAN GLASS.—It is to be gathered from the annual report by the British Consul that a notable increase in the production of glass was registered in Belgium during the year 1905. In June of that year the strike of the window-glass workers, which had been in force for some time, came to an end, and all the glass factories have since resumed work. In December the rise of wages of 10 per cent. was granted to the workers, and this is likely to show its effect on prices. The total value of the exports during 1905 amounted to 3,635,885l., and the volume of the glass exported to 227,731 tons. The exports of polished plate glass in 1904 were valued at 3,746 tons, of which 16,175 tons were taken by the United Kingdom; in 1905 the total was 38,207 tons, of which the United Kingdom's share being 17,004 tons. Of ordinary window-glass, 118,298 tons were exported in 1904, and 151,988 tons in 1905, the quantity sent to the United Kingdom being 40,049 tons in 1904, and 47,772 (valued at 1,512,880l.) in the latter year. The increase in the exports is largely due to the augmentation in the quantity of glass sent to the United Kingdom, which receives a very much larger quantity of the Belgian manufactured article than any other country in the world. The exports to Canada, China, and Japan also increased, whilst those to America and France showed a slight falling-off. The total returns of the entire glass export trade during the first

ix months of 1906, compared with those of the corresponding period in 1905, show an increase of more than 100 per cent. This month is almost entirely due to the increase in the export of window-glass, of which, in the half-year ending June 30, 1906, 30,614 tons were sent to the United Kingdom.

Miscellaneous.

PROFESSIONAL AND BUSINESS ANNOUNCEMENTS.

Mr. J. C. Moscorop-Young, architect, has removed his office from Waldo-chambers, Aldwych, to 12, Buckingham-street, Strand, W.C. Mr. Frank T. Baggallay, architect, has removed his office from 50, Berners-street to 3, Bloomsbury-street, W.C. Messrs. Herbert T. Buckland & E. Haywood-Farmer, architects (Birmingham), have removed their offices from 25A, Paradise-street to Norwich Union-chambers, Congreve-street, Birmingham. Mr. Henry F. Joel, A.M.I.C.E., consulting electrical engineer, has removed from 31, Wilson-street, E.C., to 110, Strand, W.C. Messrs. W. & R. Leggett, brickmakers, etc., of Bradford, have opened a branch showroom at 65, King-street, Manchester.

GLIMPSES INTO EARLY DIRECTORIES.—Searchers after the curious in names of streets or trades will find ample satisfaction and interest, not to say some amusement, in perusing these quaint volumes of the XVIth and early XVIIth centuries. Many of the names that appear have vanished, as also, in numberless instances, have the thoroughfares themselves, such as "Carthusian-street, Charterho." Even the varied trades are replete with interest, some being picturesquely worded, while others are of a very remarkable character, e.g., "tooth brush manufacturer"; and occasionally of the most extraordinary mixture, such as "stationer and slop-seller!" Sometimes an address or two is delightfully vague—"Batson's," for instance, or "on the Platform, Rother's," or "Commercial Sale Rooms," or, again, "London-road, Surry." But there are two points that strike one while examining these historic pages: the absence of the postal district initials and the frequent abbreviations of the secondary thoroughfares to distinguish its locality, such as "Chepst," "Rastchp," "Godli," "Spital," and so on. Of course, the tradesmen's names are arranged alphabetically, and we find "attornies" among them, while there is a strange lack of capital letters among the Italian entries for the trades. In his majesty's appearing in numberless cases, 1840 is the first directory we find that is classified according to streets (but not according to trades), and in about 1815 appeared a directory, on the same principle as the one then existing, by a rival firm, the publisher of the original one warning his customers in quaint and rather obscure language how his rival had forced him to change the address of his printing and publishing office. At the end of these delightful volumes is an alphabetical list of post towns in England and Wales, with the rates of letter postage to them, some being 5d., 8d., 1s., and even more, according to distance. For our own glorification we have kept a list of the curiosities that we have alighted under the various heads, and possibly we have aroused sufficient interest in the subject to persuade others to follow in our footsteps; we thus resist the great temptation of giving a list of them to our readers. As many as 20,000 names figure in the directories from 1820, and nearly 18,000 in the first and second decades of the XIXth century—the nucleus of the present huge list in Kelly's.

WORKMEN'S COMPENSATION STATISTICS.—A Blue Book has been issued giving statistics as to compensation paid during the year under the Workmen's Compensation Acts. In considering these statistics it is pointed out in the Report that, as no compulsory returns had to be made of compensation paid to workmen, only the cases which came in one way or other within the notice of the courts either for hearing or by registration of the memorandum are available for statistical purposes, whereas the large majority of cases are settled privately between the parties themselves. In 538 cases in which compensation was awarded, the total of 101,937. In 4,317 cases memoranda were registered, and lump sums were disposed of amounting to a sum of 105,350. Besides these amounts weekly payments were awarded, averaging between 10s. 7d. and 11s. 10d. in 587 cases, whilst under memoranda 1913 cases, averaging 13s. a week, were registered. The Report states that the average duration of weekly payments would exceed five weeks; it would appear that these weekly payments represent a sum of at least 7,831. Compulsory returns would be useful for statistical purposes, and could easily be secured by the compulsory registration of memoranda in

every case. The above figures relate only to England and Wales. Scottish and Irish cases are dealt with separately in the Report. As regards the building trade, 254 cases were disposed of in the courts, and memoranda were filed in 165 cases; in ninety-nine of these latter lump sums were payable, averaging 314. Us. 5d., whilst in sixty-six weekly payments were dealt with, averaging 14s. 5d. In the building trades gave rise to more cases than any other undertakings except factories; but it must be remembered that some building operations are included in the definition given in the Act of a "factory," so that the above figures by themselves do not represent the actual charge borne by the building trade. In the case of the amount of compensation paid under the Act, and for the year 1905 the total sum was 151,427. For England and Wales, which represents $\frac{1}{2}$ per cent. on every 100, paid in wages. The above figures give some idea of the sums paid as compensation to the working classes, but the Report estimates that only about 1 per cent. of the cases of personal injury are taken into court, and it therefore appears a matter for regret that no real estimate can be given of the real burden placed upon the building trade.

PLUMBERS' COMPANY.—At the Quarterly Court held at the Guildhall a few days ago Mr. W. D. Caroe, M.A., F.R.S., was sworn into the office of Master of the Worshipful Company of Plumbers, and Mr. Adrian Pollock and Mr. Charles Hudson into the offices of Warden and Renter Warden respectively, on election for the ensuing year.

UNIVERSITY OF ABERDEEN.—In the course of the quatercentenary celebrations the honorary degree of Doctor of Laws was conferred, on September 26, upon Mr. A. Marshall Mackenzie, A.R.S.A., architect of the Marischal College new buildings; Mr. J. M. Swan, R.A.; Dr. Arthur J. Evans, Keeper of the Ashmolean Museum, Oxford; Mr. G. K. Fortescue, Keeper of the Printed Books, British Museum; M. Salomon Reinach, Professor of Archaeology, Paris; Commandatore Rodolfo Lanciani, Professor of Ancient Topography, Rome; Sir Archibald Geikie, Secretary to the Royal Society; Mr. H. F. Pelham, President of Trinity College and Camden Professor of Ancient History, Oxford; Dr. W. M. Flinders Petrie, Professor of Egyptology, University College, London; and Mr. Arnold Hague, United States Geological Survey, Washington.

SCULPTURE ON ART, HULL.—The headmastership of the Hull Municipal School of Art has been conferred upon Mr. George Marples, A.R.C.A., Headmaster of the School of Art of the Huddersfield Technical College.

MEMORIAL CROSS, UPTON-ON-SERVER.—A cross recently erected at Upton-on-Severn in memory of the late General Sir Charles C. Johnson. It is in the shape of a Runie "wheel" cross, upon a massive plinth, of silver-grey Cornish granite. The face is carved with interlaced and crossed work, symbolical of the mystery of life, the formation of character, and the vicissitudes of fate. In the base is inserted an inscription, of inlaid leaden lettering. The cross was designed and executed by Messrs. G. Maile & Son, London.

MONUMENT TO POPE LEO XIII.—Steps are being taken to prepare the Church of St. John Lateran, for the removal of the remains of Pope Leo XIII. from St. Peter's. The monument, to be sculptured by the Signor Tadolini, the scaffolding is in position, and it is proposed to, at the same time, complete the restoration of the ceiling of the basilica, to raise the whole roof by 5 ft., and to strengthen the foundations and walls of the right nave which evince indications of cracks and settlement.

WATERBURY, TWICKENHAM.—In a letter addressed to the *Times* a resident of Twickenham directs attention to the untoward condition of the "Warren," a beautiful riverside walk which is in danger of becoming impassable through the action of the tides. The path forms a boundary of Marble Hill, the property lately acquired by the London County Council on behalf of the public. It appears that the question arises whether the parish can legally resist the Council's requirement that Twickenham should pay for the maintenance of the way; in other words, as set out in the letter, the point is—"how far one person, even denuding his title to a right-of-way decision, although he has obtained a judicial person to keep the footpath in such a condition that the easement of the property may be comfortably enjoyed." Some while ago the local authorities successfully resisted the owner's contention adversely to the parish right of user of 4 ft. in width along the embankment which protects the park from the water. The land has since been vested in the London County Council, who rely upon the judicial decision obtained by the Twickenham District Council.

MILAN INTERNATIONAL EXHIBITION.—The Jury have awarded a grand prix (the highest award) to the Commercial Education Committee of the London Chamber of Commerce for their educational exhibits.

EXHIBITION OF JEWISH ART AND ANTIQUITIES.

—In November and December next an exhibition will be held in the Whitechapel Art Gallery of pictures by living and deceased Jewish artists, rare MSS., books, prints, synagogues apparatus, and kindred objects of historical and religious interest.

ABERDEEN GRANITE PITCHINGS.—The Works Committee of Berrymondsey Borough Council reported on Monday that on September 7 an order was placed with Messrs. A. & F. Manuelle for 450 tons of 6 in. by 3 in. Aberdeen granite pitchings. On the 13th ult., a letter was received from the firm named, stating that owing to the large demand by the London County Council for the Battersea, Wandsworth, Dulwich, and Embankment tramways, and also several lines in North London, it was impossible for the quarry owners to turn out the sets required by the Borough Council or the London County Council in anything like the contracted time. They offered to supply Newry (Irish) granite sets at 1s. less than the contract price, for Aberdeen, which is 35s. 3d. per ton. The sample set submitted appeared (the Report went on to say) in every way to be equal to the Aberdeen; but the Committee had decided not to enter into the offer, and to hold Messrs. Manuelle to their contract to supply Aberdeen granite up to the limit provided therein. It had been intended to use Aberdeen granite pitchings for paving both Pages-walk and the Tower Bridge approach, but this now appears to be impracticable. Some months ago the Council entered into the offer with Messrs. Cooper & Co. for the supply of granite from Kirkcubrightshire, which was similar to Aberdeen, and which the Borough Surveyor advised was at least equal to that stone. The price of this stone was 27s. 6d. per ton. The Committee had given instructions for Messrs. Cooper & Co. to be asked whether they were prepared to contract to supply about 600 tons at their previous contract price. With regard to the Tower Bridge approach the Borough Surveyor preferred that Aberdeen granite should be used if possible, and the committee had given instructions for an order to be placed with Messrs. Manuelle for the quantity required, i.e., about 700 tons, if they will supply same at their present contract price.

DISCOVERY OF AN ANCIENT CHAPEL NEAR BRIDGWATER.—Some recent excavations made in Friars-fields, about 100 yds. from Friars' Lawn, Bridgwater, have brought to light the existence of what is probably a Grey Friars' chapel. The Rev. Dr. Foxwell, the vicar of Bridgwater, in reading old documents preparatory to writing a history of Bridgwater, obtained conclusive proof that in the XIIIth century a chapel was erected in the locality by the Grey Friars, and it was with the view of verifying the documentary assertion that these excavations have been carried out. Already part of the floor and walls of the chapel have been exposed to view.

The stonework is most interesting, whilst the architectural features revealed are in some respects very curious. Some fine specimens of glazed tile and pottery, together with a number of bones, have been found. The excavators are hopeful of completing a general plan of the ancient building.—*Western Morning News.*

RIVERSIDE PROMENADE AT READING.—At the Town Hall, Reading, on the 28th ult., Mr. Edgar Dudley, an inspector of the Local Government Board, held an inquiry into the application by the Reading Town Council to borrow 3,620. for purposes connected with a scheme for the provision of a public walk and pleasure-ground on a strip of land adjoining the River Thames to the west of Caversham Bridge. The Town Clerk (Mr. W. S. Clutterbuck) explained that the piece of land had a total area of 1½ acres, with a river frontage of about three-quarters of a mile, and an average depth of 150 ft. The Corporation desired to prevent that part of the river bank—which extended from their own property (the Caversham Bridge Hotel to the borough boundary)—from being disfigured by the erection of buildings. The stretch of river commanded by the site of the proposed improvement was that through which river traffic passed to reach what might almost be called the world-famous Mapledurham, one of the most beautiful spots on the River Thames. They also desired to provide a pleasure-ground for the inhabitants alongside the river. There was ample evidence to show that such a promenade as was suggested would be very greatly used. At present the public used it on sufferance only.

THE BRITISH FIRE PREVENTION COMMITTEE.—The Committee commenced their autumn series of tests on Wednesday afternoon, October 3, by testing two special doors known as Houghton doors (being metal doors), filled with asbestos, and with a powder fire extinguisher known as "Kyl Frye." Reports will be issued in due course. There will be further tests with reinforced concrete floors taking place in the course of next month. Of the reports to be issued this month, there will be one dealing with a series of tests with Mississippi "Wire Glass," and another with a reinforced concrete floor by the Patent Indented Steel Bar Co., Ltd.

MISCELLANEOUS.—Continued on page 411.

Thereafter, Director of Education. Tenders, with
 11 p's, marked as such, to be sent in not later

than October 10, at the Municipal Offices, Earle-street.

OCTOBER 10.—Hendon.—**MATERIALS.**—Hendon Guardians invite tenders for the supply of 20 tons of best yellow deal ends, delivered free of charge to their Workhouse, near Edgware; 50 tons of Guernsey granite spalls, delivered to Edgware Station (G.N.R.). Tenders to be addressed to Mr. F. J. Robb, Clerk to the Guardians, Union Offices, Edgware, and delivered on or before October 10, endorsed "Tender for —."

OCTOBER 10.—Ware.—**GRANITE.**—The Ware U.D.C. invite tenders for the supply of broken Guernsey granite, delivered free at Ware Station on the Great Eastern Railway, at such times and in such quantities as may be required. The estimated quantity required is 200 tons, but the Council do not bind themselves to any specific quantity. Alternative prices to be quoted for granite broken to the sizes of 1½ in., 1½ in., and 2 in., and also for 2-in granite chippings. Tenders, endorsed "Tenders for Granite," accompanied by samples, must reach Mr. Geo. H. Gibby, Clerk to the Council, Ware, before not later than October 10.

OCTOBER 11.—Fulham.—**GRANITE.**—Fulham Guardians invite tenders for the supply of 30 tons of broken Guernsey granite spalls (large) to be delivered, carriage paid, at the Workhouse, Fulham Palace-road, Hammersmith, W. Tenders, upon printed forms, to be obtained at office of Mr. J. M. Wort, Fulham Palace-road, Hammersmith, W., must be received in not later than 10 o'clock in the forenoon of October 11, sealed, and endorsed "Tender for Granite."

OCTOBER 11.—Whickham.—**ROAD METAL.**—The Whickham U.D.C. invite tenders for the supply of slag, dunstone, and hand-broken whinstone, free on rail at the nearest station to quarry, for the half year ending March 31, 1907. Forms of tender can be obtained on application to Mr. Thomas Lamert, solicitor, Clerk to the Whickham U.D.C., Town Hall, Gateshead, to whom tenders, endorsed "Road Metal," are to be delivered not later than 12 o'clock noon on October 11.

OCTOBER 12.—Atherton.—**LIME.**—The Leigh and Atherton Joint Sewerage Board invite tenders for the supply of about 400 tons of best hand-picked lime, to be delivered at the Sewage Works, Mather-lane, Leigh, during the ensuing twelve months. Sealed tenders, marked "Lime Contract," to be delivered to Mr. D. Schofield, Clerk, Town Hall, Atherton, not later than October 12.

OCTOBER 12.—Sheffield.—**IRONMONGERY.**—Sheffield Education Committee invite tenders for the supply of ironmongery (a) for repairs, etc.; (b) for use in connexion with cookery and handicraft centres, which will probably be required during the ensuing year. Samples may be seen and separate forms of tender obtained on application at the Education Committee's Office. Tenders, which will only be received on forms and in covers provided, should be sent to Mr. Jno. F. Moss, Secretary, not later than noon on October 12.

OCTOBER 15.—Aldershot.—**FLINTS.**—Aldershot U.D.C. invite tenders for supplying and carting to Fild-road, Aldershot, 600 tons of best screened red Hungry Hill flints, broken to 2½ in. gauge. Forms of tender may be obtained at the offices of Mr.

Fred. C. Uren, Surveyor, Municipal Buildings, Tenders, endorsed "Fleet-road Flints," to be sent to Surveyor on or before October 15.

OCTOBER 19.—Dublin.—**SAND AND GRAVEL.**—Tenders for the supply and delivery of sand and gravel required by the Commissioners of Public Works Ireland, to the several buildings, parks, etc., in their charge in Dublin and its vicinity, will be received up to, but not later than, 10 a.m. on October 19. Forms of tender and schedules of supplies will be supplied on deposit of 1l. The envelope containing the tender and the schedule must be endorsed, Mr. H. Williams, Secretary, Office of Public Works, Dublin.

OCTOBER 27.—Belfast.—**STORES.**—The Belfast Harbour Commissioners invite tenders for the supply of the undermentioned stores, etc., during a period extending from January 1 to December 31, 1907, viz.:—Iron castings; steel castings; carbons; cement, etc.; drain pipes, fire bricks, etc.; glass and sundries; grease, tallow, soaps, etc.; hardware, etc.; malleable iron, etc.; white and red lead, etc.; oils, etc.; packing, india-rubber goods, etc.; paints, etc.; rivets, railway bolts, spikes, etc.; Manila rope, etc.; ship chandlery, etc.; slates; timber—hardwoods, log, deals, etc.; sheathing and flooring; waste; varnishes, etc.; and for printing during the same period. Tenders to be made on the special form provided for the purpose (which may be obtained on application to the Harbour Engineer, Mr. W. Redfern Kelly), to be addressed to Mr. W. A. Currie, Secretary, Harbour Office, Belfast, and endorsed "Tenders for —," and sent in on or before October 27.

Auction Sales.

Nature and Place of Sale.	By whom Offered.	Date of Sale.
*FREEHOLD PROPERTY, SUNBURY-ON-THAMES.—At the Mart	Chancellor & Sons	Oct. 8
*THE MERCHANTS' STOCK.—At Frogmore Wharf, Frogmore, Wands-worth, S.W.	J. T. Skelding	Oct. 9
*LEASE OF FROMMORE WHARF.—At Frogmore Wharf, Frogmore, Wands-worth, S.W.	J. T. Skelding	do.
*BEST OF WOOD ALICE, FROGMORE MANUFACTURE.—At Frogmore Whf., Wands-worth, S.W.	Churchill & Sons	do.
*DEALS, BATTENS, Etc.—Great Hall, Winchester House, Old Broad-street, E.C.	Garrad, Turner, & Son	Oct. 10
*BRICKS, BRICK MAKING PLANT, Etc., IPSWICH.—At the Brooks Hall Brickyard	Pythons & Morris	Oct. 11, etc.
*NURSERY STOCK, SOUTH WOODFORD.—On the Premises	Debenham, Tewson, & Co.	Oct. 16
*FREEHOLD BUILDING SITE, BOROUGH.—At the Mart	Vladon, Smee & Co.	Oct. 17
*WOOD WORKING PLANT AND MACHINERY, HACKNEY.—On the Premises	Debenham, Tewson, & Co.	Oct. 23
*FREEHOLD BUILDING LAND, CARSHALTON.—At the Mart	Chancellor & Sons	Oct. 23
*ANCASTER HOUSE ESTATE.—At the Mart	A. S. Cohen	do.
*TOOLS, Etc.—At 50, Barbican, London, E.C.		

MISCELLANEOUS.—Continued from page 407.

TARIFFS OF PARCELS RATES. Messrs. Neale & Wilkinson, goods and parcels forwarders (32 St. Mary Axe), send us their useful "A B C Tariff" of rates for goods and parcels to all parts of the world, which they are prepared to forward, post free, on application.

KING EDWARD VII. GRAMMAR SCHOOL, KING'S LYNN.—In the course of November the King will open the new buildings of the Grammar School, which have been erected after Mr. Basil Champ-neys's plans and designs, at a cost of 40,000l., defrayed by Mr. J. J. Lancaster, a governor and former pupil, who, it is stated, has money or undertaken to endow the foundation. The school was originally founded, temp. Henry VII., by Thomas Thoresby, alderman of Lynn, who gave it lands yielding about 60l. per annum; there are endowments in favour of scholars proceeding to Cambridge. In 1825 the Corporation of Lynn built a schoolroom and master's house. At the time of his arrest in 1759 Eugene Aram was usher in the Grammar School. The bronze statue of the King for the new buildings was sculptured by, we gather, Mr. Colton, A.R.A.

Legal.

ANCIENT LIGHT DISPUTE.

The case of Guy's Hospital v. Kapp & Greenwood was in the list for hearing before Mr. Justice Deane in the Vacation Court on the 3rd inst., on an application by the plaintiffs for an *interim* injunction restraining until the trial or further order the defendants so building as to obstruct the plaintiffs' ancient lights.

It was arranged between counsel for the respective parties that the motion should stand over until October 10 on the *interim* injunction granted by his lordship last week being continued.

THE WEST SMITHFIELD NUISANCE CASE.

The case of Lovell & Christmas, Ltd. v. The Premier Meat Company was again before Mr. Justice Baggave Deane in the Vacation Court on the 3rd inst.

Mr. Bramwell Davis, K.C., for the plaintiffs, said the motion had been ordered to stand over until today, it being a motion for an *interim* injunction to restrain the defendants from using a gas-engine in premises in West Smithfield so as to cause a nuisance to the plaintiffs. Since the case was last before the Court the plaintiffs had filed affidavits to the effect that the nuisance was worse than ever, the defendants, on the other

hand, filing evidence that there was no nuisance. Having regard to the conflicting character of the evidence he felt it was impossible to ask his lordship to make an interlocutory order, and he had, therefore, agreed with his learned friend on the other side that there should be a speedy trial of the action, the parties having liberty to deliver pleadings in the vacation. It had been arranged that the plaintiffs should deliver their statement of claim within seven days, that the defendants should deliver the statement of defence within seven days thereafter, that the motion should stand till the second motion day next sittings, and that the costs should be made costs in the action.

His lordship assented to this arrangement.

CASES UNDER THE LONDON BUILDING ACT.

At the Guildhall Police Court, on the 1st inst., Mr. James Easton, builder, was summoned before Mr. Alderman Hanson at the instance of Mr. Osborn C. Hills, the *interim* District Surveyor of the Eastern Division of the City, for having commenced certain works in, to, or upon a building without previously serving a building notice in accordance with the requirements of sect. 145 of the London Building Act, 1894.

The defendant had removed an old shop front at the premises known as No. 8, Aldgate High-street, and inserted a new shop front in lieu thereof.

From correspondence produced by the builder it appeared the arrangement made by him with the owner of the premises was that the latter should give all necessary notices and pay all fees.

The magistrate said that the defendant had certainly committed an offence, but, as he was apparently under the impression that the owner had given the necessary notice, the fine would only be a nominal one of 5s. and costs. The owner cannot relieve the builder of his responsibility.

At the Guildhall Police Court, on the 3rd inst., Mr. H. Rosenthal, Manager of the American Amusement Company, was summoned before Mr. Alderman Hanson at the instance of Mr. Osborn C. Hills, the *interim* District Surveyor of the Eastern Division of the City, for contravening sect. 78 of the London Building Act, 1894.

It appeared that the defendant had converted the premises known as No. 8, Aldgate High-street into a "public building" within the meaning of the Act, and had used the premises as a room for public entertainment, without first having obtained from the District Surveyor a declaration of his approval of the construction thereof.

The plaintiff's solicitor said that as the defendant had now carried out the requirements of the District Surveyor in regard to the construction of the premises, he did not wish to press for the full penalty, but only to ask for a conviction in order to act as a warning to others.

The magistrate pointed out that the defendant was liable to a penalty of 40s. and 40s. per day for every day he had kept the premises open without the District Surveyor's approval, which meant a fine of about 60l., but, as the District Surveyor did not press for a heavy penalty, the defendant would in this case only have to pay 40s. and 23s. costs.

Patents of the Week.

APPLICATIONS PUBLISHED.*

18,038 of 1905.—L. J. B. MACARIA: *Fastening Devices for Doors.*

This relates to a fastening device for doors, comprising a slot throughout the entire semi-circumference forming the upper half of the lock casing, a removable screw or stop permitting the regulation of the travel of the latch in order that the said latch may move to right or left throughout the whole or part of the said semi-circumference, and a prolongation of the heel of the latch provided for the purpose of retaining the bolt in its extreme open position.

24,945 of 1905.—R. F. CAREY: *Domestic Fire-grates.*

This relates to a domestic firegrate, and consists in providing one, two, or more hollow bottom bars with holes or burners on the underside thereof, and connecting such hollow bar or bars with a permanent or temporary gas supply pipe. 2,515 of 1906.—W. J. HART: *Combined or Convertible Gas and Coal Fire Kitchen Ranges, or the like.*

This relates to cooking ranges, and consists in the combination with the detachable hot plate thereof of an oven of greater height than usual, a removable false bottom, thereto carried by guides, gas burners provided with guards arranged below said removable false bottom, and a soot tray carried by guides below said false bottom and gas burners.

13,218 of 1906.—S. W. WINGFIELD: *Bricks, and the like.*

This relates to an angle brick provided with —

* All these applications are in the stage in which opposition to the grant of Patents upon them can be made.

TO CORRESPONDENTS.

All communications regarding literary and artistic matters should be addressed to THE EDITOR; those relating to advertisements and other exclusively business matters should be addressed to THE PUBLISHER and not to the Editor.

* Denotes *accepted*. † Denotes *provisionally accepted*.

Rawkins &				A. F. Lee ..	1,100
Jackson ..	1,399	0	0	W. Smart ..	1,129
W. J. Bloxham	1,397	0	0	C. J. Ell	1,100
E. Tabor	1,331	11	0	Rowell & Sons,	
				Chipping	

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KEIGHLEY.—For additions to stabling, etc., Low Brierley, for the Keighley Industrial Co-operative Society. Messrs. J. Haggis & Sons, architects, North-street, Keighley.

MASS. W. Baker, Keighley..... £47 0 0
Slaters: T. Nelson & Son, Springfield-place, Bradford..... 34 0 0
Plasterer: W. H. Clark, Ingham, Keighley..... 5 0 0
Plumber: H. Mitchell, Cony-lane, Keighley..... 68 8 6

LEATHERHEAD.—For Kingston-road improvement and Oxshott-road sewers, for the Leatherhead Urban District Council. Mr. I. E. Smales, Surveyor to Council, Leatherhead.

	For Kingston-road improvement.	Oxshott-road.	Paving Crossings.
James & Co., Ltd.	1,388 0 0	£ 6. d.	£ 6. d.
J. May, Ash-lea	1542 0 0	70 0 0	24 10 0
E. Patterson	1,461 4 2	35 0 0	28 0 0
Streeter & Co.	1,056 17 2	39 8 8	32 7 6
Thacker & Co.	1,703 12 0	32 0 0	37 0 0
E. & E. Hies	1,580 0 0	32 0 0	32 7 6
S. Kavanagh	1,007 15 7	413 15 6	31 9 0
G. A. Franks	1,028 17 7	420 8 0	38 13 8
G. G. Banger	2,063 6 10	375 12 4	30 10 0
Free & Son	1,073 14 10	411 0 0	27 18 0
Langley & Co.	2,127 7 9	404 0 0	16 0 0
W. Norris	2,214 0 0	628 1 6	—
E. H. King	2,264 1 9	383 18 9	27 15 0
Zadig & Co.	2,296 0 0	354 8 5	26 16 8
S. Atkins	2,492 2 8	418 8 4	26 0 0
T. Watson	2,560 0 0	468 0 0	30 0 0
S. Faulkner	2,540 0 0	391 0 0	33 0 0
Estimate	1,725 0 0	371 0 0	28 0 0

1 Withdrawn.

[Construction of Oxshott-road sewer postponed.]

LEIGH-ON-SEA.—Gas mains, pipes and laying sewerage works valves for the Urban District Council. Mr. J. W. Liversidge, C.E., Surveyor to the Council.

CLAY CROSS COAL AND IRON CO., Mr. Chesterfield, £114 14 8
Leaving Money.
Buxton & Jenner, Southend-on-Sea..... 77 0 1
Unites for Sewage Works.
J. Blakeborough & Sons, Brighouse..... 106 10 0

LESSINGHAM.—For alterations and improvements to schools, for Norfolk Education Committee, Messrs. Olley & Haward, architects, Queen-street, Great Yarmouth.

Batchelor & Son, Stalham..... £100
[Ten tenders received.]

LIVERPOOL.—For road-making and drainage in connexion with buildings now in course of erection at Olive Mount. Mr. E. Kirby, architect, 5, Cook-street, Liverpool.

W. J. Mett, St. Andrew-terrace, Preston..... £79 10 0

LONDON.—For making alterations at Nos. 11 and 316, Essex-road, N., for the London and Provincial Bank, Ltd. Mr. V. Vagnolini, architect and surveyor, 33, Stirling-road, Clapham Rise, S.W.

J. & W. T. Inkpen & Son, H. Groves..... £2,175
C. Wall, Ltd., 2,297 W. Irwin..... 2,005
W. H. Lancelotti & Co., J. Paragon..... 1,514
Ltd., 2,265 Edwards & Medway..... 1,658
H. Kent..... 2,237

LONDON.—For erecting central library for Tottenham Urban District Council. Mr. W. H. Prescott, Architect, Council Offices.

A. R. Jackson..... £4,237 0 0
Clark & Sons..... 4,050 0 0
Hale & Co..... 4,016 10 24
J. & W. T. Inkpen & Son..... 4,000 0 0

A. Monk..... 3,930 17 82
Sands & Burley..... 3,251 0 0
Stedman & Co..... 3,868 0 0

A. Potter..... 3,200 5 82
Fitch & Cox..... 3,221 0 0
J. W. Jerrard..... 3,761 17 5

Jackson & Co., 1,144 0 0..... 3,777 0 0
B. E. Nightingale..... 3,422 0 0

2 The top line of figures denotes alterations in quantities after being checked by Engineer's department.

LONDON.—For making alterations, etc., at 12 and 13, Station-parade, Palmer's Green, W., for the London and Provincial Bank, Ltd. Mr. V. Vagnolini, architect and surveyor, 33, Stirling-road, Clapham Rise, S.W.

H. W. Say..... £275 10 0
Newby & Bros..... 890
W. J. Wheeler..... 819

MANCHESTER.—For heating, and hot-water supplies, etc., at the Royal Infirmary. Mr. Edwin T. Hall, F.R.I.B.A., 54, Bedford-square, W.C., and Mr. John Brooks, A.R.I.B.A., 18, Exchange-street, Manchester, architects.

Keith & Blackman £25,700
Z. D. Berry & Son 24,280
Newton, Chambers, & Co..... 23,702
Strode & Co..... 18,503

OTLEY. For sewerage, paving, and making good Back Garret-street, Otley. Mr. J. F. Sharpe, Engineer and Surveyor, Council Offices, Otley.

W. & H. Richmond..... £333 0 0
W. & H. Richmond..... £357 0 0
Ward & Tetley 337 7 1
R. Naylor & Son 335 0 0

SOUTHEY.—For the erection of offices, drainage, and other works at Southerly School, for Norfolk Education Committee. Mr. H. J. Green, Architect, Castle Meadow, Norwich.

R. Shanks, Chatteris..... £645
[Five tenders received.]

STALHAM.—For alterations at Stalham school, for Norfolk Education Committee. Messrs. Olley & Haward, architects, Queen-street, Great Yarmouth.

Batchelor & Son, Stalham..... £590
[Twelve tenders received.]

STANLEY (Derham).—For steel works at Shield-row, etc. Mr. T. E. Crossling, architect, Front-street, Stanley, R.B.O. Quantities by architect.

A. Routledge..... £935 0 0
A. McLaron..... 894 6 1
A. & R. Davis 884 12 0
R. Bowden..... 811 0 1

T. Stephenson 805 6 10
W. Johnston..... 702 11 0

SWINTON.—For sinking a well, for the Urban District Council. Mr. R. Fowler, C.E., Engineer and Surveyor, Council offices, Swinton.

T. Matthew..... £365 0 0
W. Crossland..... 236 0 0
H. Bowman..... 100 0 0

J. H. Dawson..... 162 10 0
Winterton..... 107 5 11

WINTERTON.—For alterations and improvements at school, for the Norfolk Education Committee. Messrs. Olley & Haward, architects, Queen-street, Great Yarmouth.

Jones, Bone, & Co., Halvergate, Norwich..... £307 15
[Thirteen tenders received.]

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Ashton Gate Works, Coronation Road,

ILLUSTRATIONS.

Proposed New Buildings, Merriion-street, Dublin, for the Royal College of Science and Govern- ment Offices: Detail of Portico and Cupola	{ Sir Aston Webb, R.A., and Mr. T. M. Deane, A.R.H.A., Joint Architects.
Examples of Marble Inlay	From Photographs.
Examples of Mosaic and Marble Inlay	From Photographs.
Illustrations of Monyash Church	From Photographs.

Illustrations in Text.

Leverington Church: New Oak Beams across the Nave	Page 431	Illustrations to Student's Column:— Figs. 134 to 149	Page 435
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The Church of Monyash, Derbyshire.



THE retired village and township of Monyash, which occupy a great part of that somewhat bleak and dreary table-land to the east of Bakewell, between the valley

of the Wye and the upper stretch of Dovedale, was a place of some little importance in mediæval days. It was the centre for holding the mineral courts relative to the lead-mining of the High Peak Hundred. A barmote court is still held at Monyash twice a year.

Considering that until quite recently Monyash was but a chapelry of Bakewell, and a comparatively small village, the chapel or church was one of rather exceptional size and of diversified interest. To understand the growth of the fabric and its unusual features it is necessary to preface the account with some brief historical facts. At the time of the taking of the Domesday Survey in 1086, Monyash (*Maneis*) obtains this single word mention as one of the eight berewicks into which the widespread royal manor of Bakewell was then subdivided. It is astonishing to note how often rash and absolutely false assertions are made with regard to Domesday by ignorant writers. In the last edition of Kelly's "Directory to Derbyshire" it is put on record that "it is recorded in Domesday that Monyash was a penal settlement for monks." At

Oncash, in this township, the Cistercian monks of Roche Abbey had a grange; but that abbey was not founded until 1147, and their grange here was never used in the manner asserted. Two priests are mentioned in the Survey as being attached to the church of Bakewell. In the reign of Henry I. the church, as well as the manor of Bakewell, were given to William Peverel, and continued in that family until the time of Henry II., when they escheated to the Crown, and were afterwards granted to various persons. Henry II. conferred the church of Bakewell, with all its appurtenances, on his second son, John, Earl of Morton, who afterwards became King John. Earl John, in 1192, granted this important rectory to Hugh de Novant, Bishop of Lichfield, and his canons. During the episcopacy of Geoffrey de Muschamp, John came to the throne, and confirmed, in 1199, Bakewell church to Lichfield, including the chapelry of Monyash, for there is little or no doubt that there had been a chapel there for some time.

Under these circumstances, with the greater part of the tithes diverted to the Lichfield Chapter, it became difficult to find support for the parochial chaplains of Bakewell. This was more particularly the case with regard to Monyash and some other parts of the Peak, for William Peverel had given two-thirds of their tithes, in 1113, to the priory of Lenton, Notts, and the priory was for ever insisting that this gift set aside John's gift to Lichfield.

Soon after John's accession to the throne, at a date (as we know from the

witnesses) between 1199 and 1200, important religious provision was made for Monyash by a charter from two benefactors. Robert de Salocia and Matthew, son of Odo, of Aston, who appear to have been joint lords of the manor of Monyash, obtained leave from the Dean and Chapter of Lichfield to grant to the mother church of Bakewell an oxgang of land, together with a house in the town of Monyash, on condition of the said mother church providing a chaplain to serve in the chantry chapel of Monyash three days in the week, viz., on Sundays, Wednesdays, and Fridays. They also ordained, with the common consent of the inhabitants of Monyash, that every message in that town should pay a farthing a year for finding lights for their chapel, in addition to the fee that they customarily paid to Bakewell for the same purpose. They further undertook, on behalf of themselves and the inhabitants, that this provision of a chaplain should not in any way prejudice the various rights of the mother church, and that they would attend services at Bakewell at Christmas and Easter, and on All Saints' Day. Meanwhile a vicar of Bakewell was appointed with a stipend of twenty marks, out of which he had to pay various assistants, and certain provision was made for the different chapelries. But these regulations were so ill-observed, that, when the energetic Archbishop Peckham made his visitation of the diocese of Lichfield, in 1280, he sternly rebuked the Dean and Canons for their gross neglect of the spiritual necessities of Bakewell and its several

dependent chapelries. In defence it was urged that it was only by the great favour of the Chapter that the inhabitants had been allowed to build these chapels to save them the trouble and danger in bad seasons of coming to the mother church. The Archbishop, by his decision, made a compromise, and, so far as respected Monvash, ordained that the chancel should be kept in repair by the inhabitants, who were also to find a chalice and a missal, but that the rest of the fabric and books and ornaments were to be supplied by the Dean and Chapter. The inhabitants of Monvash were also to add one mark in addition to the glebe of 12 acres, which they had originally attached to the chapel, to the stipend of their priest, and the remainder was to be made up by the Dean and Canons.

Difficulties, however, again broke out, and a further agreement was drawn up in 1315, by which the Chapter covenanted to pay 15s. a year towards the parochial chaplain's salary, and to remit all fees for proving and administering wills, provided the parishioners of Monvash agreed to do all the repairs of their chapel and to regularly pay their tithes to the Chapter as rectors.

In the earlier part of Edward III.'s reign, Monvash began to prosper through the greater development of the lead-mining, and the royal licence was obtained for a weekly market on Tuesday, and for a three days' fair at the feast of the Holy Trinity.

About this time, namely in 1345, Monvash obtained burial rights. There is preserved among the capitular muniments at Lichfield, an indenture from twenty-four residents of Monvash, whereby, in recognition of the grant of burial rights to their chapel, they covenanted to pay a farthing to the vicar of Bakewell for each corpse on the day of burial, and to offer at the high altar in Bakewell church every All Saints' Day twelvepence for the Dean and Chapter of Lichfield. About half of the twenty-four wax seals appended to this indenture still remain. In 1348 Nicholas de Congesdon and his brother John obtained licence to found a chantry of Our Lady in Monvash chapel, endowing it substantially with lands in Monvash, Chelmorton, and Sterndale, to secure a daily celebration, etc.; so that there were henceforth two priests at this church up to the time of the suppression of the chantries at the close of Henry VIII.'s reign. The manor and lead mines of the chapelry were in the hands of wealthy folk from Richard II.'s reign down to the Reformation—such as different members of the Talbot family—so that there would not be much difficulty about repairs or renewals of the church fabric.

The church, which is dedicated to St. Leonard, consists of chancel, north and south transepts, nave with clearstoried north and south aisles, south porch, and western tower and spire (see lithograph). The story of the fabric, given briefly, seems to be this. There was a small chapel or oratory here in early Norman days, with nave and chancel under a single roof. This building was extended eastward to form a fair-sized chancel, about the year 1200. A western tower was added between 1225 and 1250. The nave

was rebuilt and arcades opening into north and south aisles were added in the second quarter of the XIVth century. In 1318 a south transept was built. Towards the close of the same century a north transept was added; the aisle walls refitted with square-headed windows and given gabled roofs; a south porch built; and a third stage and spire added to the tower. About a hundred years later, in the reign of Henry VII., the walls over the aisle arcades were raised and clearstory windows inserted. During the "churchwarden era" various debasements were effected, the fittings changed from time to time, and flat plaster ceilings introduced. In 1887 a wholesome and much-needed restoration was brought about at the expense of the late Archdeacon Bilston, who was vicar of Bakewell.

As to the dimensions of the present church, the total interior length, from the west wall of the tower to the east wall of the chancel is 89 ft. 6 in., whilst the width of the nave and aisles is 47 ft. 9 in. The interior of the tower is 10 ft. 6 in. square. The length of the south and north aisles up to the transepts is 29 ft. 7 in.; the south aisle is 15 ft. 6 in. wide, and the north 12 ft. 2 in. The south transept measures 15 ft. 7 in. west and east, and 18 ft. 9 in. north and south; the north transept is 16 ft. 2 in. west and east, and 18 ft. 11 in. north and south. The chancel is 28 ft. 5 in. west and east, and 15 ft. 5 in. north and south.

Whatever there may have been of the nature of a simple chapel before the days of Robert de Salacia and Matthew de Eston cannot now be traced, but there is palpable evidence of work of the period of these two benefactors about the year 1200. The most striking features of that date are the enriched sedilia and piscina niche in the south wall of the chancel, which are fine and exceptional examples for so secluded and rural a district of Transition from Norman to Early English. The sedilia are separated by detached shafts with good capitals and bases. By an unfortunate error of judgment the old and immediately local stones of these shafts were removed at the time of the restoration of 1887, and shafts of polished fossil marble put in their place. This change is both inharmonious and incorrect. Fortunately the old removed shafts, which are undoubtedly the original work, were not broken up, but carefully kept by a local builder. The present vicar has wisely recovered them and placed them again in the church, where they may be seen resting in the sedilia niches. It is to be hoped that his intention of taking out the modern glossy work and replacing the old shafts will be speedily carried out.

In the north wall of the chancel, near the altar, is a large squared ambry recess, which has been fitted with a door; it is probably of like date with the sedilia. Within it rest two pewter plates, bearing the name S. Goodwin, London, and the X surmounted by a crown denoting superior quality.

The chancel itself is of *circa* 1200 date. Previous to the restoration, a single-light blocked-up window of the large lancet type, but having a rounded head, could

be noticed in the north wall. This was opened out in 1887, together with another of like style in the same wall. A like window, of which some traces were found, has been placed in the south wall of the chancel near the east end. The chancel was, to a great extent, rebuilt in 1887, but the old material was for the most part re-used and replaced. The two buttresses on the north side are plain examples of the beginning of the XIIIth century. On the south side there is an old priest's doorway with a shouldered arch (see lithograph), and a two-light window of late XIIIth century work. Adjoining the nave in this same wall is a two-light, square-headed window of late XIVth century date, like most of the nave windows. This window was filled in 1904 with good glass to the memory of Revd. A. S. Berry (a late vicar of Monvash) and Mary his wife. Below this window are traces of an earlier low side window. The east four-light window of the chancel was square-headed and debased previous to the restoration. The three-light imitative XIIIth century window, which has taken its place, is not a successful effort, and the east wall of the chancel and the floor have been treated with glossy encaustic tiles of unhappy arrangement. The archway into the chancel is supported on good corbels of early natural foliage, with heads below.

There is nothing characteristic of the XIIIth century left in the body of the church; but it is clear that the building of a western tower followed soon after the erection of the Transitional chancel. The style of the two lower stages of the tower denotes a date about 1225. On the south side of the tower is a low central buttress, pierced by a small lancet window measuring 4 ft. 6 in. by 10 in. wide (see lithograph). To find a buttress thus pierced is highly exceptional; there is a lancet in a like position on the west side of the fine tower of the church of Bingham, Notts. Above this buttress is another lancet light. There are also low central buttresses in the west and north walls. This tower was probably originally crowned by a low broached spire. The body of the church that at this time connected the Early English tower with the Transition chancel was most likely of the former style.

From this date it would seem that the fabric of the church had rest for about a century. But in the early part of the reign of Edward III., Monvash grew in importance, and doubtless in population. The minerals increased in value, and, as we have seen, the town obtained a weekly market and an annual fair, and the church obtained burial rights. This, then, was the natural time for enlarging the church. An aisle was added to each side of the nave. There were quite sufficient indications, before the church was restored, to enable us to say with certainty that these aisles had originally lean-to roofs. The arcades that divide them from the nave are similar; each consists of three arches supported by octagonal piers and corresponding responds, plainly moulded after the fashion that was common in the earlier time of Edward III. But the aisle on the south side did not remain long undisturbed. In 1348 came the founding of the chantry

of Our Lady by Nicholas de Congesdon and his brother John. This chantry was placed at the east end of the south aisle, which was considerably extended so as to form a transept of fair dimensions. The throwing-out an archway on the south side of the pier of the arcade nearest to the east, to give admission to the transept from the east end of the south aisle can now be readily traced, and was obviously done soon after the arcade was erected, but formed no part of the original plan. This Congesdon chantry chapel, extensively repaired during the last restoration, has a new three-light window of the style prevailing at the time of its foundation. The three-light, square-headed recessed window belongs to the time towards the end of the same century when the church was largely remodelled; it has small shafts in the jambs. In this chapel is a piscina niche with rounded head; a large stone bracket 26 in. wide, on which there doubtless stood the image of Our Lady; and a smaller bracket carved into two faces.

Here may be noted a feature of the east wall of this Lady chapel which is rather difficult to explain. There is an exterior line of moulded stones flush with the walling, above the square-headed window; it is not easy to understand for what purpose it served prior to the insertion of this window. In fact this corner or angle of the church, both of chancel and transept, is the one point in the fabric that cannot easily be elucidated. It is more puzzling since the restoration than it was before. After this part of Derbyshire had to some extent recovered from the devastating horror of the Black Death of 1348-9, a wave of church restoration and rebuilding passed over the district about the close of Edward III.'s reign, and running into that of Richard II. The work of this period may be roughly assigned to *circa* 1370-80; a date when the curvilinear or Decorated style was yielding place in most parts of England to the dawn of the rectilinear or Perpendicular style. In this part of Derbyshire (and elsewhere in the county, as in the chancel of Breadsall) there came about a somewhat exceptional development in the shape of square-headed windows, whose tracery had no touch of rectilinear work about them. Such were the continuation of Tideswell chancel, the almost entire rebuilding of Taddington church, and the remodelling of most of the church of Monyash. At that date a south chancel window (and probably also an east window) was given to Monyash, and also new windows to the north and south aisles, all of square-headed shape. The four-light window in the south wall of the latter aisle, with flamboyant tracery is a highly unusual example. The south porch was probably then built or rebuilt over a beautifully moulded doorway of the first half of that century.

From rather full notes taken in 1872, when the porch was in ruins, it may be confidently asserted that this was not originally what is termed an "open porch," but had a doorway in the south wall. It has recently been restored with an oak screen at the entrance. Among the little-known uses to which church porches were not infrequently put

was the holding inquests therein by the coroner over the corpses of those accidentally or wilfully killed. There are the records of more than one Monyash inquest still extant, wherein John Alderley, who was coroner for this part of Derbyshire from 1677 to 1699, summoned the jury to meet in the church porch.

To this late period of the XIVth century may also be assigned the raising of the tower and the renewal of its uppermost stage, and the crowning of it, within the battlements, with an octagon spire with two tiers of projecting windows at the cardinal points. This spire was taken down and rebuilt (on the old lines and with most of the old materials) at the beginning of the restoration of 1886-8. A remarkable plan was adopted in the XIVth century for giving access to the ringing-chamber and the bells, which is probably unique among English parish churches or parochial chapels. There was no newel stairway in any angle of the old XIIIth-century tower, and its proportions scarcely admitted of one being inserted. It was, therefore, decided to give a new west front to the south aisle, and to construct a stairway between the new and the old walls. There is a small doorway within the aisle in the west wall, but close to the south angle. Entering this, and turning immediately to the right, a series of twenty-two steps lead through a narrow passage, 26½ in. in width, up to the first floor of the tower. From thence, in the later work, newel steps lead on to the spring of the spire. This ingenious arrangement adds interest to the outer angle of the tower and aisle, as shown on the plate, which gives a south-west view.

This church had also a north transept. It is difficult to say with certainty when it was first erected, but possibly designed and begun about 1348 to balance the Congesdon Lady chapel, and not finished till the period at the end of that century now under discussion. This transept getting out of repair, probably between 1550 and 1650, when the Bakewell chapelries were so much neglected, the mean expedient was resorted to of sweeping it away, and building up the north and east walls, on the lines of the old aisle. It may be noted that in the account of this church, printed in 1876, in the second volume of Dr. Cox's *Derbyshire Churches*, it is said: "When the time for the restoration of this interesting church happily arrives, it will probably be found that there have been both north and south transepts; careful search should then be made for their foundations." Such search was made during 1886-8, with the result that the foundations of the north transept were disclosed, and the transept was creditably rebuilt on the old lines. The north aisle and transept continuation used to be known as the Flagg aisle, clearly indicating that it was occupied by worshippers from that hamlet. Against the eastern pier on the north side of the nave, at the entrance to the north transept, is a small image bracket. There are remains of early painting on the stones of this archway. The north transept is lighted by a new two-light, pointed, north window, and by a square-headed, recessed east window of three lights, the third light of which on the

north side has been renewed, as it had been cut off when the transept was destroyed. To the right hand of this window is a plain pointed piscina niche, denoting that the church had a third altar. High up in this wall, about 12 ft. from the floor, a wide stone used to project from the wall, which had served as a step into the doorway leading to the top of the rood loft. The outline of this doorway could be traced up to the restoration.

At a period well advanced in the XVth century, the high-pitched roof of the nave was taken down and a flat one substituted; the walls over the arcades were raised, and three two-light clearstory windows inserted. It would be at this time that the rood-loft would be constructed.

The font (see lithograph) is also of XVth century date, and has several characteristics in common with those of Taddington and other neighbouring churches which were renewed about this period. This octagonal font stands 36 in. high, and has a diameter across the bowl of 28 in. It has plain, square panels, save on the north side, which is carved with the arms of Bovil or Bovill, a fesse between three saltires engrailed. The bowl is supported on a cluster of four columns, the capitals of which are sculptured with the heads and hindquarters of a lion and of some smaller beast. Richard Blackwell, of the adjacent chapelry of Taddington, married Griselda, daughter and heiress of Bovill of Northampton, in the reign of Henry VII. It should also be noted that a Bovill was joint founder of Roche Abbey, Yorks, in the XIIth century, which abbey had a grange in this chapelry at Oneash. The font is covered with a flat lid, on which is inscribed "W. B., R. N., 1733." Beneath the tower is an old chest of exceptionally large dimensions; it is 7 ft. 2 in. long, 21 in. high, and 19 in. wide. It is continuously encircled with iron bands throughout, which are about 2½ in. apart. The chest is divided into two unequal parts, each with its own lid. The age of this massive receptacle points to it having been constructed to hold the vestments and altar plate for the XIVth-century chantry founded by Nicholas Congesdon and his brother. The chest is now in a rather dilapidated state, and has been coarsely mended; it would tend to its preservation if it were brought out into a better light and placed in one of the transepts.

There are no old monuments in the church. At the west end of the south aisle are some renewed tablets to the Palfreyman family, 1774-1826.


Against the east wall of the north transept rests the somewhat dilapidated large Royal Arms of George II., dated 1742, fairly well painted on panel. It is much to be desired that these arms should be rehung in the church. There is an excellent place for them over the low arch into the tower.

During the churchwarden era, this old church became much degraded. The roofs of chancel, aisles and nave were all flat and plastered. One of the best features of the costly restoration of 1886-8 was the renewal of open roofs throughout the building. This restoration which was chiefly accomplished through

the munificence of Archdeacon Balston, cost between 3,000*l.* and 4,000*l.* The church was re-opened by the Bishop of Southwell on May 9, 1888.

On the south side of the churchyard near to the porch is an exceptionally well-grown and vigorous yew-tree. The trunk has a girth of 14 ft. 7 in. at the height of 4 ft. 6 in. from the ground, and the stretch of the boughs from east to west is 51 ft. Three sides of the churchyard are enclosed by a screen of remarkably fine lime trees. They were planted by the Revd. Robert Lomas, a former minister, who was killed by falling over a precipice in Lathkildale, in 1776, as recorded in the registers.

MR. HOLMAN HUNT'S EXHIBITION.

O all who care seriously about pictures, and regard an exhibition as something more than an afternoon's amusement, the collection in one gallery of the principal works of a painter so serious in aim and so conscientious in execution as Mr. Holman Hunt, must be an occasion of great interest. We may not admire all the pictures; we may think the artist mistaken in some degree in his aims in painting. But we must recognise that an exhibition like this, consisting of comparatively few works into each of which the artist had put his whole mind and endeavour, and each one of which is a kind of separate problem, is something very different from the exhibitions of facile and clever but comparatively superficial work which one is often invited to look at. As Sir W. Richmond remarks in his introduction to the catalogue, Mr. Hunt stands in a position entirely apart from other painters of the day. You may not like him, but you cannot refuse to take him seriously who has taken his art so seriously. And there is an interest, too, in seeing again works which one may not have seen for a good many years, and confirming or revising one's feelings in regard to them.

There are some instances in which we find that we like the picture better than formerly. "Master Hilary, the Tracer" (the original title of the picture), has got round our heart now; when we first saw it many years ago it did not attract us; it seems now a very interesting and characteristic portrait of a small boy. Valentine rescuing Silvia, called "The Two Gentlemen of Verona," absolutely repelled people on its first exhibition by what was then thought the exaggerated brilliancy of the colouring; it does not strike us so now, we have become so much less afraid of strong colour; and the figure of Julia, embarrassed in the certainty of the impending discovery of her in her boy's dress, we have always thought one of the most characteristic things in modern painting. There is, however, a curiously "early Victorian" look about the figure of Silvia. The "Hiring Shepherd" also we can accept now without being too much shocked at the over-healthy blowness of the two figures, which does not prevent our enjoyment of the beautiful and indefatigable painting of the foreground and distance of the landscape. "Isabella and the Pot of Basil" is another work which

has grown upon us with the lapse of time; it is not Keats's "poor simple Isabel," it is too strong and energetic a figure for that; but it is a really noble picture both in design and colour.


Among the pictures as to which our feelings remain entirely unaltered by the present exhibition is the small but perfect and indeed wonderful picture known as "Strayed Sheep." It is interesting to learn from the catalogue note that this arose out of a commission to paint over again, as a separate subject, the group of sheep in the "Hiring Shepherd." It is fortunate that the artist went beyond his commission, and produced an original work which is a marvel of realism of detail combined with pictorial effect, and will retain its value as long as pigments will last. The "Finding of the Saviour in the Temple" also keeps its hold upon us as a painting of a religious subject based upon the most severe and accurate study. It is a pity that the artist's remarkable study in which the two central figures are built up from the skeleton outwards could not have been exhibited; it would have been an instructive lesson to many amateurs as to the work which goes into pictures that are painted to last. As to two other important religious pictures the present exhibition leaves our feeling unchanged in another sense. Sir W. Richmond thinks the "Shadow of the Cross" is splendid in tone now; that time has harmonised what was once harsh in the colour. This may be so, but we do not think time will ever persuade people to accept that nude figure of "Christ the Carpenter" as otherwise than ugly, and a most inadequate representation of Christ. Study from the life will not do everything in painting, and it will not transform a modern Syrian model into an ideal of Christ. Considering also the artist's remarkable power of realism displayed in many details even in less important pictures (look at the dog, for instance, in the "Lantern-Maker's Courtship") there is a provoking want of realism in the floor strewn with shavings; you can see that they are meant for shavings, but they are not like the reality. The really fine element is the beautiful and harmonious figure of the kneeling mother, which we always wish that we could have without the rest of the picture. The other religious work which we have always found it impossible to care for is the "Triumph of the Innocents." We are constantly told that this is the greatest religious picture of modern times. We object that it does not appeal to the modern intellect; the conception is essentially mediæval and fantastic, one might almost say childish; and the children are like models made out of some artificial substance. There is very fine painting in detail, no doubt, but as a whole we can only regard it as a seriously intended but elaborate mistake.

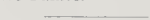
Mr. Hunt's really great picture is the latest of the large ones, "The Lady of Shalott"; and to those who, like ourselves, have always had a reverence for Mr. Hunt's seriousness of aim and devotion to his art, combined with a sadness and bewilderment at his often strange failure to produce anything beautiful out of all this serious work, it is a delight

to find in this latest picture, marvellous in its elaboration of significant detail, a really great poetic conception, such as we can imagine forming the treasure of one or another picture-gallery for centuries to come. Here, at all events, there is no discrepancy between conception and execution.

We may add that we are entirely in sympathy with Sir W. Richmond's suggestion at the close of his introduction to the catalogue, that "intelligent folk" should spend time over this exhibition, "walk home and think a little as they walk of what they have seen, and go again." It is not, we quite agree, an exhibition to be considered lightly. But at the same time we cannot help thinking (in walking home) that we have been looking at the work of a painter with great powers and high aims who has partially shipwrecked himself by some mistaken theory either as to the ends or the methods of painting. What it is one cannot exactly define; but there must be something wrong when the painter of the "Lady of Shalott" and the portrait called "The Birthday" could also paint "May Morning on Magdalen Tower" and the portrait of Professor Owen.

NOTES.

It is stated in the Dutch papers that M. Cordonnier, who received the first premium in the competition for the Peace Palace at the Hague, has been definitely appointed architect for the carrying out of the building, which is to be built nearly according to his original design. From a competition point of view it is, of course, right that the architect who gained the first premium should be appointed; but on architectural grounds we must regret the selection, for a building which if really carried out will attract so much attention, of a design of so flaunting and *rococo* a character; the last kind of thing that one would expect or wish to see as the architectural expression of a cosmopolitan Peace Palace.

AFTER a period of tranquillity in the industrial world no less than four considerable labour disputes are progressing or threatening at the present time. On the Clyde some 6,000 men are actually on strike, and other men connected with the shipbuilding industry are likely to be involved. The question in dispute is the rate of wages, and conciliation has not been resorted to. In Scotland 67,000 miners are asking for a rise of some 12½ per cent. in their wages, but this dispute is likely to be submitted to a conciliation board. At Loughborough 160 coach-builders were about to strike; the question involved is wages, and in this dispute the men's union is attempting to bring pressure on the employers by influencing some of their customers—Corporations—to refuse tenders unless the men's demands are complied with. This is a somewhat new departure in peaceful persuasion. In Wales some 28,000 miners have handed in notices to cease work in a month's time, and in this case

the sole grievance is that certain non-union men are employed. This dispute stands on a different basis; the men are not striking to benefit themselves or their families, they are simply attempting to "dragoon" their fellow-workmen into joining a socialistic union, and their fellow-workmen have been subjected to "peaceful persuasion" in its perfect form, which includes every kind of personal violence and boycotting. Is this unsettled state of affairs due to the promised legislation and the attitude of the Government towards the unions? Whether this be so or not the Welsh miners are to be congratulated on having given an opportune exhibition of their methods before the Trades Disputes Bill becomes law. The Government has a concrete example before it of what emancipation of the unions from liability may lead to if disputes for such an object can be so conducted under the existing law. If legislation in favour of a particular class is resorted to the plea of ignorance as to the result can certainly not be set up in the future.

FOR years past periodical Kentish Coal reports have come from the neighbourhood of Dover announcing the near approach of that time when Kent is to become a rival to Lancashire and other great centres of the coal and iron industries. The latest report is to the effect that three seams of coal have been discovered at the depth of some 1,800 ft., the thickness of the seams being 1 ft. 8 in., 3 ft. 4 in., and 4 ft. 6 in. It is suggested that the new coalfield extends beneath an area of a hundred square miles, and the proprietor of mining rights over about 30 square miles expects to have 1,000 men at work in the course of a year. While admitting the existence of coal in Kent, and admiring the dogged persistence which has been displayed by prospectors in the county, we have heard so many roseate prophecies of the kind on previous occasions that it is impossible to accept the latest discovery otherwise than with deferred enthusiasm.

It is announced that the Bill now before Parliament promoted by the Corporation of Dover, the object of which is, in one word, to make a proper landing-place and station on the Admiralty Pier, is likely to be passed during the autumn session. The astonishing thing is that steps have not long before this been taken to give passengers from and to the Continent proper accommodation at Dover. There is hardly a third-rate watering-place round the coast which would have been satisfied with such miserable access even to excursion steamers. The bad accommodation for passengers at Dover, a part of an international route, is little less than a national scandal. Compare Dover Pier with such places as the Midland Station at Heysham for Irish traffic and one sees how far behind the times are the Corporation of Dover and the South-Eastern Railway Company. While, therefore, we welcome the news that some steps are to be taken to construct a covered and ample station for Continental traffic at Dover, we can only observe, "better late than never."

Air Analysis and Ventilation.

In a paper entitled "Air Analysis as an Aid to the Ventilating Engineer" Mr. J. Roger Preston advocates the estimation of carbon dioxide by a volumetric method based upon its absorption by caustic soda solution. He states that the average amount of carbon dioxide present in a building in which there are a number of persons affords an indication of the efficiency of the ventilation if fresh air is supplied to the building. If the object of the analysis be to indicate the rate at which the air of the room is being changed it will be necessary to also ascertain the rate at which carbon dioxide is being generated in the room at the time of analysis, but this factor is neglected by Mr. Preston. As an indication of the toxicity of the air the estimation of the carbon dioxide is almost useless when combustibles such as candles, oil, or gas are being burned in the room. The toxic effect of air vitiated by animal respiration products is not due to carbon dioxide, but to foul putrescible organic matter, which is respired together with carbon dioxide and other gases. Since the burning combustibles evolve carbon dioxide, but not putrescible organic matter, it is evident that, where the greater proportion of carbon dioxide in the room is due to the use of these, the results cannot be compared with those obtained in rooms where the vitiation is due solely to animal respiration products. Dr. Frankland has shown that the exhilarating air of certain mountain heights contains more carbon dioxide than the air of London streets. Mr. Preston's paper is, nevertheless, of interest, and his methods, in the hands of a competent investigator, should give results of practical value.

Modern Factory Equipment.

In the current issue of the *Journal of the Franklin Institute* will be found the text of a lecture delivered by Mr. H. F. J. Porter on the methods adopted in the United States for the comfort of men and women employed in manufacturing establishments. The movement took its rise in Germany towards the end of last century and resulted in the adoption of departments and equipment described as "Wohlfahrts Einrichtungen." The chief features of the policy resulting in these "welfare arrangements" are well-lighted workrooms—cooled in summer and warmed in winter—cheerful and comfortable lunch-rooms, well-fitted lavatories with basins and baths, clothes-rooms containing lockers and drying-racks, emergency hospital rooms, rest-rooms for those temporarily indisposed, libraries and reading-rooms, rooms where classes are held for the technical and commercial instruction of employees, and other institutions too numerous for detailed mention. Similar features have been adopted very largely in the United States, where their paying value seems to be generally recognised. The lecture to which we refer is illustrated by photographic views illustrating welfare departments in several American factories, and will be found suggestive to such of our readers as are interested in the equipment of our industrial establishments.

Natural Hot Water Supplies in Queensland.

MANY of the inland towns in Queensland now derive excellent supplies of water from artesian wells, and in places where the temperature of the water is abnormally high the practice is to cool it before distribution. In two towns, however, the water is conveyed hot direct from the bore well to consumers, a system that does not involve reduction of the original pressure, and enables considerable economies to be effected. As an example we may mention the town of Muttaborra, where water issues from an artesian well, 2,707 ft. deep, at the rate of about 750,000 gallons a day, and at the abnormal temperature of 138 deg. Fahr. After passing through a trap for the interception of stones, the water enters the mains, which are laid 3 ft. below street level and encased in timber troughing. The pipes rest upon rollers, and are fitted with expansion joints about 200 ft. apart, each joint being placed in an access chamber. We can quite imagine that inhabitants whose first thought is for drinking water may prefer the system where cooling plant is adopted, but many others find the supply of hot water very convenient for sundry domestic purposes, and are probably pleased to have it at a lower rate than that at which cold water could be furnished.

Timber Consumption.

A RECENT report to the Washington Bureau of Manufactures contains some significant figures relative to the consumption of timber in various countries of the world. Great Britain uses annually 430 million cubic feet, Germany requires 325 million cubic feet a year, France and Belgium absorb every year more than 270 million cubic feet. The United States, once regarded as an inexhaustible source of timber, is now obliged to supplement her home supplies by imports from Canada. In spite of the fact that coal has superseded wood as fuel, and that brick, iron, and concrete among other materials have taken the place of timber in many branches of construction, the demand seems to be continually on the increase. In the United States, Germany, and Canada, the State authorities have already taken steps to guard against the depletion of national forests, and re-afforestation has been started on a large scale in the United States. Those best qualified to judge are unanimous in the opinion that something like a famine in timber will occur within the present century unless re-afforestation is taken up energetically in the chief timber-growing countries. The prospects of comprehensive action in this direction do not seem to be very promising at present so far as Great Britain is concerned.

Tamping and the Strength of Concrete.

SOME tests undertaken at the instance of the German Concrete Association give a fairly clear indication of the influence of tamping on the strength of concrete. The tests were conducted at three different places with the same class of material and in accordance with the same conditions. Concrete tubes of 12 in. were formed under 6, 12, and 18 blows from a 26-lb. tamping hammer falling freely from a height of 10 in. The cubes were

moulded in two layers, and after the first layer had been tamped in the mould its upper surface was roughened to secure a satisfactory tooth for the second layer, which was then tamped in. After remaining for forty hours in the mould the blocks were stored in wet sand for twenty-eight days and tested under compression in the direction of tamping. Two different percentages of water were adopted, and some of the concrete was mixed by hand and some by machine. The tabulated collection of results shows that the compressive strength of dry concrete mixtures was increased by from 12·4 per cent. to 22·2 per cent., and that in the case of plastic mixtures the increase varied between 3·2 per cent. and 18·6 per cent. The figures also indicate that beyond a certain number of blows the tamping causes a gradually decreasing augmentation of strength, and finally leads to diminution of the augmented strength. The results further show the superiority of machine-mixed over hand-mixed concrete.

THE Benchers of the Middle Temple have distinguished themselves by a tablet the last home of Oliver Goldsmith. The chambers are on the second floor of No. 2 staircase, Brick-court. They consist of two large rooms, with a kind of cupboard or sleeping-closet, which Goldsmith, removing from Garden-court, furnished handsomely, as is testified by the catalogue prepared for the sale of his effects. For the lease he paid 400*l.*, a large sum for a poet, out of the profits of his comedy, "The Good-natured Man," produced on January 29, 1768, by Colman. Blackstone occupied the chambers next below, and, being then engaged upon the fourth volume of his *Commentaries*, had frequent occasion to complain of the distracting noises made overhead by Goldsmith's younger friends. Goldsmith rented the chambers in Brick-court until his death on April 4, 1774, when the staircase was crowded with a group of unaccustomed mourners. In the meantime he brought out "The Deserted Village" and "The Stoops to Conquer," and wrote "Animated Nature," his English and Ancient Histories, the lives of Bolingbroke and Parnell, and "The Haunch of Venison." He left "Retaliation" unfinished in his desk. Goldsmith was buried in the Temple burying-ground in, it seems, what was then Churchyard-court; despite the inscriptions on the tombstone (1860) and on the memorial (1837) in the church the precise situation of his grave is unknown. His chambers in Garden-court, Middle Temple, were at No. 1, on the (old) library staircase.

THE It appears that the certainty of injury to the trees on the Thames Embankment, owing to the position chosen for the tramway lines, has at last attracted the attention of some members of the London County Council. Anyone with eyes in his head must have seen, the moment the laying of the tramway route was commenced, that the whole of the trees along the Embankment will have to be periodically lopped to make a clear way for the tramcars. It appears that in some cases the trees have already been

injured at the roots; but even if that is avoided, the beauty of their growth must necessarily be entirely destroyed by lopping them on the roadway side, if the tramcars are to run at all, and the possible beauty of an avenue of trees along the Thames at this point is entirely frustrated. The protest of the Chairman of the Parks Committee has produced no promise of any alteration being made; as usual in such cases, the member particularly concerned with the tramcars "believes that little permanent damage will be done to the trees"; so that he apparently thinks a regular lopping of trees on one side involves "no permanent damage." It would have been far better to place the trams in the centre of the roadway than to plan out the ruin of the trees in so stupid a manner.

NOTES ON MOSAIC AND MARBLE INLAY.—IV.

THE procurators of the basilica of S. Mark required at this time that each master should take two apprentices, and in this way a school was formed, which was able to assist Honorius III. with the mosaics of S. Paolo fuori. Andrea Dandolo had the life of S. Mark and the arrival of his body at Venice done in the chapel of S. Isidore. The later mosaics have interesting history connected with them, which Labarte gives. Those made by Michele Zambono, in 1450, for the Chapel of Our Lady, "dei Mascoli," represent with considerable delicacy the life of the Virgin, but in the new manner. Lanzi and Manetti wish to date them seventy years later on account of their perfection, but the archives make his date certain. The mosaics executed by the brothers Zuccato on the great arch of the nave (in or near 1550) Vasari praises by saying that they look as if they were painted in oil (!). The praises which the brothers received excited the envy of the mosaicists. Vincenzo Bianchini, his brother Domenico, Bozza (pupil of the Zuccati), and several others met to denounce them to the administrators, asserting that they had employed colours and brushes in some parts of their mosaics in the nave and in the clouds which surrounded the Evangelists in the atrium. They also accused Valerio of understanding nothing about the processes of the art of mosaic. An inquiry was ordered in 1563. Titian, Jacopo, Pistoia, Andrea Schiavone, Paul Veronese, and Tintoret were charged to examine the mosaics and give their opinion. After a close examination they said almost unanimously that there were touches of the brush in certain places, but that the effect was not damaged when they were rubbed off. Francesco Zuccato excused himself by saying that the designs were his, and that if he had added some parts in colour it was to judge of the effect before executing them in mosaic. Valerio defended himself from the accusation of knowing nothing about the processes of mosaic by showing those that he had executed by himself the figure of S. Clement in the atrium and the S. Catherine above the tomb of the Doge Morosini. The judgment was that the Zuccati were to do again in mosaic at their own expense the small parts which were expressed in colours. The judges were also asked to place the different mosaicists according to their merit. They put Francesco Zuccati first and Vincenzo Bianchini next to him, after having examined their works.

In the lower chapel of the relics at S. Croce in Gerusalemme are mosaics by Baldassare Peruzzi, made in 1537, very rough and coarse in execution. Christ occupies the centre of the vault accompanied by a choir of little angels. The medallion is bordered with cherubs' heads. The four Evangelists with their symbols are on the diagonal ribs, and four scenes of the *Invention of the Cross* in antique-looking framings occupy the spaces between. The soffits of the arches opposite the window and the door are also decorated with arabesques, among which are SS. Peter and Paul, and at the summit of the arch is the Lamb. The instruments of the Passion also appear, SS. Sylvester and Helena and a little figure of the donor, Bernardino Carvajal.

cardinal of the church in 1537. Perhaps they may be rougher copies of more ancient mosaics?

In terminating these descriptions reference may be made to the Chigi Chapel in S. Maria del Popolo, Rome, the dome of which is decorated with mosaics made by Aloisio della Pace from Raffaele's designs; planets, with their accompanying deities, and the Creator surrounded with angels. These last-mentioned mosaics have departed from the true canons of the art, but are still some distance from the pictorial treatment which destroyed it.

Portable mosaics are, strictly speaking, outside our present scope, but a few words upon the subject may prove interesting. The Byzantines made them in the Xth and XIth centuries for the decoration of altars and palaces, and they appear to have been a monopoly of Constantinople. The greater part of those which have come down to us, however, are of the XIIth or XIIIth century. They were often extremely delicate and beautiful, and were much valued. In the Imperial Palace at Constantinople there were several, which were kept in the "pentapyrgion," a kind of safe, placed in the eastern apse of the throne-room, in which were shut up the most precious objects of the Imperial Treasury. Pictures of this kind were used in the same way as ivory diptychs, offered for the veneration of the faithful in the churches, kept by the bed in palaces as devotional pictures, and taken on journeys or military expeditions with the most valuable baggage. There are two in the Opera del Duomo, Florence, which may be described as typical examples. They are 27 centimetres high by 18 centimetres broad without the border (according to Labarte), which is of enamelled silver. Each has six subjects—the Annunciation, the Nativity, the Presentation in the Temple, the Baptism of Christ, the Transfiguration, and the Raising of Lazarus on one, and the Entry into Jerusalem, the Crucifixion, the Descent into Hell, the Ascension, Pentecost, and the Death of the Virgin on the other. The composition is generally graceful and the attitudes good. The background is made of cubes of gilded copper, and the rest of very small glass tessere of great variety in colour. They are delicate enough to look like miniatures at a little distance. Another is in the Louvre, 52 centimetres high and 35 centimetres broad, a Xth-century work on a ground of hard wax. The golden parts are squares cut from a very thin sheet of copper; the colours are marbles and lapis lazuli. The fineness of the work may be judged from the fact that these marbles are only a millimetre thick, and in the caruations but half that thickness.

Paul II. (Pietro Barbo) had a collection of twenty-three of these mosaics, and seven Grimaldi, who died in 1623, described seven similar works left to the basilica of S. Peter by Cardinal Bessarion, who died in 1472. Lorenzo de' Medici possessed a number, as appears from an inventory of his works of art published by M. Eng. Muntz. A complete list of those now existing only reaches the number of 15—of which two are in the Louvre, a S. George and the Dragon and a Transfiguration, referred to above; one at South Kensington, an Annunciation; three at Florence, the two just described and a half length of Christ in the *Uffizi* made of egg-shells on a gilded background; two at Venice, a S. John Baptist in the treasury of S. Mark's and a Virgin and Child in S. Maria della Salute; two in Rome, a S. Theodore in the Christian museum of the Vatican and a XIVth-century Virgin surrounded by the Apostles in the Borghese collection; a bust of Christ at Chimay and S. Nicholas of Myra at Burscheid; a Crucifixion in the Vatonédi Monastery at Mount Athos and a S. Theodore and a Samuel the Prophet in the Basilevsky collection at St. Petersburg.

Pavement Mosaic.

The roughest kind of floor mosaic was called "opus Signinum," from the town of Signia, where it was first used. It consists of a cement ground, to which a red colour was communicated by the quantity of pounded tile mixed with it, into which tessere of marble were rammed so as to make rough patterns. Floor mosaic was called "pavimentum" from the use of the rammer (*pavica*) in solidifying the surface of the tessere, or in ramming them as in "opus

Signum." A pavement made of thin slabs of stone cut into shapes so as to form a design when arranged on a geometrical basis, in two or more colours, was called "pavimentum sectile." "Pavimentum tessellatum" was a simpler form of the same using only rectilinear forms; while in the well known "opus Alexandrinum" (perhaps named from Alexandria, where the art flourished during the first centuries of the Christian era, most of the marbles used being African) circular slabs cut from columns, with the bands of smaller fragments, which interlace and bind them together, are the most prominent feature, occasionally (as at S. Crisogono in Trastevere, Rome, and S. Mark's, Venice) mingled with mosaic of the kind called "vermiculatum." This was so called because the rows of tesserae surrounding the design were thought to suggest worms by their arrangement, and it is this form to which the name of "mosaic" has clung. Enamel mosaic was called "opus sigillum," silice and alumina coloured by metallic oxides. Pliny mentions it thus:—"Since his time (Sylla's) these mosaics have left the ground for the arched roofs of houses, and they are now made of glass. This, however, is but a recent invention, for there can be no doubt that, when Agrippa ordered the earthenware walls of the hot baths, in the thermæ which he was building at Rome, to be painted in encaustic, and had the other parts coated with stucco-work, he would have had the arches decorated with mosaics in glass if the use of them had been known; or, at all events, if from the walls of the theatre of Scæurus, where it figured as already stated, glass had by that time come to be used for the arched roofs of apartments."

There is an interesting mosaic in the basilica of Reparatus at Orleansville, Algeria, shown by an inscription to be of the date of 403 A.D. The church itself was founded in 252. Only three colours are used—red, black, and white and various shades. The style is decadent, and the ornament not very interesting, but near the apse and in the middle of the nave is a vine with birds pecking at the grapes, which is good in style, and on the platform of the apse is another, and fishes also. Round the inscription of Reparatus is an architectural framing in mosaic—heavy twisted columns and arcading, with doves drinking from vases, ornamental plaques, branches of pomegranate, etc. The ornamental interlacings sometimes anticipate the intricate Comacine plaitings.

The remains of a pavement found in the Palace of Theodoric at Ravenna in 1870 show that at the beginning of the Vth century the mosaic tradition was not entirely lost. The border has a light blue ground, the filling one of light red; geometrical figures are outlined upon it in black and filled in with yellow, red, violet, blue, and white tesserae—the border is a guilloché.

A floor mosaic found at Nîmes has a curious motif. The border represents the enclosure of a fortified town, with walls and greater and lesser towers; at each angle is a tower with battlements. Within is an arcading with caps, all laid out as if in elevation on the lines of the plan. The style of fortification is between the IIInd and the Vth centuries, and the colours used black and white only.

At Parenzo a mosaic of late Roman character was found 2 ft. below the present level of the nave in 1881, and has been traced all over the surface covered by the present basilica, built by Euphrasius (535), and at Grado is a fine pavement which is quite antique in many of its details, with inscriptions in both Greek and Latin—one of them states that the church was renovated by the patriarch Helias (571-86).

The Arab historian Ibn Sayd says that one of the conditions of peace between Caliph Valyd and the Emperor of Constantinople at the beginning of the VIIIth century was that he should furnish a certain quantity of "sfefysa" for the decoration of the mosque which he was building at Damascus. Those at Cordova are the work of Byzantine artists (according to M. Reinaud). When Saladin conquered Jerusalem he put in the mosque of Omar rich mosaics, using not only the store of precious marbles and vitreous pastes which he found, but bringing the same sort of things which he had been collecting for years from Aleppo.

The subjects of the early Christian floor

mosaics are almost universally Pagan, whether because the mosaic workers were Pagan or that the Christians desired to put such things under their feet, who can say? S. Bernard's reproaches to the Clunists show that in his day the subjects represented on pavements were thought to be degraded by their situation. "If you do not value these sacred images more, at least value your beautiful colours; why do you ornament that which will soon be soiled? Why do you cover with paintings (inlay of coloured mastics on slabs of marble) that which will necessarily be dirtied by your feet?" Among these Pagan subjects one of the most favourite was Theseus and the Minotaur, and the labyrinth which is part of this subject remained when Theseus disappeared, and was utilised for purposes of devotion. The virtues and vices personified appear about the XIIIth century (taken from the Psychomachia of Prudentius). Portraits and historical subjects are found in the XIIIth century. The signs of the zodiac and labours of the months were favourite subjects from an early period, and monsters occur as frequently everywhere. There are a few instances of subjects from the Old Testament. Hell, and scenes from the Apocalypse. Evangelists and Apostles occur at S. Remi, Reims, and the Trinity and Christ blessing at Hildesheim, and occasionally a legendary subject such as the legend of the leper of Constantine which occurs at Riez. Many remains more or less important are to be seen here and there.

In the Museo Malaspina, Pavia, are remains of the pavement of S. Maria del Popolo and one found in S. Pietro in Cielo d'Oro. The subjects include S. George and the Dragon, a castle, monsters and rosettes, and a combat of vices and virtues. The varied colours suggest a probable XIIIth-century origin. At Cremona is a pavement with similar subjects and treatment, and at S. Savino, Piacenza, the design includes a groundwork of zigzags representing water with fishes, and the months in circles upon it. There is also a seated figure of the year holding the sun in its hands, with animals surrounding in a larger circle; outside are groups of fighting men and a game at chess, a subject which also occurs in the large mosaic at Pesaro—perhaps this is of rather later date. In the museum at Reggio (Emilia) are some fragments with months and signs of the zodiac, monsters, etc., in circles in red, black, and white. The months also occur in a mosaic at Aosta in the west part of the choir, grouped in small circles round a figure of the year with a nimbus, and holding the sun and moon in either hand, which occupies the centre of a great circle laid upon an oblong framing. The outlines are black upon a white ground, but the draperies of the year and of April, July, and September are red. The grounds upon which the medallions are laid are yellow, brown, pale green, and blue. It is curious to note that at Pavia May is shown as cutting grass, while at Aosta, higher up the mountains, it is June which is so employed. January is double-headed, shuts the door of one tower and opens that of another; February, in mantle and hood, warms his hands at a fire; March falls trees; April holds flowers, and has a basket with young birds; May hunts on horseback; July cuts corn, which August threshes. The vintage marks September, grapes collected in a large basket; October bears in his bosom the autumn sowing. November drags wood for the winter, and December kills the swine in the usual manner. The colours used to fill in are red marble for flesh and a darker red for features and hair. In the Cluny Museum is a fragment from S. Denis, said to be the work of an Italian, showing the months, and gay with gold, blue-green, yellow, and serpentine.

A portion of a XIIIth-century pavement is at Novara—Adam and Eve in the Garden of Eden, with a border of birds and fishes—and one from S. Maria Maggiore, Vercelli, now in pieces in the civic hospital and private houses, shows either the craftsmen or those who commissioned the work. "Manifredus Custos et Constantius monachus." In the cathedral of Casal Monferrato is a pavement with several of the subjects seen at Siena—Abraham's expedition against the Kings of Canaan, Jonah thrown into the sea, and the history of the Maccabees. At Ivrea

the liberal arts appear, and at S. Benedetto di Polirone, near Mantua, the pavement over the grave of the Countess Matilda, who died in 1115, shows the four cardinal virtues, Prudence, Temperance, Justice, and Fortitude, beneath an arcade which resembles that in the apse vault of S. Francesca Romana, Rome, with circles tenanted by monsters and a man who attacks a dragon with a long spear. At Pieve Terzagni is a church which belonged to a castle of Countess Matilda. The mosaic pavement, which may probably be of her period, is like a carpet, with twelve larger and six smaller medallions, in which are animals and a double-tailed syren. The apse is a step higher, and here behind the altar are the symbols of the Evangelists, a gryphon, a square with some pattern-work, and a portion of a figure beneath the arch, with an acrostic inscription, which is thought to refer

S A T O R
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to a certain Arepo or Erbo, whose portrait is just below, perhaps the priest of the place. A pavement from Acqui, now in the Museo Civico, Turin, shows a camel, an archer, monsters, fishes, and birds. At Acquaneira, on the Chiese, are subjects from the Æneid, and at S. Giovanni Evangelista, Ravenna, representations of the war against Constantinople, accompanied by the usual monsters and animals, a pavement made by Abbot William in 1215 to commemorate the Third Crusade. The great floor mosaic at Otranto bears the signature of the priest Pantaleon. The bishop was Jonathas (1163), under William the Bad. It covers the nave and aisles and the presbytery. A tree starts from the doorstep of the church, branches to right and left, and reaches to the high altar. On its branches and between them are figured Biblical subjects, historical personages, symbols, and real or fantastic animals. M. Lenormant calls it "a vast allegory which embraces universal history, the entire life of the world as conceived by the religious philosophy of the epoch." The mosaic at Brindisi was of 1168, and on it the exploits of Roland were depicted, with the names of the personages partly in Latin and partly in French. The costume was like the Bayeux tapestry.

The most ancient of these Romanesque pavements is that of S. Maria Pomposa (1036), and in this fabulous monsters appear. The mosaicists depended on the marble workers for much of their material, and this close connexion led to the employment of similar motifs to those used in contemporary sculpture. In the crypt of S. Gereon at Cologne is a mosaic containing in panels subjects from Old Testament history, and in front of the altar, in the apse, a series of panels of the signs of the zodiac, black and yellow, with a little red and white. The other subjects have also dark red, green, and pale yellow. It is thought to be due to Archbishop Anno, who certainly brought monks from Lombardy about the middle of the XIIth century, who may have brought the art with them.

"Pavimentum sculpturatum" had a design engraved upon it in lines, and was sometimes of two colours. The plan of the city of Rome from the temple of Romulus and Remus is an example of this rare kind of pavement, rare in antiquity at least, for both in mediæval and Renaissance times it was in much favour. Pliny accords it a pre-mosaic origin. It is uncertain whether the filling-in of the lines with a dark mastic was an ancient practice or a mediæval invention. In the time of Leo of Ostia these appear to have been only two kinds of mosaic practised—one known as "ars muscaria" and the other called "ars quadrataria"—since he says that Desiderius, abbot of Monte Cassino, brought craftsmen from Constantinople "for both kinds of mosaic," and then names these two. Teirich says that the oldest example of the latter is in the church of S. John of the Studio at Constantinople, probably built under Leo I. about 463. The pavement is of verde antico, divided into panels by bands of opus alexandrinum, of giallo antico, porphyry, and serpentine. Up the centre the interweavings are quite Cosmatesque in style, elsewhere

simple lines of the marbles are employed; within each oblong is a frame of giallo enclosing verde antico again. If the centre feature is of the period of the foundation of the church, it is evidently much the oldest example existing of the kind. At S. Sophia, Constantinople, a small portion of the ancient pavement still exists in the north-east corner of the central square under the dome. Kinkel quotes a portion of the poetical description of Paulus Silentiarius which applies to the floor: "The walls and floors spread out like a flowery meadow, with priceless kinds of marble and other coloured stones which had been brought for the purpose from all quarries in the empire; Phrygian pavonazetto with violet spots and white and rose veins, the dark red porphyry of Upper Egypt, the light green marble of Laconia, the spotted black and white from Gaul and from the islands of Marmora, the Numidian yellow of crocus colour and gold. With this splendour of marbles the many-coloured columns are surrounded, taken from the use of heathendom and pressed into the service of the new faith." The portion of pavement which has been preserved shows on a circular slab of granite other rounds of porphyry and dark green marble, all of which were probably cut from columns, and the spaces between the circular discs are filled with small pieces, among which are to be seen blue and green vitreous pastes. In the women's gallery a fragment of pattern shows that the floor there was once inlaid in stripes; the same kind of work as in the ancient pictorial pavements.

Beneath the main dome of the monastery of Iviron at Mount Athos is a pavement of this type (figured by Didron), which is exactly like those of a later date in South Italy and at Rome. There is an inscription on the bronze ring round the central porphyry slab, which runs: "I have made fast its pillars, and it will not be shaken to all eternity. The monk George, the Ivirite and Founder." He was a contemporary of S. Athanasius, friend of the Emperor Nikephoros Phocas, and the real founder of Mount Athos. He began the monastery of Laura in 963, and Iviron was founded in 976 by Joannes Tornikios and his Iberian relatives, Euthymios and Georgios, with the help of the Empress Theophano. In the sacristy at Monte Cassino is a piece of the original pavement laid by the workmen whom Desiderius imported from Constantinople in 1066, and at Grotta Ferrata (a Basilian monastery near Frascati) is a pavement of the same type ascribed to the period of the construction of the church (1025). The art thus migrated from the East to the West, where it gained fresh life and strength. In Rome material was plentiful. Blocks and columns of porphyry, giallo antico, green Numidian marble, and all kinds of precious marbles were cut up and set together in geometrical patterns, examples of which may be seen at a dozen or more of the great basilicas of the XIIIth and XIVth centuries in Rome and its vicinity; while outside Rome, S. Vitale at Ravenna, S. Mark's, Venice, and S. Donato, Murano, may be mentioned as showing early examples of this kind of pavement. The earliest dated example in Rome is that of S. Maria in Cosmedin, which bears an inscription naming as the donor Alphanus, who was chamberlain to Pope Calixtus II. (1119-24). The slabs of marble are more ancient than his time, and the undersides bear carvings of the IXth century, with interwoven patterns of Cosmate type. At the SS. Quattro Coronati, the church of that guild in Rome, much of the marble used in the pavement consists of fragments of slabs bearing Christian inscriptions of early dates. This church was repaired in 847, 855, and again in 1100. The pavement of the chapel of S. Zeno in S. Prassede appears to be the original one (of early IXth century), and shows an undeveloped form of the usual XIIIth century motifs. At S. Lorenzo fuori the pavement of the choir is of the same date as the platform of the altar, the ciborium over which is dated 1168. Many others might be named, such as the large churches in Trastevere, S. John Lateran (rearranged and repaired by Martin V.) and S. Clemente, reconstituted by Anastasius the Cardinal between 1100 and 1130). Outside of Rome attention may be drawn to the early pavement in S. Pietro, Toscanelia; to the fine pavement in the cathedral at Spoleto,

executed in 1207 by Solernus, and signed by him; to the splendid transept pavement of the cathedral at Salerno, and to the rather later example at Sessa Aurunca, which is particularly inventive in the interweaving of the bands; but, indeed, there are so many fine Italian examples that it is impossible to mention them all. At Canterbury and Westminster are pavements which imitate the Italian type. The Westminster marbles were sent from Rome about 1267, after Richard of Ware returned from that city; his epitaph says, "hic portat lapides quos huc portavit ab Urbe." The Cosmati family produced much fine work of the kind; the cathedral at Anagni is a typical example. Here the crypt also was paved in 1231 by Cosmas and his two sons, Luca and Jacopo. A few fine examples are to be found at Palermo, where Arab influence is felt in the greater complexity of the geometrical structure of the interweavings of the pattern.*

THE ARCHITECTURAL ASSOCIATION: ANNUAL GENERAL MEETING.

The first meeting, the annual general meeting, of session 1906-07 of the Architectural Association was held on Friday evening last week, at Tufton-street, Westminster, S.W. Mr. R. Sheekleton Balfour, President, in the chair.

The minutes having been read and confirmed, seventy-nine nominations were read, and the President announced the reinstatement of Messrs. E. W. Poley and E. W. Sloper.

Donation of Lantern Slides.

The President said he desired to move a hearty vote of thanks to Dr. Pritchard, of Hampstead, for a donation of several hundred lantern slides and negatives, which includes an excellent set of Indian architecture, as well as Italian, Dalmatian, German, and English.

Mr. Hugh Stannus said he had had the honour of being the means of suggesting to Dr. E. Law Pritchard that he should make this munificent gift. The late Mr. William Law Bros. of London, a member of the Camera Club—where he often showed his lantern slides, thus imparting to others the pleasure he had felt before the originals—was a man of great energy, who had retired from business. He was not only a very active member of the British Association, attending all their meetings, but he used to devote himself particularly to the archaeological or architectural side of their work. No distance was too great for him to travel if he could bring back negatives of architectural objects, and the result was that he accumulated considerably over a thousand negatives, many of which he made into slides that the Association was now the richer by. It was a munificent gift on the part of his nephew and residuary legatee and executor, who desired only to be satisfied that this was an Association existing for educational purposes. He (the speaker) sent him the "Brown Book," and he thought that had the desired effect. If Dr. Pritchard had been there that evening he would have seen how his gift was appreciated, and he (the speaker) hoped that his gift would be the means of inducing others to emulate so praiseworthy an example. They all knew that the Association was supported mainly by voluntary contributions and voluntary action, and it was very desirable that those who sympathised with that kind of work should make similar gifts in the future. The vote of thanks was heartily agreed to.

Distribution of Prizes and Medals.

The President then distributed the prizes and medals for session 1905-06 as follows:—

A. A. travelling studentship, value 25s., and silver medal, A. Winter Rose; second prize, value 5s., E. Brantwood Muff; A. A. medal, value 10s. 10s., T. W. Watkins; A. A. essay prize, value 10s. 10s., and silver medal, G. Sanderson, Banister Fletcher Bursary, value 25 guineas, and medal, Cecil Pinnett, Savon Snell scholarship, value 50s., Vincent Hooper, Architectural Union Company's prize, 10s., R. C. Foster.

School of Architecture.

Elementary Class of Design: Prize, value 3s. 3s. and bronze medal, Percy May; certificate, H. P. I. Cart. Advanced Class of Design: Prize, value 4s. 4s. and bronze medal, J. L. S. Dahl; certificate, A. H. Brownrigg. Day School, First Year: Book prize for first place in history and construction tests, G. F. Clarkson; A. A. sketch book for first place in free-

hand drawing tests, G. D. Gordon Hake; book prize for best work in studio during whole session, L. Keir Helt. Day School, Second Year: Extra Studentship, free pass to third year's course, G. Sanderson; travelling studentship, 15s., P. A. Tilden; end of session test, special prize offered by Master, P. A. Tilden, Evening School, Third Year: First prize, P. C. W. Bakers; second prize, A. N. Beck; third prize, T. F. W. Grant. Evening School, Fourth Year: First prize, A. Wetford and J. K. Ground, equal; second prize, B. H. Collett; Andrew Oliver prize, P. C. W. Bakers; book prize, W. C. Sanderson; time sketches, book prize, H. A. Ross; Studio Scholarship, value 5 guineas, H. A. Ross; Studio Travelling studentship, value 15s., T. Braddock; Studio, Division I.: Drawings of old work, volume of A. A. sketch book, F. D. Batters; construction, volume of A. A. sketch book, F. D. Batters; study of ornament, volume of A. A. sketch book, N. W. Hadwin; design, volume of A. A. sketch book, J. F. Schneider; book prize, Sir Rupert Ford, Bart.; drainage and water supply, book prize, Sir Rupert Ford, Bart.; ventilation, lighting, and heating, book prize, Sir Rupert Ford, Bart.; professional practice, book prize, C. E. Harrison; and study of ornament, R. J. Tynan.

Lectures.

Greek and Roman architecture, book prize, G. G. Leith; elementary construction, book prize, H. D. Leith; English architecture, book prize, J. Newton; Medieval and Renaissance architecture, book prize, G. Sanderson; elementary physics, book prize, W. Craven Rhodes; geometry, book prize, R. Pierce; materials, book prize, J. F. Schneider; construction, book prize, Sir Rupert Ford, Bart.; iron construction, book prize, Sir Rupert Ford, Bart.; drainage and water supply, book prize, Sir Rupert Ford, Bart.; ventilation, lighting, and heating, book prize, Sir Rupert Ford, Bart.; professional practice, book prize, C. E. Harrison; and study of ornament, R. J. Tynan.

Mr. C. Wontner Smith, Hon. Secretary, announced that a meeting of the Camera and Cycling Club would be held on Tuesday, October 16, at 8 p.m., when a paper would be read by Mr. H. W. Bennett, entitled "A Visit to the English Cathedrals." He also announced a meeting of the Discussion Section for Wednesday, October 17, at 7.30 p.m. A paper would be read by Mr. M. G. Pechell on "Motor Garages."

President's Address.

The President then delivered the following address:—

Fellow-members of the Architectural Association, Ladies and Gentlemen.—The approach of autumn, and with it the first general meeting of a new session, awakens in your President for the time being a full sense of the obligations and responsibilities which his acceptance of that office entails.

As each succeeding year passes, the scope of our energies and all the various threads which weave the fabric and the ultimate history of our Association embrace a continually wider and more extended sphere, thereby adding, not only increased duties, but greater honour to the position to which you have elected me. It must, therefore, be my first duty to thank you, gentlemen, for your confidence in my abilities to occupy this chair. All my colleagues on the late Council will remember my reluctance to permit my name to go forward to you as their nominee, and I had at least two very good reasons for my justifiable hesitation. For one thing, I was very sensible of how many there were among my coadjutors who, though they possibly may not have been in all cases so long and actively connected with the executive work of the Association as I have been, were, nevertheless, infinitely better qualified to be your President. The other reason confronted me when I looked through the list of the numerous distinguished names among my forty-nine predecessors in this chair.

The Association has hitherto been singularly fortunate in the choice it has made of men to guide its destinies, and having such a tale of names to ponder over, each new President must naturally feel some considerable diffidence and anxiety as to how he may exhibit himself in a post which, as I have already indicated, becomes year by year more exacting in its claims and onerous in its responsibilities.

The success or otherwise of a President's term of office depends, not merely on his personal attributes and qualifications, but, of necessity, it is very largely influenced, indeed, by those who share with him the burden of the day, and on the loyal co-operation and support which they afford him.

If the Association has been fortunate in its choice of Presidents in the past, it has been equally lucky in securing the services of a good Committee. From what I have seen of the present Council, I believe that they are, one and all, actuated by the traditions

* To be continued

inherited from their forerunners. We are this year all as determined as ever to be of one mind, animated by one single purpose and ambition, namely, the continued and increasing welfare of this Association. If this good fortune always obtains, then I for one can see no limit to its era of prosperity and expansion. It possesses within itself all the needful potentialities. Its vitality has been unimpaired, nay, even fostered, by the lapse of six decades since its strenuous inauguration in the forties. If it were not for this belief of mine in the present Council whom you have elected to represent you, and my absolute confidence in their loyalty, I would not be addressing you in my present capacity to-night.

Changes in Personnel.

My next and pleasing duty is that of inviting you to bear in mind—though I am sure no reminder from me is needed—how much we all owe to our late President, Mr. Guy Dawber. His occupancy of this chair during the troubled times of our settling down into occupation of our new premises, his unflinching attention to all his varied duties, his rare tact and diplomacy in dealing with the inevitable difficulties which beset the government of a Society of the size and importance of this Association, are perhaps better known to his colleagues on the Council than they are beyond that small but hard-working body. But I know that outside that section to the ordinary members at large, Mr. Dawber's most interesting and useful as well as eloquent addresses, the wonderful energy he displayed in his efforts to free the Association from the fetters of its financial liabilities with such conspicuous success, and perhaps more than all, his good comradeship and the zeal he showed for the welfare of each branch of the Association and its work, will be long remembered by us all.

Almost without exception, so far as I have been able to ascertain, our Presidents have been modest men, and I recognise that I shall best consult Mr. Dawber's comfort by abstaining from saying anything more about him. Moreover, Mr. Dawber has had the one reward sufficient for all our Presidents, namely, to be able to view with equanimity the increase of prosperity concurrent with his term of office, and the certain knowledge that he has vacated this chair having made no enemies, but all of us his friends.

There are other retirements from the Executive which should be chronicled. Mr. Francis Hooper, our late Treasurer, who has been so unwearied a member of the General Committee and Council for so many years, is seeking some repose (we all hope only temporarily) after the care of the coffers of the Association and the collection and distribution of their contents. Though Mr. Hooper no longer acknowledges our subscriptions or calls our attention—as the case may be—to their belated appearance, I am sure we are all agreed that each one of us owes our late Treasurer a very considerable sum in the shape of a heavy debt of gratitude.

Mr. Henry T. Hare, one of those distinguished past-Presidents of ours, has, as you all know, undertaken to administer our finances, and we shall expect him, as our Chancellor of the Exchequer, to look after them in the mastery fashion that his past record entitles us to expect from him.

The resignation, through ill-health, of our Hon. Secretary, Mr. Maryon Watson, we all deplore, but our regret is mitigated in that he is still able to retain his seat on the Council. Perhaps Mr. Watson will permit me here, on your behalf, to congratulate him on his recent entry into the estate of holy matrimony.

Among other retirements from the present Council list is that of Mr. W. A. Pite, who has been such a zealous supporter of the best interests of the Association, and a constant attendant at the deliberations of the Council and the various Committees connected therewith. Messrs. J. S. Gibson, E. A. Rickards, J. MacLaren Ross, and W. A. S. Pettit we shall also miss, but this is, of course, the inevitable result of a fixed determination on the part of our members to annually import fresh blood into the body of the Executive. That is certainly an excellent theory to adopt in practice, if only it did not deprive us of the services of so many useful adherents. The various vacancies thus caused

have been filled up by other men, some tried, some untied, but I feel certain they all come prepared to sacrifice themselves in the cause of those traditions of which I have spoken. I can assure them, and those of you as well who aspire to fill some post of office, that we spare ourselves no pains to make our duties as exacting as possible in your interests.

Of our permanent officials, I may claim to speak with some knowledge, having, as it were, been behind the scenes for a good many years. It was during the four years when I was your Hon. Secretary that my duties brought me very intimately into touch with Mr. Driver and his able and hard-working lieutenants, and I then very soon became aware that few societies are as well served as we are, and certainly none are better served. Like our past-Presidents, Mr. Driver is also a modest man, and so, if he generally hides the light of his zeal beneath a very opaque bushel called "the course of daily routine," the after-results of the work he does with such energy and determination are plainly visible to those who seek their origin.

Before we entirely quit this matter of the changes in our personnel, I feel sure you will expect me to mention, among other retirements, the name of one who has been so closely connected with the student section of our members, and to whose influence and teaching many of you owe so much. You all know that we hope shortly to take the opportunity of expressing tangibly to our friend, Mr. W. G. B. Lewis, our great appreciation of the services he has rendered to us during the last thirteen years, not only to the Educational Section and also to the Sketch Book, but in many other directions as well, and, personally, I should be reluctant to let this opportunity go by without this brief word of acknowledgment to him. Mr. G. H. Jenkins, who so well assisted Mr. Lewis in his work here, has also retired.

Then we are losing our instructor in modelling, Mr. F. W. Pomeroy, owing to the greatly increased calls on his time since his election to the Royal Academy, and we tender our hearty congratulations to him on the honour conferred on him by his fellow-artists, and our sincere thanks for his services to us in the past. If it is pardonable to introduce a personal note into this address, I would like to regretfully mention the fact that, unfortunately, I have never been able myself to attend the classes of the Association, with the one exception of a course of instruction under Mr. Pomeroy, some few years ago. I shall always remember the fascination with which we watched the dead clay spring into life under his supple hands. It is curious—amazing, in fact—that the modelling class is not one of the most popular we have. The utility of even a rudimentary knowledge of the treatment of clay, that sense of mastery and command one instinctively feels over the substance, and the importance of being able to demonstrate in a practical manner our requirements, or to make alterations when models come to be submitted to us for approval during the execution of our work, should appeal immediately to us all. Remember it is no less difficult to describe form than it is to describe colour, and to get what we want, we must learn to express ourselves intelligibly to those who take their instruction from us.

While talking of the interesting and excellent work of our instructors, I think we ought to congratulate Mr. C. de Gruchy, an A.A. man, and one who has done much invaluable work in the past among our students, and on various committees as well, on his recent appointment to the mastership of the newly constituted Royal Academy Architectural Schools. We may, I think, congratulate ourselves, too, on the success of one of our members attaining such an eminent position, because I think Mr. de Gruchy would be the first to acknowledge the utility of the experience he gained with us.

Growth of the Association.

The current session completes the sixtieth year of the formation of our Society, and I suppose this fact, at any rate, entitles me to draw your attention very briefly to its progress, specially during the last decade. When we celebrated our jubilee in 1897 we had a membership of 1,111, and our subscription receipts for that year amounted to

841l. In the nine years which have elapsed since then, our membership has gone up by one-third, and last session we had 1,661 members, and the subscriptions that year were 1,406l. We commence the present session with a roll of members numbering more than 1,700, and we may, I hope, be well over 1,800 before the session terminates.

That is a very satisfactory position of affairs for us to contemplate, and it is surely a very remarkable testimony to the vitality and utility of the Architectural Association, notwithstanding the disquieting prognostications indulged in from time to time by some of our younger members, and by a handful of those members whose very lives appear to have been soured, because (mercifully for themselves if they knew but all) they have been spared by fate from the cares and worries inseparable from prominent positions in the governing body.

During the last session 157 members were elected or rejoined our ranks, while, unfortunately, deaths and resignations claimed 106, leaving a net increase of fifty-one. The hand of death has been laid more heavily upon us than usual this last year. We have quite recently lost one of the former occupants of this chair in the late Mr. J. Christian, who was President in 1864-65. Mr. Christian joined the Association as long ago as 1849. He was, I think, at the time of his decease one of our oldest living members, and may well share with Mr. J. W. Penfold, who joined in 1848, and was President in 1859-60, and Mr. J. P. Seddon, who joined in 1847, and was Hon. Secretary in 1850-51 (the former of whom is still with us), the proud title of Father of the Architectural Association. Death has also claimed Edmund Wood Thorpe, one of our Vice-Presidents in 1892-3, so suddenly cut off in his very prime, to the lasting regret of his many friends. Since our last Report was issued, Mr. Alfred Waterhouse, R.A., has also gone from us, perhaps the most distinguished of all those whose names will not again appear in the roll of members in the Association "Brown Book."

My remarks have been, so far, more or less a review of our past and present position. I will say something now about one or two matters of importance to us all as members of a large Society.

The Building Debt.

At our last annual dinner a humorous friend (I think it was Mr. F. D. Clapham) made an unexpected and, I am bound to say, quite unofficial addition to the programme, and proposed a very serious and portentous toast, "Death to the Building Debt." Notwithstanding that the reception meted out to this toast indicated its astounding popularity, I regret to say this incubus for whose departure we all so ardently long, continues, like the poor, to remain with us. I am glad, however, to report that the patient grows steadily weaker, and that his life is slowly but surely ebbing away. The means by which we have hitherto sought to bring about his complete annihilation have also almost come to an end, and latterly we have only been enabled to administer such homœopathic doses as those little silver piles of the "Purple Patch" Shilling Fund—drugs quite inadequate for the purpose we have in hand. There may possibly be few occasions when murder is legitimate, even praiseworthy, but, gentlemen, I want you to be my accomplices in ridding ourselves from the fetters of this tyrant. I want to vacate this chair and hand it over to my successor, feeling that we have set our "house in order," that our roof trees are our own, that the floors on which we tread are honestly paid for, and that the walls which encompass us are secure from the depredations of unsatisfied creditors, and that with a grateful contentment we may contemplate our habitation in this historic region for a thousand years to come. I wonder how many of you are aware that if each member of the A.A., who has not already done so, contributed only 15s., this 767l. debt of ours would to-morrow morning be an incident in our bygone history. It seems to me incredible that, in a Society like this, composed of units all desirous of a common purpose, a Society free from all cliques and schisms, a Society individually, and collectively, entirely loyal to their foundation, we should have to deplore the apathy of those 1,032 members

who have hitherto forgotten or overlooked the appeals of our late President and Council, and whose lethargic consciences have permitted them to disregard their imperative obligations. I would the more urgently invite you all to help in the riddance of this millstone, because such a comparatively trifling amount is now alone required. I would particularly ask the younger members to subscribe even small amounts, because the senior members of the Association, who have but little time to make use of the advantages it affords, have, in many instances, already contributed so handsomely. I am a little doubtful if the juniors among our ranks quite realise how much they are indebted to those who have so unselfishly provided them with such benefits. Remember that the older members, although they may be more able to subscribe, are, with the characteristic self-sacrifice in the cause of art which distinguishes our calling, tending, as it were, to set a rope about their necks by enabling their younger competers to enter the lists of active business competition better equipped and at an earlier stage in their professional life. Self-help is a great and worthy doctrine, and one which we should all cultivate. Let me, therefore, ask you younger, as well as older members, who have not already done so, to subscribe to the extinguishment of this debt, and thereby help yourselves, and do your duty by helping in anticipation those who will come after you.

It was suggested to me, in one of our publications, I think, that when I took up the reins of office I must see to it that the welfare of the younger members, who use these premises more or less as a club, should have greater attention, and that things should be made more agreeable and comfortable than they are. I do not think any of you have been more fully alive to the need of improvement in this respect than I have been. I may tell you that I have once tried to read the professional journals here. I have once endeavoured to write a letter here, and I have on one occasion sampled the fare provided by the refreshment department. Having embarked on these courageous experiments, I am fully impressed with the fact that our shortcomings are many, and, in some instances, even great. Improvements to be lasting must be gradual, but I think when I tell you that the Council has recently appointed a House Committee to deal with all these crying evils, you will hold with me that it is a step in the right direction.

But we cannot do much until we are absolved from our financial liabilities, and when I again remind you that, roughly, only 37 per cent. of our members have subscribed, you will agree with me that we should all strive to induce the remaining 63 per cent. to contribute to the abolition of this debt without delay. Funds will then be available for making our abode here more inviting, but I would personally go further and say that I look forward to the time when our premises may comprise a complete and regular clubhouse for our members. It rests with you, gentlemen, to inaugurate that happy day.

Beside this, there is another motive to be considered in our endeavours to annul our indebtedness; a matter of some urgency. It appears to me that, in the future, and I believe that date is not far distant, we shall be compelled to seek means by which we can make our education and social facilities occupy a larger area than at present. The demands made upon the Association render it necessary that we should be in a position to supply the needs of our students and others. If we desire to retain them within the precincts of the A.A. How these things may ultimately be accomplished is as yet in the lap of the gods, and I have merely mentioned this matter because I wished to point a moral to the tale of our finances.

We have now been sufficiently long at Tufton-street to feel confident that our removal here has really been popular, notwithstanding the gloomy forebodings of many of our friends who presumably sojourn in the more remote regions beyond the northern confines of Oxford-street. It is astonishing how one's personal convenience creates an insurmountable obstacle of prejudice. To change the location of an old-established tree like the Architectural Association, to pluck it up by the roots of half a century's growth, to transplant it from the heights of Great

Marlborough-street and set it down again amid the marshes of Westminster, is a critical and dangerous experiment. Your Council feel that this step, which, after so much anxious thought, they decided to take, with your approbation, has been very fully justified.

At the risk of a reiteration, which, after this lapse of time may be wearisome to Mr. Maurice B. Adams, I would like to say once more, now that our position is assured, how much we are indebted to him for the services he has rendered the A.A. at a time when it was fully ripe for expansion of its premises.

The Day School.

The A.A. Day School, that young but vastly vigorous seedling, in which the Association feels the proud proprietorship of parentage, is already bearing good fruit, and it has, moreover, assumed a prominent position in our daily life here. Its progress has been as phenomenal as its success was immediate, and Mr. W. H. Seth-Smith, who initiated the school during his term of office as President, and to whose inception it was due, can scarcely, even in his most sanguine and exalted moments, have realised how amply he was providing that which has since proved to be a long-felt want as a preliminary to the young man's office life.

What food for consideration the following figures suggest.

In session 1903-4 there were	32 students.
" 1904-5 "	42 "
" 1905-6 "	63 "

and we have started the current session with sixty-five students with the immediate prospect of several more joining, so that we anticipate having an increase of at least ten this term. Now, I want you to understand that these figures by no means represent the grand total of students whom we might have on our books if we accepted all the applications we receive. In the first place, our accommodation is limited, and we are by no means desirous of crowding our students. We are not a money-making concern, and therefore our sole wish is to give the best instruction we can under conditions as favourable as the exigencies of the case permit. Besides, we are ambitious to have only the best men in our schools, and we hope that the mere fact that a student has been admitted will, in the future, be a guarantee that he has been previously equipped with a proper general education. I shall have something more to say as to this vital matter later on.

The Evening School.

Our evening school, under its new conditions will, we fully believe, establish itself firmly upon an even more permanent basis than hitherto, now that it has been brought into a line more fully approximating with the requirements of our general scheme. In the past it has been a complete success, and it is difficult to see how it can in any way be impaired by the rearrangement of its curriculum. The Council had every confidence that Mr. T. Frank Green would achieve this goal, and the fifty who have already joined distinctly indicates that they have not been mistaken. One is glad to think that so many of our students attend our evening school and lectures; and they are more worthy of commendation than those who attend the day school, for it is no light effort to summon up courage, after a hard day's office work, to attend the instruction given here, at hours when others are seeking relaxation and amusement. Such enthusiasm brings in the end its own reward, and even at the time it tends to gratify that primitive instinct of satisfaction within one, of, as it were, stealing a march on others.

There has been much questioning in the past, and even of late, as to how a young man can best set out on an architectural career—whether he should enter an office as a pupil at once, or whether he should do so after undergoing his course of study here. The Council of the Association approved of the day school scheme because they were convinced of its desirability. Of course, my colleagues thereon will, I feel sure, give their assent if I say that we do not consider ourselves infallible. But if you scan the list of our present and past day school students you will find there many patronymics strikingly familiar in the architectural world, because they are those of the sons and nephews

of some of the most distinguished architects in Great Britain. That, I think, is a sufficiently unbiassed tribute to convert even the most bigoted sceptic, and it is, moreover, a practical form of approval most flattering to the Council, in that it not only vindicates the views we ourselves have in the worth of our curriculum. It also exhibits the confidence of those best able to form an opinion of the ability of our instructors to lay that firm and sure foundation on which we hope each of our students may raise unto himself a pinnacle of fame. Further than this, if additional testimony be needed, the Board of Examiners of the Royal Institute of British Architects has, within the last few months, agreed under certain conditions, of a by no means onerous character, to exempt from the Intermediate examination those of our students who have successfully passed through our schools, thus enabling them to proceed direct to the Final examination, which qualifies them for their Associateship.

Curriculum of the School of Architecture.

Anyone who has taken the trouble to examine in detail the recently published curriculum of our School of Architecture must have noticed a very extensive revision in the courses of instruction. The experience we have gained by past years, those wider and ever-increasing needs of the profession, and the demands made upon us by those who come to us to be taught, have caused your Executive, after careful inquiry and a very full and complete investigation into the numerous suggestions and proposals laid before us, to adopt without any drastic modifications the new scheme prepared with so much care, and after an expenditure of a vast amount of arduous labour, by the Education Committee, who, I can assure you, gentlemen, have, during this last summer proved themselves veritable gluttons for work. To us it is a gratification to know that a practically unanimous chorus of approval from our instructors, has sped our new propaganda to the hands of those for whom it has been drawn up, and so far I have heard nothing but the most favourable expressions from those architects and others who have in the past shown so much solicitude in our educational work.

We do not claim that our new syllabus is perfect, for an entirely reconstituted scheme such as that which we have just propounded must, of necessity, from time to time need those little finishing touches which it has not been possible to entirely foresee. But we feel sure that we now have the machinery of a complete organisation for a progressive, thorough, and yet succinct course of study, which is bound to commend itself to all our students, as well as to those who have the best interests of our future architects at heart.

Examinations.

We have, as you know, all along set our faces resolutely against the idea which some few misguided individuals hold, that our educational work is a crumming apparatus for the administration to unwilling or mentally deficient young men (whose parents think they will make good architects because they are incapable of doing anything else) of those few but needful formulae of which some knowledge is required at the R.I.B.A. and other examinations. I think we may congratulate ourselves that our revised arrangements will not encourage that idea. Pray do not assume I am belittling examinations. On the contrary, I, for one, hold that they are advantageous in a great degree. Not merely is the successful passing of them more or less a guarantee to the public that the architect they employ has, at all events, a rudimentary knowledge or acquaintance with some of the practical essentials of his calling, but, besides this, the zest imparted to study with a definite object in view, such as an Examination, should add what our American friends expressively call "ginger" to a class of students.

Competition with other Schemes.

The undoubted success of our schools will very likely bring us face to face with competition from other quarters, but I do not think we should regard this contingency with resentment or alarm. Indeed, I venture to think we should rather welcome it. It should stimulate our students to endeavour to

distinguish themselves and their Alma Mater more highly. It will goad the Education Committee to continue and persevere in their intention to see to it that the Association school shall always occupy the premier position amid any other institutions of like character. Moreover, even if competition does injure us, we shall, at all events, have the satisfaction of knowing that it all tends to the general advancement of that art which, in reality, fills so large a place in the daily life of mankind, and yet is so strangely neglected by them.

Proposed Life Class.

In drafting our new educational scheme, the Council feel that they have by no means come to the end of their tether; they have still many directions in which they would like to enlarge the scope of their enterprise. It is not for me to go into matters of detail of this kind on the present occasion, nor have I any mandate from the Council to do so. There is one branch of study, however, which I think personally might well form part of a post-graduate course, which we hope shortly to institute, and I believe that several, if not many, of my colleagues on the Council would welcome the addition of a Life class to our curriculum. It is true that the proposal strikes one as being a great innovation, and we should very likely, I think, have to combat some opposition. I believe, however, that such opposition, if it did come, would emanate from those whose misfortune it has been not to have experienced the advantages of such a course of study. After the cramping hours at the office drawing-board, and the dull restraint and monotony of the T-square and pencil bows, the microscopic plotting of exact dimensions, and all the wearisome but necessary detail work demanded in our working drawings, what a relief and freedom it is to find oneself standing at arm's length away from one's easel drawing large with free bold strokes of charcoal or crayon, the subtle, entrancing, ever changing curves and outlines of the human form. However anxious I am to see this class a recognised addition to the list of subjects we teach here, I cannot be oblivious to the fact that, at the present time, there are difficulties, very good obstacles indeed, to its introduction, but, in my opinion, they are difficulties of accommodation and finance, and nothing else. So, gentlemen, I would say again, and for the last time, you must clear off that building debt before we can make a move to introduce what I believe would come to be a very popular and really an urgently-desired addition, among others, to our syllabus.

Social Status of the Profession.

In the last few years, and curiously coincident with the inauguration of our day school, it has been brought to one's notice—indeed, it is patent to us all—that our profession, through the medium more especially of this Association, is being recruited from a section of the community of a better social status. That is a feature which we all welcome gladly. We hear a good deal about the proper recognition of our calling by the Press and public. It is far too trite a subject for discussion here, so I will merely say this, that, if our profession does not meet with its proper deserts, we and not the public are to blame, and it lies with us to see that we only admit to our schools men who will be well calculated to uphold the dignity of the art of architecture. Our day school students come, for the most part, from the great public schools, and are often graduates from our Universities. But that alone, of course, is not necessarily any guarantee of their suitability.

Standard of Education of those Entering the Profession.

Some years ago, when I was an Hon. Assistant to the Board of Examiners at the Royal Institute of British Architects, I was greatly surprised at the remarkably poor standard of general education evidenced by those who presented themselves for the Preliminary test. Now, a boy who comes up for this examination is presumably one who has left school and is about to enter on his professional career. I would like to ask him how he expects in the future to find time to make himself conversant with those common facts that in so many instances he omitted to imbibe during his school days. Certainly "architecture" will never substantiate its claim to be embraced within the

ranks of the "learned professions" if we accept as embryo members young men who come to us with educational qualifications of such a lamentable order. Now, gentlemen, Mr. Maule, the head of our day school, whither, as I have said, most of our students come direct with the lustre of a great public school or the 'Varsity, often finds much deplorable evidence of inefficiency in the most elementary general knowledge, and much ignorance of the most ordinary attainments requisite to enable a man to occupy even a humble station in the ranks of the profession he is anxious to join. It would be interesting to know if, in other spheres of professional life, the same disabilities are to be found among those who seek to enter them.

I cannot for one moment entertain the idea that guardians and pedagogues really deem the profession of architecture a suitable dumping-ground for the dunces. Now, I happen to be well aware that, under the tuition they receive here, our students, without loss of time, prove themselves in almost every case to be as able, intelligent, and enthusiastic a set of fellows as I think you could discover in almost any other educational establishment of a like nature. That being so, and I say it without fear of contradiction, it seems to me that we are entitled to make a grave indictment against the education which the better class schools of this country offer, and the training they provide. The scholastic upbringing in many of these expensive establishments is very often in finitely less suitable to fit a boy for his pilgrimage through life than the practical broad and commonplace foundation of general knowledge which our board schools inculcate. I could give you amazing examples of incompetence from some of those who seek admission within the portals of our schools, armed with the recommendations and testimonials from their late head-masters. Surely one feels entitled to expect that such documents should, at all events, be a fairly accurate representation of facts, and more or less a guarantee that their late charges have some sort of proficiency in matters of common knowledge. At the present time, Mr. Maule often finds it necessary to give the candidate for admission to our School of Architecture a negative reply or the option of spending another year of his life in seeking general information, before he begins to specialise here. But I hope we shall soon find a means of depriving Mr. Maule of this ungrateful duty, one which I do not think he or anyone of those in authority had in contemplation when he was appointed. I should like to see a regular entrance examination instituted here before we admit applicants. And I know our instructors will agree with me when I say that this examination might very well be of a more advanced character than the very elementary Preliminary test at the Royal Institute of British Architects.

Offshoots of the Association.

Considerable activity has been shown during the last few months among the junior ranks of the Architectural Association, resulting in the establishment of various societies under the aegis of the parent tree. The Council welcome the formation of these societies for many reasons, but chiefly because they tend so effectually to increase and cement the comradeship which has always been, to some extent, a feature in the career of this Society, and a characteristic which is surely capable of even greater prominence. The recently-founded Athletic Club and the Musical Society are both notable examples of what I mean, and we have every reason to anticipate their permanent success if we may regard their present flourishing condition as a criterion.

Architects do not, I fear, as a rule display a very brave record in the athletic world. But there are exceptions, and if our Vice-President (Mr. Walter Cave) will permit me to cite his name as one example, I think you will agree with me that there is no reason why a very distinguished athlete should not, in the fullness of time, become a no less distinguished architect. All exercises which absorb wholly our physical energies and monopolise our attention for the time being from the ever recurrent mental contemplation of the problems of bricks and mortar, quite apart from the beneficent influences of meeting our fellows away from the environment of what we term "shop" can-

not fail to strengthen our bodies, and sweep away the cobwebs which the narrow groove of our professional duties often permits to accumulate over our broader intelligence.

The Rifle Club is another offshoot which has the appearance of becoming a very popular and robust institution, and I am glad to take this opportunity of announcing that it will be formally inaugurated by Lord Cheylesmore on the 27th inst. One would imagine marksmanship should be a strong point with a body of men who, like ourselves, require an accurate eye, a steady hand, and who deal so much in straight lines. As to the patriotic point of view, I need not speak.

The Musical Society I need not commend to your attention. I can say with confidence that it will make itself "heard" in the annals of the Architectural Association. We have pleasurable recollections of it in the past, and we look forward to hearing a good deal more of it in the future, for we are satisfied that it may always be relied on to add "harmony" and give "tone" to our public gatherings.

Music has been acclaimed as the art most nearly in alliance with our own, in that it is a creative art, and not, as painting and sculpture are, largely imitative in character. Moreover, what other form of art, except our own, can give at the same moment so much pleasure to ourselves and to so many others? It was, therefore, with great pleasure that I accepted the invitation of our Musical Society to act as their President for this year, and I trust that all future Presidents of the Architectural Association may be invited, and may see their way to undertake the same agreeable task. May I counsel all of you who rejoice in sweet sounds to lend your aid?

Admission of Ladies as Members.

And now I have only one other subject directly connected with the Architectural Association on which I should like, with your permission, to say a few words. It is a somewhat delicate matter, and one which should be handled, if it ever comes before you again, as I believe it will, with more tact, and, if I may say so, with a greater degree of urbanity than it met with some years ago. From time to time your Council receives requests from ladies desirous of becoming members or of attending classes. These applications we are obliged to decline, because you, gentlemen, voted resolutely in opposition to the proposal for their admission as members. Your decision at that time was of such a determined character that we have hesitated to raise the question again. I, for one, have never been convinced of the cogency of the arguments brought forward, and it has always seemed to me on that one occasion in its career the Association fell away from its vocation, betrayed its traditions, and adopted a policy distinctly reactionary in character. Since 1893, however, times have changed; the female sex has, with its charming insistence, ingratiated itself into many spheres which have hitherto been regarded within the sole prerogative of man. Even the Royal Institute of British Architects has admitted ladies within its jealously-guarded portals of membership, they have invaded the offices of many architects, and from what I can gather all the prophecies of disaster have remained unfulfilled. On the contrary, my inquiries convince me that the converse is the case, that more steady work is the result, and that the beneficial restraint that a woman's presence commands has elevated the tone of those offices. It seems so often forgotten that when members of the other sex are ready and anxious to quit the unobtrusive duties of the domestic hearth (and, being a bachelor, I yield to no one in my belief that this is their most charming vocation) and are prepared to embark on the uncertain and generally troubled waters of an office life, they must, of necessity, be endowed by nature with such qualifications of determination and self-reliance as will enable them not only to take care of themselves, but have regard for the welfare of those with whom they are brought in contact. There are, I believe, many of our members who share my views on this matter, and I can name at least one architect of eminence who sternly refuses to capitulate to the blandishments of the Council and join our ranks, until he can enjoy with the fair sex equal advantages

of membership. Perhaps I ought to add that my distinguished friend is, like myself, a bachelor. We welcome ladies to our meetings; our conversation without their presence would be an entertainment of intolerable gloom; at times they have been known to grace our spring and summer visits with their presence; and yet when they sigh to partake of the more serious side of the Association's work you sternly and even brusquely refuse to listen to their appeals. Surely the electorate of to-day in this Society cannot be misogynists, with such hard and unrelenting natures as the electorate of their ten years ago! I believe that if we took a vote on the subject now, we should find you all prepared to adopt the fashionable "open-door" policy, and be ready and anxious to welcome, metaphorically speaking, of course, the fair intruders with open arms.

The Association.

Gentleman, I have dealt at length, at perhaps too great length, with the strictly personal affairs of the Architectural Association, but I do not apologise to you, for this occasion is one of the few—indeed, I may say it is practically the only opportunity we have during the session of saying anything about the past, the present, and the future of this Society and all the possibilities before it. Besides, I hold, rightly or wrongly, that these affairs of ours should not be without interest to our own members, and if there are present here to-night any who do not belong to the Association, I see no reason why we should not try to enlighten them a little as to what we are doing, particularly if thereby we may encourage those who are eligible among them to come within the fold. We have no desire in this Society to advertise ourselves by exhilarating details suitable for the appetite of the daily Press. We are content to do our work quietly, unobtrusively, and without those sumptuous adornments which we sometimes see spread forth to catch the public eye. We are, as I have said, a body modest in bearing, our home is placed in a quiet and unpretentious neighbourhood away from the passage of the throng; our walls may be simple brick, but they are good, sound walls enclosing a hive of zealous industry and enthusiasm for the cause of what we, at all events, deem to be the "greatest of all the Arts." For myself, gentlemen, I believe that in some by no means inconsiderable degree our country's future architecture is being forged day by day within the boundaries of these four walls, and that in course of time the coming generation of architects will be imbued more largely with the spirit of our motto, "Design with Beauty, Build in Truth."

International Congress of Architects.

I do not propose on this occasion to say very much about the architectural happenings of the past year. Of course, in London the great event has been the seventh International Congress of Architects. It is not within our province, nor is this a suitable assemblage for the discussion of the results it has attained, and the disappointments of some of its procedure. These will, of course, be dealt with by competent authorities, and in their proper place. So far as we are concerned with it here in the Association, it may interest you to know that although we, as a body, were unable, owing to the strain we have recently had on our resources, to take any official part in extending a welcome to the Congress, over 330 of our members, including "their sisters, their cousins, and their aunts," attended its entertainments and deliberations, out of a total membership (for the United Kingdom only) of about 864. That, I think, is a sufficient indication of our sympathies. Moreover, we had many informal opportunities for the exchange of information, particularly with regard to matters of architectural education, both at home and abroad, with our foreign friends, and I had the pleasure of helping to conduct Professor Otto Wagner, of Vienna, the distinguished Austrian delegate, in whose capital the next Congress will be held, over these premises when our students' drawings were on exhibition.

Palace of Peace Competition.

Another event in the architectural world since the last Presidential address was given from this chair has been the International Competition for the proposed Palace of Peace

at The Hague. If the results of this competition were not such as we could feel unqualified satisfaction with in this country, I trust it will not merely be put down to insular prejudice on our part, engendered by the melancholy fact that none of our British competitors appear in the winning list.

The London County Council Hall.

We in this great metropolis will shortly, as you know, be holding a great competition for the London County Council Hall. The London County Council, with that cosmopolitan benevolence which has so distinguished them since the interchange of visits with our charming neighbours across the Channel, has opened wide the competition lists, and invites all the world to tell the Londoner what his architecture should be like.

I trust, and I believe all, or nearly all, British architects are ready to recognise the merit in the noble modern buildings we see on the Continent and the United States of America, but in this instance I think we have some justification in expressing our dissent from the decision of the County Council. The County Hall has not, and it never can have, any international significance.

It is to be a building from which the administration of the affairs of London will be conducted, and a home for those whose duty it is to see to its thousand needs. It is to be a structure for London alone, and London only. All English architects will commend heartily any steps which the County Council can reasonably take to secure a design of the greatest possible merit, but I feel convinced that in London we want, and gentlemen, I am equally convinced that we intend to have—an edifice which interprets for us the great heritage of our national architecture. We desire in these days to see no alien structure, no matter of what magnificence, set down to face the quiet serenity of our Palace of Westminster and the very heart of this great Empire.

A British brain must conceive this great new building, and British hands must alone bring it into being. I trust I am no "little Englander," but I would ask the London County Council, the educated citizen of London, or that particularly common-sense and level-headed member of the proletariat, the "man in the street," whether any of them have for one moment contemplated the possibility of our having raised up for our edification across the river a structure resembling, for instance, the grotesque design for The Hague Palace of Peace, as a monument to the taste of our municipal government, and as an everlasting protest by them against the incompetence of our own architects and as an object lesson to us of what they deem the highest form of our art. I very much fear that the County Council in their collective capacity have not as yet recognised a due appreciation of the broad national characteristics and constituents of our calling which go to form the history of its particular evolution in this land, and still less those subtle phases and delicate variations which invest its study with such infinite charm to the architect himself and to the educated portion of the community.

Tramways on the Embankment.

Is this natural solicitude of ours for our own particular national type of architecture an effete product unworthy of consideration at the hands of the Councilors? If that is their view, then perhaps we need not feel so much wonder either at their disregard for the arboreal adornment of our Victoria Embankment. That ruthless destruction of the beautiful emerald ribbon which borders London's noblest highway, that sacrifice of its calm environment, in the cause of those dreadful hughes, "utility" and "class legislation," the scarring of its surface with tramway lines, and the conversion of its comparative peace for ever into a babel of noisome sounds. Can it be that the Embankment roadway is so narrow that the London County Council already foresees the prospect of traffic difficulties if their tram lines were put a few feet nearer the centre of the thoroughfare? Is it because the London County Council fears a revolt on the part of their patient and long-suffering ratepayers if they were invited to step across a few more feet of muddy roadway? If that is so, will they not be good enough to extend the width of the pavement a little bit, and thereby save the ratepayers' boots, and, incidentally, we

had better say, that graceful line of foliage which the unpractical members of the community, like ourselves, deem to be of some considerable importance. I do not think that it would be germane to our procedure to-night to go at length into the various great schemes which are at present monopolising the attention of London, and I have merely alluded to these matters because I think we, in common with all who love this City, should let the County Council know how much we feel interested in their work.

Suggested London County Council Committee of Taste.

The London County Council has exercised its beneficent sway actively during its short life, and in many respects for the improvement of London, as well as in directions which should more nearly appeal to architects. I hesitate, therefore, to criticise its tendency to lose sight of, among the preponderance of the other interests involved, those matters of artistic importance (minor details, perhaps, the London County Council would call them), which, in the aggregate, mean so much in their appointed place. It would be a matter for congratulation if the London County Council could see their way to institute a Committee of Taste, whose duty it would be to overlook all new schemes before they are put into actual execution, with a view to the avoidance of such unfortunate solecisms as those which have, alas, been perpetrated in the past, and to safeguard us in the future against thoughtless and unnecessary offences against the canons of art and the beauty of our great metropolis. I would go further and urge that this Committee should be given the larger reference of seeking how actual æsthetic improvements could be introduced into those proposals which come before them for consideration.

Advice to Students.

It has been my pleasing duty this evening to hand a number of medals and other prizes to those of our students who have most distinguished themselves during the past session. Such rewards as those we gain in these early stages of our setting out on the career we have chosen, bring with them infinitely more sense of satisfaction and pleasure than those larger and more important successes which come (I hope all) of you will attain later on in your professional life. The course of years, the greater occupation of our minds with the duties and worries attendant on the exigencies of actual practice, seldom permit us to pause over the good fortune which comes to some men after what is known as their "student days." Therefore, make the most of the opportunities you now have. But you cannot all win prizes, and I would say, both to those who have and those who have not, do not set much store on the value of these awards, for they will mean nothing to you later on. Do not forget what Ruskin has said about this: "It is the 'effort' that deserves praise, not the success; nor is it a question for any student whether he is cleverer than others or duller, but whether he has done the best he could with the gifts he has." The prize-winners here are by no means certain winners in the struggle for the topmost rungs of the ladder of architectural fame, and they may very likely find those coveted situations already in the occupation of those who plodded steadily and quietly throughout schools without achieving any very notable prominence. I do not believe in the "genius," so called. It is an uncertain and dangerous role to play. "Genius" is generally defined as the "infinite capacity for taking pains." But I think that is a better definition as a rule for what we call "success," the offspring of perseverance and hard work. A facile power of expression and eccentricity combined with self-confidence is the spurious article so often ignorantly christened "genius." And for that we have no room within this building. No, we want the hard worker and the man who perseveres, not alone while within these walls, but outside them as well. I cannot insist too much on the essential importance of always being ready to concentrate your attention on what you see around you, whether it be on your holidays or daily walk to business. Give ungrudgingly all the time you can possibly spare to the study of old buildings. Measure and sketch all you can, and if time will not allow, then measure and photograph; but whatever you do,

"measure." It is alone by this means that you will find out how a thing is done, how the effect has been attained; it is the one and only way by which you can attempt to analyse the architectural charm of those great monuments of our ancient art. Revel in these delightful holidays of work; they are, believe me, among the pleasantest days in your career, and you will cherish the recollection of them throughout your life. Such expeditions are, moreover, not alone valuable because of the architectural advantages they possess; they broaden the student's view of things in general, and they often bring him in contact with men and things outside his own limited sphere. That is a very important matter at this epoch of the student's life. I always think, because we must on no account ever lose an opportunity of acquiring information, particularly of a general character. It is only when you get into practice, more especially in the case of domestic work, that you find how extraordinary intimate are one's relations for the time being with one's clients, who generally expect their architect to be something of all professions, and to have some sort of knowledge of the world as well. In my opinion, if you do not cultivate general knowledge, in addition, of course, to the conduct of gentlemen, I care not what your abilities may be, you will never become successful architects.

Before I close, and as a student myself, may I remind you of a little precept which has always seemed to me particularly appropriate to us architects, when the time arrives for us to meet that wide circle of society whose orbit we must cross in the exercise of our calling. "Do not talk but of what you know; do not think but of what you have material to think justly upon; and do not look for things only that you like, when there are others to be seen." And, in conclusion, gentlemen, let me felicitate those of you who this evening carry off the garlands of victory, and allow me also to congratulate with an even greater degree of heartiness those of you who, while not attaining the goal you strove for, have yet, let me assure you, gained that even greater triumph, in the full consciousness that you have done your best. To each of you I offer my good wishes, and may you one and all for ever zealously uphold the proud and ancient traditions of the Architectural Association.

Mr. E. Guy Dawber proposed a vote of thanks to the President for his address, and congratulated him upon the position he occupied among them. The President of the Association of the present day had no light task to perform; the duty was a most onerous one and full of responsibility, but, though Mr. Balfour had told them how diffident he was about accepting the position, they would all agree that, in his hands, the welfare of the Association would be perfectly safe. The Association was not only a pioneer body of education in the country, but it also occupied now the premier position as an educational body in the United Kingdom, and the President of a society such as that was to be congratulated, and he felt sure that Mr. Balfour would make an admirable President. He should also like to thank and congratulate him upon his admirable address, which was full of interest and suggestiveness, and what was not often heard in that room, of breezy humour. They had all enjoyed the address, which was on old Association lines, and Mr. Balfour had dealt so fully with the history and progress of the Association that everyone, even those who were not members, who read the address, or who heard it read, must find it most instructive. The President had touched upon so many topics that it would be difficult to say much about any of them, especially at that late hour. He knew what it meant to prepare such an address, and he could say that, in his own case, he had had two summers darkened and spoilt in thinking of or preparing his Association address, but now that the President had delivered his address, he could sail through smooth water—as he hoped and believed it would be—for the remainder of the session. One part of the President's address surprised him, and that was as to the building debt. It had been rather a hobby of his (the speaker) to clear that debt off, and he was greatly surprised to find that as many as 1,032 members of the Association had not subscribed one penny towards the building fund. That, he

thought, was a standing disgrace. They knew that in all societies there were drones and workers, but it seemed hard that the workers, and those who were properly interested in the welfare of the Association, should be the only ones to subscribe. A large majority of the members, it was true, did not belong to the classes of the Association or parake of its benefits, but he thought that those who belonged to the Society should do their little even if only in shilling to help clear off the debt, and he hoped to be able to congratulate the President at the end of the session that members had come forward and paid off the debt. He thoroughly agreed with what the President said as to having an examination of students or members who wished to join the day school. With the schools of the Association getting so large, there was rather a danger of making the training given to students too easy and popular. It was a great responsibility the Association was taking upon itself in turning out some fifty or sixty students every year to earn their living as architects; and, while he had no wish to throw a wet blanket upon the work being done—in fact, he was thoroughly in sympathy with it and approved heartily what was being done—he thought they should hesitate before they took students into the schools unless they thought the students were thoroughly fitted to become architects, and follow the pursuit of architecture in after life.

Mr. E. T. Hall said it was with the greatest pleasure that he seconded the vote of thanks to their President, who had been a friend and colleague of his for many years, and he congratulated them heartily upon having such a man at their head—a man of few words, of considerable thought, who would lead them well and keep them in the straight path of progress which had so far marked their existence. He (the speaker) knew every member of the Association that the President had mentioned, and he knew them as men of energy, who had worked or would work well for the Association. He congratulated the President upon his address, which was full of practical wisdom and was one which students might reflect on with advantage. The address dealt with matters of primary interest to every member of the Association. He agreed with what Mr. Dawber had said as to the care necessary in admitting students, but he believed that that care was exercised now, and he understood that the master of the day school, Mr. Maule, had rejected no less than 25 per cent. of applicants in order that he might give the members of the Association as colleagues men who were earnest, zealous, and fit to become architects. That was a very wise discretion to exercise, and the result must be to raise the tone of the day school. That good work was being done by the Association all the older members were aware, and it was a great pleasure to them to see so many men coming forward, the only concern the older members had being that the help which students received now would prematurely drive out of the ranks the older practitioners. He was pleased to notice the development of the athletic activities of the members. The Rifle Club was an admirable movement, as also was the attention paid to music. He believed that music was the greatest help to students of architecture. Many a time, in his early days, when he was studying and was almost in despair, music had given him new life and had enabled him to start afresh, with new energy and a desire to succeed. A burning question was the admission of lady students to their ranks. He thought they could, with advantage, admit lady students, for more than one reason. For instance, there was a lot of talk about educating the public in the appreciation of architecture, and that was more likely to be accomplished through the ladies than in any other way. A home was a place where a woman exercised a very predominant influence, and if women had an appreciation of architecture, the public would gradually grow to appreciate it too. He should like to encourage the members to have lady students to work with them. He quite agreed with what the President had said as to the advantages of the proposed change, and he did not think that the disadvantages were anything like equal. The time was when women were

kept very much in the background, but nowadays they entered into the life of the Universities, they went to painting schools, etc., and why should they not go to the architectural schools? They would be of great value to the other students. For instance, a young student might have evolved his great castle which he hoped, so great was his conceit, to carry out one day, and he could be imagined standing before the drawing and mentally saying:—

" 'Tis a beautiful, beautiful bold design,
The rooms they are lofty and dimly lit,
And it's Gothic in every line."

But let the young lady student come along! With the light and gentle touch of her rapier wit she would bring down the swelled head of the student and make a better man of him. If he might paraphrase their motto, he would say: If they designed with beauty, they would learn to build in truth; a better appreciation of the fair sex. Of course, the Council would be careful what students they admitted, but if they once admitted ladies who were earnest they would get as good work as ever, and would add a refining influence. He hoped they would take to heart what the President had said as to thoroughness of study. Some students thought too much of making pretty designs, and they ignored those little practical matters which made or marred a home. They should think of the smallest detail, and from that their work would grow up. He wished the greatest prosperity to the Association, and health and happiness to the President. He hoped that next year they would have even a more crowded meeting with the same enthusiasm—for they could not have more—and that they would be looking forward to that great success to which the Association would attain in the future, as the greatest school of architecture in the country, and, possibly, the greatest in Europe.

Mr. A. Needham Wilson, in supporting the vote of thanks, added his congratulations to the President upon his position and the address he had delivered. He was sure he spoke in the name of his colleagues on the Council when he said that the President might be assured of their most cordial support during what would, no doubt, be a busy session. They were bound to keep abreast of the times; other bodies around them were starting rival schools, and it behoved them to keep ahead, and he could see a very anxious time before the Council. The President had referred to the large increase in the membership of the Association, and he heard the figures with mixed feelings; he heard them with great pleasure because it showed the prosperity of the Association, and he heard them with anything but pleasure when he thought that, in the immediate future, there might not be enough work to go round. One had hopes, however, that the public at large were at last awakening to the fact that there was such an art as architecture. He had been much struck by seeing in a half-penny paper that day a leading article emphasising the necessity of making our cities architecturally beautiful, and that was some slight comfort to him when he thought that, in helping to foster the schools of the Association, and in doing his little share to ensure their success, he had been forging a weapon with which to cut his own throat. The President had referred to the educational condition in which candidates for the schools came up for admission. He thought it should be their duty to get into touch with the headmasters of the public schools, so that it should not be left to a boy to decide what he should do when he left school, and that he should be encouraged to decide upon his career long before he left school, and it ought to be the duty of headmasters to assist those boys in specialising with a view to their future career, so that when they came to the Association schools they would be far better prepared for the career which was before them.

Mr. G. H. Fellowes Pryne, as an old member of Council and as a Past-President, heartily congratulated the President on his position and on the fact, remembering the forty-nine Presidents who had preceded him, that he should have given them the address he had. It was more and more difficult to get topics which were of interest which had not been dealt with before. As

to those who, in a sense, had left them, he wanted to say a word about Mr. Lewis. They must all regret that he had passed out of the teaching staff, for amongst the students he had taught there was a thoroughness that was, perhaps, lacking in others. Mr. Lewis was so careful and thorough in his work that the students who had passed under him must have felt that they benefited under his tuition. And in losing Mr. Pomeroy they had lost one who had been of much service. Everyone who watched him and saw the modest way in which such an able man taught the students would always regret that he had gone, and he hoped they would be able to get as good a successor. He felt as Mr. Wilson did about the increase of the members, and it reminded him of what a well-known doctor said once as he entered the lecture theatre and saw all the students before him. He looked up and said: "Good Lord! What will become of them?" The older men of the Association, however, in looking round the walls and seeing the work which was turned out by the students might say: "Good Lord! What will become of us?" As to the education given in the schools, Mr. Wilson had mentioned a point he had been thinking of, *i.e.*, that the head-masters of our public schools should be brought into touch with what the boys were going to do for a living. In most subjects they were often well trained—in Latin and Greek, for instance; but in English and everyday knowledge which was useful they were sadly lacking, and none were more conscious of that than the boys themselves. It would be a good thing if the Council could get into touch with the head-masters, and suggest that the boys should be trained with a view to their future career. Everyone must feel that the proposed entrance examination would be a good thing, and help in securing the best class of students. As to those who had won prizes, he would say to them, and to those who had failed, that we learn more from our failures than from our successes, and that was the experience of all of them.

Mr. H. P. G. Maule, master of the day school, said he must protest against some of the remarks of the last two speakers. What the Association was suffering from was what they advocated. It was not the need of specialisation they were suffering from, but the need of general education, and until they got better general education they would never make progress. Specialism was the great curse of the school education.

The vote of thanks having been heartily agreed to.

The President briefly replied, and announced that the next meeting will be held on October 19, when a paper will be read by Mr. Alan Potter, on "The Architecture of the Roman Empire," illustrated with lantern views. The adoption of Council's Report and balance sheet will also be moved.

THE LIVERPOOL ARCHITECTURAL SOCIETY:

THE PRESIDENT'S ADDRESS.

MR. EDMUND KIRBY, who has this year been elected President of the Liverpool Architectural Society (Incorporated), an honour which was conferred upon him twenty years ago, delivered his opening address to the members at the first meeting of the fifty-ninth session, held on the 8th inst. in the Society's Rooms, Harrington-street.

"This second election," he said, "is an honour as wholly unexpected by me as it was pleasurable to receive from my *confreres*."

Naturally the new situation calls up memories of the past and of the great changes which have taken place in the Society itself and also in this city, and especially during the interval which has elapsed between my two terms of office. These changes suggest themselves as interesting and appropriate subjects for our attention and review.

For instance, take the Society's position in the old days. It was then independent and unallied to any other society. Its members consisted of seniors and juniors; but instead of—as, happily, is the case now—the young men being the more numerous and enthusiastic at the meetings—I will not say more critical—they were few

in number, and at the lectures made their modest mark as excellent listeners to the words of the lecturers, who, though few and far between, were generally men of standing and good practice. I remember one lecture, which was interesting not only for its subject but for being in advance of the times. It was given with illustrations to enunciate the advantages of "eclecticism in art." The principal illustration gave a perspective view of a new design for St. John's Church on the west of St. George's Hall, drawn in the classic style, with a fine Corinthian colonnade introduced around the building to harmonise with the great hall behind; and Gothic windows with rich tracery were religiously inserted between them in order to maintain the true ecclesiastical feeling. This lecture was received with respect and some feelings of awe. We all felt a shock on our treasured traditions, and when the lecturer had with conscious pride folded up his manuscript, some difficulty arose in reconciling our consciences to the usual laudations politely introduced with the customary votes of thanks.

Then there was no advanced party in the Society, nor any, who founded their hopes in 'L'art nouveau,' or finality in the Early Georgian. In those days, when, as I have just told, our Society was dangerously parleying with the creation of a new style, the architectural world was groping for one also, and about that period Mr. Norman Shaw had designed "Cragside" for Sir William Armstrong. This set the ball rolling, and from north to south and east to west its characteristics copied in faintest outlines might be observed with long-drawn chimneys, sham ingle-nooks, even unblushingly copying over the mantelpiece of a shoddy dining-room or country bar parlour of the legend "East or west, home's best." Later on, to Mr. Shaw is due the credit for a further change in style when the "Queen Anne" first came under his magic pencil; and in still later years his Scotland Yard Police Offices turned the tide of opinion in a classical direction. So powerfully was this last influence felt that repetitions of many of the component parts of this building may be found in the modern works of most of the towns in the country. Gradually after this period the classical style was taken up by actual students. It was felt that a real revival was taking place, and a demand was at once started for books of study illustrating the periods of the Renaissance and of the works of the masters of the XVIIth and XVIIIth centuries.

Coming to our present day, the result has been the erection of many fine buildings in London and the provinces. Amongst the latter, as Liverpool men, we must single out some of those erected in our own city. One of the first examples of the classical style on a large scale is displayed in the stately building of the costly offices erected by the Royal Insurance Company. In the same style also will be found two fine buildings approaching their completion—one the new Cotton Exchange with its handsome front creating new life in a somewhat dead and commonplace environment, the other the new offices of the Mersey Dock Board. When last I sat in this chair the site of these offices was occupied by ships floating on the waters of the George's Dock. Now, the waters are parted, and from their bed has been raised, as by a touch of magic, the present harmonious pile of buildings, advantageously surrounded by spacious streets, which allow a full view of the entire groupings to be seen in their best aspects, and with the conspicuous dome centralising the whole composition. Before leaving the site of the George's Dock it will be remembered that there are two more large vacant sites still left unbuild upon, and likewise surrounded by broad streets and open spaces. The northern one has lately been sold by the Corporation for the erection of new offices, and it is reported that the larger vacant space between it and the Dock Offices is also about to be purchased for building purposes. It is to be hoped that the best architectural efforts will be put forward by the purchasers and new owners in the development of these schemes to render them worthy of such sites, rare in a great

commercial centre, with unique advantages—privileges. I was going to say—for architectural display with practically unlimited light and air, and great open spaces on every side in which to enjoy the beauties of the buildings they may surround. An opportunity is thus presented of achieving at what may be called the gate of the city an effect of architecture which, when completed, and in conjunction with the Dock Offices already erected, would command a frontage to the noble river worthy of rivaling that presented by the quays of Venice.

The Dock Offices now erected are the result of a design selected through competition, and finally submitted before adoption to subsequent careful study and revision. I do not know what control, if any, of the plans and elevations has been reserved by the Corporation of Liverpool over the erection of any schemes that may be put forward for the adjoining sites, but I must bring before you the fact that in similar cases of choice sites in London the Council of the Royal Institute of British Architects has for several years been asked to advise the Government and also the London County Council upon the designs of new buildings and the laying-out of important new routes and street developments before erections thereon were permitted to be begun. For example, it is well known that the new streets formed out of the Strand improvements, together with their proposed buildings, and also the questions of design of the new Government offices in Whitehall and Parliament-street, were laid before the Council of the Royal Institute of British Architects, who gave such advice as has been acknowledged to be of great value in improving the character of the building schemes submitted for their judgment. I feel confident that the Council of the Liverpool Architectural Society have men in its body to whom our City Council could in a manner similar to that in vogue in London refer such questions of design, and with the same excellent results.

During the last twenty years changes of an extensive character have been so numerous in Castle Street that it may be said to be nearly rebuilt. With the Town Hall as the end of the vista of a view looking north, I know no commercial street, even in the City of London, to compare with its appropriate and completed architectural effect. On a scale less extensive other commercial and public buildings, such as branch banks, free libraries, and schools of an up-to-date character, have been erected in the city during the last few years, many above the average in the architectural style required for the purposes for which they are designed. One must not forget, in describing new works, to include the great tobacco warehouses, the immense South end grain warehouses, and the Smallpox and Infectious Diseases Hospital built at Fazakerley by the Corporation. Judging from the reports on all sides, it appears to be the best hospital of its kind in the country.

During my first term of office beautiful plans were made for the cathedral to be built on the west of St. George's Hall, but the scheme was abandoned. I rejoice now that the new cathedral is rapidly being pushed on. Its progress will be watched with the keenest interest in the development of its fine and original design. There are many more buildings in Liverpool of much interest, notably at the University, and in other parts of the city, which time will not allow me to particularise. Though not in Liverpool, I cannot close my reference to works erected within the last twenty years without referring to Sunlight Village, founded by a great patron and lover of architecture, Mr. W. H. Lever, the second of our Honorary Fellows. The village is a remarkable invention and has the compliment paid to it of being copied in many places at home and abroad. But in happiness of design and soundness of construction so far it has no rival.

During the summer in July one of my first duties as President of this Society was to attend as one of the Committee at the International Congress of Architects in London. As your representative at this most important meeting, I think it only right to take this opportunity of giving an account of the proceedings, which cannot fail to be a subject of interest to you.

The impressions which this great gathering have left on my mind were: Firstly, the surprise created by seeing so large a number of members, many accompanied by ladies of their families, coming from far-distant lands and braving the fatigues of tedious journeys and the terrors of the Straits of Dover to meet and confer with their professional brethren in England. Many of the visitors were distinguished professors of their art, and all were frankly eager for its culture and advancement—and those who were present must have been convinced that the result of such meetings must have a far-reaching effect on the future development of the higher side of our art, marking its progress with sympathetic and national concurrence.

Secondly, I was struck by the numbers of those who more or less spoke our own language, and all in a manner sufficiently intelligible to find their way about. Accident placed me at the same dinner-table with six Frenchmen, five of whom spoke very passable English. I quote this example, as I am afraid languages are still the weakest point in our education, and their serious study should be inculcated into the minds of all earnest students to enable them to enjoy their art by travel in foreign countries and at home in reading the superb volumes on foreign art.

Thirdly, it may be mentioned that the visits to our ancient buildings and cities gave immense pleasure to the strangers; but, from an international and educational point of view, the ostensible business of the Congress was intended to be centred in the papers and discussions, but what with the evidently keen desire of the foreigners to see as much as they could of our old buildings—combined with the hot weather the attendances at the subjects set out for discussion in the programme were not so satisfactory as those at the excursions. It was quite amusing to watch the eagerness with which they made their inquiries for the routes of their various visits, and as the well-packed special train steamed out of Waterloo Station for Hampton Court, loud and deep were the observations of those for whom no room could be found, and were consequently left behind.

The most popular excursions were those made to Windsor Castle, Hatfield, Hampton Court, and the cities of Oxford and Cambridge. Our foreign friends were quite unprepared for the stately character of the architecture of the great palaces and the beauty of the University colleges, all enhanced by their gardens and parks. I think the Congress curriculum should certainly have included an organised inspection of some of our best modern works. Its omission is the more regrettable since the criticism of these buildings by foreign architects, exempt from insular prejudices, would have been most valuable, and perhaps not without a wholesome effect upon our own ideas.

There were more than sixty papers of varied interest on most of the subjects now before the architectural world, such as the training of workmen, the architect's control over the artists and craftsmen employed on his buildings, the ownership of plans, registration, etc. Then practical papers on general building subjects were discussed, one being on the use of reinforced concrete. The summing up of the discussion on this latter subject left the impression that until still further study and experiment had been made with this promising system of construction the consensus of opinion was that it must at present be used with much caution before it could be wholly employed for general use.

A well-debated paper on municipal work and the housing of the working classes brought forth at the Congress some of the most interesting papers and addresses by French and German delegates. In Germany much care and thought have been devoted in large towns to the laying out of the suburbs for workmen's dwellings. The new streets leading to them are contrived with a view to spaciousness for light and air, and are ample enough in their width to allow of the free passage of tramways leading speedily to and from the business centres without disturbing the ordinary traffic. Liverpool, of all the cities in England, is sadly backward in this movement. It is a crying public problem, and a great question for the government of

the city to take in hand at once, and with all the seriousness which the great movement demands. The mind of the general public has lately been thoroughly aroused by the recent strong reports of the Medical Officer of Health to the Corporation, and some drastic orders are in progress for the sweeping away of some of the worst dwellings of the poor. But before these are carried into effect it is certainly imperative that the great suburban schemes should be immediately taken up by the local authorities, bearing in mind in the disposition of the improvements not only the actual housing of the poor, but their easy and rapid transit by tramways or the overhead railway to and from the principal centres of labour. In whatsoever scheme which may be promulgated, I trust that cottage houses (preferably with small gardens) may be adopted in preference to the "flat" system. The Germans have carefully studied these two kinds of dwellings. The conclusion arrived at is distinctly in favour of the cottages. They are more wholesome and healthier than high flatted houses. It is obvious that children brought up on the top floors have an unnatural life when many flights of steps intervene between them and mother earth. It may be added that the new Parliament has had several serious propositions on the housing problem.

One of the last papers at the Congress was on "Official or Municipal Architecture." The discussion was quite international, entered into by foreigners as well as Englishmen. The subject has been brought into prominence by the growing tendency of municipal bodies, not only in England, but in many other countries, to give the designing of purely architectural works to their own officers. Lately architects in various towns have protested against the practice as being an injury to their livelihood and to the art of true architecture. A strong stand, directed particularly to this grievance, has been made by the local architects against the Corporations of Dundee and Bradford, on the ground that this growing custom seriously interfered with the practice of their profession. Clever as they may be, town surveyors are not generally born or trained as architects. Many corporations, nevertheless, spend large sums in art in various forms to train both the public and professional men in technical schools, schools of art, and in Liverpool especially at the art schools of the University. It stands to reason, therefore, that the natural development of this expenditure on this educational movement is in the employment of local talent. It is not fair to expect from salaried officials that they should render to corporations services of a high class order equal or comparable to those of first-class and trained architects.

Lastly, notwithstanding the occurrence of a few drawbacks, it is a pleasure to recall the completeness and excellence with which all the multifarious arrangements were carried out, not, it is sad to say, by any Government grant or official notice of any kind, but by the sole unaided enterprise of the Royal Institute. In any other country the Minister of Public Works would have exerted his position to have permitted the use of some Government buildings for the Congress meetings, and would certainly have been present to welcome and pay honour to a gathering of so many delegates distinguished in their art, and sent by their Governments to England for the public good. It is therefore all the more creditable to the Institute, through the exertions of its late President, its Secretary, and the staff employed, to have inaugurated and brought to a conclusion so successful a meeting.

I should like to say a few words respecting the Royal Institute itself; particularly so, as it was during my last Presidentship that our alliance with the central Society took place. Then, and since that time, have questions been asked as to its real benefits to country members in comparison with the advantages enjoyed by London architects. No doubt the questions are fair, and have started from grievances which I fear, to some extent, will always be peculiar to those who are provincials. To them the very fine library is, to all intents and purposes, of little value. In the meetings, which are part of the life of the Society, they have no personal participation, and the Institute premises, supported in a large degree by

country subscriptions, are only known to many of us by their printed address.

In reply, it could be reasonably urged that these remarks would apply equally well to many learned societies in London. Still, some relief might be obtained, and objections ameliorated. In these days of cheap parcel rates, book transportation is a comparatively simple matter. It might also be possible to make the illustrations of the *Journal* more ample and instructive, and to make use of the new process of colour printing in those cases when the object portrayed loses much of its significance by being deprived of its natural colours.

From my knowledge of the Council I have every reason to think that they would make every effort to be in closer touch with the allied societies. But, after all, these complaints fade into insignificance when the work of the central body of our great profession is broadly reviewed. By the election of the best men to its Council, by the high standard of professional excellence which has always been its watchword and its aim, by its concern and interest in the education of the whole profession, as exemplified in its examinations, and in countless other ways, it has earned an enduring place in our confidence and esteem. To its powerful hands we may safely entrust the guidance necessary for the solution of such difficult questions as the ownership of plans, the legal recognition of fees, municipal architecture, and other professional matters of deep and vital interest which are at present arresting the earnest attention of architects.

With reference to competitions; as these are now taking a very important place in the professional life, it is satisfactory to note the bodies who invite them, thanks to the influence of the Institute, generally call in the services of an experienced architect to aid them in the selection of the best designs. As a rule the decisions arrived at have merited the approval of the competitors. In one or two cases, I have heard complaints that the assessor, in his desire to obtain the best selection, has used a free translation of the conditions of competition. The objectors who have scrupulously followed them line for line as binding, and thus been obliged to restrict their designs, feel thereby that their time and study have been thrown to the winds. It would be more satisfactory to all concerned, therefore, that either it was expressly stated that the conditions must be strictly adhered to, or that before their issue, they should be submitted to the assessor for his approval or revision before being issued to competitors.

Address to Students.

In conclusion, I should be neglecting my obvious duty and the best precedents if I omitted to offer the younger members of the audience some words of advice to guide them on the thorny path of architectural success. I should suggest to them firstly that it is a thorny path, and beset with many pitfalls and difficulties, many of which, and those not the least, should have no place in the daily work of an architect. These are the fruit of the false circumstances with which the necessities of the times have hedged in our profession. We must endure them till we have found a cure for them. But it is rather with that arduous side of our calling which is necessary and essential to it, and which we should be proud to welcome rather than eager to escape from, that I intend to speak of now. The word of advice to which I propose to confine myself to-night is to repeat what has often been said—namely, study old work carefully, reverently, and unceasingly. There is no greater mistake than to imagine that originality springs from the neglect and ignorance of the traditions of the past. The development of architecture has grown from glory to glory like the evolution of a plant, each phase the logical issue and heir of its predecessor, and yet mutually distinct and individual. The history of architecture is not analogous to a series of intermittent earthquakes, each different from and independent of the others. The most original artists have always been those who have had the most intimate knowledge of the evolution of their art. To take one example of our own day out of many, I may refer again to Mr. Norman Shaw, whose originality is

only equalled by his exact knowledge of the details of past styles. There are, roughly speaking, two great classes of offenders against this principle. First, those who, embarking in their own cockle-shells, cut themselves adrift from all the noble traditions and ripe experience of past ages and evolve from their inner consciousness such creations that their only plea for existence is that they are original in so far as they are unlike anything else in heaven or earth. It is, however, possible to err in the other extreme and attach oneself blindly and slavishly to the particular style of a former age whose conditions and requirements are often most unsuited to our own. In this respect the tyranny of one style is as bad as that of another. All styles are transitory. It is in their principles, and not in the blind imitation of stereotyped forms, that our true instruction lies. It is indeed necessary to know the latter to arrive at the former. They must be our servants, and not our masters. But as no style should claim our unquestioning adherence, so also no style should suffer our unthinking censure. I believe it is now the fashion in the very latest school of architectural thought to speak of Gothic architecture and its principles as effete and dead. If this be so, do not forget the maxim "Nil nisi bonum de mortuis." But do not be too confident in the finality of your judgment. "We are none of us infallible, not even the youngest," as a famous professor once said to his pupils. You may perhaps laugh at your fathers for their adherence to the most commonplace of all styles, inasmuch as it unquestionably possessed the most inexhaustible variety and adaptability of any, to say nothing of its beauty. It is possible that your grandchildren, developing the infinite possibilities of this style to the requirements of their day, may even (if I may suggest such a thing) smile at some of us for professing to have found salvation in a style far more exacting and stereotyped and hundreds of years more out of date.

One last word. It may be taken as an axiom that the more knowledge we acquire in any particular branch of learning the more we must appreciate its difficulties, and the more tolerant we should become of the many faults and failures which are almost inevitable to us all in its practical application. It is at least consoling to reflect that the nearer we attain to perfection the more we realise our shortcomings. Therefore apply to these, as I trust you will also do to this paper, the words of the poet:—

"Whoever thinks a faultless piece to see
Thinks what ne'er was, nor is, nor e'er shall be."

A vote of thanks was passed to the President for his address on the motion of Mr. P. C. Thinesse, seconded by Mr. Grayson. Professor Riley and Mr. E. P. Hinde supported the resolution, and all spoke in commendation of the suggestion that the Corporation should take counsel from the profession in the matter of designs for new buildings and improvements of importance.

A NEW FORM OF DUSTLESS ROAD CONSTRUCTION.

Of the various methods that have been tried within recent years for mitigating the road-dust nuisance very few have been practically successful. Natural asphalt is probably the best material for the purpose, but, as its cost is prohibitive, except in cities and large towns, the attention of road engineers has been devoted to experiments with different forms of what are more or less worthy of being described as artificial asphalt. Tar macadam and ordinary macadam coated with tar have been found of much service, especially the former. The only disadvantages of tar, apart from the wear and tear from which every road material must suffer, are that it is liable to soften somewhat under the heat of the summer sun, thereby becoming susceptible to injury by heavy vehicles, that in dry, temperate weather particles are worn off and distributed in a finely-divided form, causing stains on household linen that cannot be removed, and that in wet weather it sometimes tends to become slippery. Road experts have shown commendable anxiety to comply with all reasonable requirements of the public, and several patented types of road material are now

available in which tar is an essential constituent. One of these, which we had an opportunity of examining last week is described by the inventors as "Taafalt," a word evidently intended as a convenient abbreviation of tar-asphalt, for it is claimed that the substance is virtually a form of artificial asphalt. We are informed that it consists of tar or pitch in a proportion not exceeding 12 per cent. of the whole, powdered limestone or granite, powdered blast furnace slag, and an alkaline solution. These ingredients are mixed in certain proportions, and heated in a vacuum pan to a temperature of more than 300 deg. Fahr. Chemical changes are said to occur, after which the product is poured into moulds and supplied in the form of blocks, or, if preferred, the work of preparation can be performed on the site of the road to be treated.

Taafalt is applied in one of two ways, either as a thin coating for existing road surfaces or in the formation of new surfaces. When applied as a coating, the material is spread to the thickness of about $\frac{1}{4}$ in., and rolled in with chips of stone to prevent undue smoothness. In the second form it is used as the binding material of a macadam road, adhering to the road metal and forming a crust, which the patentees claim is capable of enduring heavy traffic for several years, without the creation of dust.

The road inspected by us last week was that on the marine drive between Westcliff-on-Sea and Leigh. Although laid two years ago and subject in winter to the action of heavy seas, the surface shows no signs of wear, and appears to be in as good a condition as if it had been laid quite recently. It is true that the roadway is not used for very heavy traffic, and for that reason we were unable to form any positive opinion as to its probable behaviour under more severe conditions. The surface was not of slippery character, it exhibited sufficient resilience to render it practically noiseless, and such rigidity as to render improbable any serious indentation by the iron tyres of heavy vehicles. If further experience should be of equally satisfactory character, Taafalt will certainly be welcomed by highway authorities.

Fifty Years Ago.

FROM THE *Builder* OF OCTOBER 11, 1856.

ARCHITECTURAL ASSOCIATION MEETING.—Professor Donaldson said he had listened to the address which had been delivered by the President with interest, but he differed in opinion from some of the sentiments expressed in it. He recollected London some twenty-five years ago; there was then hardly a straight street in it. The streets were so narrow that two omnibuses could hardly go abreast. The streets were dirty, and the Thames was filthy, and there was hardly a garden around London. But since that time see the progress that had been made. The President had said that London becomes more and more intolerable; he (Professor Donaldson) said that it became more and more tolerable; it improved every day. Look at Cannon street: was it not large and broad? were not those great mercantile magazines worthy of being palaces? He might allude to a large number of other buildings of modern structure around London, and ask, whether it really became "more and more intolerable as a place of residence." Regent-street did not exist thirty-five years ago; the Strand was not then what it is now. Let us have a century or two as had been passed by foreigners in improving their cities, and London would be able to vie with any capital in the world. The chairman had alluded to the sewage of the Thames. If his memory served him well, three or four years ago competition was invited on this subject, and forty or fifty designs were sent in, not one of which suited the purpose for which they were required; and he did not know whether for the next ten years they would have a mode of sewage such as was desired. It had been said that Government interference was always bad, but there were numerous instances of entire failure where there was a total absence of all Government interference whatever; he need only give as one instance that of the Nelson column.

Illustrations.

NEW GOVERNMENT BUILDINGS.
MERRION-STREET, DUBLIN.



WE now give the drawing showing the cupola, and the portico towards the quadrangle, of this important building, the plan and general views of which were published in our issue of September 29.

Sir Aston Webb, R.A., and Mr. T. M. Deane, A.R.H.A., are the joint architects (appointed by the Commissioners of Public Works), and the drawing was exhibited at this year's Royal Academy.

Owing to an accident in the postal delivery, Sir Aston Webb's description of the work, which should have appeared with the former illustration, reached us too late for that issue. As this is a detail of the same building, the description may suitably be published now, referring our readers back to the plan as given on September 29.

"These buildings are being erected on a fine site in Merrion-street, adjoining Leinster Lawn, the National Museum and Library."

The new buildings will have a frontage of about 350 ft. towards Merrion-street, and a depth of 280 ft. The portion at present being erected occupies the rear of the site, and is to accommodate the Royal College of Science, now located in St. Stephen's Green.

The centre is occupied by the principal entrance, the main staircase, a large lecture theatre, with library over, and students' common-rooms, one of which is under the dome. The lower ground floor is occupied by applied physics, including electrical engineering laboratories, and the ground floor by chemistry, including a general laboratory, 75 ft. by 60 ft., and 30 ft. high. On the first floor are placed the botany, geology, mineralogy, and mathematics departments. The whole of the second floor is occupied by agriculture, and its various branches, including chemistry, bacteriology, botany, economics, veterinary, hygiene, and photography, all in connexion with agriculture.

The front portion of the site it is proposed to occupy later with Government offices, a sketch study of which is illustrated.

A contract for the foundations and the lower ground floor has been let to Messrs. H. & J. Martin, contractors, of Belfast. Mr. J. Laurie is acting as clerk of the works.

EXAMPLES OF MOSAIC AND MARBLE INLAY.

THESE examples, from photographs, are given in order to afford some pictorial illustration of the subject in addition to the historic information and description to be found in the series of articles on the subject now in progress.

We have not been able to arrange them to run exactly parallel with the article; the examples from Siena, for instance, will be described in the succeeding article, what was to have formed the article in the present issue, having been unavoidably divided from considerations of space; but the illustrations will be there for reference.

ILLUSTRATIONS OF MONYASH CHURCH.

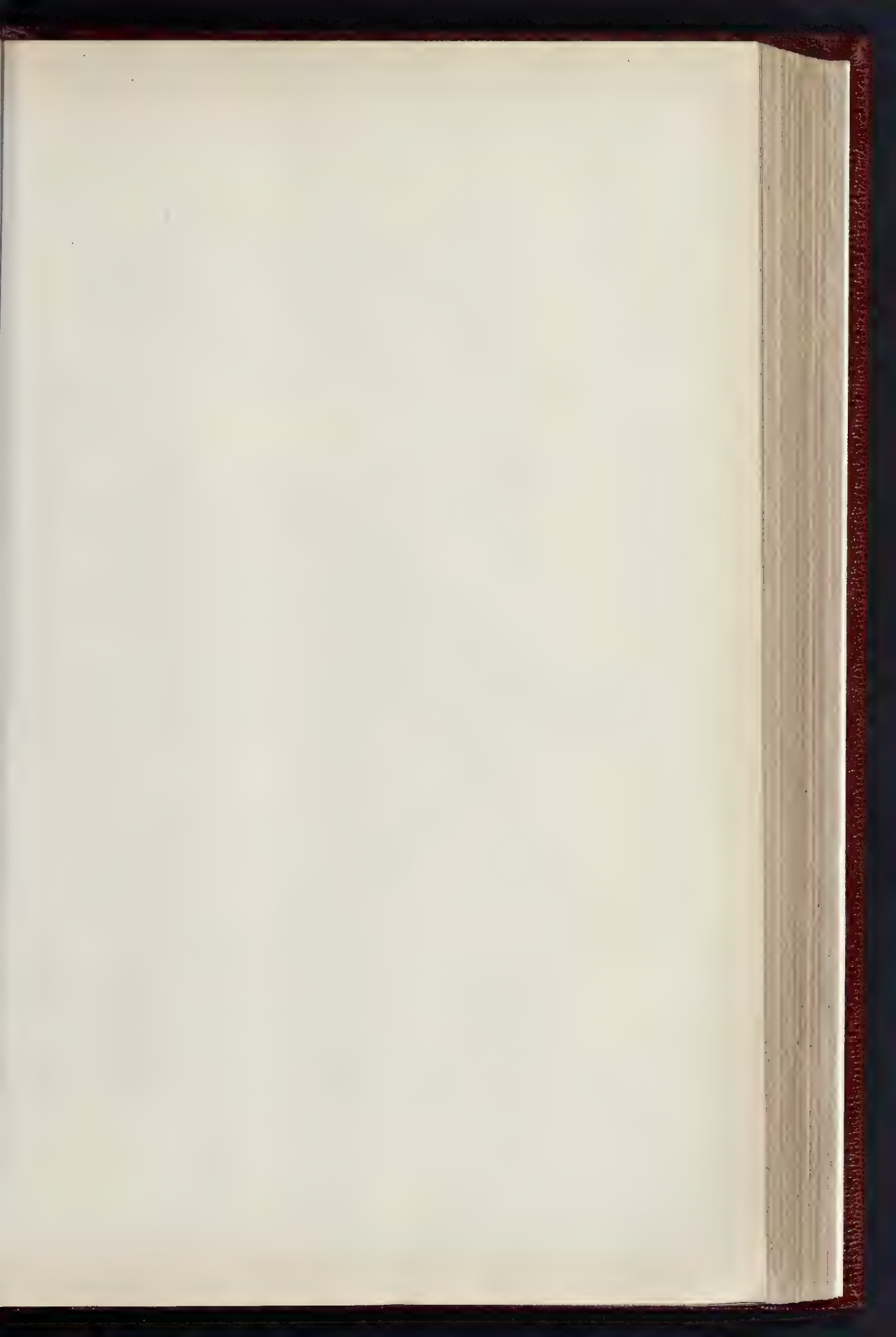
THESE illustrations are given in connexion with the first article in this issue, and illustrate the general aspect of the church as well as some special points referred to in the article.

COURT OF COMMON COUNCIL.

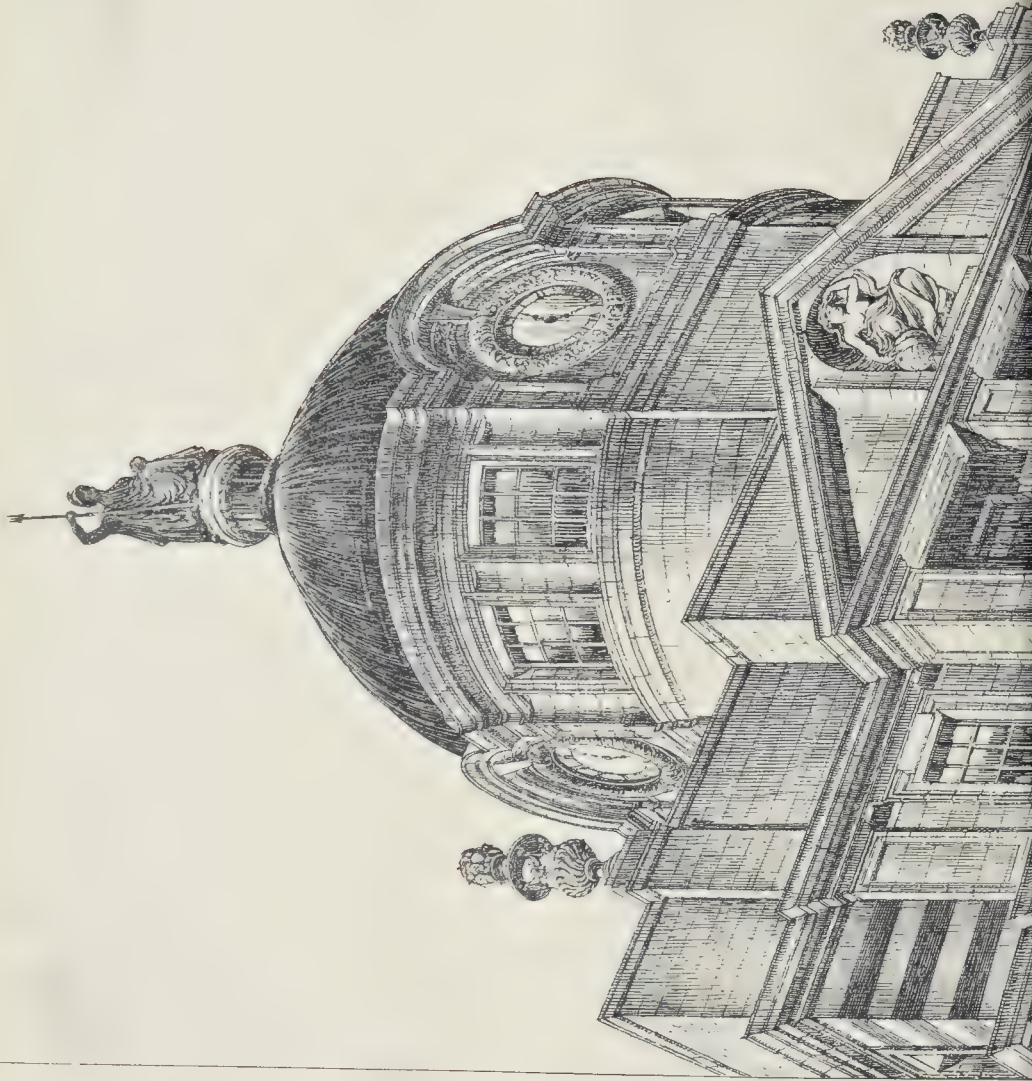
A MEETING of the Court of Common Council was held at the Guildhall on Thursday last week, the Lord Mayor presiding.

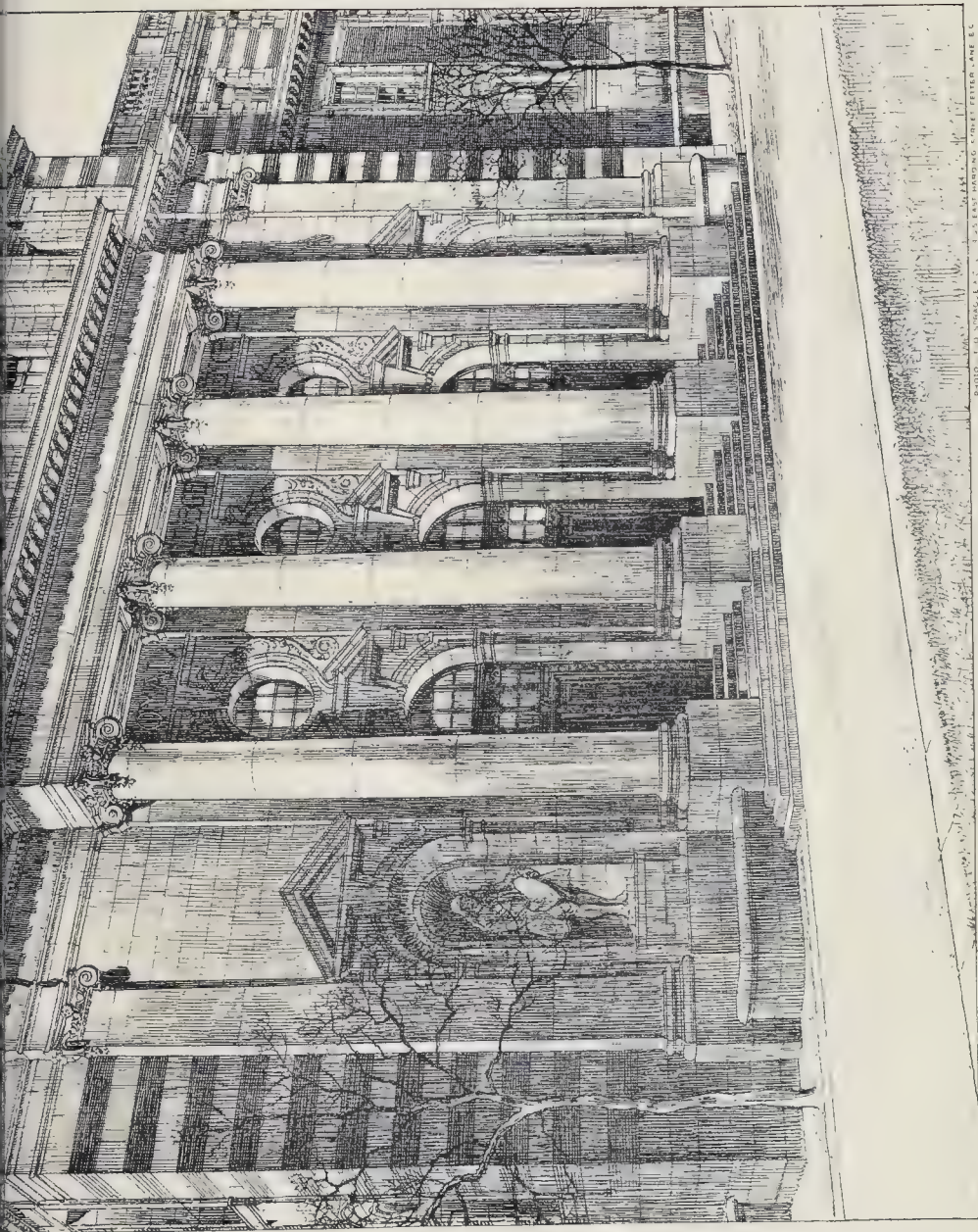
Improvement of Little Britain.—The Improvement and Finance Committee submitted for adoption an arrangement for acquiring the freehold interest in the ground required to widen the public way in front of Nos. 35-41, Little Britain, for the sum of 1,650*l.* The Court agreed.

Gift of a Picture.—The Lord Mayor laid before the Court a letter from Mr. Deputy C. T. Harris, offering as a gift to the Corporation, for exhibition in the Guildhall Art Gallery, a picture by the late Frederick Goodall, R.A., entitled "Early Morning in the Wilderness of Shur." Mr. Deputy Wallace moved that the gift should be accepted, which was seconded and adopted.



THE BUILDER OCTOBER 13, 1906

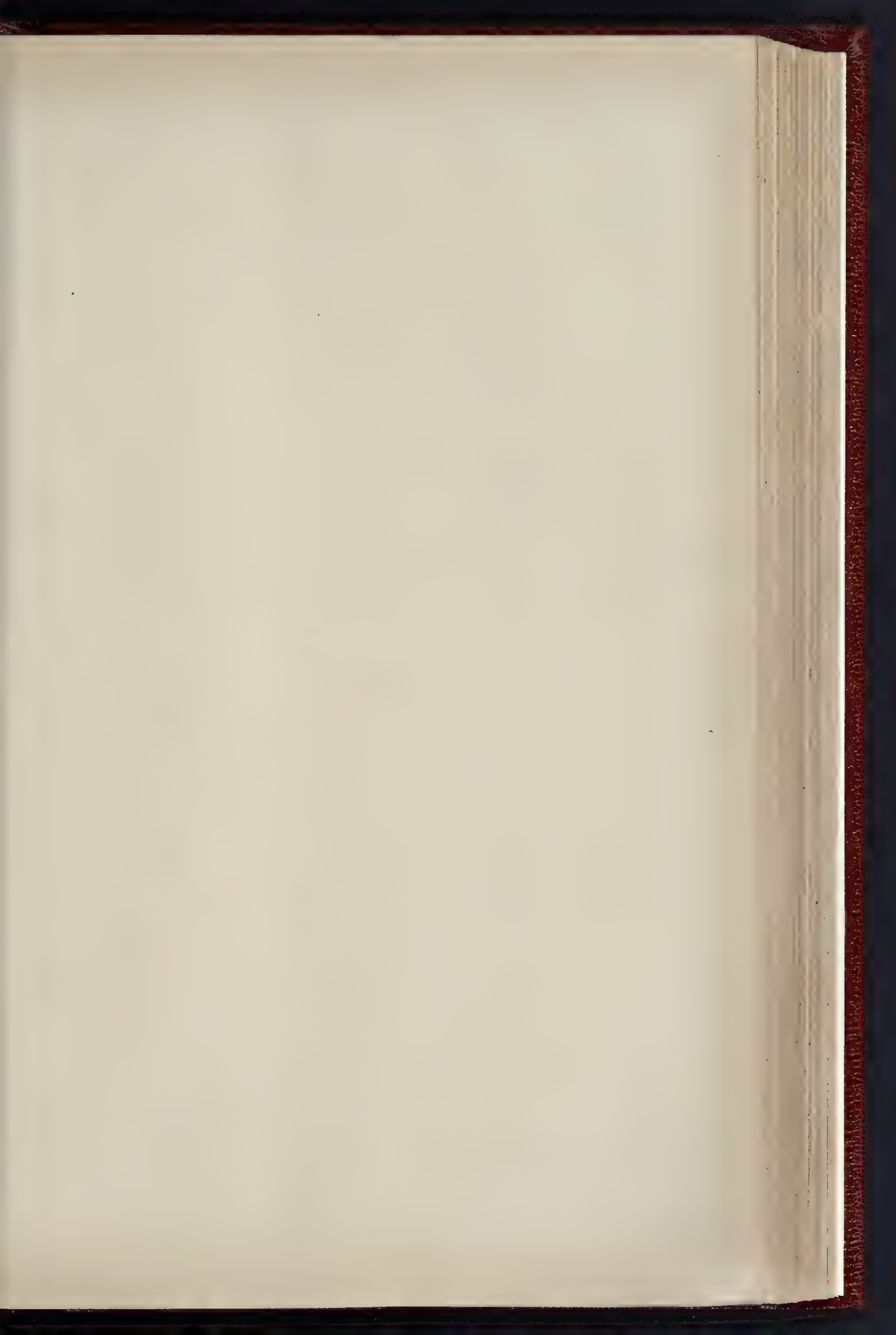




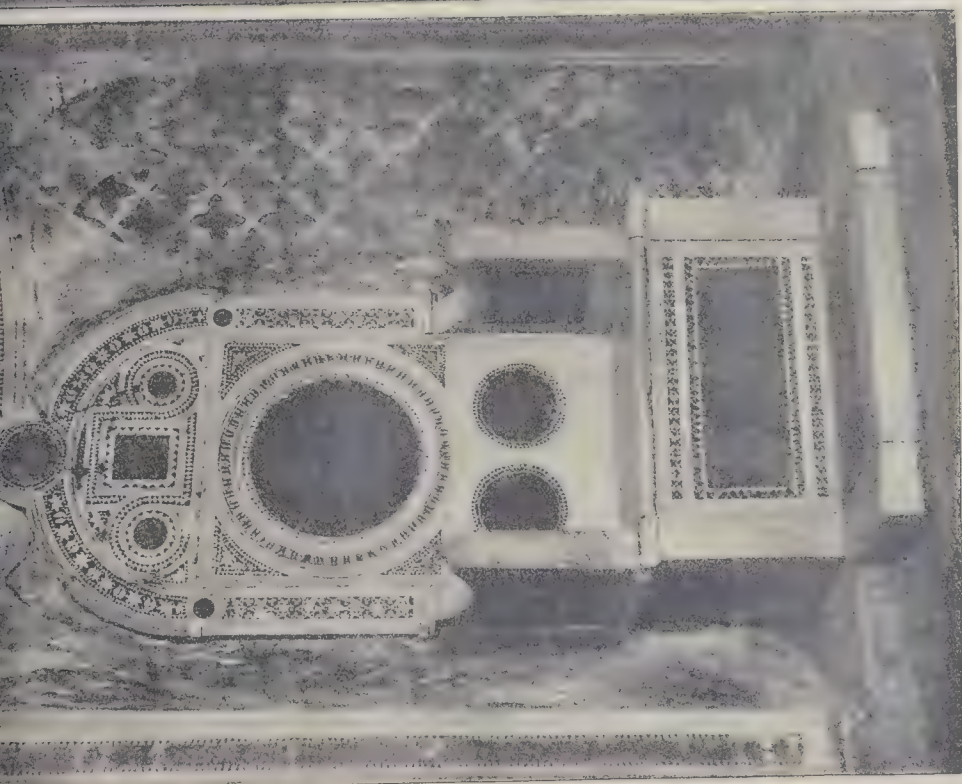
PROPOSED NEW BUILDINGS, MERRION STREET, DUBLIN, FOR THE ROYAL COLLEGE OF SCIENCE AND GOVERNMENT OFFICES.

DETAIL OF PORTICO AND CUPOLA.

SIR ASTON WYER, R.A., AND MR T. M. DEANE, A.R.H.A. JOINT ARCHITECTS





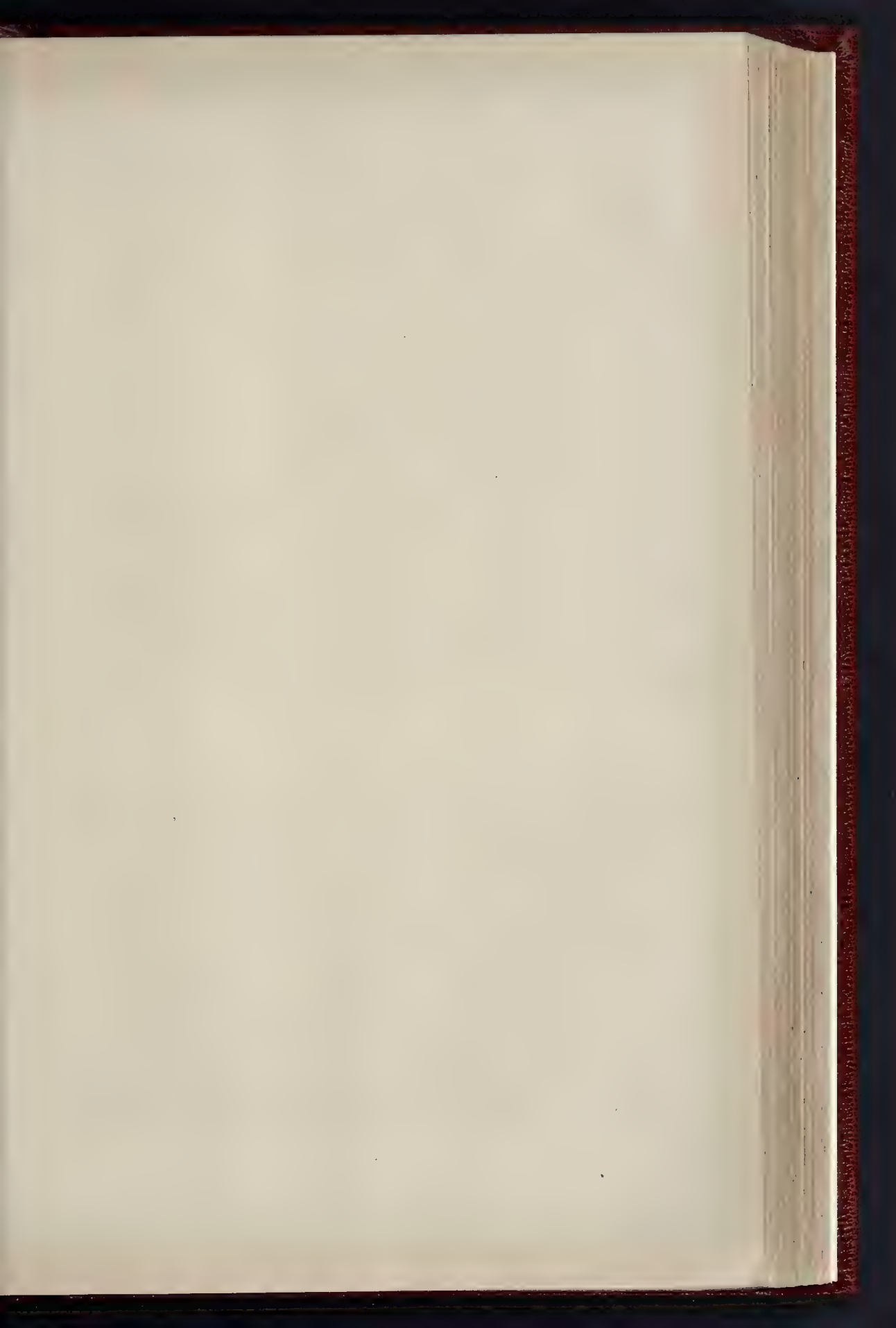


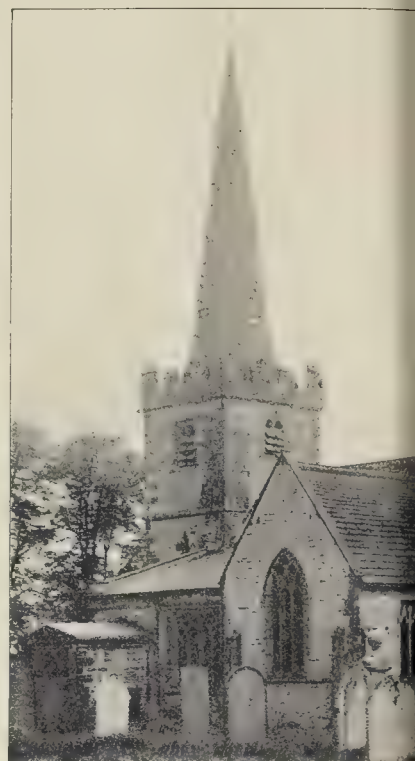
CLARK, S. BALDINA, POMPEII

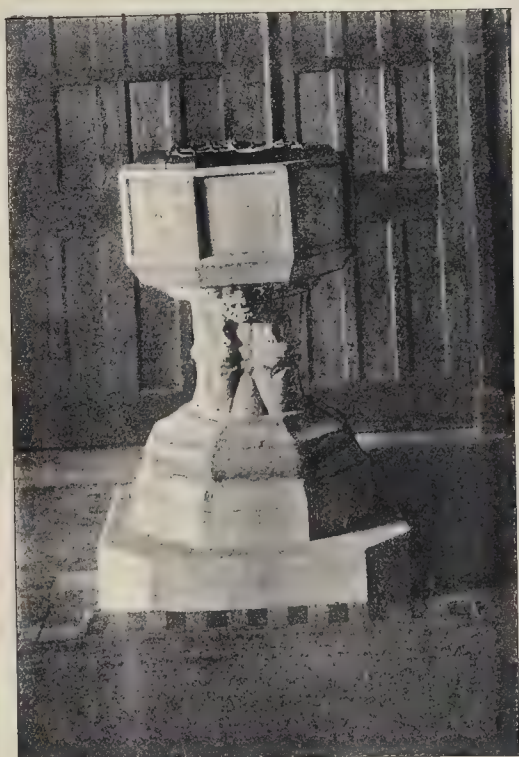


PERSIAN SIBYL, PAVEMENT, SIENA CATHEDRAL

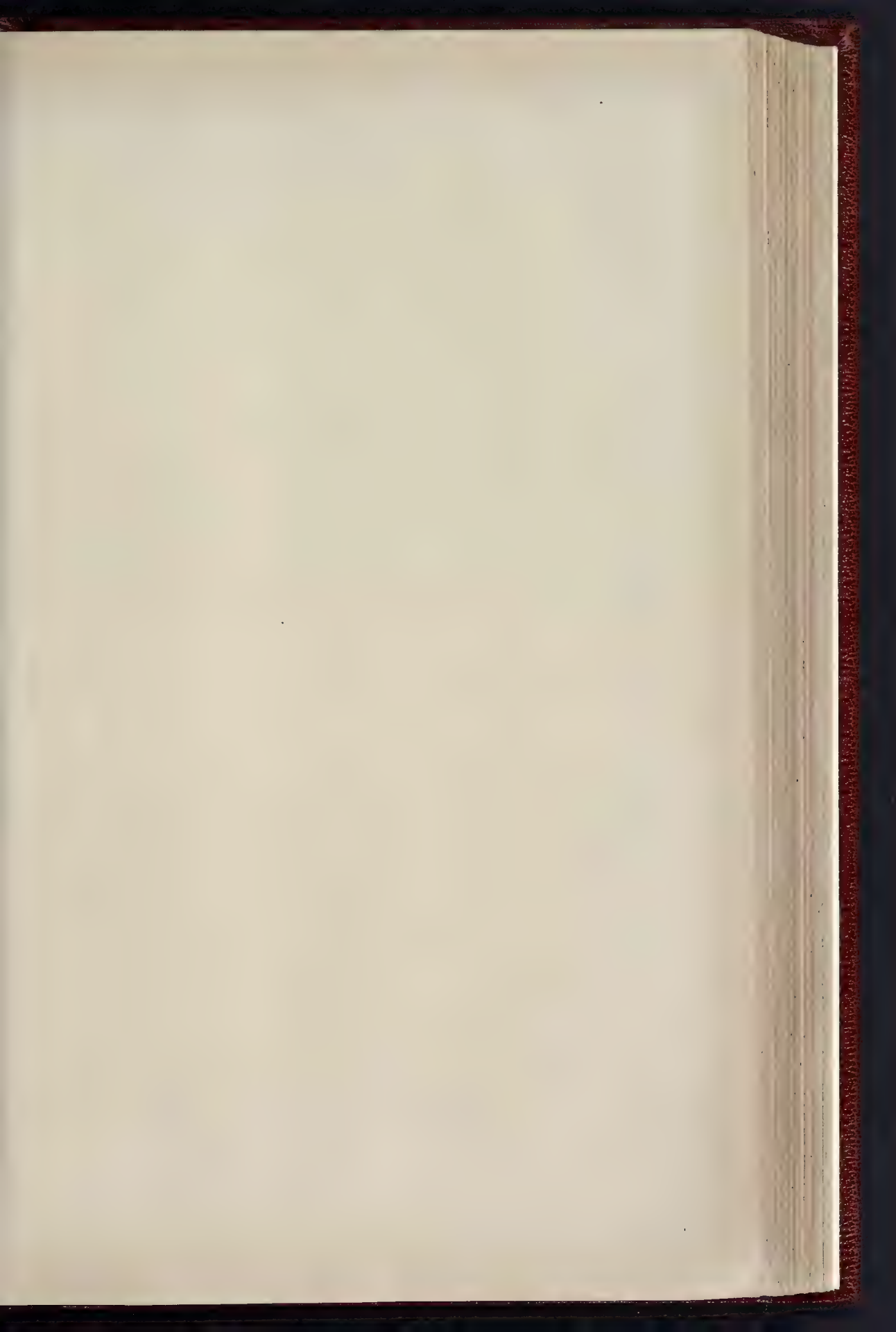
EXAMPLES OF MARBLE INLAY







INK PHOTO SPRACUE S.C. Lth & S. EAST HINDING STREET YETER LANE S.C.





VILLA ADRIANA, TIVOLI.



MAUSOLEUM AT HALICARNASSUS.

A black and white photograph showing a large, circular, concentric ring structure, possibly a geological formation or a large-scale architectural feature, viewed from above. The structure is surrounded by a rough, uneven ground surface.

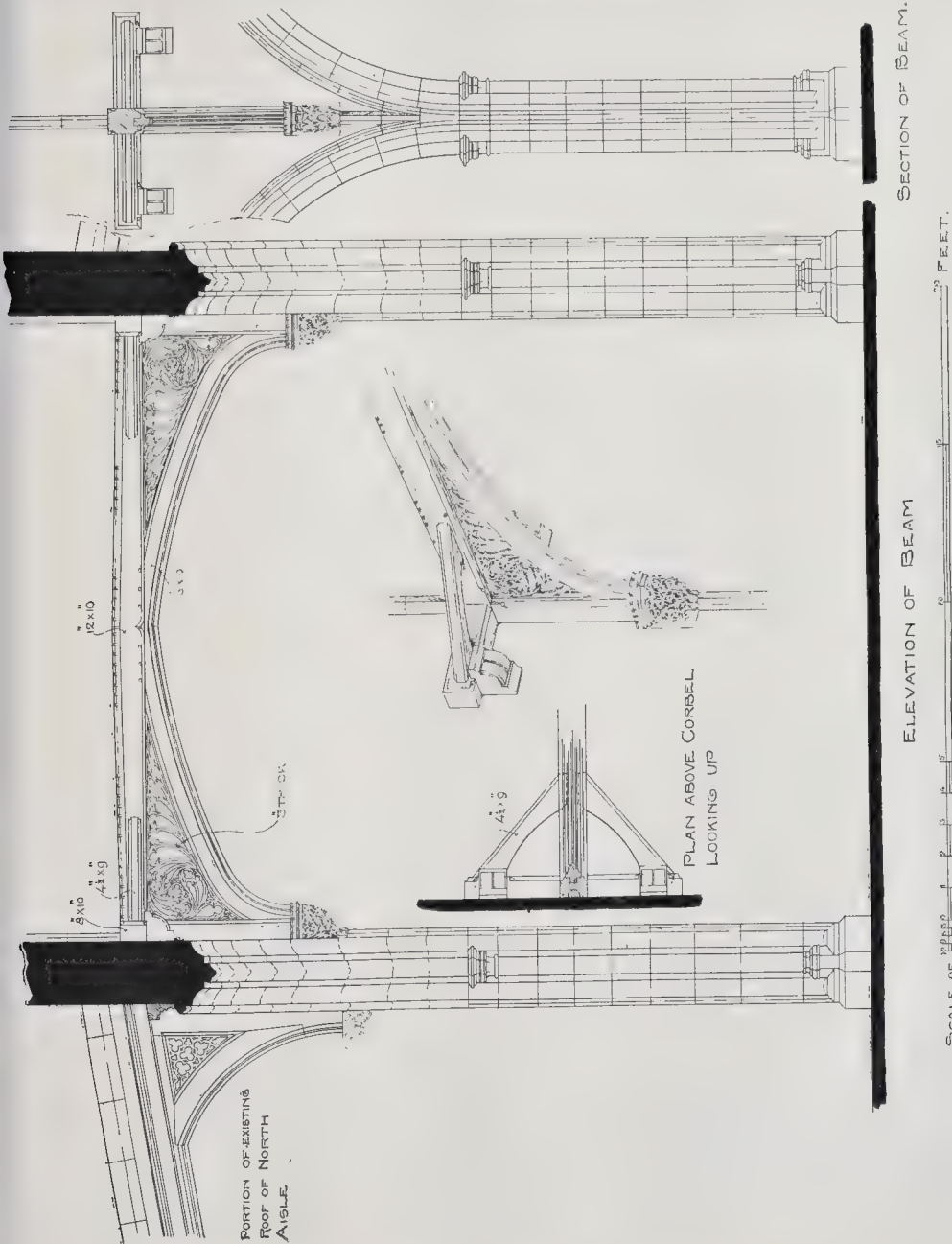
BLE INLAY PAVEMENTS

LEVERINGTON CHURCH, NEAR
WISBECH.

ABOUT five years ago the restoration of the roof of the north aisle of this church was taken in hand.
The roof dates partly from the latter end of the XIVth century and partly from a post-Reformation period, and, owing to the very serious state of decay into which it had fallen, it was found necessary to take it entirely to pieces and to reconstruct it; also either about one-third of the timbers had to be renewed.
It is manifest that work of this description could not be carried out without shaking

the existing walls to a very considerable extent, and, as the arcade on the north side of the nave was very much out of the perpendicular, it was decided to fix temporary struts across the nave as a precaution against further movement during the progress of the work. It was considered safe to adopt this method of supporting the north wall of the nave because the south wall and the south aisle were perfectly sound, having been entirely rebuilt some sixty years ago. When, however, the restoration of the north aisle roof was completed it was recognised that it would be undesirable, if not absolutely unsafe, to remove these temporary struts

without substituting some permanent support to the unsound nave wall, and the accompanying illustration shows one of the three beams which have been erected for this purpose.
The struts are constructed in the following manner:—About 10 ft. above the springing of the nave arcade horizontal beams, supported on two stone corbels, are placed against the face of the walls, and these beams receive further support in the centre from the vertical wall-pieces which stand on the carved stone corbels 4 ft. 6 in. below; the main beams, which are slightly cambered, are framed into the horizontal beams at each



end, and are also strutted to them on either side in order to prevent lateral movement, and in order to distribute the supporting power of the beams over as large an area of the walls as possible. Arched ribs are framed into the vertical wall-pieces and into the soffits of the beams, the spandrels being filled in with 3-in. tracery of varied design.

The carving of the six lower corbels, which was executed by Messrs. T. & E. Nicholls, of Wincott-street, S.E., represents the oak, maple, clematis, passion flower, iris, and daffodil.

The whole of the woodwork is executed in English oak, and Ketton stone has been employed for the corbels. With the exception of the carving of the corbels, the work has been carried out by Mr. H. Farrow, of Wisbech. J. ARTHUR REEVE.

THE ROYAL SANITARY INSTITUTE: SESSIONAL MEETING IN BELFAST.

A MEETING of the Royal Sanitary Institute was held in Belfast on the 5th inst., when the inaugural business was the holding of an examination in sanitary science, the candidates including many of the inspectors in the service of the Council of the County Borough of Belfast. The examination was conducted by Mr. E. White Wallis, Secretary of the Institute, and other officials. Several of the members made a tour of the city during the day and inspected the principal features of interest. In the evening the members, their friends, and a large number of the general public assembled in the Council Chamber at the old Town Hall, Victoria street, when a paper on "The Sewage Purification Problem, with Special Reference to Sewage Discharge into a Tidal Estuary," was read by Councillor Dr. J. D. Williamson, Vice-Chairman of the Police Committee of the Corporation. In the unavoidable absence of the Lord Mayor (the Right Hon. Sir Daniel Dixon, Bart., D.L., M.P.), an official welcome was extended to the visitors by Alderman Dr. J. King Kerr, J.P., Chairman of the Public Health Committee, who presided at the opening of the proceedings, the chair being subsequently taken by Professor A. Bostock Hill, M.D., M.Sc., D.P.H., F.I.C.

Councillor Dr. Williamson then proceeded with his address on "The Sewage Purification Problem, with Special Reference to Sewage Discharge into a Tidal Estuary," his remarks being illustrated by a diagram lent by the Improvement Committee. After alluding to the general physical features of Belfast and the rapid growth of the city in its early days the speaker referred to the main drainage scheme prepared in 1865 by the late Mr. J. J. Montgomery. In his (Dr. Williamson's) opinion it was because the scheme of 1865 was only carried out in 1885, and then only in a modified form, that much of the trouble attributed to the main drainage had since arisen. With the aid of a diagram the speaker explained the main features of the system, and went on to enumerate some of the difficulties with which the former City Surveyor (Mr. J. C. Bretland, M.Inst.C.E.) had to contend when he began to carry out the scheme. In order to obtain an outlet of a satisfactory nature on the outgoing tide the sewage had to be stored in a reservoir, and permission was given by Parliament to discharge for three and a half hours after high water, the intention being that the tide should ebb for three hours after the discharge ceased, and thus carry the sewage away into deep sea. The effect of this in actual operation was to clean the banks of the Lagan above the bridges, and soon after the works came into operation fish were caught in the harbour and far up the river at places where they had not been seen for many years previously; the smells from the river banks also ceased, and the improvement in the condition of the harbour and river was apparent to everyone. Whilst this improvement occurred within the city complaints arose that the smell on the foreshore on both sides of the lough was becoming worse. Everyone along the shore condemned the main drainage, and it was made responsible for all the evil smells, real and imaginary, detected anywhere between Belfast and the mouth of the lough. As those members who arrived by steamer might have observed, many thousands of acres of the foreshore were dry at low water. On the sloblands.

as they were called, seaweeds, chiefly ulva latissima or sea lettuce, had developed in increasing luxuriance since the sewage discharge was concentrated in its present position. Proceeding, Dr. Williamson alluded to the steps which had been taken with a view to dealing with the foreshore nuisance, and argued that a sewage farm was impracticable for Belfast. Bacterial purification seemed to have been a greater success than any other yet in use, and to-day everything was to be said in its favour. In his opinion it would take some years to eliminate all the material which was food for the weed; and the towns and villages on the lough would have to be compelled to do what Belfast was doing before they would have an unpolluted lough and a pure atmosphere.

Mr. K. Parry (Dublin), in opening the discussion, said the subject was of great interest to those who lived in towns similarly circumstanced to Belfast. In Belfast the results of sewage discharge had been different from those of almost any other town. It appeared to him that if the sewage was discharged on the ebb tide, and if the dilution was sufficient, they could discharge large volumes of untreated sewage into a tidal estuary without creating a nuisance. That had been proved at the Rathmines and Pembroke outfall, but, as had been shown, the conditions in Belfast differed to such an extent that some purification might be necessary.

Mr. James Dempsey complained that the storage tank was placed too low. Effluent had been discharged at low tide, and as a consequence the incoming tide brought the sewage back, depositing it on the shore of the lough. He contended that the city was splendidly situated for discharging a great volume of sewage into deep water. He was satisfied that the bacteria-bed system was a humbug.

Professor M'Weney (Dublin) described the conditions existing in that city. He differed from Mr. Parry with regard to the discharge of crude sewage, which, he thought, was most objectionable. Dealing with the hygienic and economic aspects of the effect of sewage discharge in tidal estuaries he instanced the pollution of shellfish, the betouling of sea water and the lowering of the vitality of the inhabitants through the inhalation of foul gases. The primary object of bacterial treatment being to render an effluent suitable for pouring into a drinking water stream he doubted whether it was really called for in the case of a tidal estuary. He was inclined to be sceptical as to the power of the typhoid germ to survive the septic tank and contact beds.

Mr. James Alexander (Belfast), after quoting statistics, said the flow of sewage cost shipbuilders 2,500l. yearly for dredging. Mr. James Munce, M.Inst.C.E. (Assistant City Surveyor), said he hoped they would not have precipitation works in Belfast. He was an advocate of bacterial purification, and if they had it the Belfast public would have nothing to complain of.

Professor Henry Robinson (London) sent in a paper in which he dealt with the question from the point of view of the creation of a nuisance which could be stopped by law.

Mr. W. Redfern Kelly (Chief Engineer to the Harbour Trust) also stated his views in writing. He could not agree with the advocates of the precipitation process, but was in favour of the bacterial system. The sewage entering Belfast Lough must have the highest standard of purification.

Alderman Dr. King Kerr said, after visiting Glasgow and several places in England with other colleagues on the Corporation, he was convinced that the precipitation process was a failure.

Alderman Sir Otto Jaffé said there was hardly a town in Great Britain better situated for bacteria beds than Belfast, as they had quite seventy-two acres for the purpose.

Mr. Hector F. Gullan referred to the condition of matters on the Mersey, where strong tides and deep water kept the sand banks clean. In Belfast there was nothing to wash away the matter from the outfall works, and he was of opinion that the bacterial treatment was the best for the city.

Mr. G. B. Wilkins (Lisburn) said the precipitation system was a complete failure at Lisburn, and they had been compelled to adopt the bacterial process.

Mr. Robinson (Londonderry) also condemned the precipitation process.

The Chairman, in closing the discussion, said he thought that the precipitation theory was dead so far as the ultimate purification of sewage was concerned. It was not the fault of the system if some bacteria beds were a "humbug"; it was the fault of imperfect construction. The system must be correct if land treatment was correct, but the difficulty had been to find areas of sufficient and proper quality to enable them to put the latter treatment on a proper basis. In Birmingham they were putting down bacteria beds every year. The bacteria system was a success when carried out under scientific conditions. Engineers' estimates, however, were cut down to such an extent that the work was often not properly done. With regard to the possible sterilisation of sewage, that was a difficult and unnecessary task, but typhoid-infected matter should be so treated before joining the main body of sewage. Chichester was the only other place which suffered from ulva latissima in the same way as Belfast; but there bacteria beds had also been laid down. The speaker concluded by moving a cordial vote of thanks to Dr. Williamson for his paper, to the Corporation for the use of the council chamber at the Town Hall, and to Mr. Munce for acting as hon. secretary to the meeting.

Mr. K. Parr seconded, and the resolution, having been passed with acclamation, was suitably acknowledged by Mr. Munce.

The proceedings then terminated.

THE LONDON COUNTY COUNCIL.

THE first meeting of the London County Council after the summer recess was held on Tuesday in the County Hall, Spring-gardens, S.W., Alderman Spicer (Chairman) presiding.

Loans.—On the recommendation of the Finance Committee it was agreed to lend Bermondsey Borough Council 2,800l. for paving works; Bethnal Green Borough Council 8,168l. for street improvement; Camberwell Borough Council 6,400l. for works at depot and 10,000l. for street improvement; Deptford Borough Council 6,234l. for furnishing town hall; Hammersmith Borough Council 6,000l. for street improvement and 25,000l. for baths and wash-houses; Lambeth Borough Council 3,000l. for sanitary conveniences; Shoreditch Borough Council 7,506l. for improvements; Wandsworth Borough Council 11,900l. for street improvements; and Wandsworth Guardians 1,150l. for poor-law purposes. Sanction was also given to the following:—Islington Borough Council to borrow 17,156l. for electric lighting and street lighting purposes and 2,400l. for paving work.

Erection of a Motor Garage at Wellington-road, Battersea.—The Building Act Committee reported as follows:—

"Our attention was recently drawn to a motor garage of a total cubical capacity of 600,000 cubic ft. which was being erected by the London Road Car Company in Wellington-road, Battersea. A notice of irregularity was accordingly served upon the company requiring them to have the building divided by walls into divisions not exceeding 250,000 cubic ft. in extent. The notice was not complied with, and police-court proceedings were accordingly taken against the company. The magistrate dismissed the summons with costs against the Council on the ground that he considered that the District Surveyor should have served a notice of objection under sect. 150 of the London Building Act, 1894, and that, as that had not been done, the District Surveyor could not serve the notice of irregularity or take proceedings for non-compliance with the provisions of sect. 75 of the Act, but he expressed his willingness to state a case for the opinion of the High Court. In view of the fact that it did not appear from the building notice that the work proposed to be done would contravene the Act, we consider that the Council should avail itself of this offer. We recommend that the solicitor do take all necessary steps for a case to be stated by the magistrate in the matter of the proceedings between the Council and the London Road Car Company in respect of the motor garage at Wellington-road, Battersea; and for the decision of the High Court to be obtained upon such case."

Col. Colville asked what the meaning of the Committee was in their recommendation. Was it to harass a trading concern? The Council ought to vary their requirements to suit such cases as this. He moved that the matter be referred back.

Mr. Whitaker Thomas seconded. Mr. Taylor, Chairman of the Committee, said the Committee did not desire to drive industries out of London. They could not, however, do more than administer the Act,

and they were prepared to recommend an extension of the cubic feet capacity for such buildings. In fact, they were seeking powers to enable them to grant a greater cubic capacity in the case of such buildings, but present they had no power.

The amendment was lost and the recommendation agreed to.

Westminster Bridge and Victoria-embankment Tramways.—The Highways Committee reported as to the arrangements made as to the Embankment tramway:

The following tenders were received from selected firms for the execution of the roadwork and platelaying in connection with the construction of the tramways: Dick, Kerr, & Co., Ltd., London, 5,836l. 14s. 2d.; J. G. White & Co., Ltd., London, 6,354l. 16s. 2d.; J. Mowlem & Co., Ltd., London, 7,744l.

The amount of the Chief Engineer's estimate comparable with the tenders is 47,035l. 15s. 1d. Under the authority given to us on July 31, 1906, the lowest tender, namely, that of Dick, Kerr, & Co., Ltd., amounting to 45,836l. 14s. 2d., has been accepted, and the contractors have also been allowed to submit the following portions of the work to the firms named:—(a) to the Anderson Foundry Company, Ltd., of Middlesbrough, or to Wilson, Pease, & Co., Ltd., the manufacture of the yokes; (b) to Boulton, Ltd., of London, or to Messrs. Hiltel, the manufacture of the insulators; (c) to Bayliss, Jones & Bayliss, Ltd., of Wolverhampton, or to Guest, Keen, & Nottelhof, the manufacture of the tie-bars, yokes, etc.; and (d) to the Associated Portland Cement Manufacturers, Ltd., the supply of cement.

The following portions of the work in connection with construction and equipment of the tramways are now in hand:

In view of the probability of the tramways being ready for working earlier than was originally anticipated, and before the erection and equipment of the Holborn substation is completed, the question has been considered of obtaining a temporary supply of electric power for working the lines pending the completion of the Holborn substation and its being connected up with the Greenwich generating-station on the one hand and the tramways on the other. In these circumstances arrangements have been made, as a matter of urgency, with the Underground Electric Railways Company of London, Ltd., to afford the temporary supply of power required, and we have given instructions for the seal of the Council to be affixed to an agreement to give effect thereto.

The Embankment Trees.—Capt. Hemphill, the Chairman of the Highways Committee, in reply to Sir Thomas Brooke-Hitching, said they were taking every step, in constructing the tramway along the Embankment, to see that as little damage as possible would be done to the trees there. His Committee were in consultation with the Parks and Open Spaces Committee in the matter.

Mr. Stuart Sankey, the Chairman of the Parks and Open Spaces Committee, said he was sorry to say that the trees on the Embankment were being very seriously damaged, and unnecessarily so. He did not speak at random, but he had received from the Chief Officer of the Parks Department a report on the subject. From this it appeared that the constructional work had already materially damaged ten trees, one of which was to be permanently removed. Owing to the sinking of shafts in the footway these had had their roots severely cut, being thereby seriously injured and they might be found necessary to replace them. Acting upon information received from the engineer, he had had a template made 16 ft. 6 in. high, with a projection from the top 1 ft. 7½ in. long, turned towards the trees.

This template was placed on the near side of the rail where practicable, and represented the amount of head-room required for a two-decker car. Upon testing the height and overhang of each tree he found that with only two exceptions of very young trees the whole would require lopping more or less on the roadside to admit of the passage of the cars. As the trees had already been pruned on that side to accommodate the ordinary vehicular traffic, this additional lopping would accentuate the existing difference in balance, and on the opposite side of the trees, if, however, the type of car proposed to be used were similar to that running on the Aldwych route, very little pruning would be necessary.

Mr. Dickinson suggested that it would be possible to run single-deck cars with trailers instead of double-deck cars, and thus save a good deal of lopping.

Capt. Hemphill replied that he hoped, notwithstanding the report which Mr. Sankey had read, that there would be very little damage done to the trees, but it would be impossible to run single-deck cars, because these lines would form part of a circular

route. He could not believe that the lopping of the trees could be such a serious matter as had been suggested.

The subject then dropped.

Workmen's Dwellings.—The Housing of the Working Classes Committee brought up the following report:—

Beacroft-buildings. New King's-road estate, Fulham, were completed during the recess, and lettings are now being effected. These buildings, which contain accommodation for 220 persons, in ten tenements of two rooms and thirty tenements of three rooms, have been provided for the purpose of rehousing 215 persons displaced in connection with the widening of Fulham Palace-road and High-street, Fulham.

The last block of dwellings on the Caledonian estate, named Bruce-buildings, was completed during the recess. The buildings contain accommodation for 356 persons in six tenements of one room, thirty-four tenements of two rooms, twenty-eight tenements of three rooms, and four tenements of four rooms. The total number of persons for whom accommodation has been provided on the estate, which was acquired under Part III. of the Housing of the Working Classes Act, 1890, is 1,358.

Briscoe-buildings. Brixton Hill, are approaching completion. The dwellings contain accommodation for 718 persons in ten tenements of two rooms, seventy-three tenements of three rooms, and thirty tenements of four rooms. The Brixton Hill estate was purchased by the Council for the purpose of providing working-class dwellings under Part III. of the Housing of the Working Classes Act, 1890.

Rotherhithe Tunnel.—Progress of Work.—The Improvements Committee reported as follows:—

"The Council will be interested to learn the progress which has been made with the construction of the tunnel under the Thames between Rotherhithe and Rotherhithe. All the shafts, four in number, have been sunk to their final depth. The cut and cover work on the south side has been completed, but little of this work has been done on the north side. The whole of the southern and about two-thirds of the northern open approach have been completed. The river wall near the entrance to the Surrey Commercial Docks and the bridge at Rotherhithe over the East London Railway have been completed. About three-quarters of the east-iron tunnel under the river has been completed, while a small pilot tunnel has been driven some way in advance of the main tunnel, and a timbered heading has been driven in advance of the head of the pilot tunnel, so that at the end of September last it was possible to walk from the south side of the river to the north.

The Council adjourned soon after 7 o'clock.

APPLICATIONS UNDER THE 1894 BUILDING ACT.

The London County Council at their meeting on Tuesday dealt with the following applications under the London Building Act, 1894. The names of applicants are given between parentheses:—

Lines of Frontage and Projections.

Brixton.—Six houses with projecting one-story shops on the northern side of Landor-road, Brixton, abutting also upon Atherfold-street (Mr. V. Vagolin for Mr. W. P. Goosey).—Consent.

Clapham.—The retention of a detached greenhouse at the rear of No. 1, Bolingbroke-grove, Clapham, to abut upon Nightingale-lane (Dr. R. W. Oram).—Consent.

Hackney, Central.—An addition to No. 74, Southgate-road, Hackney (Messrs. Spiers & Son).—Consent.

Hackney, North.—That the application of Mr. G. H. Payne for Messrs. Jordan & Payne, for an extension of the period within which the erection of eight houses with bay-windows on the east side of Upper Clapton-road, Hackney, between No. 174, Upper Clapton-road and Moresby-road, was required to be completed, be granted. Agreed.

Hackney, North.—Three blocks of flats on the western side of Church-path, Stoke Newington, with projecting porches and four story bay-windows, as shown on the plan (Mr. J. H. May for Mr. J. M. Pritchard).—Consent.

Hammer-smith.—A projecting stone porch in front of a house on the eastern side of Old Oak-road, Shepherd's Bush (Mr. R. Norman-Hewitt for Mr. T. B. Monti).—Consent.

Hammer-smith.—In connection with the consent given to the erection of nine houses with shops on the western side of Askew-road, Hammer-smith, the Council do permit the extension of a passageway across the rear of the third shop from the northward, and the erection of a bake-house abutting upon such extension at the rear of the second shop from the northward (Mr. J. J. Kelly).—Consent.

Holborn.—An oriel window and balcony in front of a proposed block of buildings on the southern side of High Holborn, opposite Nos. 193 Oxford-street, and partly on the site of Nos. 193 and 194, High Holborn (Messrs. Warwick & Hall for the Holborn Metropolitan Borough Council).—Consent.

Holborn.—A new shop front at No. 12, New Oxford-street, Holborn (Messrs. Lee, Dickins & Co. for Mr. H. Hunt).—Consent.

Islington, North.—A building on the north-western side of Elthorne-road, Holloway, to abut also upon Boothby-road (Mr. G. Lethbridge for the managers of the Highgate Presbyterian Church).—Consent.

Lewisham.—A projecting porch at the flank of No. 50, Carlholme-road, Lewisham, to abut upon Maxler-road (Messrs. Norfolk & Prior for Mr. G. A. Summers).—Consent.

Marylebone, East.—Retention of projecting wooden reflectors at the premises of Messrs. Waring & Gillow, Limited, Winsley-street, Oxford-street, St. Marylebone (Mr. R. F. Atkinson for Messrs. Waring & Gillow, Limited).—Consent.

St. George, Hanover-square.—A projecting balcony and bay-window in front of No. 10, Maddox-street, St. George, Hanover-square (Messrs. Lander, Bedells, & Crompton for Mr. T. Coles).—Consent.

St. George, Hanover-square.—A stone porch in front of No. 34, Hill-street, Berkeley-square (Messrs. Brown & Barrow for Col. Sackville West).—Consent.

St. Pancras, South.—A projecting sign in front of No. 33, Gooch-street, Tottenham Court-road, St. Pancras (Mr. J. F. Gemes).—Consent.

St. Pancras, South.—A projecting porch and two balconies in front of proposed buildings on the site of Nos. 344 to 354, Gray's Inn-road, St. Pancras (Mr. L. V. Hunt for the Welshbach Incandescent Gas Light Company, Limited).—Consent.

Strand.—Retention of a projecting clock in front of No. 48, Regent-street, Strand (Mr. R. H. Kerr for Messrs. Mellins, Limited).—Consent.

Wandsworth.—Buildings on the eastern side of Garratt-lane, Wandsworth, with flanks abutting also upon Walldon-road and Fretford-street (Messrs. Holloway Brothers).—Consent.

Wandsworth.—Bay windows and porches to houses on the north and south sides of Eatonville-road, and east side of Trinity-road, Tooting (Mr. W. C. Poole for Mr. F. Eaton).—Consent.

Wandsworth.—Three blocks of buildings on the eastern side and two blocks of buildings on the western side of Derinton-road, Tottenham-fields estate (section "C"), Tooting (Mr. B. Robertson for the Housing of the Working Classes Committee of the Council).—Consent.

Wandsworth.—The retention of one-story shops at Nos. 36, 38, 40, and 42, Lower Richmond-road, Putney (Mr. W. West for Mr. C. D. Collins).—Consent.

Wandsworth.—Porches to two houses on the north side of Baldry gardens, Streatham (Mr. W. J. James for Messrs. Wooding & Cole).—Consent.

Wandsworth.—The retention of a projecting pilaster at the flank of a house in Upper Tooting-road, Wandsworth, abutting on the western side of Stapleton-road; and the erection of shops on the southern side of Tooting-bee-road (Messrs. Taylor, Willocks & Co. for Mr. A. T. Wellings).—Consent.

Wandsworth.—Shops on the eastern side of Balham-hill, Wandsworth, abutting upon Hazel-bourne-road (Mr. P. Meredith).—Consent.

Hammer-smith.—Three shops upon the site of "Old Oak Villa," Uxbridge-road, Hammer-smith (Mr. W. G. Ingram for Messrs. Griggs Brothers).—Refused.

Kensington, North.—Iron and glass covered way in front of No. 20, Lansdowne-road, Holland-park, Kensington (Mr. G. H. Fox for Mr. T. Pocklington).—Refused.

Lewisham.—Buildings on the eastern side of Muirkirk-road, Canford, to abut upon Dowan-hill-road (Mr. B. Stewart for Mr. A. Cameron-Corbett).—Refused.

Marylebone, East.—A block of shops, with a concert-hall over, upon the site of St. Paul's Church, Great Portland-street, St. Marylebone (Messrs. Joseph and Smith for Messrs. Perry Brothers).—Refused.

Marylebone, West.—A wrought-iron arch on the forecourt of Nos. 168 and 170, Edgware-road, St. Marylebone (Mr. C. Hall for Mr. E. S. Burns).—Refused.

Paddington, North.—A workshop building at the flank of No. 59, Ashmore-road, Paddington, to abut upon Lydford-road (Mr. A. Hall for Mr. W. H. G. Balchin).—Refused.

Paddington, South.—A one-story shop in front of No. 68, Richmond-road, Paddington (Messrs. Barnett & Brothie for Mr. J. Snowman).—Refused.

Width of Way.
City of London.—That the application of Mr. W. T. Walker for an extension of the period within which the re-erection of buildings on the western side of Cross Key-court, London-wall, City, was required to be completed, be granted.—Consent.

Clapham.—A urinal at the rear of "The Nightingale" tavern, Nightingale-lane, Clapham, at less than the prescribed distance from the centre of Western-lane (Mr. W. West for Mr. T. Wallis).—Consent.

Finsbury, Central.—A building on the site of No. 8, Allen-street, Goswell-road, Finsbury, at less than the prescribed distance from the centre of

the roadway of the street (Mr. E. B. T'Anson).—Consent.

Haggerston.—A building on the site of No. 16, Felton-street, Hyde-road, Hoxton, at less than the prescribed distance from the centre of the roadway of the street (Mr. G. H. Lovegrove for Mr. E. T. Pearce).—Consent.

Kensington, South.—A billiard-room and lavatory addition at the rear of No. 32, Brompton-square, Kensington, to abut upon Ennismore-gardens-mews, at less than the prescribed distance from the centre of the roadway of Ennismore-gardens-mews (Messrs. Hubbard & Moore for Mr. A. Simson).—Consent.

Kensington, South.—Retention of a boundary wall at the rear of No. 3, Bolton-gardens, Old Brompton-road, Kensington, at less than the prescribed distance from the centre of the roadway of Bolton-gardens South (Mr. W. Cave for Mr. J. Walker).—Consent.

Limchouse.—An addition to the Durning Mission-hall, on the southern side of Elsa-street, Limchouse (Mr. A. S. Taylor for Sir E. Durning-Lawrence, Bart.).—Consent.

Paddington, North.—Two water-closet buildings in the area of No. 13, Cambridge-place, Paddington, abutting upon Market-street, at less than the prescribed distance from the centre of the roadway of Market-street (Mr. W. H. Smith for The Humber Company, Limited).—Consent.

Poplar.—Latrines at the Wade-street (Roman Catholic) Schools, Poplar, at less than the prescribed distance from the centre of the roadway of Shributt-street (Mr. R. L. Curtis for the managers of the schools).—Consent.

St. George-in-the-East.—Houses on the eastern side of Johnson-street, St. George-in-the-East, northward of St. Mary's-hall, at less than the prescribed distance from the centre of the roadway of the street (Messrs. Calnan & Son).—Consent.

St. Pancras, East.—A building on the northern side of King-street, Camden-town, to abut upon Little Camden-street, at less than the prescribed distance from the centre of the roadway of Little Camden-street (Mr. S. G. Castleman for Messrs. Maple & Co., Limited).—Consent.

Southwark.—A building on the site of Nos. 195, 197, 199, and 201, Union-street, Southwark, at less than the prescribed distance from the centre of the roadway of the street (Messrs. H. Jarvis & Son for Messrs. Hayward Brothers and Eckstein, Limited).—Consent.

Dulwich.—A building at the rear of No. 184, Camberwell-grove, Dulwich, to abut upon Stories-road, and a roadway leading therefrom (Mr. A. Lavcock).—Refused.

Limchouse.—A building on the southern side of Narrow-street, westward of No. 108, at less than the prescribed distance from the centre of the roadway of the street (Mr. J. M. Knight).—Refused.

Width of Way and Line of Frontage.

Woolwich.—That the Council do consent to the application of G. A. Wilkinson & Son for a modification of the conditions contained in the resolution consenting to the erection of buildings abutting upon the western side of Godfrey-street, the southern side of Godfrey-hill, and the eastern side of Lower Wood-street, Woolwich, so far as relates to the time within which the land shown by blue colour on the deposited plan was to be dedicated to and left open for the use of the public, and do also extend the time within which the erection of the said buildings was to have been commenced. —Consent.

Width of Way and Construction.

Haggerston.—The retention of a wooden fence at the rear of No. 279, Kingsland-road, Haggerston, at less than the prescribed distance from the centre of the roadway of Mill-row, and the retention of a wooden timber stage at the rear of the said premises (Messrs. Wagstaff & Sons for Mr. T. Jeffreys).—Consent.

Dulwich.—The retention of a one-story wood and iron shed at the eastern end of Dewar-street, Peckham, at less than the prescribed distance from the centres of the roadways of a footpath and a carriageway leading out of such street (Messrs. F. Webster & Son for Mr. R. W. Atkinson).—Refused.

Space at Rear, Construction and Alteration of Building.

St. George, Hanover-square.—A deviation from the plan approved for the erection of an iron and glass conservatory on the rear portion of the roof of the Bath Club, abutting upon Berkeley-street, St. George, Hanover-square, so far as relates to the erection of an iron and concrete enclosure to the gearing of an electric lift adjoining the said conservatory (Mr. C. Johnson for the directors of the Bath Club Company).—Consent.

Space at Rear.

Southwark, West.—A modification of the provisions of sect. 41 with regard to open spaces about buildings, so far as relates to the proposed erection of stable buildings on a site on the south-eastern side of Valentine-place, Southwark, with-

out the open space required by the said section (Mr. W. Egerton for the Malta Company).—Consent.

Deviations from Certified Plans and Projections.

Strand.—Certain deviations from the plans certified by the District Surveyor under sect. 43 of the Act, so far as relates to the erection of No. 3, Little Pulteney-street, Soho, Strand, and the erection of an oriel window in front of the said premises as proposed to be re-erected (Mr. J. P. Briggs for Mr. Moss-Vernon).—Refused.

Deviation of Certified Plans.

Westminster.—Deviations from the plan certified by the District Surveyor under sect. 43 of the Act, so far as relates to the proposed erection of a building upon the site of Nos. 51 and 51A, Strutton-ground, Westminster (Messrs. Glasier & Son).—Consent.

Width of Way and Lines of Frontage.

Bermondsey.—A warehouse building on the south side of Layton's-buildings, Borough High-street, Bermondsey (Messrs. Bailey & Wood for Messrs. Sissons Brothers & Co., Ltd.).—Refused.

Line of Fronts and Space at Rear.

Lewisham.—A house on the northern side of Springgrove-road, Hill-top-green-lane, Lewisham (Mr. J. Stanford).—Refused.

Formation of Streets.

Clapham.—That an order be issued to Mr. R. L. Freeman sanctioning the formation or laying out of a new street for carriage traffic, to lead from Nightingale-lane to Temperley-road, Wandsworth. —Consent.

Kensington, North.—That an order be issued to Messrs. Trant, Brown, & Humpfreys sanctioning the formation or laying out of two new streets for carriage traffic upon the St. Quintin estate, on the western side of St. Helen's-gardens, Kensington (for Mr. W. H. St. Quintin).—Consent.

Wandsworth.—A deviation from the plans approved for the formation or laying out of new streets for carriage traffic on the Fairfield House estate, Tooting, to lead from Mitcham-road to Totterdown-street, and in connexion therewith the widening of a portion of Mitcham-road, so far as relates to an alteration in the position of the entrance to the street (Mr. W. C. Poole for Messrs. Ayre & Kingcome).—Consent.

Wandsworth.—Permission to retain barriers across Ellerton-road, Wandsworth (Messrs. Holloway Brothers).—Consent.

Fulham.—A deviation from the plan approved for the formation or laying out of a new street for carriage traffic, to lead from Fulham Palace-road to Colehill-lane, Fulham, so far as relates to an alteration in the levels of the proposed street (Mr. A. Blackford).—Refused.

Wandsworth.—That an order be sealed (in duplicate) and issued to Mr. J. C. Radford refusing to sanction the formation or laying out of new streets for carriage traffic to lead out of the western end and southern side of Chartistfield-avenue, Putney (for Lord Westbury).—Refused.

Cubical Extent.

Greenwich.—The erection at Victoria Works on a site on the western side of Victoria-road, Old Chardon, of a building to exceed in extent 250,000, but not 450,000 cubic feet, and to be used only for the purposes of the manufacture of copper wire cables (Messrs. Scott, Hanson, & Fraser for Messrs. Johnson & Phillips, Ltd.).—Consent.

Height of Buildings.

Hackney, North.—An addition to premises on the northern side of Ashwin-street, Dalston, to exceed in height the width of the street (Mr. F. T. W. Goldsmith for Messrs. Reeves & Son).—Consent.

Width of Way, Space at Rear, and Alteration of Buildings.

Woolwich.—The conversion of a one-story stable building on the north side of The Grove, Eltham, into a two-story dwelling-house (Mr. C. A. Chapman for Mr. F. Hare).—Refused.

The recommendations marked * are contrary to the views of the local authorities.

BOOKS RECEIVED.

DAUGHTERS OF THE HOUSES AND HOW TO DEAL WITH THEM. By George H. Blagrove. Second Edition. (B. T. Batsford. 4s. 6d.)

SYMMETRICAL MASONRY ARCHES. By Mulverd A. Howe, M.Am.Soc.C.E. (Chapman & Hall.)

MODERN SUBURBAN HOUSES. By C. H. B. Quennell. (B. T. Batsford. 16s.)

READING: WITH ITS SURROUNDINGS. (Home Land Association. Is.)

PRACTICAL STENOGRAPHY. By F. Scott Mitchell. (Trade Papers Publishing Company. 3s.)

Correspondence.

GRANITE PAVING AT BERMONDSEY.

SIR, —We observe in your last week's edition a report of proceedings at a recent meeting of the Bermondsey Works Committee, in which we are referred to as having informed the Council that it was impossible for us to supply their requirements in Aberdeen pitchings in the contracted time. This statement is inaccurate and incorrect version of what passed between us and the Bermondsey Council, and such reports may have an injurious effect upon the Aberdeen trade.

What we did inform the Council in our letter was that we had difficulty in keeping pace with our existing orders (there being a purely temporary pressure), and the proposal we made would have been a convenience to us, but we did not say it was impossible for us to supply, and we were particularly careful not to do so.

Moreover, we may state that we have arranged to supply the Bermondsey surveyor with his requirements, which are considerably in excess of the quantity originally estimated for, and from Aberdeen. A. & F. MANUELLE.

The Student's Column.

ROOFS: STRUCTURALLY CONSIDERED. XIII.

19. Details of King-post Trusses (continued).

HAVING now before us the details of a king-post truss, we turn next to the details of the members which, together with a requisite number of trusses, are connected to form a complete king-post roof.

Wall-plates.—These are timbers laid upon or near the top of the side walls of a building immediately beneath the end of the tie beam, which should be notched or coggled upon them as described in Article XII. The object of the wall-plates is to afford secure connexions for the tie beams, and to distribute the weight of the roof over the supporting brickwork. As a general rule the wall plates are simply bedded in mortar, but in exposed situations it may be desirable to anchor them down to the brickwork by means of bolts and nuts, fitted with anchor plates in order to prevent the wind from lifting the roof from its bearings.

The usual position of a wall-plate is such that its inner side is flush with the interior face of the brickwork. This is not a good position from the structural standpoint, as it involves non-axial loads upon the walls instead of the axial loads that would obtain if the plates were fixed over the centre of the brickwork.

Each wall-plate should be made up of long lengths in order to reduce the number of joints as far as possible. The lengths are jointed either by *halving* or by *scarfing*, as shown in Figs. 134 and 135. At angles of a building the plates are jointed by ordinary halving, as illustrated in Fig. 136, or by *bevelled halving*, which, as shown in Fig. 137, is somewhat akin to scarfing. It will be seen that the notch in the lower member presents lateral movement of the upper member, and that, providing the two faces of the joint are kept together by a weight, the upper member cannot easily be drawn away in the direction of its length.

The width of the wall-plates for a king-post roof of given span and pitch can be readily calculated. The weight of the truss in one panel must first be ascertained; to it must be added for the roof surface in the same panel the collective weight of the rafters, purlins, ridge-board, pole-plate, boarding, battens, roof covering, ceiling joists and ceiling, and the wind and snow loads.

The total load so determined, divided by the resistance of the timber to crushing across the grain, will give the area of timber required under the ends of the tie-beam.

Experiments as to the crushing resistance of timber show that the force required to crush the fibres transversely to the extent of $\frac{1}{4}$ in. deep, is about 500 lb. per square inch for fir. In practice it would be reasonable to take the value at 400 lb. per square inch to guard against undue compression.

As an example, let us assume the total load coming upon the two wall-plates in one panel of a king-post roof to be 14,000 lb., and the width of the tie-beam to be 4 in.

Then, to keep the pressure within the limit of 400 lb. per square inch, the bearing surface

the tie-beam must not be less than $4,000 \div 400 = 35$ sq. in., and the width of each wall-plate would be $\frac{1}{2} (35 \div 4) = 4.375$ in., and making its depth 3 in., the dimensions could be, say, $4\frac{1}{2}$ in. wide by 3 in. deep.

Again, assuming the total load upon two wall-plates in one roof panel to be 24,000 lb., and the width of the tie-beam to be 5 in., the width of each wall-plate ought to be $(24,000 \div 400 \times 5) = 6$ in., and making its depth 4 in., the dimensions would be 6 in. wide by 4 in. deep.

Stone templates are sometimes recommended as having an advantage over timber wall-plates, chiefly in respect of their superior fire resistance. While such templates are often necessary for steel and other roofs of wide span, nothing is to be gained by their adoption in simple king-post roofs of combustible construction, where the wall-plates are far less exposed to possible flame than parts of the roof proper.

Pole-plates.—The pole-plates are timbers notched and nailed across the ends of the tie-beams, as in Fig. 138, or upon the principal rafters, as in Fig. 139. The most suitable position for the pole-plate is immediately above the wall-plate, but this arrangement can only be adopted by placing the junction of the tie-beam with the principal rafter between the walls, or by mounting it upon the principal rafters. In one case the tie-beam is inadequately supported, and in the other the principal rafters are weakened.

Pole-plates are essentially beams, and their proportions can be calculated by ordinary beam formulae. In practice, however, their dimensions have to be varied so much to suit different modes of fixing the roof gutters, that calculations are used more for the purpose of ascertaining whether adequate strength has been provided than of furnishing an indication to economical construction.

Purlins are beams serving the double purpose of connecting the roof trusses and of supporting the common rafters. As a general rule the purlins are notched upon the principal rafters, and supported by cleats, as illustrated in Fig. 109 ante. The purlins are sometimes coggled upon the rafters, but this method of connexion is open to the objection that, however wide the cog may be, it must reduce the strength of the principal rafters.

In an ordinary king-post roof only one purlin ought to be applied to each slope. For spans that involve common rafters of such length as to need more than one intermediate support, queen-posts should be added, as in Fig. 88 ante, or a queen-post truss substituted (see Figs. 89 to 93 ante).

As stated in Article XII., the purlins should be, as nearly as possible, over the head of the diagonal struts. For other reasons, however, it is desirable that the purlin should be placed so as to divide the common rafters into two equal spans. These two requirements are frequently in opposition, and in practice have to be reconciled, as far as practicable, by compromise.

Timber for purlins should be in pieces of maximum length so as to reduce the number of joints, which are usually made by scarfing. The best form of scarfed joint for resisting transverse strain is that illustrated in Fig. 140, where the scarf is cut vertically through the depth of the two timbers to be connected. The joint should always be arranged to come over one of the trusses.

Tredgold's rule for the proportions of purlins is

$$d = \sqrt[3]{L^3 \times C \times 1.0} \text{ for fir}$$
$$= \sqrt[3]{L^3 \times C \times 1.04} \text{ for oak} \dots (11)$$

where

L = span of the purlin from truss to truss in feet,

C = distance in feet between the purlin and other supports of the common rafters, or distance between the purlins where more than one is employed in each roof slope.

The distance between the purlins or other supports depends upon the pitch and arrangement of the roof. The pitch affects the width of the slope as compared with the width of the roof span in the proportion: $\text{width of slope} = \frac{1}{2} \text{ span} \div \cos \theta$, and the position of the pole-plate affects the distance between that member and the head of the king-post.

Ridge-plate.—This is a board, usually ranging in thickness from $1\frac{1}{2}$ in. to 2 in., inserted in the head of the king-post, as shown in Fig. 132 ante, and extending throughout the entire length of the roof. The depth of the ridge-plate necessarily depends upon that of the common rafters, and the nature of the

roof covering, for which it is suitably furnished. For instance, in Fig. 141 the ridge is surmounted with a roll for lead covering, and in Fig. 142 it is trimmed off to suit slate ridding.

The four members described above—the wall-plate, the pole-plate, the purlin, and the

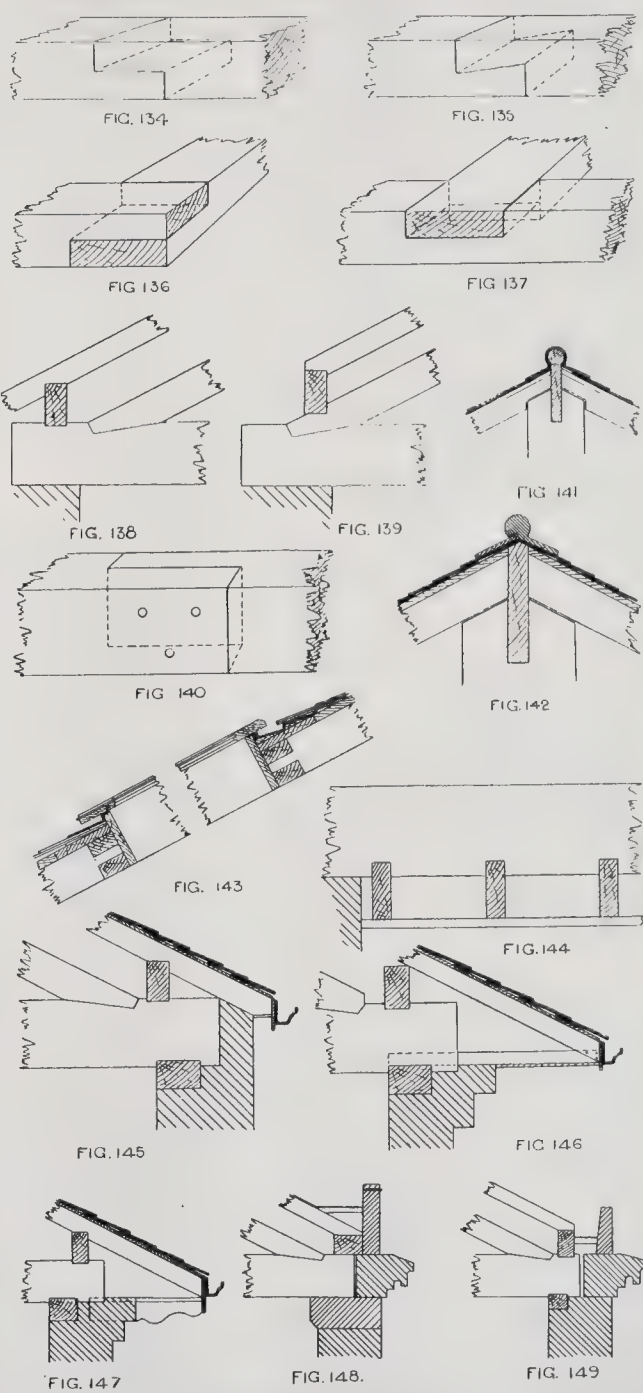


Illustration: to Student's Column.

ridge-plate—all serve to brace together the main trusses of the king-post roof, although each of them has, in addition, a special duty to perform. The same may be said of ceiling joints where these are employed.

Common rafters. We have already illustrated common rafters in small roofs, and it is now only necessary to indicate the manner in which they are applied to the king post roof.

As represented in Fig. 141, the rafters may be notched upon the head of the king-post, or, as shown in Fig. 142, carried over it and butted against the ridge-plate. They are notched over the purlin at the centre, and over the pole plate at the foot, being secured by nails in each case.

According to the mode of arranging the gutters, the feet of the common rafters may project beyond the pole-plate, or be trimmed off level with its outer face.

In cases where chimneys pass through a roof, or skylights are fitted in it, the rafters must be trimmed round the openings in a manner similar to that adopted in floor construction. Fig. 143 illustrates the details of the trimming for a skylight, having a frame projecting slightly above the surface of the roof covering. The ends of the common rafters are shown tenoned into the trimmers, to which and to the rafters forming the two other sides of the opening the lining is suitably attached.

Roof Boarding.—This, as mentioned in Articles II., III., and IV., is nailed upon the common rafters as a basis for lead, zinc, copper, slate, tile, and other roof-covering materials. It is laid parallel to the roof ridge, or diagonally across the rafters.

Ceiling Joists.—In roofs where a ceiling is required, the supporting joists are notched upon the under side of the tie-beam, as shown in Fig. 144. They are fixed 12 in. or 14 in. apart, centre to centre, and the most suitable width is 2 in.

Tredgold's rule for the dimensions of ceiling joists, spaced 12 in. apart, centre to centre:

$$d = \frac{L}{\sqrt{b}} \times 0.64 \text{ for fir}$$

$$= \frac{L}{\sqrt{b}} \times 0.67 \text{ for oak (12)}$$

where

L = span of joist in feet,
 b = breadth of joist in inches,
 d = depth of joist in inches.

Example (1).—Find the depth for fir ceiling joists, 2 in. wide in a roof, with the trusses spaced 10 ft. apart.

Substituting the necessary values in formula (12) we have

$$d = \frac{10}{\sqrt{2}} \times 0.64$$

$$= 5.08 \text{ in., say 5 in.}$$

By adopting 0.63 instead of 0.64 as the value of the coefficient for fir, and reducing the formula we have

$$d = \frac{L}{\sqrt{2}} \times 0.63$$

$$= L \times 0.5 \text{ (12a)}$$

Thus half the length of bearing in feet gives the depth of the joists in inches—a very easy rule to remember.

Table XXVIII. gives the scantlings of purlins and common rafters, with one intermediate support, as calculated by Tredgold's rules, formulae (11) and (5).

TABLE XXVIII.—SCANTLINGS OF PURLINS AND COMMON RAFTERS FOR KING-POST ROOFS: PITCH = 26° 33'. TRUSSES 10 FT. APART CENTRE TO CENTRE.

Span of Roof.	Purlins.	Common Rafters.
Feet.	Inches.	Inches.
18	4 1/2 x 7 1/2	2 x 3 1/2
20	4 1/2 x 8	2 x 3 3/4
22	5 x 8 1/2	2 x 4
24	5 x 9	2 x 4 1/4
26	5 x 9 1/2	2 x 4 1/2
28	5 1/2 x 9 1/2	2 x 4 3/4
30	5 1/2 x 10	2 x 5

Table XXIX. contains the dimensions of purlins and common rafters, as compiled by Major Seddon, R.E., for the War Office.

TABLE XXIX.—SCANTLINGS OF PURLINS AND COMMON RAFTERS FOR KING-POST ROOFS: PITCH UP TO 30 DEG. ROOF COVERED WITH SLATES LAID ON BOARDING.—(Seddon.)

Span of Roof.	Purlins. 10-ft. bearing Centre to Centre.	Common Rafters. 12 in. apart Centre to Centre.
Feet.	Inches.	Inches.
20	5 x 7 1/2	2 x 3 1/2
22	5 x 8	2 x 3 3/4
24	5 x 8 1/2	2 x 4
26	5 x 9	2 x 4 1/4
28	5 x 9 1/2	2 x 4 1/2
30	5 x 10	2 x 4 3/4

Eaves.—There are several different modes of constructing the eaves of a king-post roof. Fig. 145 shows the eaves projecting a short distance beyond the under sides of the rafters, to the ends of which a fascia board is attached for supporting the gutter.

Fig. 146 shows an arrangement in which the eaves project so much beyond the wall that it is necessary to form the soffit by short horizontal joists, termed *plancher pieces*, secured at one end to the wall plate, and at the other to the rafters. The under sides of these joists can then be covered by boarding, or by laths and plaster, as may be preferred.

Another method of supporting the soffit is by cantilevers, built into the wall, as represented in Fig. 147.

Fig. 148 illustrates the eaves finishing upon the pole-plate placed immediately behind a parapet wall, and Fig. 149 shows them as finished upon a gutter formed behind a blocking course.

WESTMINSTER CITY COUNCIL.

LORD CHEYLSMORE presided over a meeting of this Council on Thursday last week.

Rebuilding of Westminster County Court.

The General Purposes Committee reported having directed their attention to the proposed rebuilding of the Westminster County Court by H.M. Office of Works on the present inadequate site in St. Martin's-lane, although there was adjoining property available which could be acquired and added to the present site and thus permit of the erection of a much more commodious building. It was decided to approach the Treasury and the Office of Works, expressing the hope that the present opportunity might be taken advantage of for providing suitable and adequate accommodation for the needs of the city.

Pictures.—Messrs. Agnew & Sons had addressed a communication to the Council to the effect that while putting in order the Council's pictures they were interested in a series of small primitive pictures, and suggesting that they might be exhibited so that their artistic merit might be discussed. It was resolved to leave the matter in the hands of the Town Clerk with power to act.

Site for New Library.—The Libraries Committee reported having considered the offer of the School Managers of All Saints School, Knightsbridge, to sell the disused schools at Knightsbridge-green for a public library, but having regard to the restrictions to which the site was subject and to the heavy expenditure which would be necessary to convert the premises for a library it was recommended that the offer be not entertained.—Agreed.

Paving Works and Contractors.—A lengthy report was submitted from the Works Committee to the effect that the Acme Flooring and Paving Company Ltd., whose tender was accepted for the greater part of this year's paving works, have been carrying out their contract in a very unsatisfactory manner. The chief cause for complaint was the bad quality of the wood blocks supplied by the contractors. Large quantities of defective blocks had been delivered on the streets and rejected by the City Engineer, but notwithstanding these wholesale rejections the contractors continued to deliver blocks of a similar or worse character. The contractors, on the other hand, contend that a large proportion of the blocks which had been rejected are in accordance with specification, and they say that the stoppage of the works necessitated by the position taken up by the City Engineer was causing them serious damage, for which they must hold the Council responsible. They may the suggestion as to the immediate reference of the differences to an independent and disinterested arbitration. Sir John Taylor, of H.M. Office of Works, Mr. H. Tingle, and other persons of standing, had inspected quantities of the blocks delivered at Whitehall, and had corroborated the Chief Engineer's opinion that they do not comply with the specification. The Chief Engineer recommended that in the contractors' default,

and in order to hasten the completion of the paving of Whitehall and prevent the further obstruction of the street, the Council should employ the standing contractors for wood paving work, utilizing such wood blocks as the Council had in stock, and in default of obtaining the quantity required from the standing contractors for wood blocks taking the balance from Messrs. Mowlem & Co., by arrangement, for the supply of blocks which they had stocked for the Prince Consort-road contract (which was in abeyance, subject to the blocks complying with the specification). In the case of the repaving of the Charing Cross and Kensington roads, the Acme Company had taken no steps to commence the work.—Mr. Herbert Smith (the Chairman of the Committee) moved:—"That the Works Committee be empowered to take steps to obtain the execution of the paving works referred to in the contract with the Acme Flooring and Paving Company (1904) Ltd., of June 15, 1906, which the company had failed to execute, and from which they have withdrawn, and on behalf of the Council to enter into such contracts as they may deem necessary or expedient for that purpose, and that the Town Clerk be authorised to affix the Council's common seal to such contracts, and to charge the Acme Company with the increased cost which the City Council may necessarily incur." He remarked that the Council had been served with a writ by the company, claiming damages for breach of contract. After a short discussion the recommendation was adopted.

Duke of Cambridge Statue.—It was agreed to offer no objection to the plan submitted by Mr. J. Belcher on behalf of the Fund for the Memorial to the late Duke of Cambridge, which showed the design for the base of the statue proposed to be erected in Whitehall on a site opposite the portico in the centre of the new War Office.

Foundations and Drainage to Buildings.—The Works Committee also reported on the notice to builders under sect. 75 and 76 of the Metropolitan Management Act, prepared by the Council in 1903, respecting the provision of drainage for the lowest floor of a building, and notice to the Council before beginning to dig out the foundation of a new building or to make a drain. This notice had been revised by the Town Clerk, and it was agreed to adopt the amended notice and issue it.

Proposed Kiosk in the Strand.—An application from the District Messenger Company for permission to erect a kiosk on the refuge at the east side of St. Clement Danes Church, opposite the Law Courts, was refused, and it was pointed out that there was ample room within the precincts of the Law Courts to give accommodation for messengers for the users of the Law Courts.

Vigo and Regent Streets.—In response to a communication from the Goldsmiths and Silversmiths Company, urging the desirability of widening Vigo-street, it was resolved that the attention of H.M. Commissioners of Woods and Forests be called to the matter, with a suggestion that before the properties at the corner of Regent-street and Vigo-street are dealt with the question of widening Vigo-street be taken into consideration.

Marble Arch Improvement.—The London County Council had written stating that their Improvement Committee were considering the suggestion that in order to provide additional facilities for the traffic at and near the Marble Arch the railings at Hyde Park should be set back, and the land taken from the park should be paved and added to the public way. The scheme did not involve any interference with the Arch itself, and H.M. Office of Works had not yet been consulted, but the Council wished to know whether, in the event of the Crown being favourable, the City Council would contribute to the cost. It was agreed to reply that the City Council considered this work which should be undertaken by the Office of Works and the London County Council.

BANK PREMISES, DOVER.—New bank premises have been erected in Market-square, Dover, from designs by Mr. F. W. Waller, architect, of Gloucester. The general contractor for the work was Mr. C. Gray Hill, London and Coventry, and the following were the sub-contractors:—Mr. J. Barnes, Portland, supplied and masoned the stone; Mr. J. Burton, Dover, fixed the stone; Messrs. Dennett & Iggle constructed steel work, fire-proof floors; Messrs. Millow & Co., Sheffield, plumbing; Messrs. Knapp, Dover, plastering; Mr. William E. Coveney, Dover, painting and paperhanging; Messrs. Thomas & Co., Dover, wrought-iron; Mr. J. E. Ebner, London, oak block floors; Messrs. Patteson, Manchester, mosaic work; Messrs. George Wright, Ltd., London and Doulton, and Mr. Stacey, Dover, fire-places chimney-pieces, ranges; Messrs. Chatwood, London, safe door and safe fittings; Messrs. Bartholomew & Sons, Dover, blinds; Messrs. Hollins & Guest, Birmingham, heating; Messrs. Middleton & Winstanley, Dover, electric light installations and fittings.

Dunn, Hansom, & Fenwicke are the architects

Sidney Mitchell & Wilson.

CO-OPERATIVE PREMISES, CORSEHAM.—New branch co-operative stores have been erected in High-street, Corsham. The total estimated cost of the work is about 2,000l. Mr. W. H. Bromley was the architect, the builder being Mr. G. Moore, of Trowbridge.

HYDRO, PEEBLES.—The Peebles Hydropathic, which was entirely destroyed by fire last year, is being rebuilt. Mr. J. Miller, A.R.S.A., of Glasgow, has prepared the plans, and the cost of rebuilding and equipping will, it is estimated, be nearly 100,000l.

HOSPITAL ENLARGEMENT, RICHMOND.—The foundation-stone of the Benjamin Bousfield Swan memorial ophthalmic wards, an addition to the Royal Hospital, Richmond, was laid on the 4th inst. The building, which is to comprise male and female wards, with an operating theatre and nurses' hall, has been designed by the hon. architect to the hospital, Mr. Frank J. Brower.

MEMORIAL HALL EXTENSION, CROYDON.—The foundation-stones were laid recently of the additions which are being made to the Memorial Hall, in Broadway, Whitehorse-road, Croydon. In the past few weeks the demolition of old classrooms at the rear has taken place, and on this space a hall to accommodate 250 people is being erected by Mr. W. Roberts, of Elm Works, Dennett-road, West Croydon. It will join on to the old building, being 64 ft. by 26 ft., and the addition will include four classrooms, a kitchen, and the usual offices, with a heating chamber for warming the main hall. The architect of the work is Mr. Meredith.

MISSION HALL, STOCKPORT.—The New Bakers-street Mission Hall, connected with Heaton Moor Congregational Church, was opened a short time ago. The building is of red brick. The hall will seat from 300 to 400 people, having forms of pitch-pine. There are in addition several classrooms. The whole place is heated by steam. The total cost of the premises and furnishing is about 2,000l., and the building was carried out by Mr. Josiah Briggs, the architect being Mr. T. Hooley.

MEMORIAL FOUNTAIN, KILMUN, N.B.—The James Duncan Memorial Fountain at Rheumore Point, Kilmun, was recently unveiled. The memorial consists of an obelisk of finely-polished gray Aberdeen granite standing 15 ft. high, with a drinking fountain at each side, and water troughs for animals. A bas-relief of the late James Duncan faces the roadway, and underneath there is a bronze panel bearing an inscription. The contractors were Messrs. Macdonald & Co., Aberdeen Granite Works, Glasgow, and the artist was Mr. A. M. F. Shannon, A.R.S.A., Glasgow.

PUBLIC BUILDINGS IN EAST HAM.—At a meeting of East Ham Town Council on Tuesday the Engineer submitted a sketch plan and elevation of proposed offices for the Public Health and Educational Departments to adjoin the Town Hall. He was directed to prepare and submit detailed estimates, quantities, etc., with a view to same being included in the application to the Local Government Board relating to the excess expenditure on the Town Hall and the Technical College. The Engineer was further instructed to prepare and submit a report dealing with suggestions, viz.: (1) the erection of a mortuary on the Town Hall site, and (2) the enlargement of the existing mortuary as a temporary measure. **NEW OFFICES IN CHEAPSIDE.**—The new premises of the Scottish Temperance Life Assurance Company in Cheapside were recently opened by Lord Provost Bishland, of Glasgow. The building is from the designs of Mr. Fred Rowntree, architect, with sculptured accessories modelled and executed by Mr. N. Hitch, and the contractors were Messrs. L. Whitehead & Co., Ltd.

Sanitary and Engineering News.

PAVING OF WHITEHALL. The Westminster City Council, at their meeting on October 4, having considered a report upon the quality of the wooden blocks delivered for the paving of Whitehall, resolved to empower their Works Committee "to take steps to obtain the execution of the paving works referred to in the contract with the Acme Flooring and Paving Company (1904), of June 15, 1906, which the company have failed to execute, and from which they have withdrawn, and on behalf of the Council to enter into such contracts as they may deem necessary or expedient for that purpose, . . . and to charge the Acme Company with any increased cost which the City Council may necessarily incur."

REFUGE HARBOUR, BRISTOL CHANNEL.—In his report upon the suggested provision of an adequate harbour in the Bristol Channel, Sir William Matthews confirms the opinion formed by the Royal Commission many years ago, and recommends the construction of a breakwater 2,500 ft. in length at St. Ives, to be built of concrete blocks upon a rubble base, with a spur 500 ft. long, leaving an entrance 500 ft. in width,

at an estimated cost of 847,000l. Sir William Matthews deals with the natural advantages offered at Clovelly, Port Quin, Newquay, Padstow, and Lundy Island. The island affords shelter in south-west gales, but the outlay upon a harbour there would, it is calculated, amount to nearly three millions, and the greatly increased cost would, it is considered, not yield a proportionately more advantageous result.

A FLOATING GRATING DOCK FOR THE WEST INDIES.—Messrs. Clark & Stanfield, of Westminster, have made plans for a self-docking floating grating dock, which will be built by Messrs. Swan, Hunter, & Wigham Richardson, of Wallend-on-Tyne, for the Trinidad Dock and Engineering Company. The dock will have a total length of 385 ft., a clear width of 56 ft., which can be increased by 9 ft. more, and a lifting power of 4,000 tons.

REFUSE DESTROYER.—A refuse destructor has been built at Felling, near Newcastle, by Messrs. Heenan & Proctor, of Manchester and Worcester, at a cost for the destructor and buildings of 11,200l., the consulting engineers being Messrs. Haddock & Dykes, of Westminster. The destructor has six cells, two combustion and six settling chambers, etc., with a burning capacity of 75 tons (which can be extended to 100 tons in eight cells) per week for four hours. The cells have 25 ft. of grate-area a-piece, and the furnaces are of best fire-brick, having a minimum thickness of 9 in.

IMPROVEMENTS AT THE WATERWORKS, TORQUAY.—Although the original estimate for the construction of the New Trenchford reservoir, in connexion with the Torquay waterworks, was 22,000l., it was found necessary last year, states the *Western Mercury*, to obtain power to borrow an additional sum of 17,000l., and recently Mr. A. A. G. Malet, M.Inst.C.E., an inspector of the Local Government Board, held an inquiry with reference to the application of the Town Council for permission to borrow a further sum of 14,400l. for the completion of the work. This brings the total amount up to 53,000l., and in addition there is the cost of the Act of Parliament authorising its construction, another 3,000l. It is expected that the work will be completed by April next. Great and unforeseen engineering difficulties have been met with in carrying out the construction, especially in connexion with the excavation of the trench for the dam. In some places solid foundation was found only at a depth of more than 100 ft. The new reservoir will hold about 200 million gallons, being about three-quarters of a mile in length. The dam is 300 ft. wide at the base, the depth being 50 ft.

Stained Glass & Decoration.

ST. PETER'S, HERSHAM.—Work is now proceeding in connexion with the decoration of the chancel of St. Peter's Church, which will cost about 400l. The contractors are Messrs. Clayton & Bell, who are working under the supervision of Mr. F. L. Pearson, architect. The carving of an alabaster rosette is also in progress.

MEMORIAL WINDOW, DORCHESTER.—A stained-glass window has been erected at the Maison Dieu on the north side of the Connaught Hall, in memory of the late Mr. Worsfold Moxell. It has three lights, with a quatrefoil at the top, and the artist was Mr. Lonsdale, Messrs. Heaton, Bullen, & Bayne, of London, executing the work.

Appointments.

LIVERPOOL.—The Liverpool City Council sanctioned, on the 3rd inst., the appointment of Mr. John T. Alexander, Deputy Building Surveyor, to be City Building Surveyor in succession to Mr. William Goldstraw, who has retired on superannuation. Mr. Alexander served his articles with the late firm of Messrs. Thomas D. Barry & Sons, civil engineers and architects, of Liverpool. He subsequently gained experience in the office of the Borough Surveyor of Birkenhead and in Derbyshire. Subsequently he became manager and chief assistant to Mr. J. Clarke, architect and surveyor, of Liverpool, which post he resigned on his gaining an appointment under the Health Committee of the Corporation of Liverpool in 1886. From 1886 to 1890 he was engaged under Mr. Clement Duncombe, and afterwards under Mr. H. H. Percy Boulnois, City Engineer, as a chief assistant.

Foreign.

FRANCE.—The Salon d'Automne (the Fourth) was opened last Saturday. It includes a gallery for a special exhibition of the works of Courbet. —A fresco, in three panels, by M. Hector d'Espouy, has just been completed over the inner gallery. It represents "La Gloire" in the centre; on the right "Les Lettres" and on

the left "Les Arts."—A bust of Zola, by M. José de Charnoy, has been unveiled at Médan.—The theatre at Nancy has been destroyed by fire.—M. Lux, the municipal architect of Belfort, has been commissioned to carry out a new abattoir for the town.—M. Copet, architect, of Bourges, has been commissioned to carry out a hospital at Villars (Ain).—In an old house at Champigny-sur-Vendée has been discovered, hidden beneath a layer of plaster, an interesting mural picture representing the marriage of Gaston d'Orléans with Marie de Bourbon Montpensier (1625).—The town of Mity-Mory (Seine-et-Marne) has announced a competition, open to all French architects, for a new girls' school.—M. Boer, architect to the town of Moulins, has been commissioned to carry out an Art Museum for the town.—The municipality of Cahors, in spite of the instructions of the Department of Instruction Publique, is persisting in its intention to demolish the ancient bridge, an interesting specimen of XIVth century work, and replace it by a steel bridge. This projected act of vandalism has aroused strong protest.—The municipality of Nice has opened a competition for a new Lycée.—The Under-Secretary of State for Fine-Arts inaugurated at Montmorency, last Sunday, a museum of objects which had belonged to Rousseau, which has been installed in the Mairie of Montmorency.

GERMANY.—On September 1 and 2 the thirty-fifth Congress of German Architects and Engineers took place in Mannheim. With reference to the Congress held last July in London, the question was raised as to whether international congresses were advisable owing to the difficulty of following discussion in a foreign language. In discussing the restoration of Worms Cathedral, which has been the most difficult problem of the sort within the last century, Professor Hofmann, of Darmstadt, said that settlement was not due to the subsil water, but to the loose soil on which stood the 3 metre foundations; this settlement had caused the outer table to sink 35 cm. out of the horizontal and the west tower to overhang 54 cm. The western choir had presented many difficulties; not only were the foundations defective and the damages caused by fire extensive, but a third evil had been discovered. The great oval rose window had always been looked upon as a masterpiece of Romanesque construction. It has now been discovered that the rose was originally a perfect circle, but that it settled gradually into an oval as the result of the rotting of the wooden ties built into the walls. Into the chases left by the rotted beams iron cramps have been run. The work of restoration took five years and cost 725,000 francs. Herr Leubbrand, of Sturmgarten, read a paper on "The Advance in the Construction of Wide Span Bridges." Before 1885 there was in Germany one single bridge whose arch was over 40 metres span, whereas now there are more than forty such, the bridge over the Syra Valley reaching the gigantic span of 90 metres. The speaker further pointed out how new methods of using old material had likewise tended to lighten construction, for whereas in old structures the depth of the vault equalled 1.35 of the span, in a concrete bridge lately built in Hohenzollern, the ratio is 1.82. Speaking on the principles of a new style, Professor Widmer said that this would arise from artistic, not from practical, considerations. Machinery is the most suggestive expression of our culture; it creates a new world of form, but until the artist recognises the beauties of these new forms some time must elapse. All creations of modern technique are characterised by simplicity and fitness, and our building art will also develop along these lines of reality and suitability. The analysis of the Frankfurt water supply shows a hardness of from 1 to 2 deg., and a proportion of 28 mgr. per litre of carbonic acid and humic acid. Such is the effect of this on iron that all the pipes from the reservoir became choked with rust of such toughness that it could not be washed out. The iron itself became so soft that it could be cut with a knife. The effect on cement was no less disastrous. A few years ago the concrete reservoirs were built at a cost of one million marks and lined with cement 20 mm. thick. This cement has been eaten through, although it had been painted with a preservative, and the concrete behind reduced in places to powder. The reservoirs have since been restored and painted with "Intertol," which appears, after a trial of 206 days, to be successfully resisting the acids in the water.

NEW YORK HARBOUR.—The making of an entrance through the Ambrose (formerly the East) Channel is in progress. It is intended to render the channel 35 or more feet deep, at mean low-water, and 2,000 ft. wide, for a length of about 7 miles, which will be illuminated at night throughout. From the Atlantic Ocean, via Sandy Hook, to the Battery, a distance of 22 miles, the channel is maintained with a least depth of 30 ft. Colonel W. L. Marshall is engineer officer in command of the port and district.

KAOLIN AND STONE IN VICTORIA.—According to a report of the Victorian Department of Mines, the kaolin and other clay deposits of Victoria,

both pottery and pigment clays are numerous and valuable, but, except near Melbourne and Bendigo, attention is confined to ordinary brick clays, while pigment clays are almost entirely neglected throughout the State. Kaolin of good quality occurs in many places. At Egerton 489 tons, valued at £681, were raised, while at Axedale a deposit is being worked, but operations are hampered by the somewhat heavy railway freights. At the latter place 100 tons, valued at £61, have been raised. For the year 1904 the value of the clay (according to the Government statistic) manufactured was as follows:—Pottery, 31,4381; pipes and tiles, 53,4541; and bricks, 129,1381. The figures for 1905 are not yet available. There is, says the report, a great future before the clay industry, and it is a matter for wonder that such an important source of wealth is so little developed. There is no valid reason why it should not attain the importance among the products of the State that it has among those of the United States of America and Europe. The same remark applies to the building-stone industry, which is in an even less developed state. There are several quarries that produce basalt, granite, slate, and flagstone, but the quantity placed on the market is infinitesimal compared with the available supply while in the shape of various kinds of porphyry, marble, and freestone, there is, as yet, little or nothing done regarding their utilisation, though beautiful stone occurs in numerous parts of the country. Many of these occurrences are in localities rather difficult of access, but there are others which are easily accessible, though still requiring under-estimation. The approximate value of stone raised was £4,9431.—*Board of Trade Journal.*

THE LABOUR MARKET IN THE COLONIES.—The October circular of the Emigrants' Information office, 31, Broadway, Westminster, states that in Canada work in the agricultural, manufacturing, mining and lumbering industries, and in railway construction has been very brisk, and the number of immigrants has been exceptionally large. It is, however, too late in the year for the ordinary emigrant to go there now, unless he goes to friends, or has enough money to live on during the winter. In Australia reports from several places in New South Wales, as Willemia, Orange, Cooma, Tanworth, and Jerilderie, show that there is practically no demand for more labour of any kind; at Young, however, there is a demand for a few carpenters, joiners, bricklayers, stonemasons, and blacksmiths. In Victoria there is no general demand for mechanics, but at Bendigo men in the building trades have been wanted. No one may enter Cape Colony unless he possesses 20*l.* on arrival, or has secured employment beforehand according to a prescribed form of agreement. The labour market in all the principal towns and country districts is well supplied, and many unqualified mechanics are unable to find work. All mechanics therefore are warned against going to Cape Colony, unless they go to situations engaged for, or have means of their own sufficient to keep them for some months. Men in the building trades especially are warned against going. In Natal there is a plentiful supply of skilled and unskilled labour, and no more is wanted. No one may enter the Transvaal or Orange River Colony with a permit. Such permits are given only immediately to applicants, unless there is any police record against them, on their making personal application to the Permit Secretary, Transvaal and Orange River Colony Permit Office at Cape Town or Durban, or to H.M. Consul General at Lourenço Marques. But no permit is granted to anyone (1) who does not possess 20*l.*, or who has not secured *bona-fide* employment in the Transvaal or Orange River Colony. Persons are warned against going to the Transvaal at the present time in search of work, as the local supply of all kinds of labour is more than sufficient. The building trades at Johannesburg are bad, and large numbers of masons, carpenters, bricklayers, plasterers, and others have left the country through inability to obtain employment. Owing to this exodus there is a large number of empty houses, which fact has the double effect of lowering rents and stopping further building operations. There is a similar scarcity of work in other trades, which causes much distress.

Miscellaneous.

PROFESSIONAL AND BUSINESS ANNOUNCEMENTS.—Mr. T. W. Russell, architect, has removed his office from 50, Berners-street to 3, Bunsbury-street, W.C.

MEMORIAL TO BISHOP BARDSELEY.—A bronze tablet has been erected in the south aisle of Carlisle Cathedral in memory of the late Dr. J. W. Bardseley, Bishop of Carlisle. The tablet, designed by Signor Lucchesi, is in the shape of a shield, with figures of "Humanity" and "Loving Kindness" on either side.

STATUE OF THE DUKE OF CAMBRIDGE.—The equestrian statue of the late Duke of Cambridge will be set up in the roadway, Whitehall, opposite

the new War Office. Mr. Belcher has made designs for the architectural portion of the monument; the statue will be sculptured by Mr. Adrian Jones, of Chelsea.

THE GREAT WHEEL. EARL'S COURT.—The demolition of the Great Wheel has been taken in hand. It was built after Mr. Walter B. Basset's designs for the Indian Exhibition, 1885, at a cost of £60,000. The wheel, constructed of mild steel, is 250 ft. in diameter, and weighs some 1,100 tons; two engines of 18 horse-power supplied the motive power. The first "big wheel" was that at Coney Island, in the United States, which has been destroyed.

RIPON CATHEDRAL.—A new chiming clock, by Messrs. W. Potts & Sons, is fixed in position. The two dials, 6 ft. 8 in. diameter, are filled in with bronze metal behind the figures, whilst their inner portions are open, leaving the stonework visible.

YORK HOUSE, TWICKENHAM.—The Duc d'Orléans has placed his property at Twickenham in the market. The beautiful grounds of the house extend over 10 acres to the river, and are traversed by the high road. The property, formerly named York Farm, was given, it is said, by Charles II. to Lord Clarendon upon the public announcement of the marriage of Lady Anne Hyde to the Duke of York. The main portion of the house, having three floors, with two shallow wings and gabled roofs, was occupied by the Duke, whose daughters, Mary and Anne, were born there. Having been the home of Laurence Hyde, Earl of Rochester, and Dr. Cleaver, Archbishop of Dublin, it was bought in 1817 by the Hon. Mrs. Damer, the sculptress, who remained there until her death in 1828, bequeathing the estate to Lady Johnston. A later resident was the Comte de Paris, from whom the house passed to Sir Mountstuart Grant Duff, who sold it for 14,000*l.* to the Duc d'Aumale, who presented it to his son on his marriage. The interior of the house was redecorated and repaired eight or nine years ago by Messrs. Leslie & Co., of Kensington, and Messrs. Rawlings Brothers carried out entirely new drainage and sanitary works, electrical installation, etc. The ceilings were then renewed under the Louis Quinze style, and the early Elizabethan ceiling in the first floor excepted; and the fine contemporary staircase was preserved. The apartments comprise a museum, with a marble swimming and Turkish bath adjoining, a grand saloon, six reception rooms, and thirty-one bed and dressing rooms. The upset price is fixed at 16,000*l.*

HOUSES OF CELEBRITIES.—A plaque of encaustic ware has been affixed to the front of No. 31, Baker-street, where Bulwer (Lord Lytton) was born in 1803.—The Tottenham Urban District Council have decided to house their museum in Bruce Castle, the home of Sir Rowland Hill when he kept the school there, and to fit up his study as a Rowland Hill and Penny Post room. Fourteen years ago the Council bought the park, about 20 acres, and the old schoolhouse, for 15,000*l.*, for the public benefit and enjoyment; our number of September 20, 1892, contains a historical account of the property, which, with Tottenham Manor, belonged to Robert, Earl of Annandale and Carrick, and his son, Robert I. of Scotland; Sir William Hamilton rebuilt the house, of which some portions yet remain, in 1614-6.—With the demolition of No. 15, at the south end, on the east side, of Buckingham-street, Strand, disappears the house which the Tsar Peter the Great occupied in 1689. The house—at that time by the river-side, see illustration in the *Builder* of January 6 last—was a former home of the Institution of Civil Engineers, and home of Black, the novelist, who writes of it in his "Sunrise"; it contains two ceilings finely painted by hand. The street was built in 1675, on the site of the Duke of Buckingham's unfinished mansion, York House.—Signor Alfonso Colano has made a model for the monument which is about to be erected in memory of Gabriele Rossetti at Vasto, his birthplace.—The Keats-Shelley Memorial Committee invite subscriptions to a fund for purchasing the house by the Trinita dei Monte steps in the Piazza di Spagna, Rome, in which Keats lived, and for converting it into a museum and memorial of Keats and Shelley. A committee is formed for the erection of a marble tablet on the Villa Magni, between Lerici and San Terenzo, a two-storied boat-house on the Gulf of Spezia, to which the Shelleys, with Trelawny, and Williams and his wife, removed from Pisa on April 26, 1822; in Villa Magni Shelley began his "Triumph of Life," and there he lived until his final catastrophe of July 8 of that year.

TEMPERATURE-REGULATING APPARATUS.—Since the middle of last century numerous forms of thermostat have been devised for controlling the source of heat in warming, drying, and kindred installations. Some of these have been successful, and others unsuccessful, the usual cause of failure being not so much the thermostat proper, but the feeble power of the mechanism. One of the most efficient methods of applying the thermostat is that embodied in the Johnson System of Temperature Regulation, introduced in 1884 by the Johnson Service Company, of Milwaukee, U.S.A. The thermostat proper is essentially the same as many others, the manner

in which it is applied being the key to the efficiency of the complete thermostat. This apparatus is designed in accordance with the principle of a small power releasing and controlling a greater power. The small power developed in the thermostat is furnished by the expansion and contraction, due to temperature variations, of a thin tongue formed of brass and steel strips soldered together. One end of the tongue is fixed and the other fitted so as to constitute a valve, setting in motion a tiny air motor forming part of the thermostat mechanism. Owing to the unequal expansion of brass and steel, the tongue is warped to the right by a fall of temperature, and to the left by a rise of temperature. Thus the piston of the air motor is caused to move forward or backward, opening or closing a second and larger air valve connected with pipes attached to the thermostat and with the valve or damper which it is desired to control, the pipes being supplied with compressed air from a simple type of air compressor. The same pipes furnish air for the tiny air motor previously mentioned. In small buildings the compressed supply pipes, and in large buildings it is operated by steam. From the foregoing outline it will be seen that the very feeble power of the metallic tongue operates a small valve, which releases and controls a greater power operating a larger valve, and this valve in turn releases and controls a still greater power operating a still larger valve. Thus by the application of a complete system of thermostats acting in this way, valves or dampers of any kind or size can be effectively and automatically controlled throughout heating, ventilating, drying, and hot water supply installations.

EVERY'S TABLE PATTERN CEMENT TESTER.—A very compact form of machine for tensile cement tests has been introduced by Messrs. W. & T. Avery, of Birmingham. The base occupies a space of only 34 in. by 18 in., and the apparatus can be conveniently used on any strong table or bench. It has been designed for testing cement 1 in. squares up to the maximum strain of 1,000 lb., and consists essentially of a lever and a steelyard having at the end a cylindrical vessel into which shot can be discharged from a similar vessel fixed at the top of the apparatus. The specimen is held in shackles, one secured to the straining screw and the other connected to the ing screw the specimen can be drawn taut in the shackles, and the steelyard adjusted to a perfectly horizontal position. Shot from the reservoir are admitted into the lower vessel by opening a valve at the foot of the supply pipe, and continue to flow until the specimen breaks. The supply arrangement operated by the fall of the steelyard. The weight of the shot in the vessel is obtained by means of a sliding weight on the steelyard and loose weights added to a counterpoise. The graduations on the steelyard give the equivalent weight of the shot in the vessel up to 200 lb., the remainder being obtained by loose weights on the counterpoise. In this way the exact strain at which the specimen breaks is readily ascertained.

WAR MEMORIAL, IPSWICH.—On the 29th ult. General Sir John French unveiled, at Ipswich, the East Suffolk memorial to the soldiers of the Suffolk Regiment, and soldiers from the Eastern half of the county serving with other regiments, who fell in the South African War. The memorial stands about 15 ft. 6 in. high, the statue itself, representing a soldier in khaki uniform, being about 6 ft. 3 in., whilst the pedestal is a little over 9 ft. The pedestal is of stone, and has panels in bronze on each of its sides. Those at the back and sides bear the names of those who fell in the war, whilst the one in front bears the dedication. The sculptor was Mr. Albert Toft.

PROPOSED ENLARGEMENT OF THE ROYAL INFIRMARY, MANCHESTER.—On the 2nd inst. a special meeting of the Board of the Manchester Royal Infirmary was held to consider a report of the Building Committee in respect of the new infirmary now in course of erection at Stanley-grove.

The committee was requested on September 25 to consider whether it was desirable to put a third story on the surgical and medical blocks or on the latter only, and it reported that the cost of the former plan would be 25,000*l.*, exclusive of surveyor's and architect's commissions and of furnishing, and of the latter missions and of furnishing, and of the latter accommodation for 108 beds at a cost of about 200*l.* each, reducing the average cost for the whole of the beds by 65*l.*, and bringing the equipment of the new infirmary to 598 beds. The committee added that if the erection of the extra story were deferred till after the completion of the hospital the extra cost would be 4,000*l.*, or 5,000*l.*, and in addition serious inconvenience would be caused to the nursing wards by scaffolding, dust, noise, etc., during the six months which it was contemplated the work would occupy. The committee, therefore, recommends that the additional stories on both the surgical and medical blocks should be built now. The resolution was adopted.

MISCELLANEOUS.—Continued on page 443.

OCTOBER 22. — Glynccorwg. — STORES.—Glynccorwg D.C. invite tenders for the supply of tubes, water and gas fittings, C.I. pipes, ironmongery, kerb and channel, lead, yarn, and disinfectants for a period of one year. Specifications and forms of tender may be obtained on application to Mr. W. P. Jones, Surveyor, Council Offices, Cymmer, Port Talbot. All tenders must be delivered under seal on or before 10 o'clock on Monday, 23rd October 22, addressed to Messrs. (Cuthbertson & Co., Ltd.), Clerk, 55, Water-street, Neath, and endorsed "Tender No. 1," etc., respectively.

OCTOBER 22.—**Wallasey**.—**GRAVEL**.—The Parks Committee of the Wallasey U.D.C. invite tenders for the supply of 150 tons of Jersey gravel. Further particulars and form of tender may be obtained on application to Mr. H. H. Travis, Engineer and Surveyor, Public Offices, Egmont, Cheshire. Tenders (on official form only) to be enclosed in a sealed envelope, endorsed "Tender for Jersey Gravel," and addressed to Mr. H. W. Cook, Clerk and Solicitor, Public Offices, Egmont, Cheshire, and to be delivered per post not later than October 25.

OCTOBER 23.—**Barking**.—**GRANITE**.—The U.D.C. of Barking Town invite tenders for the supply of 500 cubic yds. of 2-in. gauge, and 250 cubic yds. of 1½-in. gauge hand-broken Gurnsey granite, delivered alongside the Council's Wharf, Barking Creek. Full particulars and form of tender can be obtained upon application to Mr. C. E. Dawson, Surveyor to the Council, Public Offices, Barking. Tenders are to be sent in, marked on the outside "Tender for Broken Granite," before 12 o'clock noon on October 23.

OCTOBER 27.—**New Shoreham**.—**FLINTS**.—New Shoreham U.D.C. invite tenders for the supply of about 500 yds. of hand-picked surface flints, broken to pass through a 2-in. ring, to be delivered about middle of November, in quantities of not less than 40 yds. per day. Further particulars and form of tender can be obtained from Mr. A. W. Nye, Town Surveyor, Town Hall, Shoreham. The Council also invite tenders for hire of steam roller in November.

All tenders to be delivered to Mr. Harold Brown, Clerk to the Council, Council Offices, Shoreham, on or before October 27.

OCTOBER 27.—**Osgore**.—**LIMESTONE**.—Osgore and Garw U.D.C. invite tenders for the supply of broken limestone and limestone gravel for the district of the Council for the term of twelve months, commencing from November 1, 1906, and delivered in such quantities and at such times and railway stations as the Surveyor to the Council may from time to time order and direct. The stone shall be broken carefully and sufficiently small to pass through a 2½-in. gauge by its largest dimensions after being screened through a 1½-in. mesh. Form of tender and further particulars may be obtained from Mr. H. Dawkins, Williams Engineer and Surveyor. Sealed tenders, endorsed "Broken Limestone," to be sent to Mr. S. H. Stockwood, Bridgend, on or before October 27.

OCTOBER 28.—**London**.—**SWISS**.—The Great Western Railway Directors invite tenders for the supply of the undermentioned stores from December 1 next to November 30, 1907: (1) bricks; (2) lime, plaster of Paris, and cement; (3) stone, artificial stone paving slates, drain-pipes, and crucibles; (4) firebricks and fireclay; (5) glass—plate and sheet; (6) lamp glasses, globes, tubes, etc.; (7) and (8) drysalteries, emery sand, etc.; (9) acids, alkalis, etc.; (10) oils and turpentine; (11) colours, paints, white and red lead, etc.; (12) varnishes; (13) brooms and brushes; (14) buckets, spades, etc.; (15) rope and cordage; (16) leather; (17) india-rubber goods; (18) telegraph instruments; (19) telegraph apparatus (insulators, etc.); (21) telegraph ironwork and tools; (22) tele-

graph drysalteries; (23) electric light carbons; (24) electric lamps (incandescent); (25) zinc, antimony, brass, copper, rivets, etc.; (26) tin plates; (27) hardware and lamp work; (28) wire—iron and steel; (29) rivets, bolts and nuts, etc.; (30) fishplates, and bolts and nuts for permanent way; (31) nails, screws, etc.; (32) valves, gaskets, stack pipes, and fittings; (33) locks; (34) steel tools (files, saws, shovels, etc.); (35) platelayers' tools; (36, 37, and 38) ironmongery—general; (39) brasswork, builders' and general; (40) brasswork, pressure gauges and water fittings; (41) gasfittings, brass; (42) incandescent gasfittings and mantles; (43) gasfittings, gasolene; (44) sanitary ware and fittings; (45) waste and lamp cottons; (46) canvas, floorcloth, felt, etc.; (47) carpets, cloths, calico, etc.; (48) carriage trimmings, levers, etc.; (49) smallware and horsehair; (50) handles, aprons, etc.; (51) fencing and gates; (52) horse harness fittings; (53) leather, twine, curricula, etc., for horse department; (54) mineral oil and spirit; (55) sandries. Samples and patterns may be seen at the General Stores, Swindon, from October 17 to 26, at the following hours, on application at the office of the Stores Superintendent, Swindon—Monday to Friday, 10 a.m. to 5 p.m.; Saturday, 10 a.m. to 12 noon. Specifications, with forms of tender (upon which alone tenders can be received), may be obtained at the office of the Stores Superintendent at Swindon. Tenders, addressed to Mr. G. K. Mills, Secretary, Paddington Station, London, and marked outside "Tender for Stores," will be received on or before October 29.

Auction Sales.

Nature and Place of Sale.	By whom Offered.	Date of Sale.
* TOOLS, IRONMONGERY, Etc., BARBICAN .—On the Premises of the London and North Western Railway, Hackney.	A. S. Cohen.	Oct. 16, 17
* FREEHOLD BUILDING LAND, CAMBRIDGE HEATH, E. —At the Mart.	Madon, Smees, & Co.	Oct. 17
* BUILDING SITE, FULHAM .—At the Mart.	Perkins & Caesar.	Oct. 19
* WHOLESALE IRONMONGERY'S STOCK .—At 18, Chiswell-street, Finsbury.	Forebrother, Ellis, & Co.	Oct. 25
* FREEHOLD MANUFACTURING PREMISES, HACKNEY .—At the Mart.	Fryer, Cooper, & Co.	Oct. 25
	Hubbard & Whittingham	Oct. 30

MISCELLANEOUS.—Continued from page 439.

APPOINTMENT OF SANITARY OFFICERS.—The Local Government Board has sanctioned the appointment of Mr. M. Malins, in place of Mr. W. A. Perry, deceased, as Sanitary Inspector of the Metropolitan Borough of Camberwell. The Board has sanctioned an increase in the salary of Mr. E. Ainly, Sanitary Inspector in the Metropolitan Borough of Bethnal Green; and increases in the salaries of Messrs. W. E. Benjamin and A. Pevensey, Sanitary Inspectors in the Metropolitan Borough of Battersea.

MEMORIAL TO THE KING'S OWN SCOTCH BORDERERS, EDINBURGH.—A memorial has been erected on one of the central pedestals of the North Bridge, Edinburgh, to the men of the King's Own Scottish Borderers who have died in battle. The memorial is triangular in form. The central figure is an officer of the regiment in khaki uniform. On his right are two of the soldiers of the regiment, also in fighting garb, and wearing helmets. On the other side is a bare-headed soldier in a seated attitude, who has been wounded. Worked out in hard grey sandstone, the memorial rests on a base 2 ft. 6 in. in depth, the central figure of the officer rises 9 ft. above it. In front and on each side (north and south), upon the frieze of the base and carved in stone, is the victor's wreath of laurel. There is also a bronze panel bearing an inscription. The sculptor is Mr. W. Birnie Rhind, R.S.A., and the cost of the memorial will be £1,100.

Legal.

CASES UNDER THE LONDON BUILDING ACT.

At the North London Police-court, on Friday last week, before Mr. Fordham, K.C., Mr. John Cannon, of 13, Watson-street, Matthias-road, N., was summoned by Mr. Henry Lovegrove, District Surveyor of Buildings for South Islington, Shoreditch, etc., for making an alteration to a building in Midway-avenue without giving notice as required by the London Building Act. Mr. Lovegrove stated that he had written to the defendant, the occupier, acting as builder, reminding him that he had not given notice. The magistrate fined the defendant twenty shillings and twelve shillings costs, or fourteen days.

At Guildhall, on the 3rd inst., before Mr. Alderman Hanson, Henry Rosenthal was summoned for having used as a public building No. 8, Aldgate High-street, without having first obtained the approval of the District Surveyor. The proceedings were instituted under the London Building Act, 1894. It appeared that the defendant turned a shop into a bioscope exhibition, with seating accommodation for a number of

people. No notice was given to the surveyor. A large quantity of combustible materials was used, and the only communication with the upper part of the premises, where there were several offices and a hairdresser's shop, was by a wooden staircase. Although the defendant had since had the staircase rendered fireproof, it was pointed out that the offence was a serious one, and as a warning to others a nominal penalty was asked for. The defendant stated that he was an American and anxious to comply with the English law. He had made inquiries of the London County Council as to what he ought to do, and until he received this summons he thought he had complied with all requirements.

The Alderman: You are liable to a penalty of 40s. for each day this offence continued, making 60l. in all. Ignorance of the law is no excuse, although it is our custom to deal leniently with foreigners. A nominal penalty only is asked for, and I shall impose a fine of 40s. and 3s. costs.

ANCIENT LIGHT DISPUTE.

The case of Guy's Hospital v. Kapp & Greenwood was mentioned to Mr. Justice Baggallay in the Vacation Court on the 10th inst. on the application of the plaintiffs for an interim injunction to restrain the defendants until the trial or further order from so building as to obstruct the ancient lights of the plaintiffs.

Counsel now mentioned that it had been arranged that the defendants should continue to do what was necessary for the protection of the work, and subject to that the interim injunction would be continued until the trial, the parties to have liberty to deliver pleadings in the vacation.

His lordship assented to the order as proposed.

Patents of the Week.

APPLICATIONS PUBLISHED*.

10,971 of 1905.—J. B. COLE: *Moulds for Concrete Chimneys and like Structures.*

This relates to a mould for concrete chimneys comprising an inner section and an outer section relatively arranged to provide a space between them, and a plurality of sections arranged in said space and free from contact with each other and each adapted to form an air space within the wall of the structure formed in said mould, the said inner and outer sections being each composed of a series of sections one or more of which are detachable.

21,980 of 1905.—S. MADDOCK and A. H. JORNSTON: *Water Storage Apparatus.*

This relates to means whereby the dregs and sediment which ordinarily collects at the bottom

* All these applications are in the stage in which opposition to the grant of Patents upon them can be made.

of a water storage cistern may be drained away to any suitable outlet or waste, such as the rain down-spout or the like. In addition to the usual draw-off pipe in the cistern bottom, a separate discharge pipe is fixed. The cistern bottom is inclined, preferably towards the centre, and is fluted or grooved to give the dregs a tendency to gravitate towards the discharge aperture. This aperture is provided with a stop plug or with a valve operated by a lever and chain pull leading to the room below the cistern loft. The waste-pipe leading from this discharge aperture is also provided with a stop tap disposed near to the cistern. This stop tap is arranged to make a screwed joint with the waste or discharge pipe and the latter is led away to the rain down-spout or elsewhere.

14,150 of 1906.—G. A. MOWER: *Dust and like shoots for Floors.*

This relates to an apparatus for collecting dust, refuse and the like, and consists of a sweep-down inlet provided with a lid or door which is hinged or pivoted at some distance from the side thereof.

1,610 of 1906.—A. W. A. CHIVERS: *Chimney Tops, Ventilators, and the like.*

This relates to a chimney top, ventilator, or the like having in combination a chamber into which the smoke or other products of combustion such as heated air and gases exhaust, a secondary passage through the chamber, and an annular passage with outlets for receiving the down draught.

15,448 of 1906.—G. BARKER (H. C. WESTMORELAND): *Gates.*

This relates to a metal gate comprising a frame of any section of metal, solid or tubular, with a wiremesh body woven thereon, and with or without central vertical stays.

18,302 of 1905.—H. CARTER: *Pipe Joints, especially suitable for connecting Pipes in Tanks and cisterns.*

This relates to pipe joints or the like which are sealed by a flexible washer or disc, and is characterised by providing a cone-shaped ferrule with a flange whereby the ferrule may be expanded or contracted upon the pipes or the like.

18,533 of 1905.—F. A. L. HARRIS: *Construction of Fire-resisting Flooring, Walls, Ceilings, and the like.*

This relates to a construction of fire-resisting flooring, walls, ceilings, and the like, and consists of a base of armoured concrete, ferro-concrete, common concrete, or other fire-resisting material, blocks of wood, or other suitable material having their bases wider than their exterior surfaces, that is to say dovetailed or rebated, or being grooved or beaded to enable them to be embedded or anchored in the plastic material, longitudinal wooden or other bevelled, rebated, grooved, or tongued plates secured thereto, and a finished covering of wooden boards or boards of other suitable material having their ends formed to correspond with the shape of the longitudinal plates and to be held down thereby.

SLATES.			WOOD (continued).		
In.	ft.	d.	Prepared Flooring, etc. (continued).	Per square.	£ s. d.
10	best blue Bangor	13 2	1 in. by 7 in. white, planed and	£ s. d.	£ s. d.
12	" "	13 6	matched	0 12 6	0 15 0
12	" "	13 6	1 1/2 in. by 7 in. white, planed and		
12	" "	13 5	matched	0 15 0	0 16 6
12	" "	13 5	1 in. by 7 in. yellow, matched	0 11 0	0 13 6
12	" "	13 5	and beaded or jointed brds.	0 14 0	0 18 0
12	" "	13 5	1 in. by 7 in. white	0 10 0	0 11 6
12	" "	13 5	1 in. by 7 in. white	0 12 0	0 15 0
12	" "	13 5	6 in. at 6d. to 8d. per square less than 7 in.		

TILES.			s.	d.
Best plain red roofing tiles ..	52	0	per 1000 at 47.	6 1/2.
" " Hip and Valley tiles ..	3	7	per doz.	20
Best Broseley tiles ..	50	0	per 1000	20
Do. Ornamental tiles ..	52	0	per 1000	20
" " Hip and Valley tiles ..	3	0	per doz.	20
Best Babylon red, brown, or brindled do. (Edwards) ..	57	6	per 1000	21
Do. Ornamental do. ..	50	0	per 1000	21
Hip tiles ..	4	0	per doz.	21
Valley tiles ..	3	0	per doz.	21
Best Red or Mortlake tiles ..	51	9	per 1000	21
" " shire do. (Ponkes) ..	51	9	per 1000	21
Do. Ornamental do. ..	54	6	per doz.	21
Hip tiles ..	3	8	per doz.	21
Valley tiles ..	3	8	per doz.	21
Best "Rosemary" brand " "				

WOOD.			LEAD, &c.		
In.	ft.	d.	Lead—Sheet, English, 3lb. and up.	per ton, in London.	£ s. d.
10	best blue Bangor	13 2	Pipe in coils	22 2 6	0 0 0
12	" "	13 6	Soil pipe	22 2 6	0 0 0
12	" "	13 6	Compo pipe	25 2 6	0 0 0
12	" "	13 6	Zinc—Sheet	34 0 0	0 0 0
12	" "	13 6	Vulcanite	35 10 0	0 0 0

		At per 50 of 50 ft.	
Elr timber: best middling Danzig		4	10 0
of Mangel average specification		5	0 0
Seconds		4	0 0
Small timber (8 in. to 10 in.)		3	12 6
Small timber (6 in. to 8 in.)		3	0 0
Pitch-pine timber (30 ft. average)		4	0 0
		4	15 0
JOINTS' WOOD.		At per standard.	
White Sea: first yellow deals,		24	0 0
3 in. by 9 in.		25	0 0
Battens, 2 in. and 3 in. by 7 in.		16	10 0
Second yellow deals, 3 in. by 11 in.		19	0 0
Battens, 2 in. and 3 in. by 7 in.		13	10 0
Third yellow deals, 3 in. by 11 in.		13	10 0
Battens, 2 in. and 3 in. by 7 in.		11	0 0
Petersburg first yellow deals,		21	0 0
3 in. by 11 in.		22	0 0
Battens, 2 in. and 3 in. by 7 in.		13	10 0
Second yellow deals, 3 in. by 11 in.		16	0 0
Do. 3 in. by 9 in.		14	0 0
Third yellow deals, 3 in. by 11 in.		13	0 0
Do. 3 in. by 9 in.		12	10 0

White Sea and Petersburg—					
First white deals, 3 in. by 11 in.	14	10	0	15	70
" " " " " "	3	in. by 9 in.	13	10	0
" " " " " "	13	10	0	14	10
Second white deals, 3 in. by 11 in.	13	10	0	14	10
" " " " " "	3	in. by 9 in.	13	10	0
" " " " " "	13	10	0	13	10
" " " " " "	10	0	0	11	0
Pitch—do. do. do. do. do. do. do.	19	0	0	21	0
Under 2 in. thick extra	0	10	0	1	0
Yellow Pine—First, regular sizes	44	0	0	upwards.	
" " " " " "	44	0	0	upwards.	
Second, regular sizes	33	0	0		
Yellow Pine oddments	28	0	0		
Kauri Pine—Planks, per ft. cube.	0	3	6	0	5
" " " " " "	0	3	6	0	5
Large, per ft. cube	0	3	0	0	3
Small	0	2	6	0	2
Walnut Oak Logs, per ft. cube.	0	5	6	0	6
Yellow Walnut Oak, do. do. do.	0	5	6	0	6
" " " " " "	0	0	8	0	9
" " " " " "	0	0	7	0	8
2 in. do. do. do. do. do. do. do.	0	0	7	0	8
Teak—Mahogany—Honduras, do.	0	0	9	0	1
" " " " " "	0	0	9	0	1
Selected, Figury, per ft. super.	0	1	6	0	2
as inch	0	1	6	0	2
Dry Walnut, American, per ft.	0	1	0	0	1

Peak, per load.....	17	0	0	...	22	0	0
American White Pine Planks, per ft. cube.....	0	4	0	...	0	5	
Prepared Flooring, etc.—							
1 in. by 7 in. yellow, planed and shot.....	0	13	6	...	0	17	6
1 in. by 7 in. yellow, planed and matched.....	0	14	0	...	0	18	0
1½ in. by 7 in. yellow, planed and matched.....	0	16	0	...	1	0	0
1 in. by 7 in. white, planed and shot.....	0	12	0	...	0	14	6

VARNISHES, &c. (continued).			TERMS OF SUBSCRIPTION.		
In.	ft.	d.	"THE BUILDER" (Published Weekly) is supplied DIRECT from the Office to residents in any part of the United Kingdom at the rate of 12s. 6d. per annum (52 numbers) PREPAID. To all parts of Europe, America, Australia, New Zealand, India, China, &c., &c., the rate is 15s. 6d. per annum (52 numbers) PREPAID. Remittances payable to J. MORGAN should be addressed to The Publishers of "THE BUILDER," 25 Abchurch Lane, London, E.C. 4. SUBSCRIBERS IN LONDON and the SUBURBS, by prepaying at the Publishing Office 12s. 6d. per annum (52 numbers) or 4s. 9d. per quarter (13 numbers), can ensure receiving "The Builder" by Friday Morning's Post.		
10	best blue Bangor	13 2	Communications for insertion under this heading should be addressed to "The Editor," and must reach us not later than 10 a.m. on Thursdays. (N.B.—We cannot publish Tenders unless authenticated either by the architect or the building-owner; and we cannot publish announcements of Tenders accepted unless the amount of the Tender is stated, nor any list in which the lowest Tender is under 100L, unless in some exceptional cases and for special reasons.)		

VARNISHES, &c. (continued).			TENDERS.		
In.	ft.	d.	* Denotes accepted. † Denotes provisionally accepted.		
10	best blue Bangor	13 2	BANSTEAD.—For the erection of additional buildings for the London County Council.—		

VARNISHES, &c. (continued).			BARKING.—For overhead tanks, Barking outfall works, for the London County Council:—		
In.	ft.	d.	F.W. Bull. £783 1 0 A. E. Symes £532 14 J. Stokes & Sons 339 17 5 W. Harris 494 18 J. E. Mason & E. Proctor & Sons, 456 18 Barnes.—For the supply of concrete tubes, for the Urban District Council, Mr. G. Bruce Tomes, Engineer and Surveyor, Council House, High-street, Mortlake, S.W.—		

VARNISHES, &c. (continued).			BOURNEMOUTH.—For painting works in parks and pleasure grounds, for the Town Council, Mr. F.W. Lacey, Borough Engineer and Surveyor, Municipal Offices, Bournemouth:—		
In.	ft.	d.	W. Bevis, Norwich-road, Bournemouth. £277		

VARNISHES, &c. (continued).			BRICKWORTH.—For the erection of a septic tank, filter, sewers, etc., on the Spraton Filtration Area, for the Rural District Council, Mr. A. Lewis, Surveyor, Hill Side, Brickworth, Quantocks by Surveyor:—		
In.	ft.	d.	Bosworth. £456 4 3 Chown. £319 0 0 Andrew. 409 13 0 Clarke. 307 0 0 Bendons. 350 0 0 Higgs. 302 0 0 E. Green. 349 0 0 Cheyney Bros. 200 0 0 Crane. 335 10 0 Spraton. 200 0 0 Heap. 327 0 0 [Surveyor's estimate, £275 15s.; contingencies, £24 6s.; loan, £300.]		

VARNISHES, &c. (continued).			GLENKINDIE.—For erecting a schoolhouse for the Towie Parish School Board, Mr. A. Taylor, architect, Keldrummy, Aberdeenshire:—		
In.	ft.	d.	Mason: J. Mitchell, Huntly. Carpenter: J. Shand, Clova, Lamsden. Slater: C. McDonald & Sons, Alford. Plumber: W. Leask, Alford. Plasterer: A. T. D. Morrison, Alford. Painter: W. C. Mann, Alford.		

VARNISHES, &c. (continued).			HAYWANT.—For erection of a house at Denville, for the Misses Boys, Messrs. Hall, Pain, & Goldsmith, surveyors, 48, West-street, Farnham:—		
In.	ft.	d.	E. & A. Spigg. £1,105 0 0 Gudge. 1,072 0 0 W. T. Dugan. 995 0 0 McCarthy. 991 0 0 E. J. Franks. 991 0 0 Rogers. 955 11 4		

VARNISHES, &c. (continued).			HEREFORD.—For the erection of three villa residences on the Moor Park Estate, Hereford, Mr. H. Skyrme, architect, Hereford:—		
In.	ft.	d.	W. Powell, Hereford. £1,250		

VARNISHES, &c. (continued).			LLENDUNO.—For road construction, Mostyn-broadway, for the Urban District Council, Mr. E. P. Stephenson, Engineer, Town Hall, Llandudno:—		
In.	ft.	d.	W. Davies, Llandudno. £2,328 14 2		

VARNISHES, &c. (continued).			LONDON.—For repairs and decorations to house, Carlton Vale, London, N.W. Mr. H. Riches, architect, 3, Crooked-lane, King William-street, E.C.4:—		
In.	ft.	d.	Osborn & Sons. £185		

Seyssel Asphalte Direct from the Mines.

ESTIMATES GIVEN ON APPLICATION

The Builder.

VOL. XCI.—No. 3324.

OCTOBER 30, 1906.

ILLUSTRATIONS.

Detail of High Bay of Choir, Liverpool Cathedral.....	Mr. G. Gilbert Scott, Architect.
Lyddington Hospital, Rutlandshire }	Drawn by Mr. W. Eaton, A.R.I.B.A.
Hambleton Old Hall }	
Buildings in Brisbane	From Photographs.

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Architecture in Brisbane.



VEN in winter Brisbane suggests the tropics, though it is actually well beyond their area, for the sun shines with great brilliancy, and when there is rain it is frequently of the torrential order. The air is balmy and the prevalent wind is from the sea, moist and warm, though by contrast it feels cool. The only cold wind is from the west, hard and cutting, deprived of every particle of moisture by its long traverse over the dry interior. But summer! Then the thermometer keeps up steadily in the eighties or nineties, and humanity clothes itself in white.

Under these conditions of life it would only be natural to expect the city to present a different appearance to those in cooler climes, but on a first glance at the buildings in the main streets one might easily imagine oneself in Sydney or Melbourne, or one of the larger provincial towns of the cooler south. The ordinary business structure is just like a hundred others elsewhere, but beyond the central commercial nucleus one sees with pleasure that the public buildings and private dwellings possess a distinct climatic note of their own. In the former pillared loggiae are a marked feature, more especially in the older buildings, and the latter usually have verandas on at least three sides. All the suburbs except South Brisbane are hilly and picturesque, but

owing to the clearing of the native bush still somewhat bare in contrast with the thickly-covered hills farther out. Planting does not appear to have been taken in hand with much vigour except in one or two favoured spots, as the subsoil generally is rocky, and water not sufficiently abundant to indulge in irrigation. But much more might be done than has yet been accomplished if the desire existed. On the other hand, trees, though they give shade, break the breezes so essential to comfort, and encourage mosquitoes.

The electric trams that now invade every suburb must be a great boon to the citizens, especially of the working classes, for they provide easy access at a cheap rate to what was a few years ago open country, but is now cut up into fair-sized allotments, each with its own detached wooden iron-roofed cottage. The terrace dwellings so prominent elsewhere are practically unknown, and the long, unlovely lines of mean streets conspicuous by their rarity. The typical working man's cottage is square in plan, four-roomed, with a hipped galvanised iron roof, three verandas, and raised on "stumps" well above the ground. It may also have a small kitchen tacked on at the rear. Its general colour, roof included, is a dusty whitey grey, and the dark shadows between the stumps under the floor seem to disconnect it from mother earth, so that the hillsides from a distance look for all the world as if they were covered with gigantic mushrooms, or the huge umbrellas one sees in the piazzas of Italian towns on market-days. Only they all look sun-scorched and shabby, as paint

loses its freshness in a very short time, and to continually repaint a wooden cottage would be a costly item. In one or two better-class dwellings a local architect is trying Stockholm tar as a substitute, and is even inclined to leave the hardwood weather-boards unpainted. They then turn a beautiful silvery grey, but it is to be feared would warp, crack, and perish rather quickly.

Amongst the better-class dwellings some few show signs of decided architectural skill, and a commendable absence of fussy features. The roofs of course are of iron (tiles and slate will not stand the gigantic hailstones—3 in. in diameter—which occasionally fall), but they are broad-spreading, covering house and verandah in one long slope, and running up to a ventilated ridge. Verandas are usually broad, but even so require shading, and Chinese blinds are noisy and perishable. The architect just referred to has, however, hit on a very clever substitute, viz., vertical green-painted pivoted louvres between the handrail and the head, the louvres in each bay all connected by a horizontal rod, by means of which they can be instantaneously closed or opened to any desired angle. We may, however, suggest an idea in connexion with the roof, which has been proved successful elsewhere, but does not yet appear to have been adopted in Brisbane. It is this. Frankly recognise that the roof-space must be hot, hence dispense with boards or any check to heat under the iron, and render the ceiling underneath as heat-proof as possible. Then ventilate the roof most abundantly. This



Queen-street, Brisbane, in 1858.

will ensure a cooler dwelling than the present method, and cost no more.

But it is time to pay attention to the more important buildings which have been erected since our previous article on Brisbane was written,* and of these the new Lands Office (see lithograph) stands out pre-eminent as the best exterior that has yet been designed and carried out in this semi-tropical city. It is rectangular in plan, 234 ft. by 158 ft., with a central court (see plan on page 450). The two ends face George and William streets respectively, a third faces a small public garden, and the fourth a lane. Being also close to the river it has every advantage of position in its favour, and, on the whole, is well worthy of it. The illustration shows the general composition of the façades, which are of stone, but it does not indicate one very serious blot visible from a greater distance, viz., the obtrusive and utterly prosaic cemented and painted structures behind the parapet. In an old building where the need for extra accommodation is urgent such excrescences may be pardoned though deplored, but in a new building erected at great cost and only just completed such a fiasco is little short of an architectural crime. Evidently some one has blundered. The composition of the façades in detail is satisfactory on the whole, though it could have been improved in some particulars. For instance, the rusticated columns to the centre windows of the wings on the second floor look too weak under the heavy pediment above, and though they have caps they are destitute of bases. This fault might easily have been avoided by using double the number of rusties, giving only a small space between as in the floor below, and by inserting a moulded base. On the other hand, the treatment of the angles of the parapets may be commended, and the small windows in the wings give variety and a sense of scale which would otherwise be lacking. The figure-carving may also be noted as passable considering the little patronage afforded to sculptors in a new country like Australia. But

when the building is entered the visitor gets a series of shocks, the first at the entrance doors filled with so-called stained glass. Figure subjects made up of large pieces of strong-coloured glass, without any shading and close to the eye, are a little too awful, and would hardly have suited a flaring hotel bar, so it may be imagined how they jar on one's nerves in a public building of this importance. Then on going forward a few paces the internal court is revealed, but alas, instead of the architectural effect one naturally expects from the exterior, nothing meets the eye but plain bare cemented walls with crude window openings, and along one side and end commonplace projecting iron balconies. With a sense of disappointment one turns down a dark corridor to note that the woodwork and plastering are nicely detailed, but on looking at the gas-fittings the fact is revealed that they are of the showy flimsy type that merchants import for the cheap suburban cottage. So without much desire to penetrate farther one emerges, wondering why, in a building reputed to have cost 150,000*l.* and so lavish in many ways, such meannesses have been permitted. We have, however, since heard that the fittings of some of the principal rooms upstairs are in much better taste, but at the hour of our visit they were not accessible.

Close by in Elizabeth-street a new brick church of pleasing Byzantine Romanesque design next attracts attention. It is at present the pro-Cathedral, in lieu of the old one removed to make room for the Lands Office Garden; and when the Cathedral is built will serve as a mission church. The site is sloping and the east end faces the street, hence a lower story used as a school and hall, and a picturesque grouping of entrances, cupola-capped bell turret, chancel and transeptal gables. The church itself possesses a nave and aisles of three bays, a shallow chancel and no clearstory. The vergers said it was badly ventilated, but every window has two large iron pivoting sashes, and there are ample ventilators in the roof. No, the fault was in the construction of the roof, open

timbered with boarding behind the rafters and iron on that. Such a roof in a hot climate cannot be cool. An inner ceiling is an absolute necessity, but one that is not yet recognised. A good point to be noted in the interior is that the end roof principals are kept about 2 ft. away from the gable walls with a very satisfactory effect.

Returning to George-street one notes an ecclesiastical-looking single-story stone building of simple pointed Gothic design, but on closer inspection a board labelled "Office of the Commissioner of Police" reveals itself. Peeping inside the semi-ecclesiastical character is maintained; and one expects to see a new kind of ecclesiastical constable to match; and it is only when one learns that the building was erected as a Church Institute, while the old pro-Cathedral was still in existence, that the mystery is explained.

This leads to inquiry for the site of the proposed new Cathedral, which is at the other end of the central quarter of the city just above Petries Bight and the chief wharves. Journeying thither one finds a spacious allotment unoccupied save for one old house. It fronts Ann-street and rises up gradually about 10 ft. or 12 ft. till the other end is reached, where Adelaide-street is seen 30 ft. or more below down a vertical wall of rock, and a magnificent view of the winding river is obtained. *Vice-versa*, the view of the Cathedral from the river will also be superb, and whoever arranged the exchange of site with the Government had a true eye for effect, and Brisbane churchmen are to be congratulated. Tenders have recently been obtained for the eastern end of the Cathedral, but it is understood that they are largely in excess of the estimate and of the funds available. And no wonder, for charming as the design may be, and as all Pearson's work was, he was never economical, and his scheme for Brisbane Cathedral is no exception to the rule. A cruciform plan with double aisles, vaulted throughout, the inner aisle carried up as a vaulted triforium, sharply pitched roofs, abundant window openings, the inevitable spire-roofed stair turrets, and the whole to be

* See *Builder*, August 20, 1898.



Queen-street, Brisbane, in 1890.

carried out in stone, tells its own tale as to cost even in this country; but in Australia, where wages are high, hours short, and labour unskilled in such elaborate Gothic work, the difficulties are doubled. It is also a pity that climate has not been considered; the design is purely English and in England would look splendid, but in semi-tropical Brisbane the large amount of window-glass, the lack of shadow, the delicate Gothic detail and the high-pitched roofs are out of place. If it is not too late the ecclesiastical authorities would do well to consider the desirability of adopting a much simpler design and one more suited to local conditions.

Adjoining the Cathedral site the schools and Church Institute have already been erected, and at a first glance at the picturesque grouping, the high-pitched roofs, and the early Gothic detail, one is constrained to exclaim "Pearson." But on closer inspection the provision of a roomy loggia or balcony, and folding doors opening down to the floor on to iron railed balconies to give through draught, show local knowledge. Further inquiry elicits the fact that the latter surmise is correct, and that the whole building was constructed from designs by local architects out of the materials of the old pro-Cathedral. A job of this kind is never an easy one, but to turn a church into a school and produce a capital result may be justly regarded as a triumph. A special feature of much value in a hot climate is the covered playground obtained by raising the classrooms on brick tiers.

Passing along Ann-street towards the Central Railway Station one comes to another new church just erected by the Presbyterians at a cost of over 10,000*l*. It is Romanesque in design, very simple and bold, not to say bald, and carried out in brick with the scanty dressings in cement instead of stone, the result of

severely cutting down a competition design to reduce it to the stipulated cost. The site is a corner one and so steeply sloping that a school below and the church above are both accessible from street levels, the latter of course by a few steps, wisely enclosed in a roomy porch. At the head of these is a large narthex with three entrances to the church. The interior is open and roomy-looking, the heavily-arched transepts are shallow, and the pulpit platform and organ apse effective and well designed. But the pulpit has a sounding-board, which is certainly necessary, as the proportions of the church are high, short, and broad. The roof here also is open to the ridge and will no doubt be hot though covered with tiles instead of iron. But there are no principals against the end walls, and the finish is crude compared with the pro-Cathedral. Externally the tower is placed anglewise at the street corner, probably the most useful place, but artistically a mistake, as the building looks as if it would slip down the hill, a defect that would have been obviated if the tower had been placed on the lower side of the church. Notwithstanding the baldness of the exterior the design is a powerful one and a refreshing change from the too ornate and petty detail of most of the Brisbane churches. The recessed apse enclosed within a large arch with an outer gallery around it is quite a novelty and effective at that.

A little farther along the other side of the street is the new Central Railway Station, the central block of the frontage to the street with its loggia and tower being in stone, and the long wings screening the platforms, a much inferior composition in brick and stone. Behind the central feature an elliptical trussed steel roof spans the platforms and lines, and as the trusses are carried down to the floor they are no doubt tied at rail level. The farther side of the station

is enclosed or rather screened by an arcade of strong-looking columns and arches which is effective. Being the chief railway-station of the State the authorities no doubt felt justified in a liberal outlay, and the result considered as engineer's architecture is not nearly as disappointing as in most similar cases.

Returning to the upper end of Queen-street the Treasury Buildings (see lithograph) still show a gap at the George-street corner, which when filled up would complete this extensive pile, and, by removing the small existing structures which encroach, would much improve the approach to the Victoria Bridge. It is a great pity that it does not continue the line of Queen-street, as did the old bridge, but no doubt its remains spared by the great flood of 1893 stood in the way, and were temporarily utilised while the new bridge was constructed. It is however a blunder that time will only accentuate.

Going north along Queen-street one notices the Trustee Building, a two-story structure in red brick and cement with a central loggia on the first floor, showing a recognition of the climate as the front faces west. The ground floor is hidden by the usual iron veranda, and in this case it is well, as the ground-floor piers do not tally with those above, a shop-front having been crowded in to rental advantage, but further artistic detriment of poor detail. Farther on one comes to the ostentatious cement-fronted *Daily Telegraph* Newspaper Company's offices, and then to a row of shops next the opera-house, in the usual red brick and cement, but of decidedly original though not beautiful design. When one arrives at Edward-street however the eye is attracted to the other side of Queen-street by a well-designed group of shops at the corner in rough-cast and cement with wide eaves, an iron roof, and the inevitable veranda; but in this case

treated so simply that it harmonises with the design as well as it is possible to make it. Farther along the same side of the street a bit of pure Dutch design strikes the eye in the auction mart of Messrs. Isles, Love, & Co., very well and characteristically designed, with a high-stepped gable and two arches below. It certainly gives one a shock in a semi-tropical climate, but it is on the shady side of the street and is a most refreshing change from the mass of commonplace which surrounds it. On the opposite side of the way Messrs. Shaw & Sons possess a shop with two entrances, abundant plate-glass, and two grey granite columns under the street veranda, and above a perfectly plain rock-faced granite front of five arched bays, with a robust corbelled cornice and a plain parapet over. It is plain and strong, and the veranda fortunately masks the hiatus between the vigorous-looking superstructure and the plate-glass below. Farther on an attempt has been made in the Colonial Mutual Life Assurance Company's building to solve the everlasting problem of plate-glass shop-front the solid superstructure. The ground floor is lofty, with a granite entrance at

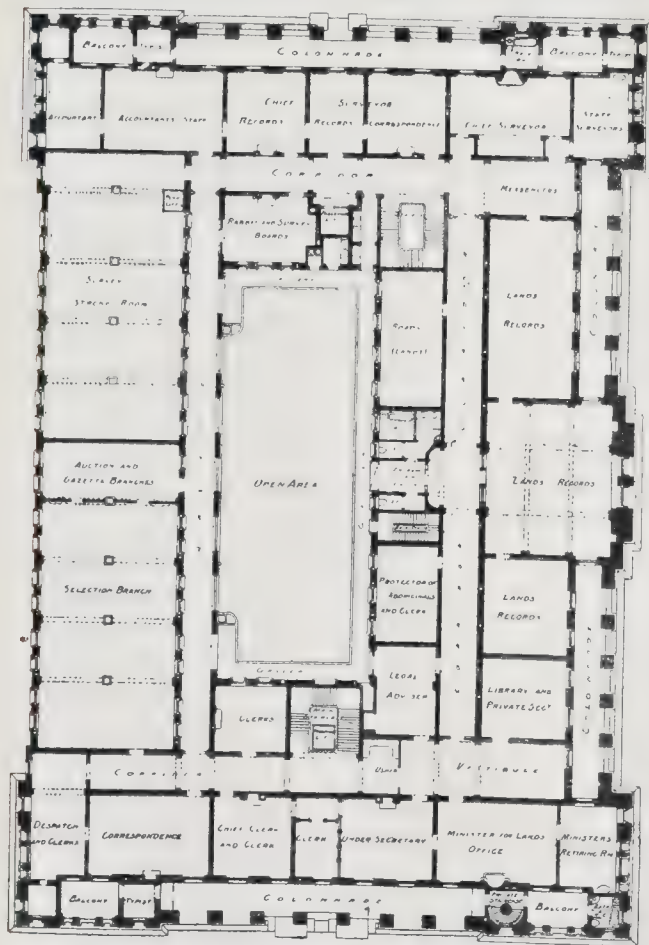
each side, and between a huge elliptic arch enclosing a metal-framed shop-front. The idea is good, but the abutments hardly look strong enough to resist the thrust of the arch, and the latter is out of scale with all the other details. Those in the upper stories are very ornate, and we must say vulgar, for all the styles seemed mixed therein, Romanesque grouped shafts and copper bases with Ionic copper caps being one of the most delectable features.

Turning down Creek-street, one finds at the corner of Elizabeth-street the office of the United Insurance Company, a two-story brick and stone Romanesque design, commendably simple, sensible, and unforced, but a few doors farther on is another large and ostentatious Romanesque three-story structure in red-brick and coloured red cement. Returning to Queen-street and proceeding northwards the Bank of North Queensland deserves passing notice, it is simple and sensible, with two side entrances and a recessed centre, and is well-detailed. The South British Company's office is more ambitious, but its heavy cement columns above, narrow side entrances and large centre window below, are out of scale with one

another, and the balustraded balconies without piers at the ends decidedly crude. The Commercial Union Assurance Company's building would attract attention by its size alone, and it is on the whole a well-proportioned design in stone, red brick, and cement in somewhat Venetian Renaissance manner, the detail being effective, though when analysed the component parts are somewhat open to criticism. On the opposite side of the street another and simpler Dutch design with a sweeping hollow gable is to be noted, and then we arrive at Petries Bight, the Custom House (see lithograph), and the wharves, and there is nothing new to interest the architectural critic till the full-length statue of Byrne, a one-time Premier, comes in sight. It is in bronze, by Mr. Mackennal, and decidedly successful for a modern subject.

The next halt is at the Valley, where the trams diverge, and the Bank of New South Wales attracts attention. It is of two-stories with eaves but no visible roof, and one wonders what they mean, until one discovers by a back view that the roof is a long flat slope of iron falling to the rear. The façades consist of a simple but pleasing arched treatment, with a canted angle entrance and a projecting curved bay over, but the one jarring note is the shop-front inserted for revenue purposes, which does not harmonise with anything. Next door is a large draper's emporium in florid Romanesque, red all over, which acts as an excellent foil to the Bank, though it is in itself unsatisfactory. The corner opposite the Bank is well rounded to afford room for the curve of the branch tramline, and the shops thereon are rather originally treated with semicircular projecting turrets or bays, but the iron mansard roofs above quite spoil the effect. Farther on is a branch office of the Commercial Banking Company, a small but well-designed façade with balconied shops on the left, and a draper's on the right, both well treated. Just round the corner of the next street is Messrs. Stewart & Son's red brick and cement warehouse, a well-considered front with gables at each side and wide, projecting modillioned cornices to both ground and first floors. It is quaint and pleasing. It is quite possible that in the suburbs or more outlying parts of the city there may be more new buildings worthy of note, but time and space are limited, and so we must content ourselves by a reference to the Post Office at Woollongabba (see lithograph), an exceedingly well-designed building not long completed. It has a rough stone plinth, and above is largely in plain and rough cast cement, with only a little brick showing here and there. The treatment of the cement work is much more satisfactory than usual, though the features still show too much stone design in detail. The modelled ornament is particularly good. Climate has also been considered, as the eaves are wide and a good balcony is provided to the living rooms.

The excellent system of electric trams has been referred to, and they will do much to improve and spread the city, though it is said the shareholders do not at present obtain a satisfactory return. That however will come. It is a pity



Lands Offices, Brisbane. Plan. (See page 448.)

that as much advance in sanitation as a locomotion cannot be chronicled; but the earth closet system is still in vogue, and the odours on a hot day must be as bad as of old. Schemes of drainage have been discussed, but nothing has been or appears likely to be done for some time to come. There are two serious difficulties in the way. The first is floods, which are occasionally very heavy and destructive, rising 4 ft. to 6 ft. above the lower levels. The second is lack of pence due to droughts and federation. The former could be overcome by adopting a pneumatic closed system, but the latter is a more serious matter, and sound legislation can alone provide a remedy for political evils, while in time the weather cycle of good seasons may return. May the era of improvement soon commence, for Queensland possesses the greatest potentialities if wisely developed, and the grit of its people is well known.

RECENT LABOUR CONGRESSES.

AT two great labour Congresses lately held—that of the Miners' Federation and the Railway Servants' Congress—undoubtedly the most important question raised was the attitude which in future was to be adopted by these bodies towards the Labour Representation Committee—that is to say, to quote the resolution carried by the Railway Servants' Congress, whether "all candidates shall sign and accept the conditions of the Labour Party and be subject to their Whip." This question would have no interest whatever were it a mere dispute between Labour leaders, but as it is it involves the greater principle—Shall the trade unions accept as a whole the policy put forward by the Labour Socialist Party, rendering their delegates mere puppets of that party? Mr. Richard Bell urged that "to try to amalgamate the Socialist organisation with trade unionism was like trying to amalgamate oil with water," and we are inclined to agree with him. But as we have pointed out before in these columns, the important point for the public to bear in mind is that the past legislation in favour of trade unions, and the proposed extended legislation in the same direction, is entirely based upon the unions being mere trade organisations, and if they are now to be converted into purely political societies the position should certainly be reconsidered, and the proposed immunity offered by the Trades Disputes Bill to these societies from civil liability for wrongful acts should, if given at all, be most strictly limited to their functions as trade unions.

The Railway Servants' Congress apparently refused to allow this question to be submitted to a general ballot, but the Miners' Federation submitted the point for ballot, and the resolution to join the Labour Representative Committee was defeated.

It must also be noted that at the meeting of the Miners' Federation a resolution was carried directing the Executive Committee to devise means by which non-union men could be induced to join the Federation. If the unions join the Labour Socialist Party it will mean in many cases that in this free country

persecution shall be resorted to such as has recently been experienced in South Wales, not to compel men to join the trade union, but to compel them to join the ranks of the Socialists and to forward their policy. Too much stress cannot be laid upon the fact that the time has come for the Legislature to protect those workmen who do not wish to join the unions; not, as is proposed, to hand them over body and soul to the paid agitator.

The general programme at these Congresses follows in the main that of the Trade Union Congress—old age pensions, State ownership of undertakings such as railways and mines, minimum wages, and eight-hour days. A pleasing feature, however, of the proceedings was the moderate tone of the Presidential address at the Miners' Federation, which is refreshing after the blatant arrogance so freely indulged in by certain sections of the Labour Party the last few months. He expressed the opinion that strikes were menaces to the truest interests of the workers of the world, and the best interests were served by great unions settling wage questions before a strike by conciliation boards, rather than after fighting and when all their resources were exhausted. Of the general questions discussed at the meeting of the Federation we need only comment here upon two. In the resolution on old age pensions it was admitted that this measure had become a necessity owing to the effect of the Workmen's Compensation Acts in excluding older men from employment. It was to meet this difficulty that the Bill introduced by the late Government contained provisions which would have encouraged employers in employing older men, by lessening the liability to pay them compensation on the same scale as able-bodied men. These provisions have been left out of the Bill now before Parliament. It is obvious that some limit must be placed upon the burdens laid upon trade. In our issue last week we gave the statistics of the sums paid in compensation, but now apparently all the stages in a workman's life are to be provided for by the State, if the Labour Party have their way. Children are to be educated and fed, able-bodied men housed, the injured pensioned, the widows provided for, the old supported, and, lastly, the unemployed—unemployed from whatever cause—to be offered employment at trade union wages.

The second point we would comment on is the resolution for increasing the minimum wage and for extending the area over which it should uniformly apply. Some of the speakers seriously contended for a fixed minimum of universal application, irrespective of the character of the coalfields. It is by resolutions of this kind that the unions prove their disregard or ignorance of the economic conditions upon the observance of which the trade of this country must depend.

CHURCH RENOVATION, MACCLESFIELD.—Christ Church, Macclesfield, was recently reopened after being closed for cleaning and redecorating. The designing of the painting was undertaken by Mr. James Ward, art master, the School of Art, Macclesfield, and the contract for the painting was given to Mr. S. W. Whittaker. Besides the painting the organ has been overhauled and repaired by Messrs. Taylor & Co., and the gaslights within the Communion-rails reacquired by Mr. J. J. Slack.

NOTES.

Exeter Cathedral. IN reference to criticisms which have appeared in the press in regard to the partial restoration on the west front of Exeter Cathedral, we may say that from our knowledge of the *personnel* composing the "Dean and Chapter" of Exeter Cathedral, we feel sure that they are carrying out no repairs other than what are reasonably desirable. That the rebuilding of the great west window and gable window are included in this statement of opinion, demands some qualification. The great west window has recently been re-glazed. We expressed ourselves at some length as to the desirability of this step in our issue of February 21, 1903. It had unfortunately, as we thought, been selected as the site of a memorial window to the late Archbishop Temple, and if the glazing—by Peckett—was removed, it was evident that the condition of the stonework would make it imperative that the greater part of it should be rebuilt. That these two windows are from the outside grateful to the eye, we doubt if even the Dean and Chapter would concede. Neither can anyone do otherwise than greatly lament the gradual substitution of new pinnacles for old. But many have been condemned as unsafe, and speaking from observation only, we cannot express surprise. The partial restoration of the sculptural screen which covers the base of the front is executed in Ketton stone, which is yellow, and contrasts, as some may think oddly, with the Beer stone of which the fabric is composed. As the Ketton dries out much of the colour will disappear. At the present moment, however, the restored portions obtrude themselves, and challenge criticism. This recent work reproduces with unquestionable interest the all but obliterated detail, and we cannot condemn a point of view which approves of a limited portion of a disappearing architectural feature, on an extended scale, being reclaimed from the general decay. Indeed we believed this to be the point of view from which the Society for the Protection of Ancient Buildings deals with its restorations. Several new columns were substituted by the Society's architect when the restorations to the facade of the Exeter Guild Hall were carried out under his able superintendence. The preservative coat of whitewash which the Society advocates may possess the virtue which is claimed for it, but there are probably many who will hesitate to substitute whitewash for stone, as a matter of appearance.

SOMEWHAT surprising evidence was brought before the Royal Commission on Coast Erosion on Tuesday by Colonel Hellard, R.E., Director-General of the Ordnance Survey. Notwithstanding the serious inroads made by the sea on various parts of the East and South Coasts, the fact seems to be that during the past thirty-five years accretion has caused a net gain of some 30,000 acres of rateable land in England, and a net gain of nearly 4,000 acres on the East Coast of Scotland. On the other hand, the total loss of foreshore has been very nearly 40,000

acres in England and Scotland, and it must be remembered that the removal of foreshore constitutes a future menace to the land behind. Consequently it will not do to be too jubilant about the encouraging figures adduced by Colonel Hellard, especially as a very large proportion of the land gained is due to reclamation work in the Wash, Morecambe Bay, and off Southport. Moreover, the fact that landowners in some counties have secured property on easy terms is not much consolation to owners in other parts, who yearly witness the incroachment of the sea into their lands.

At the meeting of the Law Society recently held at Manchester Mr. Dixon H. Davies read an interesting paper on "Local Government—Unconstitutional Tendencies," which will well repay perusal. The main object of the paper is to illustrate the disastrous effect municipal trading is having on industrial enterprise and general finance in this country. Mr. Davies traces the history of electrical development for the last five-and-twenty years, and shows that, commencing with the Electric Lighting Act of 1882, the tendency has been to kill private enterprise. The private capitalist has to give notice to the local authority of his intention of starting any undertaking, a notice which the local authority has the opportunity of extinguishing by subsequent notice to undertake the undertaking themselves. The purchase clause to acquire going concerns at the end of twenty-one years, although extended by the Act of 1888 to forty-two years, the writer also considers has paralysed private enterprise, whilst the restrictions to local areas have had a disastrous influence on undertakings for the distribution of electrical power. On the effect the local authorities, by their borrowing powers, are having not only on credit generally but even on Imperial finance, the paper is equally instructive, and the writer also comments on the influence the local authorities are able to exert on Parliament in relation to private Bills by their combination as represented by the Municipal Corporations Association, and on this point we remember that the assertions of the writer were fully borne out by a statement of the Lord Chief Justice some years ago. The paper concludes with some suggestions for reform, amongst which we may mention (1) The control of local finance by the House of Commons; (2) that the local authorities should finance out of revenue and only be allowed a capital account in exceptional circumstances, and under the direct control of all ratepayers; (3) amendment of the Trustees' Act as to investment in such securities; (4) stringent audit of accounts. We recommend our readers to peruse the paper in its entirety.

Since the death of General Pitt Rivers in 1900 the office of Inspector of Ancient Monuments, under the Ancient Monuments Protection Act of 1882, has not been filled up. It is to be hoped, as a correspondent recently pointed out in the *Times*, that this does not mean that the Office of Works does not intend to keep

the appointment permanent. The object of the office of Inspector is to have some competent and independent person who will see that the monuments vested in the Office of Works are properly cared for. However capable officially the department may be, it is not an archaeological department with specially trained members, and a fair-minded technical adviser can, therefore, always be of service. It is most desirable that historical monuments should be vested in some public body. The individual owner may fulfil his duties admirably, but his son may be a different character. Continuity of care is required in the case of historic monuments, and this can only be obtained by the ownership of them being transferred to public trustees. It will certainly tend to this object if the office of Inspector of Ancient Monuments is speedily filled up.

Two remarkable subsidences of recent occurrence and almost of identical character are striking object-lessons of the necessity for paying the most careful attention to foundation work. The first case is that of a grain elevator, 60 ft. wide by 100 ft. long by 180 ft. high, which stood on the bank of the Kamisistikwia River, in Ontario. It was built on concrete foundations supported by 60-ft. piles driven through clay to a solid rock bottom. The concrete foundation walls 16 ft. high were only 16 in. thick, and were far too thin to withstand the enormous weight of the building and its contents. The foundation wall gave way at one corner on the river front and collapsed entirely, permitting the whole structure to slide bodily for a distance of 30 ft. into the river, where it stood in 20 ft. of water at an angle of 25 deg. from the vertical. The structure was of the steel tubular type, and, while it showed little indication of injury from the outside, was so twisted as to render futile any attempt at repair. The other case is that of a large concrete-steel grain silo at Tunis, which had been built to its full height when the foundations yielded, and the building sank on one side to the depth of several metres, and remained at an angle very much the same as that of the tower of Pisa. Nevertheless, thanks to the rigidity due to the characteristic features of concrete-steel construction, the building suffered no injury whatever, and has since been restored to its original position. This certainly is a triumph for reinforced concrete, although conveying a very strong hint that in this as in other classes of structural work the foundation is a detail of vital importance.

An interesting question discussed this year by several French technical papers, in connexion with the various proposed schemes for the electric lighting of Paris, was the physiological effects of the light produced by low candle-power high voltage lamps at the frequencies at which it was proposed to work. A paper recently published by Mr. E. P. Hyde in the *Bulletin of the American Bureau of Standards* gives a partial answer to this question. By means of an elaborate experimental investigation extending over

twelve months he has established the truth of Talbot's law to within the narrow limits of observational error. This law may be stated as follows: If the retina be excited by light pulsating so rapidly that the pulsations cannot be noticed directly, the continuous impression which results is the same as if the light were absolutely steady and had a value equal to its mean value. The truth of this law could only have been established experimentally, and Mr. Hyde's results are conclusive. That the light given out by an alternating current low candle-power glow lamp is intermittent can easily be proved in the following way:—A top with black and white sectors is made to spin, and is illuminated by light from the lamp. It usually appears of a uniform gray colour, but at a certain critical speed the sectors appear stationary. At speeds slightly greater than this they will appear to rotate in one direction, and at speeds less than this in the opposite direction. The explanation is that at the critical speed the maximum pulsations of the light occur exactly at the instants when one white sector has moved into the position previously occupied by the contiguous one, and so, owing to the permanence of visual impressions on the retina and the similarity of the appearance presented by the top at the instants of maximum illumination, it appears to be stationary. This effect is much more pronounced with the light coming from alternating arc lamps as the fluctuations of the light are much greater. The stroboscopic effects produced in this case are useful in practice, as they often enable the engineer to tell the exact speed of the rotating parts of his machines. When the pulsations of light are so rapid that they are not directly noticeable by the eye there are apparently no injurious effects produced.

WE have repeatedly called attention to the importance of protecting the windows of buildings from the effects of outside fires, and it is very desirable that trustworthy data should be made available as to the most efficient methods of affording protection. Two comparative tests conducted by the British Fire Prevention Committee constitute a step in the right direction. The results, as stated in a report just published, demonstrate the great resisting power of wired glass and steel shutters under exceptionally severe conditions. They also show the liability of teak sashes to succumb to the effects of intense heat, and the susceptibility of deal sashes, even when protected by steel. The two tests to which we refer were made in the same building and lasted for one hour, the temperature being gradually raised to 1,500 deg. Fahr., followed by the application of water for two minutes. In sixty minutes the teak sash glazed with wired glass burst into flame outside; in forty-seven minutes the deal sash, glazed with sheet glass and protected by a Kinnear steel rolling shutter, also took fire. It is worthy of note that the wired glass did not fall to pieces, although knocked out by the force of the water-jet. If this material had been employed in a steel frame the probability is that it would

Municipal Trading.

The Importance of Good Foundations.

The Light from Alternating Currents.

The Inspector of Ancient Monuments.

Fire Tests of Windows.

have remained in position and in a still serviceable state. The sheet-glass was completely destroyed and the steel shutter slightly damaged, but its practical utility was very evident. If wired glass in a metallic sash and a steel shutter were applied in conjunction they would probably form an almost invulnerable shield against any flame likely to attack a building from the outside.

Careless
Railway
Engine Drivers.

THREE Reports on railway accidents issued this week by the Board of Trade, and received from three different inspectors, point unmistakably to the lack of care exercised by some drivers of locomotive engines—a habit that was responsible for two or three most serious railway disasters that have occupied a considerable share of the public attention within the past few months. Reporting upon the collision that took place on September 3, at St. Pancras Station, where an express train from Derby ran into the buffer stops at the speed of between six and eight miles an hour, Major Pringle says that the collision was brought about by “failure either to use the brake-power properly or to bring it early enough into action.” Colonel von Donop, in his report upon a similar mishap at Hull on August 23, says that the train entered the station in accordance with the company’s regulations, but that no allowance was made for the greasy state of the rails, a condition that is more or less chronic owing to the presence of fish waggon, as we think all drivers ought to know. In this case it was only when the driver was close up to the stop that he became alive to the fact that the hand brake had been rendered inoperative. He then woke up and put on the Westinghouse brake, but too late to prevent the collision. The third report is that of Colonel Yorke on the derailment of a train near Coatbridge on the Caledonian Railway, owing to “a wholesale disregard of the speed restrictions laid down for the safety of the traffic.” After two events such as those of Salisbury and Grantham one would imagine drivers throughout the kingdom making up their minds to be more careful than ever. But the effect seems to have been quite otherwise.

Glastonbury
Abbey.

RUMOUR is rife that the abbey ruins will shortly be offered for sale, and that proposals for their purchase and removal to America have already been declined. Apart from its architectural history and beauty* Glastonbury possesses the uncommon interest which attaches to its associations with the first introduction of Christianity into Britain. Standing in the marshy tract of Avalon, the Saxon Glastn-ey, it is the successor of the wicker church dedicated to the Virgin whereof the foundation is ascribed to Joseph of Arimathea and his band of brethren, the missionaries sent to our country by Philip the Apostle of Gaul. Dewi, Bishop of Caerleon (for Wales), rebuilt the ruined church, and it is said that Patrick of Ireland found a home during some years in the convent he organised there and into which at a later period Augustine first introduced the

Benedictine rule. Ina, King of the West Saxons (688-728), reinstated the abbey which the Danes subsequently destroyed. Then Dunstan made good the havoc wrought by the Danes, and Edmund I. appointed him abbot. King Edmund’s son, Edgar, who had a palace near the town, enriched the foundation and bestowed extensive privileges upon the monks. The abbots were sovereign-lords throughout the Isle of Avalon; they sat in Parliament as barons; the revenues were computed at 3,508*l.* 13*s.* 4*d.* at the Dissolution. Whytng, the last abbot, was hanged on the neighbouring Torr-hill for contumacy in 1539; he had one hundred monks and four times as many servants; the XIVth century abbots’ (private) kitchen testifies to the high state in which the abbots lived. Within the church were buried Kings Edmund and Edmund Ironside; King Arthur, whose remains were found, *temp.* Henry II., in the Isle of Avalon, and his Queen Guinevere. The existing ruins are those of the St. Mary’s Lady Chapel or *Vetusta Ecclesia*, representing the original church, and of the *Major Ecclesia*, eastward, with the later Galilee vestibule that joins the two. The erection of the greater church with its buildings upon the Benedictine plan and of St. Mary’s Chapel was begun without delay after the fire on May 25, 1184.

The Institute
of
Oil Painters.

THE twenty-fourth exhibition of this Institute, now on view at the Gallery of the Institute of Water-Colours, contains a number of fairly interesting works, with a sprinkling of those which stand out from the rest as paintings with a special individuality in method or conception. Among these must be included Mr. F. Cayley-Robinson’s “Waning Day” (19), an interior with figures of three very melancholy young girls very stiff in their attitudes, the whole picture being also very flat and artificial in effect—rather carrying one back in fact to the days of pre-Raphaelitism. But it is not commonplace, and is certainly interesting in colour. In the first room also Mr. Padday’s little sea-picture of a ship “In Search of a Warmer Climate” (8), and Mr. R. Little’s “The Old Tower at Viareggio” (15) are works outside of the commonplaces of pictorial effect. Mr. Gemmell-Hutchinson’s “An Idyll of the Shore” (61) is one of those provoking pictures in which a very pleasing composition is shown in a surface like worsted-work. Mr. W. H. Pike’s two pictures, “Harmony” (70) and “The Fair” (238), both crowded with small figures, show a certain novelty and spirit in the treatment of subjects of this class. In the same room is a really fine landscape by Mr. Aumonier, “On the Hillside” (62); a forcible study of an effect of “Storm” (83), by Mr. C. E. Johnson; a minute and beautifully composed little landscape, “Pastoral” (41), by Mr. A. Hartley; and a shadowy study of a nude model resting, her back to the spectator, “At the End of the Sitting” (73), which has a fine pictorial quality. In the west gallery Sir James Linton’s “Cleaning Up” (104) shows his old power in the painting of bric-à-brac. Also in this room is a vigorous landscape, “Pas de Calais” (148), by

Mr. Hughes-Stanton, whose large French landscape in the last New Gallery Exhibition has put him in a new position among contemporary landscape-painters—the middle distance trees seem a little too black and heavy; Mr. Talbot Hughes’s “A Lavender Evening, Denmark” (118), unusual both in subject and treatment; Mr. Alfred Hitchens’s “At the Brook” (128), a pretty nude of the old school; and Mr. Cayley-Robinson’s very interesting and pathetic picture “Outward Bound” (127), very much of the new school, but a work not to be passed over. Mr. Borough Johnson’s “Homewards” (167) is a kind of inverted *Mauve*—that is, the parallel sheep are coming up to the foreground instead of away from it. Mr. Montague Smyth’s “The Sea Off the East Coast” (196) and Mr. Hill’s “Deal” (197) are both good landscapes, the latter somewhat heavy in effect; Mr. Frampton’s quasi-medieval painting of St. Cecily (192) does not illustrate Tennyson’s verse, and occupies more space than its stiff archaisms are worth; his “Navigation” (354) in the large room would do well as a mural decoration: Among much that is mediocre in the large room are to be found a brilliant sketch by Mr. Sargent of the personages in “A Venetian Tavern” (265); a beautiful idyll by Mr. Wetherbee, “Cloudland” (262); Mr. Bartlett’s very fine stormy coast-scene, “Storm-bound in the Rosses, North-West Donegal” (289), with a boat full of characteristic figures in the foreground; Mr. Leslie Thomson’s “Blakeney Marshes—Sunset” (311); Mr. Harry Fidler’s very clever study entitled “Bread” (350); a very fine landscape by Mr. Aumonier, “The Hayfield” (360); another fine one by Mr. Frank Walton (the President), “In the Heart of the Surrey Hills” (370); and Mr. Charles Sims’s charming and natural group “The Kiss” (377), exchanged between mother and child, the same little boy who has figured in several of his pictures already.

WE are glad to hear that the incomplete steel tower at Wembley Folly, which has long stood as a monument of a foolish scheme that came to the grief it merited, is now to be “scrapped.” It is to be hoped that before long the Eiffel Tower at Paris will meet the same fate, and the earth will then be rid of two monstrosities, at all events.

AN architect or architectural draughtsman who writes “M.S.A.” after his name has been for some time past touting the profession by a lithographed letter to induce them to employ him to do their competition designs for them. The following is a reprint of the lithograph letter, which is headed in MS. by the name of whatever competition is referred to:—

“DEAR SIR,—Should you intend to compete for the above, I should be pleased to render you any assistance thereon.

Having been seven years in the Board of Education, I have had an exceptional opportunity of becoming acquainted with every detail of the requirements of this class of building, and have designed a large number.

In recent competitions my designs have been placed as follows:—

Then follows a list of his “designs” which have been placed 1st, 2nd, or 3rd; i.e., we presume designs made by him in

* See the *Builder* of August 4, 1894; No. 3 of our series, “The Abbots of Great Britain,” with plans and drawings by Mr. Roland W. Paul.

the name of the ostensible competitor; and the document proceeds:—

"Making a special study of competition work, I am enabled to accept very moderate fees, depending almost entirely upon success therein."

During the last few months we have received about a dozen copies of this precious circular, sent to us by different architects, with strong expressions in regard to it. This kind of thing must be stopped. It is becoming more and more recognised that competing by proxy is a discreditable business, and in many Conditions of Competition a clause is now inserted by which the competitor undertakes that the work is his own and that he is assisted only by his usual office staff. And in any case, to send such a circular to an architect of standing and repute is a gross impertinence, and if the author of these circulars does not know that he had better learn it, before going any further.

NOTES ON MOSAIC AND MARBLE INLAY.—V.

In the semi-subterranean chapel of S. Silvestro, below S. Martino ai Monti, Rome, is a simple mosaic of black-and-white stones, which may be coeval with the building, thought to have been part of the sub-structures of the baths of Trajan. At S. Alessandro, Rome, strips of marble enclose squares of rough mosaic of grey marble, with a kind of quatrifoglio of tesserae of porphyry and serpentine. A pavement of the same character was found in S. Lorenzo fuori, when the original level of the north aisle of the choir was reached by excavation in 1858-9. At S. Angelo in Formis, near Capua, the greater part of the floor is of mosaic of white shapeless tesserae, set close together, in which is a portion of a Roman inscription in black tesserae, with slabs of marble, some of them inlaid in the Cosmati manner, and "opus Alexandrinum." Here a disc of porphyry has had white tesserae let into it in the same manner as they appear in "opus Signinum; and at Caserta Vecchia is pavement before the altar in which "opus Alexandrinum" is mixed with slabs engraved with the Evangelists' symbols and other beasts in the manner of "opus Sculptratum."

The process by which the "pavimentum Sculptratum" of the Romans was made was greatly developed in Medieval and Renaissance times, and excellent examples may be seen in Florence, Siena, and Venice. In Florence the pavements of the Baptistery and of S. Miniato have wonderful designs upon them, sunk and filled in with a black mastic, which date from the beginning of the XIIIth century (that at S. Miniato is dated 1207), and include a fine circular design of the signs of the zodiac. The inscription in the Baptistery has been so much worn by the feet of generations of Florentine citizens as to be illegible, and most of the incised lines have also perished, leaving only the white and black silhouettes. At S. Marco, S. Maria Novella, and S. Croce, Florence, are many fine gravestones decorated in this manner, one of which (in S. Maria Novella) is as modern as 1821. Teirich quotes from Rumohr an account of the making of the monument of Messer Carlo d'Agnoliello, Bishop of Siena, who died in 1444, which is interesting as giving details of the cost and of the time required for such work of that period. It lies near the altar of the chapel of S. Crescenza in the cathedral.

"To Master Giugliano of Como, for 45 days' work chiselling at the tabernacle and the figure 45 lire. To Master Antonio Federigho, for 25 days' afterwards with a fine chisel, 20 lire. To Lorenzo d'Andrea, for 13 days' work at the frieze, taking out the ground of the leaves, etc., 5 lire 17 soldi. To Francesco di Stefano, for 30 days' work on the frieze and pitching in the same, 5 lire 4 soldi. To Master Giovanni Salattelli, for 9 days' work on the frieze, 7 lire 4 soldi. To Pietro da Como, for 3 days' help in filling and scraping the frieze, 1 lire 8 soldi. To Master Pietro di Minella, overseer, for the work of a month and a half, 38 lire 8 soldi."

The receipt for the black filling is:—
For 60lb. of pitch at 2 soldi the pound.
" 20lb. of wax " 9 soldi the pound.
" 10lb. of bolus " 1 soldo 9 denari the pound.

The whole of the materials cost 17 lire 11 soldi.

A modern receipt given in the *Builder* of July 19, 1902, is as follows:—

"Yellow wax, resin, and Burgundy pitch mixed with lamp-black, and made into a thick paste with a little sulphur and finely-sifted plaster. Wax and resin equal, lamp-black and pitch added till quite black. Another is—6 pt. sulphate of iron and 1 of rough saltpetre. Expose for twenty-four hours, reduce to powder, wash several times, and roll into sticks for use, mix a little with lamp-black."

These are only suitable for indoor use.

The most celebrated example of this kind of pavement is that of Siena Cathedral, commenced in 1369, when a payment was made to Maestro Antonio di Brunaccio. The subjects are executed in two ways. The oldest panels show a drawing of the contours and interior lines of the figures on the marble with the chisel, the hollows being filled with a black and hard composition like niello. In the second manner, black, grey, and white marbles are used, giving a kind of chiaroscuro to the subjects. Some description of this celebrated pavement may be interesting. It is about 280 ft. long by 162 ft. broad in its broadest part, the transepts. Outside the principal door are represented the principal religious functions, from a cartoon by the painter Giusparre, and before the side-doors, on one side the Pharisee and on the other the Publican, with borders and ornaments made in 1447 by Bastiano, son of Corso of Florence, who worked in Siena from 1420, and died there in 1455. The borders of many of the subjects are no doubt his, and probably also the execution of those which were done during that period. The subjects of the Pharisee and the Publican were done in 1513 from designs by Giacomo Cozzarelli.

The nave is divided into five bays. In the first Hermes Trismegistus the Egyptian gives to two personages, Gentile and Christian personified, a book with the laws and literature of Egypt. The design is attributed to Giovanni, son of Stefano (1488). The second bay is *opus tessellatum* (1373). In the centre are the arms of Siena, the she-wolf suckling the twins Romulus and Remus, and around are the arms of allied towns to the number of twelve. The third bay, a work of the same date, represents a wheel with twenty-four spokes, at the centre of which is an eagle with outspread wings, crowned with an imperial crown. The fourth bay has a grand composition; Virtue is seated on the top of a hill robed and crowned like a queen; Socrates and Krates are at her sides. The crowd which tries to mount in response to her invitation is hindered by the difficulty of the ground, by venomous beasts, and, above all, by Fortune, who seeks to seduce men by her naked beauty. She has her right foot on a globe, her left in a ship, and holds a sail in her hand, which swells in the wind. The designer is unknown, but the figures resemble Pinturicchio's work, especially that of Fortune. The fifth shows the story of Fortune under the symbol of an eight-spoked wheel; at the top a man robed like a king is seated on a throne, lower down three men seize the wheel with hands and feet; on the left, one is near the top, another on the right descends head foremost, and the third, opposite the king, is upset, and only holds on with great effort. The wheel is enclosed in a lozenge, and half-length figures of Epictetus, Aristotle, Seneca, and Euripides, holding inscriptions, are in medallions attached to the sides of the lozenge. This is in rather a bad state. It was designed by Pinturicchio in 1504.

The aisles have a sibyl in each bay. They were made in 1482 and 1483, and one of them, the Persian, is perhaps the most entirely satisfactory figure in the pavement (see plate in last week's issue). The transepts have subjects from the Old and New Testaments. Under the cupola are: The Parable of the Beam and the Mote, designed in 1459 by Antonio di Federigho; the Story of Elijah and King Ahab, in several pictures, designed by Domenico Beccafumi; and Moses Receiving the Law, the Golden Calf, etc., from the same hand, designed in 1531. He also did Moses Striking the Rock, between the columns that support the upper great arch. In the transepts are: The Battle of Jehthah against the Ammonites and the Sacrifice of his Daughter, designed by Benvenuto di Giovanni del Guasta in 1485; the Battles of

Saul, Death of Absalom, Deliverance of Bethulia (1473), Massacre of the Idolatrous Priests and of the Innocents (1482), attributed to Matteo di Giovanni. The Ages of Man, by Antonio di Federigho (1475), is the only non-Scriptural subject in this part. It is at the entrance of the south crossing.

Beyond the cupola in the centre of the choir is a medallion with King David seated on his throne between four musicians and holding a psalter in his hand (see plate in last week's issue); in two compartments adjoining he slings a stone at Goliath, and Goliath falls. These were designed by Domenico di Nicolo, architect to the cathedral in 1423. The borders are by Bastiano and Agostino di Nicolo. The sanctuary floor has many subjects—in front of the altar, Abraham Prepares to Sacrifice Isaac; round this composition are other small subjects—Melchizedek, Adam and Eve, Abel's Sacrifice, and several detached figures. These are the work of Beccafumi (1544-6). In the south choir aisle is a figure of the Emperor Sigismund surrounded by his ministers, due to Domenico di Bartoli (1534). Then Samson Fighting the Philistines, by Domenico di Nicolo, between Moses with the Tables of the Law and Judas Maccabeus. On the other side are Joshua's Fight against the Ammonites and the Hanging of the five Canaanish Kings, also by him, between the figures of Joshua Staying the Sun and Solomon. Finally, round the sanctuary are personifications of Temperance, Prudence, Justice, and Power (this is the first figure subject noted in the accounts, "1406, Mar. 13, Marchese d'Adamo e compagni maestri di pietra da Como" 140 lire were then paid them for the "wheel opposite the sacristy"), and behind the high altar, Pity. They have been repaired. According to Lanzi, it was Matteo di Giovanni to whom the idea of using grey marbles for rendering *chiaroscuro* first occurred. Vasari, with his usual inaccuracy, ascribes Domenico di Nicolo's work to Duccio, whose date he gives as 1350-56. But documents prove his life to have been lived between 1282 and 1339, while, as has been stated, the first notice of the storiated pavement occurs in 1369. Beccafumi used white, black, grey, and also red marble, with niello outlines and shading lines. The bottom of these lines has a series of hollows to afford a key, which look like drill-holes. The pavement was finished in 1531 in the episcopate of one of the Tolomei.

In Santa Croce, Florence, are many gravestones executed in niello; they always have a crest in the centre and a border round. None are earlier than 1400. The finest is dated 1493, and is decorated with two shields with a garland round them, framed in delicate black pilasters. Round the pulpit is a very delicately-worked design by Benedetto da Majano, executed in 1482, in black, white, and red. Similar work may be seen at the Cathedral of Spoleto, at the Certosa of Pavia, and in several of the Venetian and Padovan churches. The well and the lavabo in the sacristy of the Certosa, which are such wonderful pieces of carving and so delicate in design, are both decorated with bands of elaborate ornament in niello, and the process was often used for delicate arabesque ornament applied to such things as wall fountains and chimney-pieces. That of the Sala dei Giganti in the Ducal Palace at Venice may be taken as an example of the latter, and there is a fountain in the north court of the Victoria and Albert Museum, also of Venetian origin, which shows how it was applied to the enrichment of the former.

Some of the patterns of the floor at S. Miniato, Florence, are repeated on a larger scale on the facade, where, I believe, they are not niello but a real inlay of black (or dark green) on white. The line to be drawn between *opus Scitile* and niello is a thin one, and it is really more a matter of the scale of the work than any difference in its appearance when completed.

Opus scitile was very largely used in the decoration of walls in Roman times, but it was apparently more generally executed in glass than marble, which is proved by the fact that detached pieces, carefully shaped, have been found by thousands in the ruins of villas near Rome. A Greek example of the use of glass cut to shape for inlay is in the temple of Minerva Polias at Athens, where pieces of blue glass are inlaid in the

plaited torus between the volutes of the capitals of the portico. Pliny (book 36, ch. 15) mentions a temple at Cyzicus, the walls of which were faced with polished stone, with threads of gold between the joints—this was probably a pattern of coloured marble outlined with gold; a similar treatment, cement or mortar being substituted for the gold, was used in the IVth and Vth centuries A.D., as in the nave of S. Sabina at Rome, and the baptistry at Ravenna. The earliest notice of incrustations of glass is that of Pliny, concerning the theatre built by Scarcus, stepson to Sylla. It had three stories, the lowest of which was of marble, the second of glass, the third of gilded wood, and the way in which it is spoken of makes it evident that it is the decoration which is referred to, not the construction. Suetonius (book 1, ch. 46) gives the astonishing information that Cæsar was accustomed to carry both tessellated and scutella pavements with him on his campaigns.

In the palace of the Cæsars "scutella" of marbles, granites, and porphyries was laid down under Nero, and in several towers of the part of the wall of Rome near the Porta S. Giovanni are some similar remains, probably of Aurelian's time. In the museum at Naples are some pieces of glass which have formed part of a pattern on a wall, which have been ground to shape, not chipped, and in the British Museum are a good many pieces which were found at a villa of Lucius Verrus, four miles from Rome on the Via Cassia. These pieces formed part of a quite small pattern, for there are forty-five pieces to the space of 5 in. square. The colours are an opaque brick red, red with circles, and dots of opaque yellow or white, which appear on both sides of the glass, and rosettes of yellow on a red ground, and transparent green with a yellow edge, carefully ground so as to correspond in shape and size. Other colours were found in fragments, and the upper portion of a female face, and part of a fish, made by hot glass arranged in the proper manner, thus making a slab. Thousands of pieces of glass which have formed part of wall decorations are found annually near Rome of all kinds of shapes and tints, the most common colours are red, white, and green, and the shapes octagons, triangles, squares, and portions of circles. In this form of "scutella" it was usual to mingle vitreous pastes and natural stones, as in the "opus vermiculatum."

Herr Von Minutoli says in a book on glass among the ancients, published in 1836, that he was informed by Signor Luigi Vescovali that the walls of a chamber in a palace between the Porta S. Sebastiano, and that of S. Paul at Rome, were found to be covered up to a man's height from the ground with choice marbles, and above that height with coloured glass plates and arabesques. Vescovali, who showed him some figures in "giallo antico," engraved and executed in a very good style; these were originally let into the wall between the plates of glass, and many of the accessories, such as shields, swords, tunics, or chlamydes were made of coloured glass. A fragment of "opus scutella" is in S. Ambrogio, Milan—a lamb on a dark ground, and lightly modelled with a border of squares with rosettes and paterae; but the most elaborate examples which have come down to us originally decorated the walls of a great hall or basilica, erected by Junius Bassus, Consul A.D. 317, which were covered with subjects in "opus scutella." They formed the subject of an article, by Mr. Nesbit, in *Archæologia* for 1870, which was illustrated. Herr Von Minutoli illustrates one panel, the Hylas, and Signor Venturi illustrates the tiger panels, which are now in the Capitoline Museum. The basilica was dedicated to S. Andrew towards the end of the Vth century, having been bequeathed to the church by Flavius Valilla, a Goth, who became "maiestri urbis militie." In the VIIth and IXth centuries it was known as Catabarbara Patricia, it is thought because of the barbarian patrician donor. In the XVth century it was in decay, about which time San Gallo made a drawing of it, now preserved in the Barberini Library in a volume dated 1465. It was disused as a place of worship, and the monastery was incorporated with the adjacent convent of S. Antonio Abate, to which a hospital was attached. Grimaldi (1622) says that the

French monks of S. Antonio destroyed the mosaic pictures to use the cement as a remedy for fever! It was dismantled in 1686. In the semi-dome of the apse was a mosaic of Our Lord and Six Apostles, standing. Two compartments of the subjects in "opus scutella" were taken at some time to the palace of Cardinal Massimi, at the Quattro Fontane, now the property of the Prince del Drago, representing Hylas and the Nymphs, and a Consular procession. The ground of both these pictures was originally green porphyry, though in the Consular procession it is now "Verde di Prato," the rocks in the Hylas are "alabastrino fiorito," the figures of Hylas and the Nymphs "giallo antico," the hair some kind of alabastrine, the jug held by Hylas and the armlets and bracelets of two of the nymphs mother-of-pearl. The water, the blue portions of the nymphs' draperies, and the cloak of Hylas, which is orange and red, are of glass. The flying drapery of a nymph on the right of Hylas is pale "palombino," and a band of Egyptian embroidery on some hanging below is wholly of glass, the figures careless copies of Egyptian originals, sometimes of one colour, sometimes, especially in the draperies, "millefiori," perhaps parts of broken vessels. The other picture shows a consul or other high official clad in a *toga picta*, or "triumphalis," in his chariot going to preside at the circus games. The white horses are of "palombino," the chestnut of "giallo antico," the leg gear of the men on horseback "palombino"; the garments of all are of glass, as are also the horse trappings, except the discs in the breasts and head-bands of the horses attached to the biga, which are of mother-of-pearl. Two other subjects, showing tigers attacking cattle, are in the Museo Capitolino. The background and stripes of the tigers are green porphyry, the rest of the tiger "giallo antico"; the bullocks are a pale fawn-coloured marble, the eyes mother-of-pearl. The ground on which they stand is some sort of alabastrine. All the glass used is opaque except the deep blue, and the work is rough and irregular, the pieces not fitting accurately.

"Opus scutella" was used very early for the decoration of Christian edifices. Thus, at S. Sabina, Rome, built by Celestine I., in 422, the spandrels between the nave arches are decorated with ornamental inlays of serpentine and porphyry, and at S. Demetrius, Thessalonica, above the nave arches is an inlaid frieze which simulates a cornice supported on consoles, below this square plaques of varied design are inserted in the spandrels. At Parenzo, Istria, the apse is decorated with "opus scutella" in the lower part, made of porphyry, serpentine, "rosso antico," lapis lazuli, opaque glass, white onyx resembling that found in Algiers, red marble, and mother-of-pearl, used both in mosaic and in large discs made of whole shells. There are eight different patterns in the panelling, facing each other in pairs, and the designs resemble those at S. Sophia, Constantinople and the Baptistery, Ravenna. The central panel over the bishop's seat has a gold cross on a trellised ground of serpentine and mother-of-pearl, mounted on a hill between two lighted candlesticks. The cypher of Euphrasius, the founder, occurs twice, and proves that it is part of the original decoration.

GRAMMAR SCHOOL, MANSFIELD.—The new buildings which have been erected at the Queen Elizabeth's Grammar School for Boys at Mansfield for science and art instruction were opened recently by Mr. H. Bompas Smith, M.A., headmaster of Lytham College. The new buildings have been erected in the north-west angle of the playground. On one side is the physics laboratory, fitted with working benches, sinks, balance shelves, cupboards, and blackboard. On the other side is a classroom for lectures, fitted with demonstration-table, blackboard, and long desks on a stepped gallery. The art-room measures 30 ft. long by 20 ft. wide, and is lighted from the roof on the north side with windows below, and is fitted with dresser, cupboards, sink, blackboard, etc. The rooms are warmed with low-pressure hot-water radiators, and are well ventilated. The building is faced with stone and roofed with red hand-made tiles. The chemistry laboratory attached to the main building has been fitted with additional working benches, and the old fittings have been improved. Mr. J. Bilson, of Hull, was the architect.

* To be continued.

MAGAZINES AND REVIEWS.

IN the *Burlington Magazine* the editorial article on "English Provincial Museums" contains some wise suggestions, especially in regard to the mistake of attempting too large an art-museum and consequently, in the endeavour to fill the space, getting a collection which represents quantity rather than quality. That sort of museum may be a holiday amusement, but it must do more harm than good in an educational sense, by leading people to regard as good and typical work that which is only second-rate and commonplace. An art-museum must show people the best in art or it is not worth having at all, and indeed does more harm than good. Where a sufficient number of works of the best class cannot be permanently secured, the best policy is to have a permanent nucleus of good work and endeavour to get up loan collections. There is a long article by Miss Ellen Duncan on "The National Gallery of Ireland," an institution of which many of us on this side of the water do not know enough. But the central interest of this number is certainly in the reproductions from "A Fourteenth Century Sketch-book" recently acquired by Mr. Pierpont Morgan in Paris. The "book" consists of six panels of boxwood, the two outer ones a quarter of an inch thick. The inner ones, very thin, have been treated with a wash of gouache to take the silver print. The panels are held together by thin strips of parchment glued along the inner edges. The whole of the sketches are reproduced in the magazine the same size as the originals. The book is only about 5 in. by 2½ in., so that the array of sketches got into it is not very large. The heads and some sketches of figures show a great deal of freedom of style. An interesting item is the sketch of two knights tilting, which shows the upright position of the rider and the means employed to maintain it. There is a sketch also of a piece of leafage ornament. This reproduction of a set of genuine and hitherto unknown XIVth century sketches is certainly an unusual *trouvaille* to find in a modern art magazine. As to who their author is we do not think the speculations on that point are worth much. The attempt is made to attribute it to this or that artist whose name is more or less known; but it is only speculation. The sketches may be by someone whom we never heard of at all. The *Shilling Burlington*, the first number of which is issued this month, is a kind of abridgement of the half-crown issue, giving some of the illustrations and articles of the larger edition, and summaries of the contents of others. Thus, the account of the XIVth-century sketch book secured by Mr. Pierpont Morgan is summed up in a short paragraph giving only the main facts, and the specially valuable reproductions of the sketches are not given. But the majority of the illustrations in the larger edition are given, just as well executed, and the publication is in this respect an ample shilling's worth.

In the *Art Journal* Mr. Alfred Maskell takes up afresh the subject of "Forgeries and Imitations of Works of Art," about which we have heard a good deal already from Mr. Spielmann in another periodical. Mr. Maskell gives two or three illustrations of special examples, of one of which, an ivory shield professing to be Italian Renaissance work, a curious history is given. It is admitted, however, that the workmanship on this is exceedingly good, and Mr. Maskell rather criticises the attitude of those who, when a work of art is discovered to have been a forgery, immediately regard it as artistically worthless on that account; whereas it may be, and sometimes is, as good work as that of the period to which it professed to belong. Two of the principal plates are after pictures by Copley Fielding, a painter who has been rather too much neglected; he was a mannerist, certainly, but the seapiece given as a frontispiece has less of his manner than usual, and is a fine work.

The *Architektonische Rundschau* contains two or three striking designs. One of these is an odd but very picturesque country house by Herr Reuters, of Wilmsdorf (Berlin), in no describable style, but original enough. A long school building in the Hensteigstrasse at Stuttgart, shown in a neatly drawn outline elevation, is picturesque, though burdened with rather too

great an expanse of lofty roof (two stories of dormers show in it); Professor Fischer, of Stuttgart, is the architect. In contrast with these is the quasi-classic Heinemann Gallery at Munich, apparently an art-dealer's establishment. A portentously tall order of pilasters with capitals of novel design, holds up a boldly projecting cornice running right across the front. Oddly enough, the orthodox slice of architrave with three faces is introduced over the capitals, breaking round, while the frieze is omitted and the cornice is continuous. The windows are grouped between the pilasters, and some alto-relief sculpture figures are introduced in panels over two of the windows. In spite of some eccentricity, it is an effective piece of masonic design.

In the *Berliner Architekturwelt* also we find a fine solid piece of classic masonry design in the centre portion of the façade in the "Dienstgebäude des Preussischen Ministeriums der Geistlichen Angelegenheiten" in Wilhelmstrasse (what is the precise purpose of the building with this enormous title we fail to make out, and therefore give it as it stands). The centre-piece of the elevation consists of a very boldly rusticated and colonnaded projection with cornice, above which is a balustraded balcony and a second centre-piece and cornice with light Ionic columns and balusters; four statues stand on the piers of the balustrade. The architect, Herr Kieschke, understands scale and refinement in classic detail. The number is a very good one; among other things to be noticed are the Melanchton Kirche, with its twin leaded spires connected by a little gabled gallery at the base; a "Villa" by Herr Friedrich Blume, apparently roughcast walls with a very strongly accentuated stone rustication at the angles and some very nice little points of design in the details; an effective piece of brick architecture in a portion of an electricity station, by Herr Schwetjen; and the interesting and original entrance door to a house in Köpenickerstrasse, by MM. Berndt & Lange.

The *Antiquary* reviews briefly Sir Norman Lockyer's book on stone monuments astronomically considered, in a tone which is respectful but sceptical. We have always felt very doubtful about this astronomical settling of the age of Stonehenge, and the critic in the *Antiquary* considers that Sir Norman Lockyer's theory supposes a higher state of culture than can be believed to have existed in Britain at 1700 B.C., the date which he considers to be fixed "within twenty years." The *Antiquary* suggests, and we agree, that "the pick and spade are surer archaeological tools than the theodolite." Among "Notes of the Month" it is mentioned that recent excavations in the main street of Horsham have brought to light some specimens of pottery said to be of XIIIth century date; four large jars, with handles, and two large urns, each having a dark green glaze. It is not stated what has been done with them. We presume there is no local museum at Horsham.

The *Independent Review* contains an article on "The Genius of William Morris," by Mr. J. W. Mackail, the author of the admirable biography of Morris, which was reviewed in these pages on its publication. The article was originally an address delivered to the Art-Workers' Guild. Not unnaturally, with the bias of a biographer and a friend, he a little exaggerates Morris's genius. All that is said as to the new vitality which Morris imparted to industrial and applied art is perfectly true. But that Morris's genius was "the genius of architecture" is a dictum we can hardly accept. Morris had really no true feeling for architecture; he took too narrow a view of it. He was rather like the Churchman who said: "When I say the Christian religion I mean the Church of England"; and when Morris said "architecture" he meant "Gothic architecture"—that and nothing else. What is said about his carrying the sense of design into his poetry is true enough, but the fact is that he overdid it, and killed the life out of his poetry—the long poems at least, such as "The Earthly Paradise," by too artificial a finish; it is beautiful decorative poetry, but it does not get beyond that. Morris's really fine poems are some of the short ones, in which the feeling is stronger and the sense of design less prominent. Morris was a remarkable man, and exercised a remark-

able influence within certain limits; but one can hardly give the title of a great genius to a man whose sympathies in regard to art and life were confined within such narrow limitations.

In the *Portsmouth Review* Professor Knight writes an article on "Edward Burne-Jones" which appears to have been in reality a review of Burne-Jones's biography when it first appeared, held over till it is a good deal out of date. It is, however, not so much a review as an appreciation, carried somewhat too far. It is to be regretted that we seldom see in a magazine article of this kind, in England, an impartial attempt at a critical judgment, which (if they only knew it) would be of much more value to the public. Generally speaking, some friend of the deceased artist is persuaded to write an article on him, and the result, naturally, is something more euphemistic than well balanced, in which the defects of the subject of the article are defended or explained away. This is amiable, but it is not criticism.

In the *Nineteenth Century* is an article by Mr. Macnaghten, a former assistant-master at Harrow, on "Geography in our Public Schools," which touches on a subject of practical importance for men of all professions, architects not least. A knowledge, ready and within call, of the geographical relation and positions of foreign cities and countries, is what every educated man ought to have, and what many have not; and Mr. Macnaghten thinks this may be traced to the want of an intelligent teaching of geography in our schools. He mentions the map teaching as practised for the lower forms at Eton in the seventies and eighties, the period apparently of his own experience (the upper forms were supposed to have passed beyond the region of geography). The production of a map of a country was ordered, as a task to be completed in so many days. There was a great rivalry in neatness and finish of draughtsmanship and writing, and some of the productions were beautiful in this sense, but what they learned was calligraphy and not geography, the facts being forgotten very soon afterwards. The effective system would have been, of course, to announce that on a certain day a map of a given country would have to be drawn in school from memory, and must be got up in the meantime. Mr. Macnaghten, however, suggests that geographical lessons might be made far more interesting, and more likely to retain their hold on the memory, by lectures on the geography of a country accompanied by lantern views of towns or scenery, numbers of which are attainable in the present day; a lantern map of the country remaining on the screen as a fixture during the lesson. It is an excellent idea, and would render geography in schools what it might be—one of the most interesting of studies. It is entirely in the spirit of the teaching of Dr. Arnold, who always endeavoured to convey to his scholars some idea of the scenic character of places mentioned in history. He said that he himself could not remember the positions of towns until he had formed a mental picture of their appearance.

In *Harper* Dr. Thwing, President of the Western Reserve University (U.S.A.), writes an appreciative article on "The University of London," of course more in relation to its studies than its architecture, of which, however, several illustrations are given. It is noteworthy that he considers the laboratories as by no means up to date or equal to similar establishments in America. We come on England again in an article by Mr. Shackleton on "The Strangest Corner of England." What particular part of the realm does an American visitor class under that description? There would be many guesses; we will leave the reader to find out from the magazine. There are some curious and interesting illustrations of a place which comparatively few Englishmen are acquainted with. A valuable article in which much information is compressed into a small space is that by Professor Kennedy Duncan, Professor of Chemistry in the University of Kansas, on "High Temperatures and Modern Industry." It is a sketch of the progress in the attainment of higher and higher temperatures in industrial laboratories, and some practical uses to which they have been put, notably in the manufacture of rubies and diamonds which are identical with those found in the products of nature. The

ruby thus made cannot be called an "artificial" ruby in the usual sense of the word; it is produced by mechanical and chemical processes, but the resulting stone is identical with the natural stone. So it is in the case of the diamonds, but the diamonds which have so far been produced by the same means are of infinitesimal size. The production of genuine diamonds of a larger size is regarded as possible, but only with an almost disproportionate expenditure of material and force. The mere question of the attainment of great temperatures is of interest in itself, however, apart from their industrial uses. We quote the concluding paragraph of the Professor's paper:—

"According to a paper recently communicated to the Royal Society, Sir Andrew Noble has reached the highest point of temperature in terrestrial thermometry. He has accomplished this by exploding cordite in closed vessels with a resulting pressure of fifty tons to the square inch and a temperature of no less than 5200 deg. C. Sir William Crookes saw that one incidental result of this experiment should have been the formation of diamond—that is, if his calculations were correct. On working over the residue of the explosion chamber, he has recently extracted from them small crystals that seem to be veritable diamonds. We see, then, that if men cannot control the conditions that make large diamonds, they, at least, understand them. It is, in all likelihood, a matter of a comparatively short time when the diamond will have been conquered as absolutely as the ruby."

With this final temperature of 5200 deg. C. we have reached the limit of man's present attainment. On looking back, we see that every step in temperature he has so far taken has led him just as far along the path to universal conquest—the absolute conquest which he is destined ultimately to make. But of temperature alone he is still has far to go. We have had evidence from many sources that even in the sun, which is by no means the hottest of the heavenly bodies, and which yet possesses temperatures that transcend anything we know on earth, the very elements of matter lie there disintegrated into simpler forms. Such temperatures are the distant Alpine heights ever and ever so far higher than the slight ascent to which we have so tediously arrived."

It is an excellent feature in the American illustrated magazines that when they wish to have an article on a scientific subject of this kind they go to an eminent and responsible man of science for it, so that however the subject may be compressed and simplified for the general reader, the article is important and authoritative. We wish it were the same in England. When there is an article on a scientific subject in an English illustrated magazine, it is generally of the most superficial character—"popular" in the worst sense of the word.

The *Courier* contains one of Mr. Timothy Cole's masterly examples of wood-engraving. After a highly characteristic work by Goya, "The Balcony," two Spanish ladies in bright dresses in front, watched by two cloaked figures in the rear; the contrast between the massing of light and dark, the sparkle of the women's dresses and the sombre cloaked figures behind, gives an opportunity for effect peculiarly suitable to wood-engraving, and of which the talented engraver has made full use; it is one of the best works he has ever produced.

Among the contents of the *Hame Counties Magazine* is an interesting article on the history of the old house in Hertfordshire known as "Moor Park," and its various owners and transformations. It appears that the stone-faced building which now exists is a facing with stone of an older brick house, this alteration having been carried out by one Mr. Styles, who was one of the few people who made a fortune out of the "South-Sea Bubble" scheme, having been prudent enough to sell his interest in it at an early date, before the bubble had burst. His successor, after a considerable interval "in Chancery," was Lord Anson, the navigator, who also made the place famous for its fruit production, especially for "the Moor Park apricot," to which there is a reference in Jane Austen's "Mansfield Park." The ancient house of Moor, or More Park, in the same domain but not on the same site as the present house, was for some time the residence of Wolsey.

WESLEYAN MISSION-HALL, EAST HAM.—On the 4th inst. the new Central-hall, erected by the East Ham Wesleyan Mission, was opened. The building is erected with Accrington pressed bricks, but stone dressings, green slates, and plaster decorations on main fronts. The height from pavement to top of dome is 100 ft. Mr. Charles Brightman, of Watford, is the contractor, and Messrs. Gordon & Guntton, architects, have designed the buildings, the total cost of which has been about 26,000.

THE INSTITUTE OF BUILDERS:
ANNUAL DINNER.

The annual dinner of the Institute of Builders, Incorporated, was held on Wednesday in the Whitehall Rooms, Hôtel Métropole, Charing Cross, W.C., Mr. Frederick L. Dove, President, occupying the chair. There were also present:—The Venerable Archdeacon Sinclair, D.D.; Sir H. Truman Wood, Secretary Society of Arts; Col. G. Haward Trollope, V.D.; Mr. R. S. Balfour, President of the Architectural Association; Mr. T. Colcutt, President of the Royal Institute of British Architects; Mr. Geo. Langridge, President of the Surveyors' Institution; Mr. J. W. Lorden, President London Master Builders' Association; Mr. G. Macfarlane, President, National Federation of Master Builders; Mr. A. R. Smith, Master of Tylers' and Bricklayers' Company; and Messrs. J. C. Amphlett, J. E. Arpin, J. Bell, J.P., H. H. Bartlett, R. E. Bennison, R. Briggs, H. Burton, J. J. Ball, S. Bolton, E. J. Brown, H. W. Burrows, J. Howard Colls, J. Carmichael, J.P., T. J. Carless, C. Chart, G. L. Crickmay, F. J. Dove, H. S. Dove, L. L. Dove, C. Elliott, M. Evans, E. O. Estcourt, Basil P. Ellis, J.P., A. R. G. Fenning, J. S. Gibson, T. Gregory, H. S. Greenwood, B. I. Greenwood, E. A. Gruning, E. B. Hoare, F. Higgs, H. H. Holliday, W. M. Higgs, A. Harrison, R. A. Hill, E. J. Hill, W. M. Hill, J. S. Holliday, E. Haslehurst, Houlton Horton, C. J. Hinsley, E. B. L'Anson, A. Blomfield Jackson, G. W. King, A. H. Kinder, W. Liddle, W. Latter, P. J. Long, W. Locke, Walter Lawrence, Arnold Mitchell, F. G. Minter, L. J. Maton, E. Nash, R. W. Neill, A. Neill, Rowland Plunbe, W. A. Pite, A. E. Parker, J. F. Parker, H. Pratt, J. Randall, R. St. A. Roumieu, L. C. Randall, F. P. Rider, E. S. Rider, F. G. Rice, P. Rhodes, A. Stansfeld, A. Stoner, A. W. Turnbull, H. D. Thompson, J. M. Theobald, C. Wall, W. F. Wallis, Howell J. Williams, L.C.C., M. Wheeler, B. C. Wotton, T. Costigan (Secretary), and others.

The toasts of "The King" and "Queen Alexandra, the Prince and Princess of Wales, and the other members of the Royal Family" having been honoured,

Mr. J. S. Gibson proposed "The Institute of Builders," coupled with the name of the President, Mr. Dove. He said that he thought the Institute of Architects would have to consider the question of including in its educational curriculum the necessity of instructing rising architects in the art of after-dinner speaking. The younger architects might very well be taught to speak, say, in various styles dependent upon the dinner, the company, and the subject. It was quite possible that we might evolve a new order of after-dinner oratory. At any rate, one could instruct the younger men to speak—say, in the Early English or the Decorated Gothic, or, at all events, in the Perpendicular style. Personally, he would sooner try to analyse that mysterious document, a bill of variations, which was submitted by a builder at the end of a contract, than stand up and speak, and he thought the builder would receive his observations on that mystic bill of variations with probably more pleasure than he would listen to his speech; though the silence of the architect was usually golden to the builder. Architects found as a rule very firm and warm friends amongst the builders, and individually they came across men whom they respected and delighted to know; and they were delighted to have the co-operation of builders in carrying out their ideas, and without whom those ideas would have no effect at all. But, apart from that, it was desirable that, as a collective body of architects, they should have sympathy and intercourse with the builders as a collective body, i.e., that the Institute of Architects should have, in matters appertaining to the carrying out of buildings, the variations of contracts, and the carrying out of contracts, the co-operation of the Institute of Builders. It was only by such means that we could help forward the real tradition of good building. At the present time we were face to face with a great many new methods of building—a great many new materials or new applications of old materials; but there was a conservatism amongst architects as a body, and the fact of a tradition weighed very largely, consciously or unconsciously, in

their work. He was surprised sometimes to find the manner in which new buildings in London were being erected a vacant space was, in a week or two, covered by a great block of steel; then the roof was put on and the walls added, and, last of all, the foundations were put in. In all these changes of methods of building it was wise that architects as a body should take advantage of the experience of builders—an experience of the use of materials and the proper methods by which their best qualities could be utilised. The Institute of Builders should be supported by architects individually and as a class, and he had great pleasure in proposing the toast. The Institute had its work to do, and he believed it would do it well.

The President, who was received with musical honours, in reply, said that the Institute was a tree of considerable growth. It was founded in the early part of last century by some of the leading builders of the time, and some descendants of whom they had amongst them that evening. The Institute grew slowly, but it grew well, and it had watched over the best interests of the trade. In those halcyon days—the middle and the latter part of the last century—the duties the Institute had to perform in the provinces and in London could be counted almost on the fingers of one's hand, and the keen competition which existed now did not exist then. Furthermore, the great development of public bodies had not taken place, and, consequently, as the number of builders and the amount of work had increased the duties of the Institute had grown, too, so that at the present time a position on the Council of that body was by no means a sinecure. Since that long-standing difficulty between the Institute of Architects and the Institute of Builders, i.e., the conditions of contract, had been so happily disposed of the Institute of Builders had been engaged in other important work. That work consisted sometimes in combating, more often in putting into shape, some of those crude proposals which some of those well-intentioned but doctrinaire members of the London County Council were fond of producing. With the co-operation of the Institute of Architects, the Surveyors' Institution, and other organisations, the Institute had been able to do yeoman service in this direction. Fortunately, as the London County Council grew older it grew wiser, and the net result was that they seemed to have discovered that it was possible for men engaged in a business which they had followed all their lives to know quite as much how to conduct the affairs appertaining to the building of London as a body of gentlemen whose principal qualification seemed to be to know how to say smooth things to the electors of London. A matter which had come prominently before the Institute during the last twelve months, and was causing the Council a great deal of anxious thought, was the subject of sub-contractors. It was a very remarkable thing that, after a builder signed a contract, there were all manner of pains and penalties if he ventured to sub-let without the authority of the architect; and yet, when he opened the bill of quantities, he found it full of instructions that certain works were to be performed by, and certain provisions made to pay, Tom, Dick, and Harry, so that there was often very little left for the builder to do but dig out the foundations. The builders of London and the provinces recognised the fact that work as to a new patent had to be done by a certain firm, and that artistic work—stained-glass, carving, etc.—should be carried out by men selected by the architect; but it was a hardship to a builder, who had been brought up to the trade and flattered himself that he knew something of building work, to find that part or the whole of the joinery, or the stonework, or ironwork, had been taken out of his hands and given to someone else. Nothing was more disheartening to a builder than to find a lot of joinery, for instance, pitched into the work when his own joinery shop was not fully occupied. The evil did not stop there, for when the work was finished, and something went wrong with this sub-contracted work some time afterwards, the question was asked: "Who was the builder?" and the contractor got the blame for work which he was not responsible for.

and which he was deprived of the privilege of doing. The evil had grown up from the bottom; it did not start with the best men of the profession, but it began at the bottom, and was started by fifth and sixth-rate architects, and it was creeping into the practice of the best men of the profession. The Council of the Institute of Architects would help the Council of the Institute of Builders if they could devise some scheme dealing with this difficulty. Perhaps something could be done by conference, and, if so, the Institute of Builders would be very glad to assist. If gentlemen at the head of the architectural profession would take a strong lead other architects would follow. He thought that perhaps the evil had grown up as a result of the personal eloquence of the modern commercial traveller and the kindness of heart of architects. If the Institute of Architects could find some means of bringing the matter before their members they would be helping the trade and the profession. Builders could do the work architects wanted done as cheaply, and perhaps cheaper, as it was done by the men sometimes employed, and they could certainly do it better than it was done at the present time. He was proud to be in the chair that evening, and in the presence of his father, who had occupied the chair before him. He thought he was the first President of the Institute who had had this experience.

Mr. J. Howard Colls, in proposing the toast of "The Architects and Surveyors," said that the two professions were so intertwined with the building industry that success to one necessarily meant success to the other, and it was a happy fact that they had with them that night the Presidents of the two great Institutes representing architects and surveyors. There was a time when this was not so—when it was supposed that one side or the other side was trying to get the better of the other. Those times were past, and there was a keen desire that they should do the right thing one to the other. He was sorry to say that the state of the building trade could not be said to be a happy one. He supposed that during his career of forty years in the trade there had never been so many unemployed in the trade as now, and he was afraid that during the coming winter we should find that there would be a great deal more distress than we had had in the past, especially in London. It was difficult to tell why this should be so. The general public saw a lot of building going on, and there was no doubt a great deal of public work in hand; but amongst the smaller work, which, after all, employed by far the larger number of men, there was a terrible falling off in the industry. In London he was afraid that the London County Council, in their laudable desire to improve the buildings of London, by their extreme measures had been doing the very reverse. There was no doubt that the main support of the operations of the trade came from the erection of small buildings, and not the large theatres and public buildings which were being erected; and a man who wanted nowadays to rebuild his premises was so hampered by regulations and rules that he was absolutely frightened to do the work, and rather than rebuild he would patch up the premises and keep them in that state. How, therefore, could they wonder that the building trade was in the state it was? What he wanted to point out was that if the London County Council were so desirous of doing away with the unemployed they should ask the architects and surveyors to confer with them in order to see how much too far they had gone in their building requirements. He did not speak with animus. The London County Council was a new body, and, in spite of their ability as men, they had not the knowledge which was necessary to carry out these matters properly. Again, look at the unlet land of the London County Council. Their leases were so strict and onerous that people were not willing to take land from them. The result was that the general public and the working man suffered, and he respectfully suggested to the London County Council that they might confer with the Institute of Architects and the Surveyors' Institution to see how far alterations might be made in order to mitigate the evils he referred to. He hoped that some effort would be made to confine the

competition for the new County Hall to the architects of England.

Mr. T. Colcutt, President of the Royal Institute of British Architects, who responded for the architects, said that the Institute of Architects existed and was formed with one object, i.e., for the welfare of the architect, and probably it had in view also the advancement of architecture; and he had no doubt that the Institute was doing better work in the way of the advancement of architecture than it had ever done before. They had before them very many questions—the questions, for instance, of the education of the architect, the registration of architects, and the question of the education of the public in architecture. He did not think they pretended to lay down any rules as to the manner in which the public should be educated in architecture, but they did feel that the great majority of the public, and especially that public who were employers, did not show that just appreciation of architecture that they ought to find in those who instigated our large buildings. The art of architecture was the oldest of the arts, but before architecture became a fine art the art of building had existed for ages before. And he thought it could be confidently said that the workmanship and the materials of our buildings were never better than they are to day. He read some time ago a letter from Carlyle to Ruskin on the decay of workmanship and British material, Carlyle having written on receiving the intimation that the life of a modern brick was not longer than thirty years. Jerry-building had existed from the earliest times; but he was thankful to say that we did not get bricks now with so short a life. We got excellent bricks and materials and all that we could desire as a result of the two Institutes working together.

Mr. George Langridge, President of the Surveyors' Institution, said he was glad that the idea that surveyors were the enemies of builders was now exploded. It was, and always had been, a mistaken notion.

The Venerable Archdeacon Sinclair then proposed "The City Guilds and Trade Organisations," and in the course of an interesting speech he said that four or five new churches were erected in London every year, and in the last half-century 240 churches had been erected in London. The success of a building belonged first of all to the architect, but only second to that was the conscientious work of the builder. There was a close connexion between the two, and he thought that the builder might often give with advantage suggestions to the architect. At Cairo he saw a new building without any foundations, and there the builder might have made a useful suggestion. A parish-room was raised in a part of his archdeaconry some four years ago, and they had just recently had to spend 120l. on the floor of the building, because the architect had not provided means of ventilation, and dry rot set in and the whole thing had to be done again. There again the builder might have made some useful suggestions. The City guilds had set an example to other institutions in carrying out the objects for which they were originally founded.

Mr. A. R. Smith, Master of the Worshipful Company of Tylers and Bricklayers, whose name was coupled with the toast, suitably responded, and said that the great difficulty the companies found was that they could not get students. He made an appeal to the builders to assist them in this matter. If they could get more students, the Court of his Company would not be backward in providing the funds with which to teach them.

Mr. Macfarlane, President of the National Federation of Master Builders, also replied, remarking that every trade of importance must nowadays have its own trade organisation, for such were the conditions of modern industry that without the combined effort of the main body of its members the individuals of an industry could not hold their own.

Mr. Paul Rhodes then proposed the last toast, i.e., "The Visitors," coupled with the name of Sir H. Truman Wood. He said that the jerry-builder was made by the jerry buyer. The object of builders in joining the Institute and the National Federation was to endeavour to get workmen to come back to the old feeling that they used to have for the firm they were connected with—

the idea that the firm they were connected with was their concern. They had the additional desire to do what they could in teaching apprentices to make them good mechanics. There was no more certain proof of the character of a people than the buildings they left behind them.

The proceedings shortly afterwards terminated.

THE LONDON COUNTY COUNCIL.

The usual weekly meeting of this Council was held on Tuesday in the County Hall, Spring-gardens, S.W., Alderman Spicer, Chairman, presiding.

Loans.—On the recommendation of the Finance Committee, it was agreed to lend Hackney Borough Council 4,500l. for sites for libraries; Hammersmith Borough Council 5,500l. for street improvement; and Lambeth Borough Council 9,000l. for baths and wash houses.

Schools.—The Education Committee recommended, and it was agreed:—

That the necessary steps prescribed by sect. 2 of the Education Act, 1902, be taken with a view to giving public notice, and informing the Board of Education, of the Council's intention (i) to provide 1,135 additional public elementary school places in Tooting (Wandsworth) by the enlargement of the Smallwood-road London County Council school by 219, and of the Broadwater-road London County Council school by 256, places, and by the erection of the Fountain-road and Francis-road projected London County Council schools, and (ii) to provide a number of 340 and 320 school places respectively, and (iii) to acquire a site for future requirements on the Fuzedown estate (Wandsworth).

Holborn to Strand—Letting of Central Portion of Crescent Site.—The Improvements Committee reported as follows:—

The Council will remember that on March 20, 1906, it accepted an offer, made by a syndicate, for a lease for ninety-nine years, at a rent of 55,000l. a year of the central portion of the crescent site formed in connexion with the Holborn to Strand improvement, and on July 31, 1906, authorised the sealing of the agreement for the lease. We had hoped that the agreement would have been exchanged, and the deposit of one year's ground rent made on August 16, but the syndicate were not then able to complete the matter. The date for completion was altered to August 24, on the basis that interest would be paid on the deposit from August 10 to such date as the deposit should be paid. The syndicate were unable to complete on August 24, and as they have not yet done so, we have no alternative but to advise the Council to rescind its resolution sanctioning the letting. We recommend that the resolutions of March 20 and July 31, 1906, with regard to the letting to a syndicate of the central portion of the crescent site formed in connexion with the Holborn to Strand improvement be rescinded.

Sir M. Beachcroft charged the Improvements Committee with being unbusinesslike.

Mr. Howell Williams said that he was told by builders in connexion with the Institute of Builders that it was absolutely impossible to do business with the Council. It was not a question of conditions, for they had been amended, but the one reason was that the Council asked impossible and unreasonable prices for their land.

Mr. Hubbard (Chairman of the Committee) said the Council might take Mr. Williams as an expert with regard to the value of land, but the Committee preferred to be guided by the valuer. It was not yet certain that the syndicate would not carry out their undertaking.

Theatres, etc.—On the recommendation of the Theatres and Music-halls Committee, the following proposals were agreed to:—

"Additional means of ventilation in the auditorium of the Aldwych Theatre, Kingsway (Mr. W. G. R. Sprague); rebuilding at Challis's Royal Hotel, Nos. 59 to 64, Rupert-street, and 7, 8, and 9, Coventry-street (Mr. W. J. Ansell); the erection of Hamerton Hall, Stockwell Green, to accommodate 500 persons (Mr. E. W. Mountford); alterations to seat 100 at the London Pavilion Music-hall, Piccadilly (Messrs. Wilson & Long); additional sanitary accommodation at the Pavilion Theatre, Northumberland-road (Messrs. E. Runtz & Ford); work at Odene's Restaurant, 132, Victoria-street (Mr. A. C. Kent); work at the Piccadilly Hotel (Mr. W. Woodward); work at the Playhouse (formerly Victoria Theatre), Northumberland-avenue (Messrs. Blow & Billery); Music hall (Finsbury Park Empire), at the junction of St. Thomas's-street and Finsbury-street (Messrs. H. H. Malcham & Co., for Messrs. Empires Ltd.); iron and glass Agricultural Hall, Islington (Mr. J. Jeffreys); St. Luke's Parish Hall, Brockley Rise (Messrs. E. H. Tre, Strand, with a view to obtaining an entrance from Savoy-court (Mr. A. B. Jackson); certain small structural alterations proposed to be executed at Spitalbank Hall, Catford (Messrs. H. & G. Taylor); rearrangement of the rooms on the basement and ground floor at the Waldorf Hotel Aldwych (Messrs. A. Marshall Mackenzie & Son)."

London Building Acts Amendment: Tribunal of Appeal and District Surveyors.—The Building Act Committee reported as follows:—

"The Council will remember that on the second reading of the London Building Acts (Amendment) Bill, 1905, all parts of the Bill, with the exception of Part VIII, relating to the means of escape in case of fire, and the reduction of the risk of fire in buildings, were withdrawn by arrangement between the members of Parliament in charge of the Bill and the City of London (Escape from Fire) Bill, and that on April 4, 1905, the Council ordered copies of a document showing the effect of the Bill on the existing Acts to be sent to the City Corporation, the metropolitan borough councils, and other authorities and associations interested, for their observations with a view to an amended Bill being introduced as soon as possible. We have for some time past had under consideration the observations received in response to the Council's invitation, but owing to the magnitude of the work we have not been able to report to the Council in time for a Bill dealing with all the amendments required in the London Building Acts to be introduced in the next session of Parliament. Moreover, we think that the members of Parliament in connexion with the London Building Acts (Amendment) Act, 1905, shows conclusively that it would be very difficult, if not impossible, to pass in one session of Parliament a Bill dealing with the whole of the amendments required in the London Building Acts. There are, however, two matters with regard to which we think that an amendment of the law should be sought without delay. These are the constitution of the Tribunal of Appeal and the method of remuneration of district surveyors. These two matters can be conveniently dealt with, apart from the others which require a separate and satisfactory amendment of the law in these two respects can be secured it will greatly facilitate the work of formulating proposals with regard to the other necessary amendments. An additional reason for urgency exists in the fact that a considerable number of district surveyors' districts are vacant at the present time, and it is desirable that the temporary arrangements made for the supervision of these districts in view of the possibility of securing at an early date legislation with regard to the mode of payment of district surveyors should be terminated as soon as possible.

In the circumstances we think that a Bill dealing with the two matters in question should be introduced in the next session of Parliament, and we have informed the Parliamentary Committee, in accordance with standing orders No. A 161 (2), of our intention to recommend the Council to this effect. We recommend:—(a) That standing orders Nos. A 161 and 162 relating to applications to Parliament be suspended so far as may be necessary to enable the following recommendation to be considered:—(b) That application be made in the session of Parliament of 1907 for the amendment of the London Building Acts so far as may be necessary to alter the constitution of the Tribunal of Appeal and to enable the Council to establish a satisfactory system of payment of district surveyors by salaries.

The consideration of the matter was deferred.

The Council adjourned soon after 8 o'clock.

APPLICATIONS UNDER THE 1894 BUILDING ACT.

The London County Council at their meeting on Tuesday dealt with the following applications under the London Building Act, 1894. The names of applicants are given between parentheses:—

Line of Frontage and Projections.

Chelsea (detached) and Kensington, North.—Erection of buildings on the northern side of South-row and western side of West-row, Kensal Town (Mr. E. W. Fagg for Mr. J. Stockwell).—Consent.

Deptford.—Two iron and glass shelters at the Broadway Theatre, Deptford, to abut upon New Cross-road and Tanner's-hill (Messrs. Vaughan, Brown, & Cook for Messrs. D. Allen & Sons).—Consent.

Dulwich.—An extension of the periods within which the erection buildings on the west side of Vestry-road, Camberwell, was required to be commenced and completed (Messrs. Birt & Son).—Consent.

Haggerston.—Projecting one-story shops in front of Nos. 49 and 51, Queen's-road, Dalston (Messrs. Young Brothers).—Consent.

Lewisham.—Twelve houses with porches, on the western side of Hither Green-lane, Lewisham (Messrs. Norfolk & Prior for Mr. W. Rolfe).—Consent.

Wandsworth.—Projecting shop fronts in front of No. 63, High-street, Putney (Mr. A. Sykes for Messrs. Lilly & Skinner, Limited).—Consent.

Westminster.—A deviation from the plan approved for the erection of a projecting one-story shop in front of No. 131, Victoria-street, Westminster, and a projecting one-story shop at the rear, to abut upon Ashley-place, so far as relates to the erection of projecting pilasters in front of the shop abutting upon Ashley-place (Mr. W. Woodward).—Consent.

Wandsworth.—One-story shops in front of Nos. 289 to 303 (odd numbers only) inclusive, Streatham High-road, Streatham (Mr. A. E. Chasemore for Mr. G. W. Elvin).—Refused.

Wandsworth.—Buildings on the southern side

f Melrose-road, Southfields, eastward of Avenue-road (Messrs. A. W. Taylor & Co. for Mr. A. Duff).—Refused.

Width of Way.

Kensington, South.—Buildings on the western side of Bolton-mews, Kensington, at the rear of No. 6, "The Boltons," and at less than the prescribed distances from the centre of the roadway of Bolton-mews (Mr. A. C. Forrester for Mr. S. V. Morgan).—Consent.

Line of Frontage, Space at Rear and Projections. —Norwood.—Six houses on the site of "The Mount," Thurlow Park-road, Norwood (Mr. G. Herbert).—Consent.

Formation of Streets.

Wandsworth.—An extension of the time within which the roadways of a proposed street for carriage traffic to lead from Burntwood-lane to Magdalen-road, and two proposed streets out of the eastern side of Tramere-road, Wandsworth, were to have been clearly defined throughout by posts and rails and thrown open to the public as highways (Messrs. Holloway Brothers).—Consent.

Dwelling-houses on Low-lying Land.

Camberwell.—That a licence be granted to Mr. S. F. Cope for the erection of two dwelling-houses on low-lying land situated in Elmlington-road, Camberwell (Mr. W. M. Proudfoot on his behalf).—Consent.

The recommendation marked † is contrary to the views of the local authorities.

Architectural Societies.

THE ARCHITECTURAL ASSOCIATION.—A rift section has been formed in connexion with the Architectural Association Athletic Club. It has been founded for the use of members of the Architectural Association and Architectural Association Day School only, who are cordially invited to join. Practice has been fixed for Thursday evenings, from 5.30 to 9 o'clock, when a sergeant-instructor will be in attendance at the headquarters of the London Scottish R.V., 59, Buckingham-gate, S.W. Revolver practice will be held once a month. We are glad to give publicity to this intention on the part of the Association, which intimates that the architectural profession will not be behind other bodies of men in preparing themselves to take part in the defence of their country if called upon. Mr. J. H. Squire is the Hon. Secretary for the Rifle Club.

SHEFFIELD SOCIETY OF ARCHITECTS.—The first meeting of the winter session of the Sheffield Society of Architects and Surveyors was held on the 11th inst. in the rooms of the Literary and Philosophical Society, when the President (Mr. E. Holmes) delivered his Presidential address. After thanking the members for his re-election as President, he remarked that negotiations were now proceeding with the University authorities which he hoped would result in all future ordinary and general meetings being held in the new University buildings. A complete scheme for the education of architects and surveyors had been formulated by the Council, and approved in general meetings, and was now only waiting the sanction of the University authorities. He had very little doubt that in a very short time the scheme would be in full working order. The President then criticised the want of zeal by members of the Society in taking advantage in the past of the many schemes of education which had been instituted and conducted by members of the Council, warning the members that, if advantage were not taken of the educative aims of the Society, it must of necessity die a natural death. He warned the younger members that a lukewarmness in their profession in their younger days could only end with a cold and unremunerative old age. He was referring to remuneration, not in its narrow sense of making money, but to the only remuneration which is worth anything at all in life, the satisfaction of success merited by real honest work. He therefore advised those young members who could not raise any enthusiasm in their profession to consider seriously whether they should not leave it and find something more congenial to their tastes. He therefore begged the younger members of the Society that during the coming year their watchword should be enthusiasm. The President passed on to thank the members of the Council and lay members of the Society for the interesting

and instructive lectures they had received during the past year, and expressed a hope that during the coming year they would not only have members of the Council, but younger members of the Society, coming forward with subjects for discussion. He then related the progress which had been made by the Council of the Society in their negotiations with the City Council with respect to the proposed new by-laws, and stated that their criticism of the proposed by-laws, he thought, was now admitted, had not been in any way destructive, but had tended to simplify the by-laws, and render them more workable and practicable. Amongst other subjects which had had the attention of the Council he mentioned the question of compulsory registration of architects and surveyors, exhibition of model cottages, congress of architects, etc. He urged the young men of the Society to force themselves to the front more in the future than in the past, instancing the opinion of many Americans that one great fault of this country is that our young men have no chance, and expressing the opinion that until late years, at any rate, a man had not been deemed fit to be entrusted with any important work until he was well past early manhood. He advised the members of the Society to endeavour to cultivate specially any particular faculty which they believed themselves to possess, and to force themselves to the front in every possible way. He then laid stress on the absolute necessity of providing better and healthier dwellings for the working classes, and expressed the opinion that it lies in the power of large landowners in the neighbourhood of large towns to correct the evil of overcrowding to a great extent by laying out their estates with wider roads and deeper plots, by judiciously planting trees and providing open spaces for recreation, etc. He invited the co-operation of municipal authorities to this end by framing by-laws more applicable to rural districts, and of less stringency than are necessary in purely urban districts, and suggested that the Local Government Board should assist municipalities to this end. He referred to the necessary demoralisation which comes to all men and women who are brought up in slums and insanitary neighbourhoods, and expressed the opinion that the housing problem might, by careful thought, be settled on natural and commercial, instead of on artificial lines, which did not commend themselves to business men. He referred to the question of acquiring by municipalities of open spaces round cities, and expressed the hope and the belief that the new road undertaken by the Corporation through the Rivelin Valley would prove a success both artistically and commercially. Speaking of the large number of vacant sites which are now in the possession of the Corporation, he suggested to the members of the Society that they might usefully turn their attention to the solution of how to deal with these vacant sites. He, lastly, referred to the important question of local taxation—a burden which, he said, is growing more inequitable and more intolerable every year, and to the consideration of which every citizen should carefully set himself. He touched upon the proposals for taxation of ground values, and said that, although no scheme had seriously been suggested which did not adequately protect and deal with the existing circumstances and contracts, at the same time it must be remembered that circumstances are so much changed that could they have been foreseen neither of the parties would have entered into contracts which existed to-day. In conclusion, he again invited his hearers not to confine themselves too narrowly to their profession, but in all matters to have in view the well-being of the community generally. Questions were being forced to the front which a few years ago would have been considered Socialistic and ridiculous, and it was only by the careful consideration of thoughtful men that such schemes should be brought within the range of practical common sense, and these turned to the good of the community at large. A hearty vote of thanks was accorded on the proposition of Mr. E. M. Gibbs, seconded by Mr. J. B. Mitchell-Withers, and supported by Messrs. W. J. Hale, T. Winder, and W. C. Buck.

LIVERPOOL ARCHITECTURAL SOCIETY.—From the annual Report of the fifty-eighth session

of the Society we learn that it now numbers 127 members, as against 120 last year, the roll consisting of fifty-seven Fellows and seventy Associates; there are also two Honorary Fellows and eleven Honorary Associates. In regard to the student members, who now number forty (a decrease of one), the Report states that the Council regard it as essential that all applicants for studentship of the Society should possess evidence of a good general education, by having passed at least the equivalent of the preliminary examination of the Royal Institute. In compliance with the expression of opinion by members that some active steps should be taken to create a popular interest in the improvement of the appearance of the city the Council have appointed a committee with a view to inaugurating a movement among influential citizens for promoting that object.

Engineering Societies.

THE JUNIOR INSTITUTION OF ENGINEERS.—On Saturday afternoon, October 13, a visit was paid by this Institution to the Engineering and Machinery Exhibition at Olympia. On the arrival of the visitors, nearly 150 in number, divisions were formed, and Dr. H. S. Hele-Shaw, F.R.S., Mr. J. H. R. Whimfield, A.M.Inst.C.E., and Mr. R. S. Hindle, A.M.I.Mech.E., and other gentlemen acted as guides to them. All the exhibitors, having been previously advised of the visit, were prepared to explain to the members, and demonstrate, where practicable, the notable features which were to be seen throughout the exhibition. Assembling at the conclusion, in the restaurant, the thanks of the Institution were conveyed to the exhibition authorities, and the exhibitors, which Sir William White, K.C.B., as President of the exhibition, and Mr. Arthur Ross, F.I.C., respectively acknowledged. The ensuing meeting is to take place on Friday, November 2, when Mr. William B. Bryan, of the Metropolitan Water Board, is to deliver his Presidential address on the subject of "Water Supply."

Correspondence.

ZODIACAL MOSAICS.

SIR,—In connexion with the valuable articles on Mosaic, and Marble Inlay in the last few numbers of your journal, I don't know whether you may consider the subject of the Zodiac in mosaics as worth noticing, but I have not observed all the following examples among those mentioned. The twelve signs make a remarkably handsome pavement pattern either in tessera or in marble inlay, though, of course, the reasons for using the Zodiac thus, were not artistic, but rather mystical or astrological. I don't remember coming across any example of a Zodiac in Roman mosaics.

1. In an old mosaic pavement of small white and black stones representing the seven planets, signs of the zodiac, etc. In the Isle of San Giulio, Lake Orta, North Lombardy. 14th or 15th century. Now destroyed. Stuart: "Sketches of the Riviera and Lake of Orta." Milan, 1867.

2. In a tessellated pavement in the crypt of San Savino, Piacenza. 11th century. Murray: "North Italy." 1843; p. 379. "Discrizioni di Monumenti Piacenza"; and "Archeologia," xlv.

3. Black and white circular Zodiac in the pavement of the Baptistery, Florence, by Strozzi, the astrologer, with a motto which can be read either way. 15th century. "Annales Archéologiques," xv, 231; "Archeologia," xlv. Murray, 1048; Baedeker, 1200; Cook, 1293, are the dates given.

4. In mosaic on the west doorway of Notre-Dame Cathedral, Rheims. 11th century. "Archeologia," xlv., "Dictionary of Architecture."

5. In mosaic at Tournus. 11th century. "Archeologia," xlv.

6. In mosaic tablets on the pavement, 12 in square, Notre-Dame, S. Bertin, S. Omer. Almost unique. Greek or early Italian. Perhaps from the East. Shaw: "Specimens of Tile Pavements." Weale; "Belgium." "Archeologia," xxx; Walset: "Description du pave de S. Omer," i., 847; Builder, xlii., 787; Rolleston: "Mazzaroth."

7. In the pavement of the crypt of S. Gereon, Cologne. Three signs on each side of the altar and six in front. "Archeologia," xlv., "Ann. Archéol." xvii. 11th century. By Avenarius.

8. In mosaic designed by Raphael, each with one sign. Libra is Venus. 1516. Paper casts are in the V. and A. Museum.

9. In the mosaic pavement before the high

altar in Lyons Cathedral. XIVth century. "Archæologia," xlix; Higgins: "Anacalypsis," i., 69, ii., 67; "Dict. Arch." 5, 8.

10. In white marble inlay, along a meridian line, in a chamber beyond the choir, in the Capuchin Church, Piazza Barberini, Rome. By Casani; fl. 1622.

11. Planisphere in a mosaic pavement, with meridian line and signs; in S. Petronio, Bologna. By Cassini, 1655. Morgan: "Italy," 5, 8.

12. Black and white zodiac in a mosaic pavement in San Miniato, near Florence. 1207. "Ann. Arch.," xv., 231; Waring: "Arts," plate xxiv., "Archæologia," xlv.

13. In a circle of very fine Roman mosaic work. In the Grand Triunon, Versailles. Circa 1810.

14. Very large signs in circles, in the mosaic pavement of the Galleria Umberto, Naples. Circa 1890.

15. In the black on white inlay, on the pavement of the Duomo, Milan, along a meridian line.

16. On a table of most delicate mosaic, in the Gallery of the Pitti Palace, Florence.

17. In rosso and giallo inlay, along a meridian, in the pavement of Messina Cathedral. Old and worn.

18. In red Spanish marble inlay on white, along a meridian, in San Nicola, Catania. By Sartorius, 1841.

19. In black, white, and brown, in a mosaic pavement, with the four rivers, hall of Riggs Museum, Hague. XIXth century.

20. In the pavement, in black and white inlay, with the months, of the chapel of S. Firmin, in S. Denis. "Dict. Arch." Engraved in Lenoir: "Atlas," plate xi.

21. In chocolate and white, in a fine mosaic pavement, with sun and moon, and two Latin verses from the "Children's Song," in the vestibule of an old Gothic church in Severinskloster, Cologne. D. J.

METROPOLITAN WATER BOARD.

At the first sitting of the Metropolitan Water Board after the recess, the Works and Stores Committee reported that in accordance with the resolution come to by the Board they had obtained quotations from firms of quantity surveyors who would be prepared to take out quantities for future works upon condition that such works should be measured up by an officer of the Board and paid for on such measurements at the prices placed by the contractors against the respective items in the bills of quantities attached to or accompanying their tenders. It was recommended that Messrs. J. Leaning & Sons, Mr. T. Woodbridge Biggs, Messrs. Northcroft, Neighbour, & Nicholson, and Messrs. Widnell & Trollope be employed from time to time, and this was agreed to.

The same committee reported on the acceptance of a tender by Messrs. Dowra & Son of 1,342l. 18s. 11d. for work in the protection of the company's mains in consequence of the County of Middlesex (Waltham Cross) Light Railway Order.

Mr. H. Ward raised the question of the committee only having invited three contractors to tender, viz., Messrs. Dowra, Messrs. J. Aird & Son, and Messrs. J. Mowlem & Co., and said some of them had fought hard for open tendering in connexion with their work. If they compared the prices quoted by the selected firms in two other contracts which were reported on that day it would be seen that they were very high.—Mr. Bernard (Chairman of the committee) said the Board in the usual way did have open tendering, but in this case they had to consult the Middlesex County Council, with the result that the three firms were selected.

Estimates of 350l. and 150l. were approved for carrying out extensions of workshops at Kew Bridge Pumping Station, for which tenders will be invited.

METROPOLITAN ASYLUMS BOARD.

At the usual sitting of the Metropolitan Asylums Board on Saturday the Works Committee submitted a detailed statement of the amount spent in adapting the infants' school at Belmont Asylum, for which the Local Government Board had asked. The net extras on the contract amounted to 1,449l. 15s. 5d. It was resolved that the statement be forwarded to the Local Government Board.

Adaptation of Boys' School at Belmont Asylum.—The Engineer reported that his estimates for heating, hot-water service, laundry machinery, fire services, electric telephones, fire alarms, and lighting for the completion of the adaptation of this asylum amounted to 22,600l.

Works and Tendering.—A letter was received from the Local Government Board stating that having regard to a report which they had received from their inspector they consented to the managers entering into a contract with Messrs. Chaffer & Newman for the execution of certain work in connexion with the pier boat at Long Reach, at an estimated cost of 563l. 13s., without first advertising for tenders.

Darenth Asylum.—The Works Committee re-

ported having considered a letter from the Local Government Board commenting on the amended plans of the proposed workshops at Darenth Asylum, and suggesting, *inter alia*, that the estimated cost of the scheme, viz., 3,500l., should be sufficient to include the cost of a new basket-making shop. The committee found that the Board's views could be met by omitting certain proposed area walls, and they recommended that revised plans be sent to the Board.—Agreed.

Competitions.

MUNICIPAL BUILDINGS, COVENTRY.—The General Works Committee of Coventry Town Council have recommended that municipal offices and shops be erected on the Earl-street site in accordance with the designs of Mr. T. F. Tickner at an estimated cost of not more than 30,000l. The City Engineer has, by instruction, reported upon the plans.

WORKING-MEN'S HOUSES, TRANENT, N.B.—In the competition for these, for the Co-operative Society, the plans of Mr. E. C. H. Maidman, of Edinburgh, have been selected. The estimated cost is 2,046l.

Fifty Years Ago.

FROM THE *Builder* OF OCTOBER 18, 1856.

THE BOARD OF WORKS AND NEW BUILDINGS.—The Board of Works have had under consideration for some time a letter to the District Surveyors requesting them to inform builders and others who may desire to build on forecourts that the consent of the Board must first be obtained, and to call the attention of the Board to any cases in which their warning may have been disregarded. This request, if made, the District Surveyors will doubtless attend to, but they have no power to go further.

Touching the interpretation of the expressions, "the general line of fronts in any street," and "the regular line of buildings," the Board, in the letter referred to, say they "regard these terms as implying the line of houses in the street, as originally designed and built, without reference to subsequent additions, or so far as built when these Acts came into operation." There are many cases in which no declaration of the Board could enforce such a reading, and sending it out will simply serve to cause delay and vexation. We have a case in point before us at this moment. The forecourts, 30 ft. or 40 ft. in length, of a range of houses have been built over for some time past, with the exception of one about the centre. On this the owner is about to build, and he is informed by the surveyor to the local board that he must obtain the consent of the Metropolitan Board of Works before he begins, or he will involve himself in trouble. No declaration in the world can make the term "regular line of buildings" apply in this case to any but the line of shops on each side already brought out: the owner will, of course, therefore pay no attention to the intimation, beyond denying the necessity, and as no local board of sane men would think of fruitlessly involving the parish in law, by causing a building put up in such a position to be demolished (the only course open), the requirements of the Board are brought into contempt.

We are quite as anxious as the Metropolitan Board can be to preserve the thoroughfares from invasion (our endeavours to that end date very long before theirs), but it is useless to attempt to go beyond the law and apply the same rule to all cases, without reference to circumstances.

In respect of "projections," the Board have been very stringent, and loud are the complaints which reach us both of injurious delay and injustice. Take one case: the builder of a house in a rural suburb, standing some distance from the footway in its own garden, desired to have a small bow-window. The adjoining house on one side is in the same hands, and there is garden ground on the other, yet the Board refuse the application. Surely this is an unnecessary interference with private will, and is, moreover, greatly opposed to the improvement of our street architecture.

The Board should be careful: if they are not swamped by the sewers, they may get impaled on "projections."

Illustrations.

DETAIL OF HIGH RAY OF CHOIR, LIVERPOOL CATHEDRAL.



THIS illustration is a reduction from the large drawing which was hung in the Royal Academy this year. It represents the central bay of the choir on what would be the south side of the building had it the usual orientation.

This bay forms one of the minor transepts, which constitute one of the principal features of the design.

The stone employed for the exterior is Woolton, a red sandstone from quarries on the Cheshire side of the Mersey, banded with stone of a somewhat lighter shade.

Mr. G. Gilbert Scott is the architect.

LYDDINGTON HOSPITAL, RUTLANDSHIRE.

LYDDINGTON HOSPITAL was an ancient manor-place of the Bishop of Lincoln.

A great part of the manor was reserved by the Bishop, who had a palace here, the hall of which, together with a large chamber, forms part of the hospital.

After the Reformation Bishop Holbeck gave the manor to Edward VI., who granted it to Gregory, Lord Cromwell, and his wife for their lives.

Edward afterwards gave the reversion to William Cecil, Lord Burleigh, whose son Thomas, Earl of Essex, in 1602, converted the palace into an hospital for a warden, twelve poor men and two women, and gave it the name of Jesus Hospital.

The edifice stands on the north side of the church, the south and chief front of the hospital facing the same; but the accompanying sketch shows the back of the hospital with its cloister.

The buildings consist of the warden's house, a common kitchen, fourteen separate apartments for the poor people, and a large chapel. There is still in one of the windows some of the painted glass which decorated the bishop's palace, with the inscription "Dominus Exaltatus Meus."

W. EATON, A.R.I.B.A.

HAMBLETON OLD HALL.

HAMBLETON OLD HALL is one of the best examples to be found in Rutlandshire of the type of small house erected during the Renaissance Period.

It consists of a central hall, with the living apartments of the family on one side and the servants' quarters on the other.

The arcading is of good proportions, and enhances the beauty of the front.

There are no records or dates on the building to show the time of its erection or who it formerly belonged to.

The perspective sketch accompanying these notes shows the north front.

W. EATON, A.R.I.B.A.

BUILDINGS IN BRISBANE.

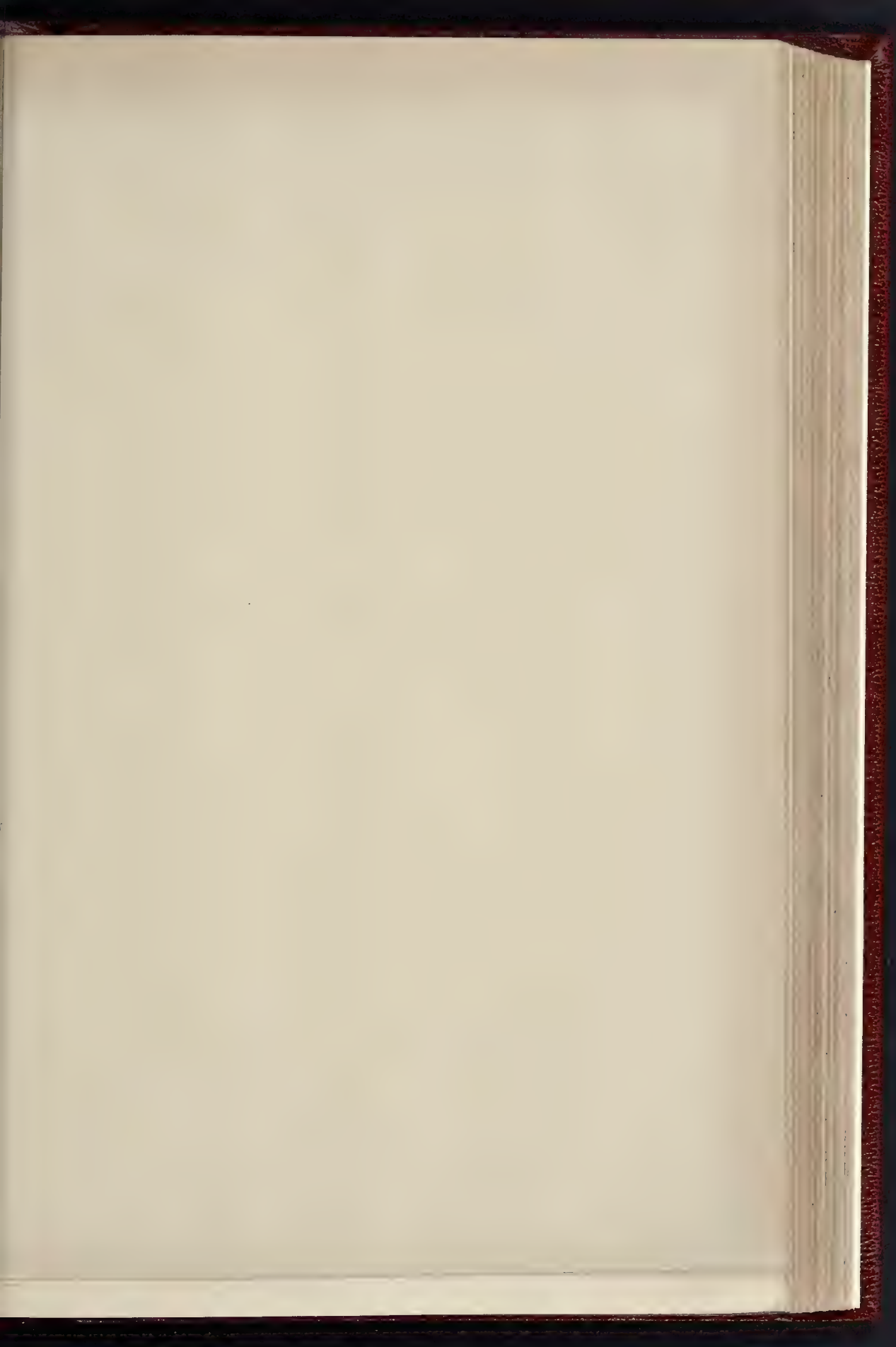
THE illustrations of buildings in Brisbane are given in connexion with, and as illustrations to, the first article in the present issue, in which they are all referred to or described.

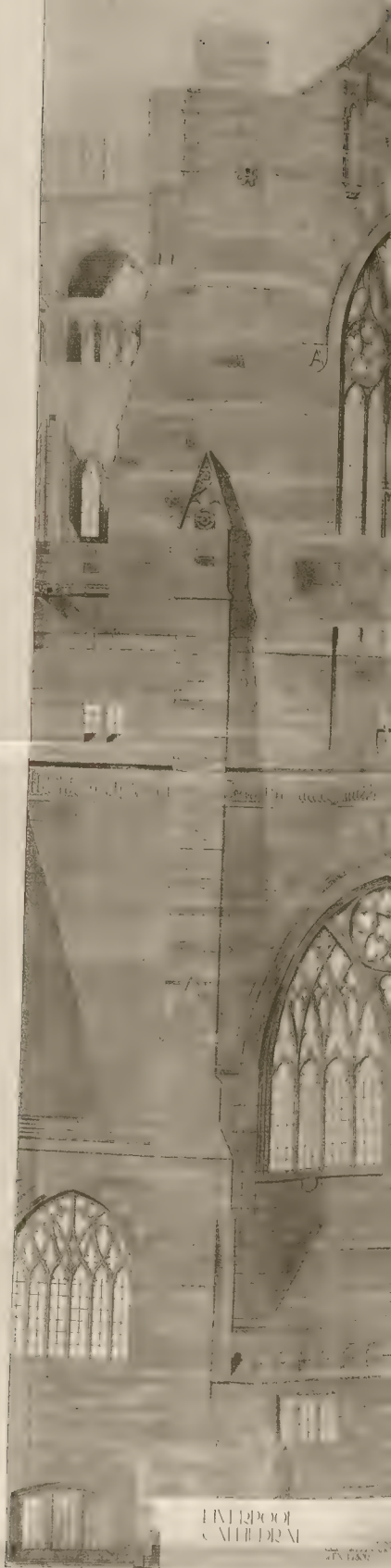
BOOK RECEIVED.

AIMS AND IDEALS IN ART. By George Clausen, A.R.A. (Methuen & Co.)

COTTAGE HOSPITAL, MOFFAT.—On Tuesday last week a new Cottage Hospital was formally opened at Moffat. The building is of one story, with attics, and will be used for non-infectious cases only. Two large wards have been provided, occupying the south front of the building, with the matrons' room between. A small private ward occupies a position to the west, with oriel window.

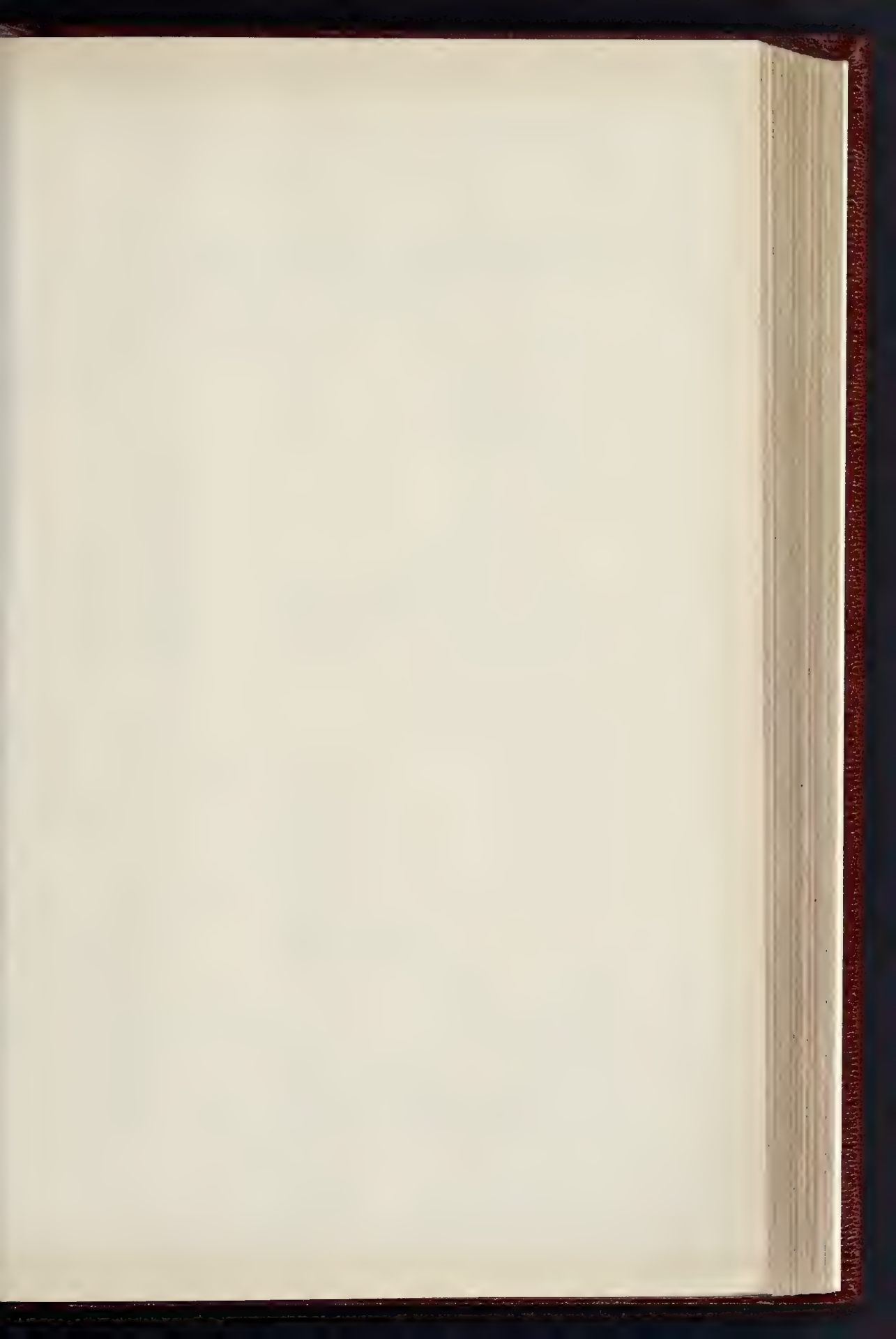
The surgery, placed near the main entrance, has a large window towards the north. Bath-room, lavatories, linen-room (heated by hot-water pipes), and other conveniences are also provided, while the kitchen, in a wing towards the rear, is self-contained and shut off from the rest of the building. Bedrooms for the nurses and servants are arranged in the upper part of the building, and these rooms are capable of being shut off to ensure that nurses who may have been on night duty may rest without disturbance while the daily routine of the hospital is in progress. Externally the building is of whinstone, with freestone dressings, and red-tiled roof, with half-timber work introduced in the gables. The architect was Mr. E. C. H. Maidman, of Edinburgh.





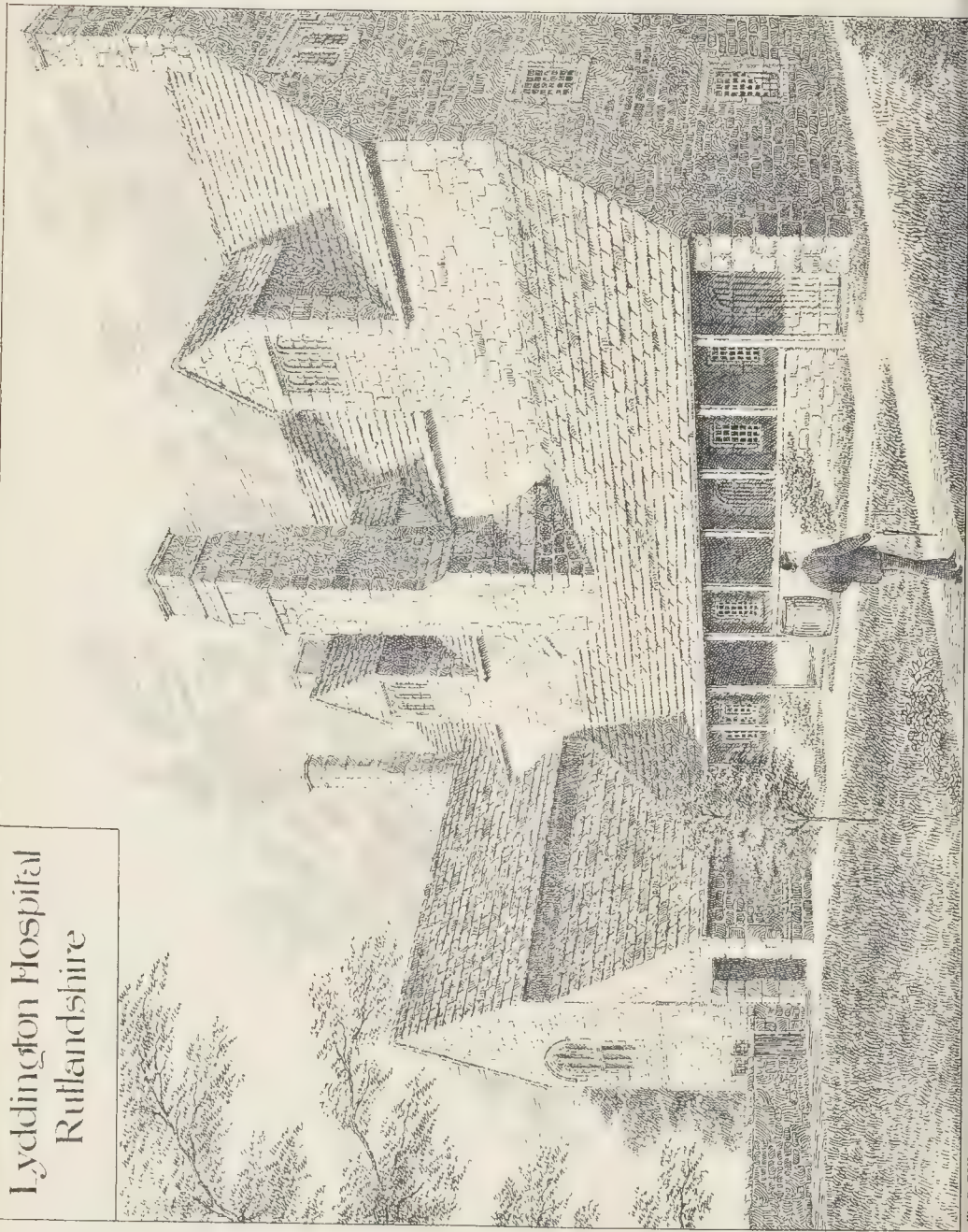
INTERIOR
ROOFING

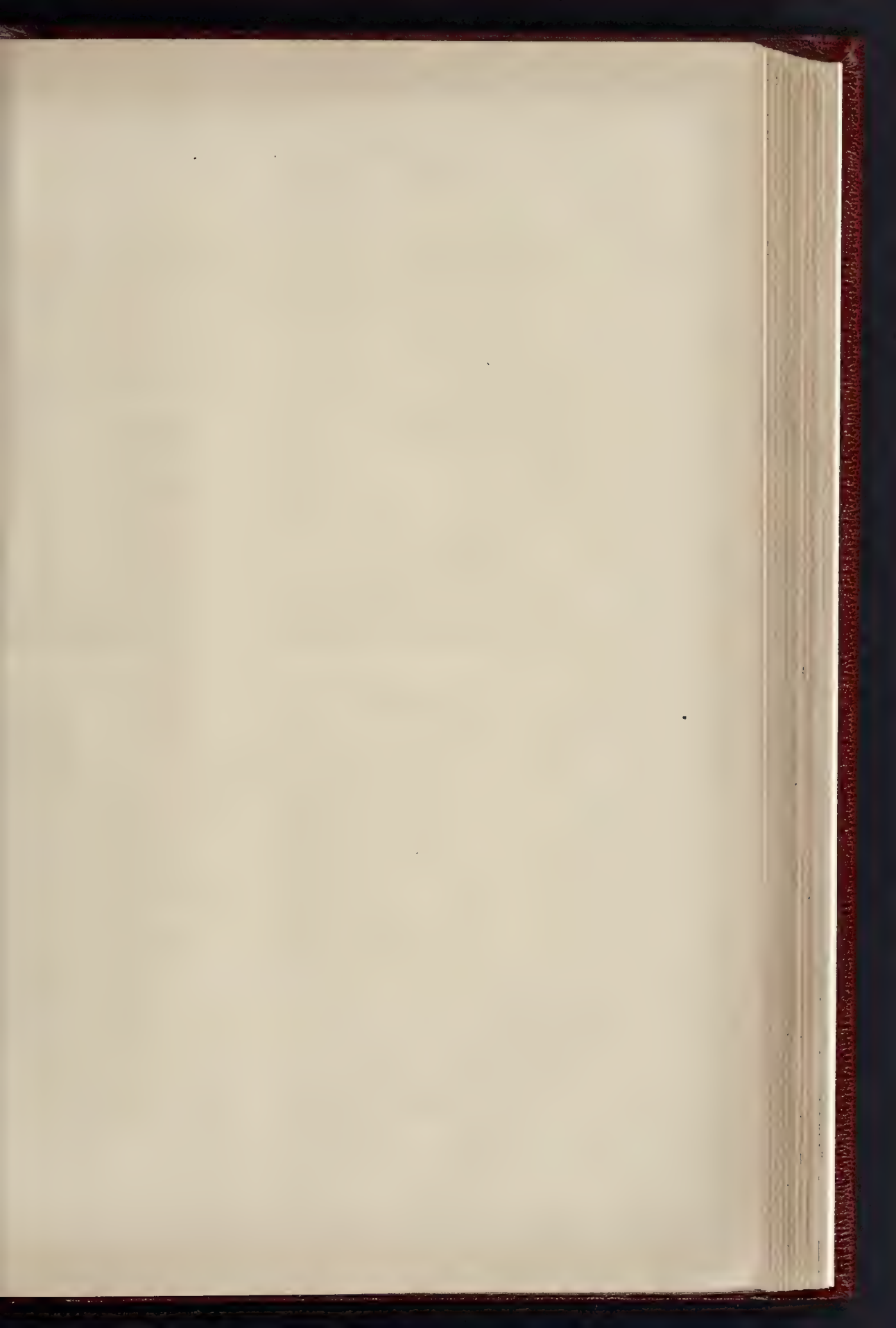




Lyddington Hospital
Rutlandshire

THE BUILDER, OCTOBER 20, 1906.





THE BUILDER, OCTOBER 20, 1906.



CUSTOM HOUSE.



TREASURY BUILDING.





QUEENSLAND NATIONAL BANK.



THE POST OFFICE.

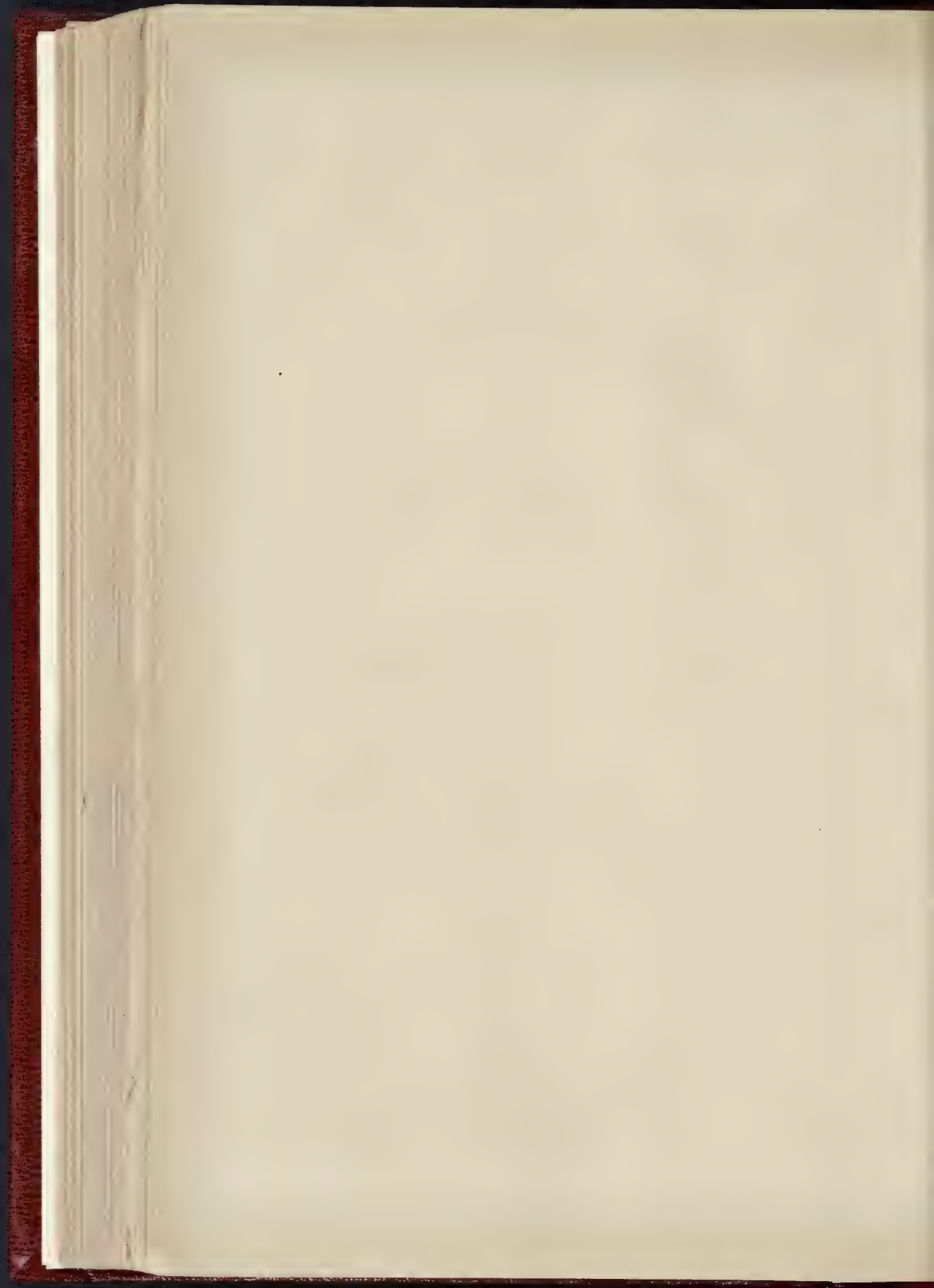


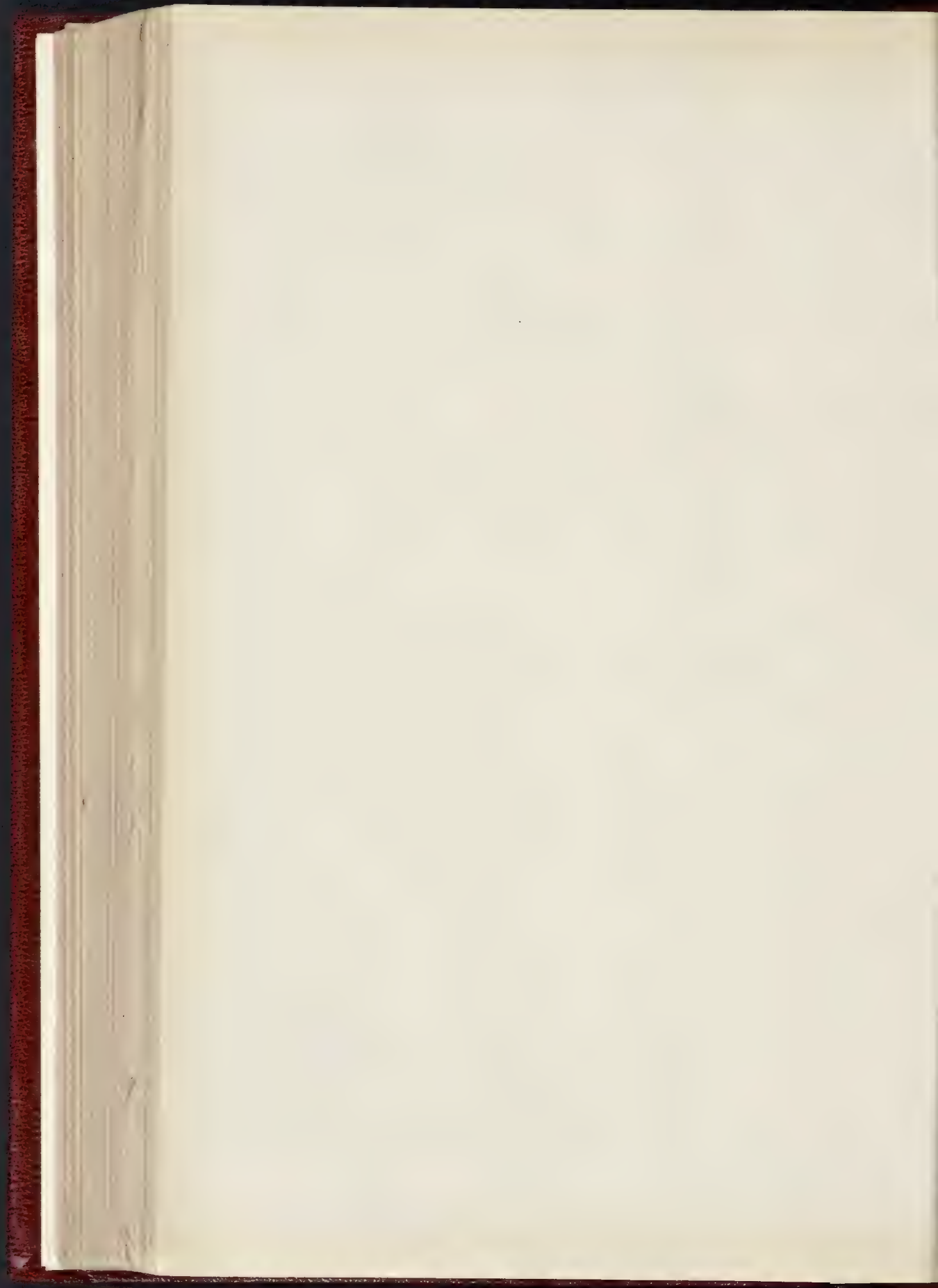
THE LANDS OFFICE.



POST OFFICE, WOOLLONGABBA.

BUILDINGS IN BRISBANE.





The Student's Column.

ROOFS: STRUCTURALLY CONSIDERED.—XIV.

20. Details of Queen-post Trusses.

ANY of the members in an ordinary queen-post roof are essentially similar in construction and disposition to the corresponding members in an ordinary king-post roof. The detailed descriptions and illustrations in Articles XII. and XIII. of the principal rafters, tie-beams, struts, wall-plates, pole-boards, purlins, ridge-plates, common rafters, roof boarding, ceiling-joists, and eaves may be taken as being generally applicable to a queen-post roof such as that represented in Fig. 150.

Therefore, in the present article it is only necessary that we should give detailed consideration to such members as are peculiar to queen-post construction, and to modifications in the dimensions and arrangement of members that are common to both king-post and queen-post roofs.

To facilitate reference we take details in the same order as that followed in Articles XII. and XIII.

Principal Rafters.—In a truss such as that illustrated in Fig. 150 the principal rafters stop at their junction with the queen-posts. In roofs of wider span the principal rafters are carried up to the ridge, and a small king-post may be added or a regular king-post truss formed in the triangular apex of the queen-post truss, as shown in Figs. 91 and 92 ante.

These variations involve no deviation from the methods of construction described in Article XII. The purlins are carried by the principal rafters, except in the case of those at the head of the queen-posts. The manner in which the latter are fixed will be described under the head of *straining beam*. As a general guide to the proportions of the principal rafters in queen-post trusses, where the pitch does not exceed 30 deg., the following rule will be found useful:—

Roofs without ceilings:

$$a = \frac{S^2}{50 R} \quad (13)$$

Roofs with ceilings:

$$a = \frac{S^2}{45 R} \quad (14)$$

Roofs with ceilings and attics:

$$a = \frac{S^2}{40 R} \quad (15)$$

Where a = cross-sectional area (bd) of the rafter in inches.

S = span of the roof in feet.

T = distance of the trusses apart in feet.

R = rise of the roof in feet.

The ratio of breadth to depth may be taken approximately as 7:10, subject to any modifications necessary for preserving uniformity in the breadth of the chief members of the roof truss.

Example (1).—Find the dimensions for the principal rafters of a queen-post roof with ceiling, the span of 40 ft. and the pitch of 25° 33', the trusses being spaced 10 ft. apart.

Here $R = 40 \div 4 = 10$ ft., and substituting the other values in formula (13) we have

$$a = \frac{40^2 \times 10}{45 \times 10} = 35.55 \text{ sq. in.}$$

Making the dimensions in approximate accordance with the proportion 7:10, the

TABLE XXX.—SCANTLINGS OF PRINCIPAL RAFTERS FOR QUEEN-POST ROOFS COVERED WITH SLATES LAID ON BOARDING. TRUSSES 10 FT. APART CENTRE TO CENTRE.

Span of Roof.	Tredgold, Pitch 27°.	Hurst, Pitch 27°.	Seldon, Pitch up to 30°.		Calculated Pitch 25° 33'.			
			Without Ceiling.	With Ceiling.	Without Ceiling.	With Ceiling.	With Ceiling and Attics.	
Feet.	Inches.	Inches.	Inches.	Inches.	Inches.	Inches.	Inches.	
32	4½ × 5	4½ × 5	4½ × 4½	4½ × 5	4½ × 5	4½ × 6	4½ × 7	
34	5 × 5	5 × 5	4½ × 5	4½ × 5	4½ × 5	4½ × 6	5 × 6	
36	5 × 5½	5 × 5½	4½ × 5	4½ × 5	4½ × 5	4½ × 6	5 × 6	
38	6 × 6	6 × 6	4½ × 5½	5 × 6	5 × 6	5 × 6	6 × 6	
40	6 × 6	6 × 6	4½ × 5½	5 × 6	5 × 6	5 × 6	6 × 6	
42	6 × 6	6 × 6	5 × 5½	5 × 6	5 × 6	5 × 6	6 × 6	
44	6 × 6½	6 × 7	5 × 5½	5 × 6	5 × 6	5 × 6	6 × 6	
46	6 × 7	6 × 7	5 × 5½	5 × 6	5 × 6	5 × 6	6 × 6	

TABLE XXXI.—SCANTLINGS OF TIE-BEAMS FOR QUEEN-POST ROOFS COVERED WITH SLATE LAID ON BOARDING. TRUSSES 10 FT. APART CENTRE TO CENTRE.

Span of Roof.	Tredgold, Pitch 27°.	Hurst, Pitch 27°.	Seldon, Pitch up to 30°.		Calculated Pitch 25° 33'.	
			Without Ceiling.	With Ceiling.	(a)	(b)
Feet.	Inches.	Inches.	Inches.	Inches.	Inches.	Inches.
32	4½ × 10	4½ × 10	4½ × 10	4½ × 10	4½ × 10	4½ × 10
34	5 × 10	5 × 10	4½ × 10	4½ × 10	4½ × 10	4½ × 10
36	5 × 10	5 × 10	4½ × 10	4½ × 10	4½ × 10	4½ × 10
38	6 × 10	6 × 10	4½ × 10	4½ × 10	4½ × 10	4½ × 10
40	6 × 11	6 × 11	4½ × 10	4½ × 10	4½ × 10	4½ × 10
42	6 × 11½	6 × 11½	4½ × 10	4½ × 10	4½ × 10	4½ × 10
44	6 × 12	6 × 12	4½ × 10	4½ × 10	4½ × 10	4½ × 10
46	6 × 12½	6 × 12½	4½ × 10	4½ × 10	4½ × 10	4½ × 10

* If the joint of the tie-beam with the principal rafter cannot be placed immediately over the supporting wall, increase the depth of the tie-beam by one or two inches.

rafter would measure 5 in. wide by 7 in. deep, or, if preferred, 5½ in. by 6½ in.

Example (2).—Find the dimensions for the principal rafter of a roof as in the foregoing example, but with the pitch of 30°.

Here $R = \frac{1}{2}(40) \times \tan 30^\circ = 11.5$ ft.

Substituting this and the other values as before we have

$$a = \frac{40^2 \times 10}{45 \times 11.5} = 30.8, \text{ say, } 31 \text{ sq. in.}$$

Thus the dimensions of the rafter could be made 4½ in. by 6½ in., or 5 in. by 6½ in., as preferred.

Example (3).—Find alternative dimensions for the principal rafter of a roof, as in Example (1), but with the trusses spaced (a) 8 ft., and (b) 12 ft. apart.

(a) In this case we have

$$a = \frac{40^2 \times 8}{45 \times 10} = 23.4 \text{ sq. in.}$$

corresponding with the dimensions of 4½ in. by 6½ in., or 5 in. by 5½ in.

(b) In this case we have

$$a = \frac{40^2 \times 12}{45 \times 10} = 42.6$$

corresponding with the dimensions of 5½ in. by 7½ in., or 6 in. by 7½ in.

Table XXX. contains the scantlings of principal rafters for queen-post roofs of different spans, as stated by various authorities, and dimensions calculated by Rules (13), (14), and (15), but modified as necessary for making the rafters uniform in width with other members of the truss.

Tie-beams.—The tie-beam for a queen-post truss is connected as described in Article XII., the only difference being that it has two intermediate supports in a roof like that illustrated in Fig. 150, and more than two such supports in roofs having princess-posts as well as queen-posts.

Tie-beams having to carry no load beyond

their own weight can be calculated by Rule (7) ante.

In the case of a truss where the queen-posts divide the tie-beam into three equal lengths, the rule can be reduced to a very handy form.

The rule as given on p. 376 is

$$d = \frac{L}{\sqrt{b}} \times 1.47 \text{ for fir.}$$

Here L = the greatest unsupported length, which in a tie-beam supported by two queen-posts is equal to one-third the span (S) of the roof.

Hence we can write the equation

$$d = \frac{S \div 3}{\sqrt{b}} \times 1.47$$

which reduces to

$$d = \frac{S}{\sqrt{b}} \times 0.49$$

By writing 0.50 instead of 0.49 we obtain

$$d = \frac{S}{\sqrt{b}} \quad (16)$$

The following example shows the practical agreement of the original and modified rules, and the saving of time by adoption of the latter:—

Example (4).—Find the depth for the tie-beam of a roof with two queen-posts and the span of 46 ft., the width of the beam being 6 in.

By Rule (7) we have

$$d = \frac{46 \div 3}{\sqrt{6}} \times 1.47$$

$$= \frac{15.33}{1.817} \times 1.47 = 12.4 \text{ in.}$$

By Rule (16) we have

$$d = \frac{23}{\sqrt{6}} = \frac{23}{1.817} = 12.6 \text{ in.}$$

The first result would naturally be raised to 12½ in., and the second result can be reduced to the same dimension, as the difference between 12.6 and 12.4 is only 0.2 in. In the case of smaller spans the discrepancy is much less, and in some calculations it does not affect the practical dimensions in any way.

Table XXXI. contains measurements for the tie-beams of queen-post roofs of various spans, as stated by different authorities, and for purposes of comparison two sets of alternative dimensions, calculated by Rule (16), are given in the last two columns.

Where rooms are constructed in a queen-post roof the tie-beams should be calculated by ordinary beam formulae, or for preliminary estimates by Tredgold's rule.

The ordinary formula for the breaking-

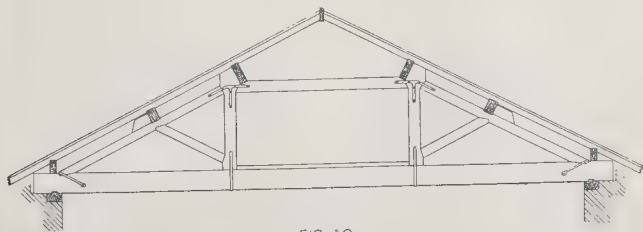


FIG 50

weight (W) of rectangular beams supported at both ends and uniformly loaded is

$$W = \frac{4}{3} \frac{f b d^2}{l} \quad (17)$$

Where

f = modulus of transverse rupture.
 b = breadth of the beam in inches.
 d = depth of the beam in inches.
 l = length of the beam between supports in inches.

To ascertain the depth for a beam of known width for a given load we obtain from equation (17)

$$d = \sqrt[3]{\frac{3}{4} \frac{W l}{f b}} \quad (18)$$

Similarly, to ascertain the width for a beam of known depth for a given load we have

$$b = \frac{3}{4} \frac{W l}{f d^2} \quad (19)$$

By applying any required factor of safety to the value of f , we can calculate the safe loads for tie-beams instead of the breaking-weights.

TABLE XXXII.—MODULUS OF TRANSVERSE RUPTURE (f) OF RECTANGULAR TIMBER BEAMS.

Description of Timber.	Value of (f) lb. per sq. in.
Ash, Canadian	10,050
" European	12,000-13,000
Beech	10,000-12,000
Birch	11,700
Elm, Canadian	11,800
" English	6,000-8,700
Fir, American Red Pine	7,100-11,200
" Yellow Pine	8,100
" Dwarf	11,800
" Kaure	11,350
" Larch	5,000-10,000
" Pitch-Pine	6,600-9,450
" Riga	9,900-12,000
" Spruce	16,500-27,000
Greenheart	10,800
Jarrah	17,350
Lauan	10,000
Oak, American	8,700
" Dantzic	10,000-13,600
" English	9,000
Sycamore	14,800
Teak, African	12,000-19,000
" Indian	6,600
Willow	6,600

The tie-beam of a truss with two or more queen-posts might be calculated as a continuous beam, but this course is not to be recommended, as it involves somewhat tedious and intricate calculations, and the reliability of the results is certain to be affected by any slight alteration in the position of the supports after the roof has taken its bearing. A preferable course is to consider any additional load-bearing capacity due to continuous beam action as constituting an increase of the factor of safety, or, in some cases, to regard it as a justification for employing a somewhat lower factor of safety than would be adopted for a beam simply supported at the ends.

The three following examples illustrate the use of formulae (17), (18), and (19).

Example (5).—Find the safe load, with the factor of safety of 8, for the tie-beams of a queen-post roof of 36-ft. span having rooms over the tie-beams, the unsupported length of which between the queen posts is 12 ft., 2 in. deep, and made of fir, for which the value of f = 12,000 lb.

By Rule (17), the safe load is

$$W = \frac{4}{3} \frac{(12,000 \div 8) \times 6 \times 12^2}{144} = \frac{4}{3} \frac{1,296,000}{144} = 12,000 \text{ lb.}$$

Example (6).—Find the depth, with the factor of safety of 8, for the tie-beams of a queen-post roof of 42-ft. span, having rooms over the tie-beams representing a total load of 120 lb. per square foot; the roof trusses to be 10 ft. apart, and the unsupported length of the tie-beams between the queen-posts to be 13 ft.; the tie-beams to be 8½ in. wide, and made of fir, for which $f \div 8$ = 1,500 lb.

By Rule (18) the depth should be

$$d = \sqrt[3]{\frac{3}{4} \frac{120 \times 10 \times 13 \times 156}{1,500 \times 8.5}} = \sqrt[3]{\frac{3}{4} \frac{2,433,600}{12,750}} = 11.9, \text{ say, 12 in.}$$

Example (7).—Find the breadth, with the factor of safety of 8, for the tie-beam of a queen-post roof of 36-ft. span, having rooms over the tie-beams representing a total load of 112 lb. per square foot; the roof trusses to be 9 ft. 6 in. apart, and the unsupported length of the tie-beams between the queen-posts to be 12 ft.; the tie-beams to be 13 in. deep, and made of fir, for which $f \div 8$ = 1,500 lb.

By Rule (19) the breadth should be

$$b = \frac{3}{4} \frac{(112 \times 9.5 \times 12) \times 144}{1,500 \times 13^2} = \frac{3}{4} \frac{1,838,592}{251,500} = 5.44, \text{ say, } 5\frac{1}{2} \text{ in.}$$

Tredgold's rules for the depth and breadth of tie-beams acting as girders are

$$d = \sqrt[3]{\frac{L^2}{b}} \times 4.20 \text{ for fir}$$

$$= \sqrt[3]{\frac{L^2}{b}} \times 4.34 \text{ for oak} \quad (20)$$

and

$$b = \frac{L^2}{d^3} \times 74 \text{ for fir}$$

$$= \frac{L^2}{d^3} \times 82 \text{ for oak} \quad (21)$$

Where L = unsupported length in feet.

b = breadth in inches.

d = depth in inches.

For the purpose of comparison we give two examples taking the necessary values from Examples (6) and (7).

Example (8).—Find the depth of a tie-beam of fir acting as a girder, breadth of beam = 8½ in., unsupported length = 13 ft.

By Rule (20) we have

$$d = \sqrt[3]{\frac{13^2}{8.5}} \times 4.20 = 2.25 \times 4.20 = 9.45, \text{ say, 10 in.}$$

Example (9).—Find the breadth of a tie-beam of fir acting as a girder, depth of beam = 13 in., unsupported length = 12 ft.

By Rule (21) we have

$$b = \frac{12^2}{13^3} \times 74 = 4.85, \text{ say, 5 in.}$$

Obituary.

SIR RICHARD TANGYE.—We regret to announce the death, on October 14, at his residence, Coombe-bank, near Kingston-on-Thames, of Sir Richard Tangye, K.B., F.R.G.S., aged 72 years. Sir Richard Tangye, who was knighted in 1894, was head of the firm of Messrs. Tangye Brothers, who converted themselves into a limited liability company, with Sir Richard as chairman, in 1881. The firm consisted of the deceased and his four brothers, the sons of a Cornish miner, who was a member of the Society of Friends. Richard was born at Broad-lane, Illogan, and was educated at Redruth and the Quakers' School at Didcot. In 1862 he quitted the vocation of schoolmaster to take a clerical situation in Thomas Worsdall's counting-house, Birmingham; his brother George became his fellow clerk there, and his brother James foreman in the workshop. Then the brothers Richard and Joseph started in business as tool-makers, being ultimately joined by their brothers George, James, and Edward. Their first great success was due to Joseph's invention of a hydraulic lifting-jack which Brunel largely employed for the launching, broadside on, of the *Leviathan*, afterwards the *Great Eastern*, from Scott Russell's yard in the Isle of Dogs. The work, which occupied many weeks, aroused much interest, and daily reports were issued of the progress made, in inches. They also acquired and perfected Weston's invention for the making of differential pulley-blocks. The firm removed from Clement-street, Birmingham, to Soho, where their Cornwall Works, at first covering three acres, now extend over an area seven times as great, and give employment to upwards of 2,500 hands. The firm actively promoted the interests of their workmen; in 1880-1 they gave sums of 10,000l. for the establishment of a municipal art gallery and museum and 11,000l. for the Birmingham School of Art. Sir Richard Tangye devoted much of his private fortune to endowments in aid of promising students and kindred educational and philanthropic objects. He formed a fine collection of Wedgwood ware, and was author of a history of the pottery. He was Richard Cromwell; eleven years ago he brought out a revised edition of "The Rise of a Great Industry," wherein he describes the chief events of his singularly successful career.

General Building News.

METHODIST CHURCH, LITTLE EATON.—A Free Methodist Church has been erected and opened at Little Eaton. The premises are on the main road from Derby to Ripley, and consist of a service-room, with an alcove for choir and organ, and minister's vestry, with schoolroom and kitchen underneath. The building is of brick, with stone facings, and is heated by the low-pressure hot-water system. The architect has been Mr. A. E. Eyre, of Derby, and the builders Messrs. Harris & Hunt, of Marehay.

CHURCH ADDITION, YARM.—A new vestry has been added to Yarm Parish Church. It has cost over 1,000l., and was built to the design of Messrs. Austin & Paley, of Lancaster, by Messrs. J. Davison & Son, Stockton.

BAPTIST CHURCH, MARKET HARBOROUGH.—The foundation-stone of the new Baptist Church at Market Harborough was laid on the 18th inst. The building is designed in late Gothic freely treated, the facings being red bricks and dressings of stone. The contract amount for the church, etc., including alterations and additions to the existing school, is 1,982l., and is let to Messrs. H. Herbert & Sons, 33, Millstone-lane, Leicester. The accommodation in the church is for 543 persons. The architects are Messrs. George Baines & Son, London.

ST. LUKE'S CHURCH, WALLSEND.—A tower is being added to this church. The belfry has already been completed, and above it will spring a spire, making a total height of 140 ft. from the ground. The nave and aisles of the church were built twenty years ago, to the designs of Messrs. Oliver, Leeson, & Wood, architects, of Newcastle, which firm has also superintended the completion of the building. The work has been carried out by Messrs. Braithwaite & Son, contractors, of Byker, with whom Mr. R. Robinson has acted as clerk of works.

ST. MATTHEW'S CHURCH, WILLESDEN.—On the 13th inst., the completed nave, narthex, and western gallery of this church was dedicated. The work has been carried out by Messrs. Messenger & Co., of Loughborough and London.

WELBECK ABBEY GLASSHOUSES.—The Duke of Portland is having a considerable section of the glasshouses at Welbeck renewed and modernised. The new work includes a span corridor, 280 ft. by 16 ft., three span plant-houses, each 40 ft. by 20 ft.; six span houses, each 37 ft. by 12 ft.; span propagating house, 60 ft. by 12 ft.; also a lean-to range, comprising three fish-houses and two vineries, 300 ft. by 15 ft. The work is being carried out by Messrs. Messenger & Co., of Loughborough and London.

HOSPITAL, CRIEFF.—The Crief and District Cottage Hospital, which has been erected at a cost of about 1,500l., was formally opened by Mrs. J. B. Whitelaw, Strouan, on the 10th inst. The building is situated in Pittenzie-street, and it consists of two public wards, male and female, and a small private ward, with the necessary administrative apartments. From the main entrance there is a hall, from which a corridor runs the full length of the building. To the south of this corridor are the male ward, private ward, matron's sitting-room, and female ward, while to the north are the operating-room, linen-store, ward pantry, bathroom, kitchen, scullery, etc. Upstairs are bedrooms for matron, nurses, and servants, nurses' bathroom and box-room. The wards occupy positions to the south. The walls are plastered and painted in green, purple, with a dado of enamel; the floors are of narrow pine and are polished. The private ward is intended for one bed, and is finished in a similar fashion to the two large wards. The operating-room is lighted by two large windows, in addition to a north roof light. The building is heated by hot water on the low-pressure system. The architect was Mr. E. C. H. Maidman, Edinburgh.

ORTHOPEDIC AND SPINAL HOSPITAL, BIRMINGHAM.—At the Birmingham Orthopedic Hospital, on the 10th inst., the Marquis of Hertford opened the new out-patient department. The new building is in Great Charles-street, on the west side of the garden of the hospital. It is intended to rebuild the old in-patient department at an early date, and the space between the two structures will form a small garden. The new building is in the Elizabethan style, with mulioned windows, and is faced with slightly glazed red bricks and terra-cotta. In the basement there is a large room for patients' perambulators, a patients' room and a bathroom adjoining, store-rooms, heating-apparatus, hall, and staircase. The ground floor includes a dispensary and a waiting-hall for eighty-five patients, while on the other floors are two isolation wards, nurses' rooms, two exercising-rooms, and two massage-rooms for men, women, and children. The plans of the buildings were prepared by Mr. F. B. Osborn.

HAMPSTEAD NEW END SCHOOL.—In August, 1903, the School Board for London acquired compulsory powers for the purchase of this site, and in October, 1903, preliminary plans of the proposed school were passed by the Works Committee of the School Board. On March 24,

1904, a tender for the erection of the school was invited by the School Board, but the Board of Education declined to approve the finished plans inasmuch as the work of the School Board was about to be transferred to the London County Council. In the meantime the firm whose tender has been accepted withdrew their tender, and the Council, who subsequently considered the matter, decided on July 19, 1904, to accept the tender of Messrs. Treasura & Son, amounting to 20,329l. The new school is four stories in height and has had to be erected partly on arches, owing to the varying levels and small area of the site. The spaces under the arches have been utilised for the formation of covered playgrounds. The following is the accommodation provided:

Senior mixed	193
Junior mixed	194
Infants	220
Total	612

The senior mixed department contains five classrooms, accommodating from thirty to forty-eight children. There is also an assembly hall 40 ft. long by 21 ft. 6 in. wide, science and art rooms, each some 30 ft. long by 20 ft. wide, and ample cloak and lavatory accommodation. The junior mixed and infants' departments each contain four classrooms accommodating from twenty to thirty children. In each of these departments there is an assembly hall about 40 ft. long by 21 ft. 6 in. wide, and ample cloak and lavatory accommodation. The school is warmed by a low-pressure hot-water apparatus, and ventilated by robin tubes in the classrooms for the admission of fresh air and flues from the ceiling line for the emission of vitiated air. The playgrounds for the several departments are at the ground level, and an additional playground for the girls on the top of the school. There are also covered play-sheds for inclement weather. The area of the boys' playground is equivalent to about 34 sq. ft. per child, while the area of the girls' and infants' playgrounds is equivalent to about 33½ sq. ft. per child. The sanitary arrangements are of the latest type approved by the sanitary authorities. The elevations are of red brick, relieved by Portland stone dressings, cornices, strings, etc., and the roofs are covered with Brossley tiles. Internally the staircases and dados of classrooms, halls, and corridors are faced with salt-glazed bricks. There is no house erected for the schoolkeeper, but part of an existing house on a site has been adapted for his use. The school has been designed by and erected under the supervision of the Council's architect (Education), Mr. Thomas J. Bailey. The cost per head of the erection of the school, calculated on the accommodation, has amounted to 33l. 4s. 4d., but it should be stated that the high cost is accounted for by the difficult nature of the site, which is of a sloping character, necessitating the provision of large and costly retaining walls both to the buildings on the site and to the adjoining premises. The estimated cost of the site is 22,796l.

—PLANS OF THIS SCHOOL, TO ACCOMMODATE 1,200 CHILDREN, were passed by the School Board in January, 1904, and on March 21, 1905, the Council accepted the tender of Messrs. Treasura & Son, amounting to 19,438l. for the work of erection. The school buildings are three in number, each being one story for senior mixed, junior mixed, and infants' departments respectively, while a separate block is provided for a drawing classroom and a room for practical science on the playground level. The following is the accommodation provided:

Senior mixed	382
Junior mixed	388
Infants	35
Total	1124

The senior mixed school contains nine classrooms, accommodating from thirty to forty-eight children. There is also a large assembly hall, about 57 ft. long by 26 ft. 6 in. wide, and ample cloak and lavatory accommodation. The junior mixed school contains seven classrooms, accommodating from forty-eight to fifty-six children. This department also includes a large assembly hall 57 ft. long by 26 ft. wide, and cloak and lavatory accommodation. The infants' school contains eight classrooms accommodating from forty-eight to fifty children. It also includes a large assembly hall 57 ft. long by 26 ft. 6 in. wide, and cloak and lavatory accommodation. The schools are warmed by a low-pressure hot-water apparatus, and ventilated by robin tubes in the classrooms for the admission of fresh air, and flues from the ceiling line for the emission of vitiated air. The playgrounds are tar-paved and drained; there are also covered play-sheds for inclement weather. The boys' playground has an area of 66 sq. ft. per child, while the girls' playground has an area of about 50 sq. ft. per child, and the infants' about 44 sq. ft. per child. The elevations are of stock brick, relieved by Portland stone dressings, etc., and the roofs covered with Brossley tiles. Internally the staircases and dados of classrooms and halls are faced with

saltprezed bricks and the corridors with white glazed bricks. An existing house on the corner of the site has been adapted for the use of the schoolkeeper. There are also two other brick structures on the site which have been used for temporary accommodation, and these may be adapted for "centres" in the future. The schools have been designed by and erected under the supervision of the Council's Architect (Education), Mr. Thomas J. Bailey. The cost of the erection of the school per child calculated on the accommodation provided is 17l. 5s. 10d. The estimated cost of the site is 2,297l.

CHURCH HOUSE, EYEVESHAM.—A new church house has been erected on a site at the south-east corner of the market-place at Eyevesham. The plans for the work were prepared by Mr. C. Ford Whitcombe, architect, and Messrs. Espley & Co.'s tender, at 588l., was accepted.

INSTITUTE, LLENFANI, ANGLESEY.—An institute was opened on Friday last week by Mrs. Bramston Smith at Llenfani. The institute contains reading-room, games-room, billiard-room, bathroom, lavatories, etc., and accommodation for resident caretaker. The contractors have been Mr. T. P. Thomas, of Llanfair, P.G., for the general work, and Mr. Philip E. Jones, of Bangor, for the whole of the sanitary and plumber's work. The building has been designed by and erected under the superintendence of Mr. Richard Hall, architect, Bangor.

NEW MUNICIPAL OFFICES, HOLBORN.—The Holborn Borough Council, at their meeting on the 10th inst., discussed the question of new offices, the debate arising out of a report of the Plans Committee on tender. It was proposed that the offer of Messrs. J. Greenwood, Arthur-street, amounting to 21,375l., plus 650l., be accepted. Councillor E. L. Pyke said the scheme was extravagant and a waste of the ratepayers' money. The new offices would cost them 80,000l. before they were finished with them. The Mayor (Dr. W. R. Smith) said Mr. Pyke's figures were wholly inaccurate. The cost of the new buildings were estimated by the architects at 21,000l., and so far as he (the Mayor) could judge it the total cost—erection and land—would amount to 46,000l., representing 4d. in the pound on the rates. If they got their loan for a longer period than they expected the increase on the rates would be less. After further discussion and a division Messrs. Greenwood's tender was accepted.

Stained Glass & Decoration.

ST. PETER'S CHURCH, BUDLEIGH SALTERTON.—A new three-light stained glass window has been placed in this church, executed by Messrs. Percy Bacon & Brothers, under the supervision of Mr. G. H. Fellowes-Pryne, the architect. The upper tier contains the standing figure of the Virgin and Child in centre light, St. Elizabeth in the left, and St. Simon in the right light; the lower tier contains the Nativity, with the adoration of the Magi and Shepherds on either side. The tracery openings have angels with scrolls containing texts.

Sanitary and Engineering News.

WATER SUPPLY FOR DUBLIN.—The Corporation have applied to the Local Government Board for leave to contract a loan in respect of a scheme for obtaining more water from the Varty Valley, Co. Wicklow, at an outlay of 135,000l. Mr. Spencer Harty, past-president, I.C.E., Ireland, has prepared the plans, and Mr. John G. O'Sullivan, C.E., is the resident engineer. The works, supplementing the present supply, comprise a reservoir 2½ miles long to hold 1,250 million gallons, equivalent to a supply for ninety days, and thus increasing the storage to an aggregate of nearly 3,660 million gallons.

WATER SCHEME, COLWYN BAY.—At Colwyn Bay recently Mr. J. Herbert Roberts, M.P., opened the high level water scheme constructed by the District Council. The works were designed by the Town Surveyor, Mr. William Jones, and carried out by Mr. George Law, contractor, Kidderminster, at a cost of 4,500l.

BRIDGE WIDENING, ABERDEEN.—A commencement has been made by the contractor, Mr. George Hall, with the preparations for the widening of Union-bridge. The widening is being accomplished by introducing a steel arch rib on each side of the bridge, supported upon masonry abutments. The steel arch will have a span and radius similar to the existing masonry arch, and the underside of the ribs will be kept 18 in. above the level of the underside of the existing arch. For the support of these ribs, the existing abutments on both sides of the bridge will be lengthened, and in carrying this out it is proposed to use the whole of the masonry framework, and retain all the features of the original design. The balustrading over the existing arch ring will be replaced by a specially-

designed light iron parapet. Two 12-ft. footpaths and a 36-ft. carriageway will be obtained by the widening. The contract price of the improvement is 6,518l., and the work will be carried out under the supervision of Mr. G. R. G. Conway, of the Burgh Surveyor's Department.

PROPOSED BRIDGE RECONSTRUCTION, CALLANDER, N.B.—At a recent meeting of the Western District Committee of Perthshire County Council, Provost Scott, of Callander, attended on behalf of the subscribers to the scheme for reconstructing Callander-bridge, and reported that the five plans prepared by the County Council had been considered by the Town Council of Callander, and by the subscribers. In addition, plans had been sent in by engineers and bridge builders in different parts of the country, and these having also been considered, the subscribers selected a plan by Messrs. Foreman & McCall, engineers, Glasgow, for a stone bridge having concrete arches and stone parapets. The cost was estimated at 3,000l. Subsequently a small committee was appointed to confer with the Town Council of Callander and the subscribers as to the scheme to be recommended.

Foreign.

FRANCE.—M. Gustave Michel, the eminent sculptor, has been commissioned to execute a monument to be erected by national subscription to the memory of Jules Ferry.—The palace of the Popes at Avignon has at length ceased to be used as a barracks; the soldiers who inhabited the building have gone into the new barracks erected in the neighbourhood of Avignon. The fine château which formed the Papal palace, built in 1334, under the Pontificate of Benedict XII., and completed in 1513, is to be restored to its original condition and used as a museum of antiquities.—The Conseil Général of Aveyron are about to rebuild the pont de Verdalle, at Millan, at the estimated cost of 202,000 francs.—A new barracks is to be built at Douai at a cost of a million francs.—A steel bridge is to be built over the Rhône at Givors, for the passage of the railway line from Givors to la Voulte. The cost is estimated at 106,200 francs.—A new asylum for the aged is to be built at Versailles at a cost of a million francs.—A military sanatorium is to be built at la Leyne, near Toulon, in the commercial forest of Janas.—A committee has been formed to erect a monument to Jules Verne, the popular romance-writer.—M. Emile Zandelle has been commissioned to carry out the rebuilding of the Théâtre des Célestins at Rouen, and the work has just been commenced.—The death is announced, at the age of 87, of M. Henri Bouché, member of the Académie des Beaux-Arts and curator of the engravings department in the Bibliothèque Nationale. His whole career had been in connexion with the Bibliothèque, and he had a well-earned reputation as a writer on art. He was the author, among other works, of "Guide du Cabinet des Estampes" and "Travaux sur les industries, les mœurs, et costumes of ancient France"; studies on the bindings in the Bibliothèque, and on the works of Jacques Callot, Guttenberg, etc. He took an important part in the organisation of the exhibition of the "Primitifs Français" at the Pavillon Marais, and the exhibition of miniatures at present on at the Bibliothèque. In 1904 he was elected as the successor to Corroyer, the architect, at the Académie des Beaux-Arts. At the time of his death, which was very sudden, he was engaged in writing a history of the art of miniature painting.

GERMANY.—Exhibitions grow in favour. In Germany alone this year there have been Art exhibitions in Berlin, Munich, Nuremberg, Dresden, Weimar, Cologne, and Karlsruhe. The Nuremberg Exhibition showed the most complete record of arts and crafts in Bavaria, and included a new section for exhibits relating to architecture and landscape gardening. The architect, Herr Theodor von Kramer, was responsible for the laying out of the site, which leaves nothing to be desired in practical arrangement, clearness of plan, and variety of scenery. He has not been so successful in his design for the principal entrance, which is heavy without strength, peculiar without individuality. However, his Main Building for Bavarian Industries, all his powerful originality is well illustrated. On the whole the designs are characterised by a quiet, imposing, individual treatment. A section has been devoted to measured drawings and models of old buildings, in order to awaken and intelligent interest in home architecture and local art and to revive the spirit that actuated old masters.—Next year Mannheim will celebrate the 300th anniversary of its founding. The town is peculiar in that it was totally destroyed by French incendiaries in 1689, so that no ancient buildings have survived. Furthermore, in 1864, its inhabitants numbered only 30,000, whereas in the last decade the numbers have suddenly risen to 160,000. This rapid growth involved great activity on the part of

architects, and hence the town shows a fine and most interesting collection of modern architectural works.—The new offices for the *Munich's Latest News* may be described as a gigantic concrete cast faced with stone. This building is but another example of the facility which ferro-concrete confers on planning, and is an instance of the æsthetic rendering of this material, which problem is one of the attractive tasks of modern art. No attempt has been made in the interior to disguise the material and to make it pass for what is erroneously called "a better class of work." Messrs. Heilmann & Littman were the architects of this building, which is a fine example of modern Munich architecture.—A large gymnasium lately opened in Munich was built from the designs of Herr Hertel at a cost of 160,000 marks. Although the greatest economy was practised and not a single ornament adorns the plastered brick building, its parts are so well grouped and it fits so well with its surroundings that it is a distinct acquisition to the neighbourhood.

BAVARIA.—According to the annual report of the British Consul (Mr. Buchmann) just received at the Foreign Office, the syndicate of South German cement works for the sale in common of their products yields satisfactory results. The cement industry, however, suffers like the rest of the Bavarian building trade, more especially from the stagnation in Munich, where, during the last two years building operations have reached their lowest level in consequence of unsound speculations and the erection of houses beyond the actual needs of the population. This is shown by the following record of new buildings erected in Munich in the years quoted, viz.:—1900, 679; 1901, 489; 1902, 375; 1903, 361; 1904, 156; 1905, 160. The population in 1900 was 499,930, whilst in 1905 it was 538,990. Matters were complicated by a strike and a lock-out of the Munich bricklayers and stonemasons in the summer of 1905, lasting nine weeks. In consequence of this many hundreds of men engaged in the building trade left Munich with their families. There are also building societies (Terrain-Gesellschaften) in Munich, with a capital of almost 3,000,000. Bricks in Bavaria cost from 11. 7s. to 11. 10s. per 1,000, carriage paid. The wages of Italian brickmakers rose in 1905 15 per cent.; those of German brickmakers 10 per cent. The Bavarian highlands provide Munich with building timber, which reaches the town by the river Isar in the form of rafts. The Bavarian granite industry suffers from keen competition, Sweden more especially importing the black variety, which, although getting worse in quality, increases in price. A new Bavarian company for the working of marble quarries near Tegernsee was formed in 1905 with a capital of 37,000.

STRAITS OF BELLE ÎLE, NORTH AMERICA.—A scheme is formulated by its promoters for constructing, opposite Point Amour, a tunnel, ten miles in length, beneath the Straits of Belle Isle between Labrador and Newfoundland, with the object of expediting railway transit between Quebec and the north-eastern coast and of shortening the voyage across the Atlantic. The Newfoundland Government have authorised the Newfoundland and Lake St. John Railway Company to make a line between the Straits and Blanc Sablon on the Canadian and southern side boundary of Labrador, and will, it is stated, subsidise the undertaking to the extent of \$75,000 per annum. The proposed line will run for a length of 30 miles through the island to Hare Bay, at the northern extremity, which is distant about 1,800 miles from Ireland. The cost of the tunnel is calculated at 1,200,000.

Miscellaneous.

PROFESSIONAL AND BUSINESS ANNOUNCEMENTS.—Mr. J. C. Traylen, architect and surveyor, 15, Broad-street, Stamford, has taken into partnership his son, Mr. H. F. Traylen, the practice being carried on under the style of "Traylen & Son," at the above address.—Mr. W. H. May, architect, of 10, Princess-square, Plymouth, has joined Messrs. Hine & Odgers, architects, and the firm will now be known as Messrs. Hine, Odgers, & May, architects and surveyors, 23, Lockyer-street, Plymouth.—An amalgamation has taken place between the Birmingham Guild of Handicraft, Ltd., and Gittins Craftsmen, Ltd., who will in future carry on the joint business under the name of the former company at 45, Great Charles-street, Birmingham, and at 7, Newman-street, Oxford street, London, W. The company retains the services of the directors, designers and principal craftsmen of both the amalgamated firms.

THE TOWER, WEMBLEY PARK.—The incomplete tower in Wembley Park is about to be taken down by Messrs. Heenan & Froude, of Manchester, who were the contractors for the building after a competition held seventeen years ago. Sir Edward Watkin projected the erection of a tower 1,200 ft. high, and laid out a park and pleasure-grounds at Wembley, near

Harrow. But no more than the first stage, reaching a height of 160 ft., was finished. The structure contains some 3,000 tons of steel, for the cutting of which into short lengths for smelting purposes shears are being erected in the park.

SLATE TRADE.—The imports of foreign slates for the quarter ending September 30 show a decrease, in value of 26,294, as compared with the corresponding quarter of last year. This decrease, combined with the increase in loading at the Carnarvonshire quarries, shows that Welsh slates are regaining their hold on the market, which they partially lost owing to high prices a few years ago.

WAR MEMORIAL, ARMAGH.—The public memorial erected in Armagh to the officers, non-commissioned officers, and men of the Royal Irish Fusiliers who fell during the South African War, was unveiled on October 6 by General Lord Grenfell. The subject represented is a trumpeter about to sound "The Last Post." The figure of bronze is about 7 ft. in height, and stands upon a granite base, which is about 12 ft. high. On three sides of the pedestal are engraved the names of those who were killed or died, while the front shows the badge of the regiment and the names of the different engagements in which it took part, with an inscription underneath. The bronze was designed and modelled by Miss Kathleen M. Shaw, R.H.A., and the granite base and pedestal were carved under her supervision by Messrs. Purdy & Millard, Belfast.

WOOD-PAVING, ETC., IN CHURCH-STREET, KENSINGTON.—The inhabitants of Church-street, having been pleased with the expeditious manner in which this work was carried out, resolved to show their appreciation by presenting a timepiece to Mr. Daniel Dennis Murphy, road foreman to Messrs. W. Griffiths & Co., Ltd., the contractors, and an umbrella to Mr. Hillier, the Kensington clerk of the works. The presentation took place at the Cathedral Church, Church-street, a large number of residents being present. Mr. Gardiner said he understood that Mr. Murphy had, in addition to carrying out the work in Church-street, also superintended the whole of the repaving of Holland-park-avenue, and he, Mr. Gardiner, himself an old resident and ratepayer, could testify to the excellent manner in which both the Holland-park-avenue and Church-street work had been carried out. The inscription on the timepiece was: "Presented to Daniel D. Murphy by a few tradesmen of Church-street as a token of appreciation of his expedition in relaying the wood-paving, etc., in Church-street, Kensington, Oct. 2nd, 1906."—Mr. Murphy expressed his thanks.

FOUNTAIN, HYDE PARK.—A fountain and bronze statue, sculptured by Countess Feodora Gleichen, which Sir Walter Palmer has presented to the nation, will be erected in Hyde Park under the superintendence of the Office of Works.

NEW BUILDINGS, Y.M.C.A. ASSOCIATION.—The Young Men's Christian Association has removed from Exeter Hall in view of the heavy outlay for structural alterations involved by the requirements of the London County Council. The National Council of the Association have opened a fund for the erection in London, at an estimated cost of at least 85,000, of a central memorial building to comprise a lecture-hall, library, classrooms, reading and writing rooms, restaurant, gymnasium, swimming-bath, residential quarters, etc. Meanwhile the sons of the late Sir George Williams, who founded the association sixty years ago, have presented to the Council the lease of No. 13, Russell-square, as their contribution towards the memorial to Sir George Williams, and for use as the headquarters of the Y.M.C.A. organisation and its largely increasing work.

UNIVERSITY HONOURS TO AN ENGINEER.—At Convocation held at Armstrong College, Newcastle-on-Tyne, a few days ago, the degree, *honoris causa*, of D.Sc. was conferred upon Mr. Charles A. Harrison, Engineer to the North-Eastern Railway Company.

WAR MEMORIAL IN ST. PAUL'S.—Field-Marshal Earl Roberts, on the 10th inst., unveiled the memorial which has been erected in the crypt of St. Paul's Cathedral to the memory of those members of the Middlesex Yeomanry who lost their lives in the South African war. The memorial is of Hopton Wood stone, with a bronze medallion, on which is represented a yeoman on horseback, with an inscription underneath. It is the work of Mr. Basil Gotto.

BREAKING-UP OF STREETS IN LONDON.—The Borough Engineer and Town Clerk of South-wark have prepared the following joint report upon the circular letter of the London County Council, asking whether the Borough Council would support them in promoting legislation to enable the London County Council to make regulations to govern the breaking-up of streets: "With regard to the proposal of the County Council that works carried out by different authorities and companies should, as far as possible, be executed simultaneously at certain times of the year, they are strongly of opinion that no general regulations for the breaking-up of

streets at one time over the whole of the Metropolis would be feasible or desirable. While in the West End there would be an endeavour to secure the carrying out of the works at other times than during what is known as the "London Season," such regulations would be impracticable in other parts of the Metropolis. Moreover the simultaneous breaking-up of streets would tend at present that equality of employment of labour during the whole year which is essential to mitigate the lack of employment from time to time. At the same time they regard the proposal of the County Council to obtain Parliamentary powers to make regulations to govern the breaking-up of streets as one that is highly desirable, provided the proposal of Westminster, that the regulations before being made should be subject to the approval of the Borough Councils, is adopted and subject to the following conditions:—

(1) That the administration of the regulations when made by the London County Council should be placed in the hands of the local authority. (2) That all notices of intention to break up roads or streets should be given to the local authority. (3) That the local authority should have power on receipt of notice to break up streets to fix within reasonable times the days and hours within which the work shall be carried out. (4) That the approval of the local authority of the carrying out of works should last for a definite limited period of time only. (5) That in the event of it being necessary for the road or pavements to be reinstated a second time after the completion of the works, the company or authority carrying out the works should be compelled to bear the expense of such reinstatement. (6) That all works should be carried out to the satisfaction of the local authority or their responsible official."

TUNBRIDGE WELLS.—The Town Council have agreed to promote a Bill in the course of the next Parliamentary Session for the purpose of acquiring, at an estimated expenditure of about 30,000, the chalybeate springs on the "Pantiles" and of preserving the purity of the waters. The medicinal properties of the springs were first discovered in 1606 by Dudley, Lord North, whilst a guest of Lord Abergavenny at Bridge Castle in the neighbourhood. Lord Abergavenny visited up the wells and laid out the parade and falks, now considerably modernised, as a place of popular resort. Samuel Richardson possessed a drawing, since engraved, of the Parade, with the upper and lower walks, as in 1748, with figures, identified in his own handwriting, of himself, Dr. and Mrs. Johnson, Mr. Pitt (Earl of Chatham), Miss Chudleigh (Duchess of Kingston), Nash, Garrick, Colley Cibber, Speaker Onslow, and Mr. (Lord) Lyttelton.

Legal.

STRAND BUILDING DISPUTE.

Is the Vacation Court, on the 17th inst., before Mr. Justice Baggallay Deane, the case of Draper v. Lorden was heard on a motion on behalf of the plaintiff to attach the defendant for alleged breach of an undertaking which he gave to Mr. Justice Buckley in the Chancery Division on August 10 last.

Mr. Macnaghten appeared in support of the motion, and Mr. Roskill, K.C., for the defendant. Mr. Macnaghten said the undertaking in question was to the effect that the defendant would not diminish the support enjoyed by certain houses in the Strand. It was during the previous week, as the plaintiff said, that the defendant had committed breaches of this undertaking, and on Saturday, the 13th inst., notice of motion for committal was served on the defendant. That morning five long affidavits had been filed on behalf of the defendant resisting the motion, and it was necessary that those affidavits should be answered on behalf of the plaintiff before the motion was heard before the court. In the circumstances he asked that the application should stand adjourned until the first motion day of next sittings.

Mr. Roskill opposed the adjournment. He said the defendant was a well-known gentleman in the building trade, and he had been served with the notice of motion for that day. The undertaking the defendant gave to Mr. Justice Buckley was that he was not to interfere with the support of the particular building save as required by proceedings under the London Building Act. In the affidavits filed by the plaintiff when he launched the present motion he simply stated that it was not necessary to pull down the front wall of a certain building in the Strand. He submitted that proceedings of that nature ought not to be taken on evidence of that kind, and he opposed any adjournment of the motion.

In the result his lordship said he could not hear the motion on the present materials, and adjourned the same until the first motion day next sittings.

Order accordingly.

UNAUTHORISED DRAINS.

A BIRMINGHAM builder named Edward Airy was fined on the 15th inst. for offences against the Corporation by-laws. The stipendiary, in delivering judgment, said that two summonses had

LEGAL.—Continued on page 468.

List of Competitions, Contracts, etc.

For some Contracts still open, but not included in this List, see previous issues. Those with an asterisk (*) are advertised in this Number: Competitions, iv.; Contracts, iv. vi. viii. x.; Public Appointments, xvi. xvii.; Auction Sales, xxvii.

Certain conditions, beyond those given in the following information, are imposed in some cases, such as: the advertisers do not bind themselves to accept the lowest or any tender; that a fair wages clause shall be observed; that no allowance will be made for tenders; and that deposits are returned on receipt of a bon-fide tender unless stated to the contrary.

Competitions.

*** DECEMBER 31. — Wolverhampton. — NURSES' HOME.**—The Wolverhampton and Staffordshire General Hospital Committee, Wolverhampton, invite tenders for a nurses' home, to be erected on the site adjoining the hospital, Wolverhampton. The site available may be seen, and all information obtained, on application to Mr. J. S. Neil, House Governor and Secretary, to whom designs must be delivered on or before December 31.

*** SUNDARLAND. — CHILDREN'S HOSPITAL.**—The Sunderland Infirmary invite designs for a children's hospital at The Barges, Sunderland. Plans must be submitted to the architect, Mr. J. H. Thompson, 30, Market Street, Sunderland, by October 25. Instructions to competitors, and lithographed plans of the site, may be obtained from Mr. T. Robinson, Secretary, Infirmary Offices, Bank Buildings, Sunderland, on deposit of 10s. Designs to be delivered at the offices of the Secretary before noon on February 1, 1907.

Contracts.

BUILDING.

OCTOBER 22. — Dublin. — URINALS.—Dublin Improvement Committee invite tenders for the supply of two four-stall urinals, made of cast iron, and fitted with white enamelled fireclay stalls, between the streets, 100, 30, and 22, are offered. Instructions to competitors, and lithographed plans of the site, may be obtained from Mr. T. Robinson, Secretary, Infirmary Offices, Bank Buildings, Sunderland, on deposit of 10s. Designs to be delivered at the offices of the Secretary before noon on February 1, 1907.

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OCTOBER 22. — Georgetown. — ALTERATIONS TO SCHOOLS.—Monmouthshire Education Committee invite tenders for certain alterations and repairs required to Georgetown (Tredegar) Junior Mixed and Infants' Central School, Monmouth. Plans and specification may be seen either at the office of Mr. David Morgan, F.R.I.B.A. (Messrs. James & Morgan), architect, Charles Street, Cardiff, or at any office of Messrs. Morgan, James & Morgan, C.C. Offices, Newport, Mon., not later than October 22.

OCTOBER 22. — North Ormesby. — ALTERATIONS, ETC., TO HOSPITAL.—For certain alterations and additions to the existing hospital buildings, names and addresses on or before October 22, to the architect, Mr. J. H. Thompson, 30, Market Street, Sunderland, by October 25.

OCTOBER 23. — Belfast. — ALTERATIONS TO DISPENSARY.—Belfast Guardians invite proposals for making alterations and additions to the Dispensary, Lorettoville, Springfield-road, Belfast, in accordance with plan and specification, which may be seen at the office of Mr. Joseph W. Robb, Clerk of the Union, Clerk's Office, Union Workhouse, Tenders, endorsed "Alterations to Dispensary," to be lodged in the tender box, board-room, before 12 o'clock noon on October 23.

OCTOBER 23. — Salford. — ROOMS. — Salford Corporation invite tenders for the removal of existing buildings and the erection of a recreation room at the rear of the Branch Library in Greengate, Salford. Drawings may be seen, forms of tender and combined specification and bill of quantities obtained, at the Borough Engineer's Office, Town Hall, Salford. Tenders, endorsed "Recreation Room, Greengate," addressed to the Chairman of the Museum Committee, must be delivered to Mr. L. C. Evans, Town Clerk, Town Hall, Salford, not later than 4 p.m. October 23.

OCTOBER 24. — Bathdown. — SLATING, REPAIRS, ETC.—Bathdown Board of Guardians will, at their meeting on October 24, receive tenders for keeping in order, for a period of one, two, or three years, as may be decided, the exterior slating of all the workhouse buildings, repairs of chimneys, etc., also eave gutters and down-pipes. The Master of the Workhouse will afford any information required to enable parties to tender. Sealed tenders, addressed to the Chairman of the Slating, Repairs, etc., must be deposited in the tender-box here not later than 12 o'clock noon on the above-named day (Clerk's office, Loughlinstown).

OCTOBER 24. — Whitehead. — WORKMEN'S HOUSES, ETC.—The Midland Railway Company (Northern Counties) invite tenders for the erection of the Whitehead, Whitehead, and Whitehead, four workmen's houses, stables for four horses. Copies of drawings and specification may be obtained on payment of 10s. to the Borough Engineer's Office, Town Hall, Salford. Tenders, endorsed "Tender for Houses at Whitehead," and "Tender for Stables, Whitehead," must be delivered to Mr. J. H. Thompson, 30, Market Street, Sunderland, by October 24, not later than 10 a.m. on October 24.

OCTOBER 25. — Halifax. — MECHANIC'S SHOP.—The erection of mechanic's shop at Highroad Well, Halifax. Plans may be seen, and bills of quantities obtained, at the offices of Messrs. Jackson & Fox, architects, 7, Rawson-street, Halifax, from October 18 to 25, on which last-named day sealed tenders must be delivered here not later than 12 noon.

OCTOBER 25. — Horsham. — ADDITIONS TO SCHOOL.—West Sussex Local Education Authority invite tenders for extending the cloak-room accommodation to the boys', girls', and infants' departments. Plans, specifications, and conditions of contract may be seen, and forms of tender obtained, at the offices of Mr. C. H. Burslow, architect, 6, West-street, Horsham. Tenders, sealed and endorsed "Tender for Extension at East Parade Council Schools," to be addressed and delivered to Mr. Lionel Thompson, Secretary, Education Offices, West-street, Horsham, not later than 12 o'clock noon on October 25.

OCTOBER 25. — Kendal. — ALTERATIONS.—Pulling down a wing and alterations and additions at Eller Bank, Kendal, for William Taylor, Esq. Bills of quantities and all particulars from October 18 to 25, on application to Mr. Stephen Shaw, F.R.I.B.A., architect, Kendal.

OCTOBER 25. — Ovensend. — ENGINE-HOUSE, ETC. For masons, joiners, plumbers, and slaters trades required in the erection of an engine-house, conveniences, etc., to Holmfild Mills, Ovensend. Plans and particulars may be seen, and quantities obtained, at the offices of Mr. Lister Coates, A.R.I.B.A., architect, Central Chambers, 10, Central-street, Halifax, from October 19 to 25.

OCTOBER 26. — Merthyr Tydfil. — ALTERATIONS TO HOTEL.—For extensive alterations and additions to the Vulcan Hotel, Merthyr Tydfil. Plans and specifications may be seen at the office of Mr. Arthur Lloyd Thomas, A.M.Inst.M.E., engineer and architect, Church Street-chambers, Pontypridd. Sealed and endorsed tenders to be sent to a clerk on or before October 26.

OCTOBER 27. — Bagworth. — SCHOOL ENLARGEMENT.—Leicestershire C.C. Education Committee invite tenders for the enlargement of Bagworth Council School, together with out-offices, drainage, and other works connected therewith. Conditions of contract, quantities, and form of tender may be obtained from the Architect, Mr. J. F. J. Goodacre, Berridge Street Chambers, Berridge Street, Leicester, on payment of a sum of 2s. Sealed tenders, upon the forms supplied, to be sent in the envelopes provided to office of Mr. W. A. Brockington, Director of Education, County Education Office, 33, Bowling Green-street, Leicester, not later than 10 a.m. on October 27, addressed to "The Chairman of the Buildings and Sites Committee."

OCTOBER 27. — Great Eastwood. — ALTERATIONS, ETC.—Essex Education Committee (Billerica) Advisory Sub Committee invite tenders for structural alterations and additions to the Council School, Great Eastwood. Plans, specifications, and form of contract may be inspected at the office of the Architect, Mr. Frank Whitmore, 33, Duke-street, Chelmsford, between the hours 10 a.m. to 4 p.m. on any day except Saturday. Builders desirous of tendering must send in their names and addresses to the architect at once. Sealed tenders, endorsed "Tender for Great Eastwood School Alterations," should be sent to Mr. F. W. Bittles, Clerk, Brentwood, not later than October 27.

OCTOBER 27. — Kibworth and Little Bowden. — SCHOOLS.—Leicestershire C.C. Education Committee invite tenders for the erection of Council Schools at Kibworth and Little Bowden, together with out-offices, drainage, and other works connected therewith. Conditions of contract, quantities, and form of tender, may be obtained from the Architects, Messrs. Coates & Johnson, Bank Chambers, Market Harborough, on payment of a sum of 2s. Sealed tenders, upon the forms supplied, to be sent in the envelopes provided, to office of Mr. W. A. Brockington, Director of Education, County Education Office, 33, Bowling Green-street, Leicester, not later than 10 a.m. on October 27, addressed to "The Chairman of the Buildings and Sites Committee."

OCTOBER 29. — Farnworth. — SCHOOL.—The Farnworth Education Committee invite tenders for the erection of a new public elementary school, in Plodder-lane, Farnworth. Bills of quantities may be obtained on written application, to Mr. H. Roston, Secretary of Education, Education Office, Parley Street, Farnworth, near Bolton, on payment of a deposit of 10s. Sealed tenders must be delivered before 12 o'clock noon, October 29, sealed and endorsed, to the Secretary.

OCTOBER 29. — Holbeck, Leeds. — ALTERATIONS TO WORKS.—Tenders for Erection of proposed alterations and additions to works and offices for Messrs. Frank Horsell & Co. Limited, Holbeck, Leeds. Names to Mr. James Fraser, architect, Leeds. Drawings and specification can be seen, and bills of quantities obtained, on payment of a deposit of 10s. Sealed tenders must be delivered to the architect before 10 o'clock noon, October 29.

OCTOBER 29. — Nottingham. — SCHOOL. ALTERATIONS.—The Education Committee invite tenders for alterations, etc., at the All Saints' School, Fore-street, West. Plans may be seen, and bills of quantities obtained, at the office of the Architect, Mr. Frank B. Lewis, Guildhall on payment of a deposit of 10s. Sealed tenders, endorsed "Tender for alterations, etc., at the All Saints' School, Fore-street, West," addressed to Mr. W. J. Abel, Clerk, Offices, Victoria

street, properly endorsed, to be delivered at his office not later than 10 a.m. on October 29.

OCTOBER 29. — Outlane, Huddersfield. — WALL.—Huddersfield Guardians invite tenders for the erection of a boundary wall, at the Children's Homes, Outlane. Plan and specifications may be seen at the office of Mr. E. A. Rugby, Clerk to the Guardians, Union Offices, Ramsden-street, Huddersfield, on application, and sealed tenders must be sent in not later than noon on October 29.

OCTOBER 30. — Rhondda. — ALTERATIONS TO HOSPITAL.—Rhondda U.D.C. invite tenders for alterations and additions to the Isolation Hospital, Ystrad, Rhondda, including the erection of a pavilion, combined convalescent and discharging block, and additions to the present administrative block, laundry, and stable blocks. Plans and specification may be seen, and bills of quantities and tender forms obtained, at the office of the Architect, Mr. W. D. Morgan, Post Office Chambers, Penryn, upon the production of a receipt for a deposit of 2s. 6d. from the Accountant of the Council. Sealed tenders, endorsed "Tender for Hospital Extensions," must be delivered before noon on October 30, at the Council Offices, Penryn, Rhondda, addressed to "The Chairman of the Health Committee, Rhondda Urban District Council."

*** OCTOBER 31. — Hammersmith. — ALTERATIONS.**—The Hammersmith E.C. invite tenders for carrying out certain alterations and additions at No. 96, King-street, Hammersmith. Plans of the intended works may be seen, and copy of the specification, with the form of tender, can be obtained, on application to Mr. H. Mair, Borough Surveyor. Sealed tenders, endorsed "Tender No. 96, King-street," must be delivered to Mr. H. Mair, Thompson, Town Clerk, Town Hall, Hammersmith, before 6 p.m. October 31.

OCTOBER 31. — Woolwich. — DIVING-BELL.—The Guardians of the Woolwich Union invite tenders for a new women's dining-hall at the Union House, High-street, Plumstead. The plans and specifications can be inspected at the office of the Board's Architect, Mr. J. O. Cook, 14, Ecanor-road, Woolwich, where copies of the quantities can be obtained on the payment of 1s. 10s. deposit. Tenders must be sent to Mr. Tom Taylor, Clerk to the Guardians, not later than 4 p.m. on October 31, at No. 30, Rectory-place, Woolwich.

NOVEMBER 1. — High Spenn. — Cottages. The Consett Iron Company, Ltd., invite tenders for the erection of thirty-nine cottages at High Spenn. Plans and specifications may be seen, and quantities obtained, upon application to the company's architect, Mr. Chas. F. Oliver, at the General Offices of the company at Consett. Tenders, addressed to the Consett Iron Company, Ltd., and endorsed "Tender for Cottages," must be delivered on November 1, 1906.

NOVEMBER 3. — Norderph (Upwell). — CONVERSION OF HOUSE INTO COTTAGES.—For the conversion of house into two cottages and drainage and sub-division of yard and buildings, also fencing, grass land at Chapel Farm, Norderph. Plans and specifications and conditions of contract may be seen at Mr. E. C. Warner's, at Norderph. Tenders, in sealed envelopes, must be delivered to Mr. Christopher Davies, Deputy Clerk of the Norfolk C.C., 11, Prince of Wales-road, Norwich, on or before November 3 next, and endorsed "Norderph—Tender."

NOVEMBER 5. — Dublin. — HOUSE.—Great Northern Railway Company (Ireland), invite tenders for the erection of a stationmaster's house at Sixmile Cross Station. Parties wishing to tender for the work can see the drawing and specification at the office of Mr. W. H. Mills, Engineer-in-Chief, Amiens-street, Dublin, or copies of them at the office of the District Engineer, Belfast; and forms of tender can be obtained at either of the above-mentioned places on payment of 1s. each (not returnable). Tenders, made out on the forms supplied by the Company, and endorsed "Tender for Stationmaster's House," should be delivered to Mr. T. Morrison, Secretary, Secretary's Office, Amiens-street, Dublin, not later than 10 a.m. on November 5.

*** NOVEMBER 6. — Colchester. — ASYLUM.**—The Visiting Committee of the Essex County Lunatic Asylum invite tenders for the foundations of the main building to be erected at Mile End, about one and a half miles north of Colchester Main Line Railway Station. Plans, specification, agreement, etc., may be seen at the County Asylum Offices, 4, Duke-street, Chelmsford, on and after October 15. Contractors must send names and addresses at once to Mr. W. P. Gepp, Clerk to the Visiting Committee, Chelmsford, with a deposit of 20s. when a copy of the quantities will be sent. Sealed tenders, endorsed "Tender for Foundations, New Second Asylum, Colchester," to be sent to the last mentioned not later than November 6.

*** NOVEMBER 12. — Surrey. — ADDITIONS, ETC., TO AN ASYLUM.**—The Asylums Committee of the E.C.C. invite tenders for the erection of two acute blocks and rebuilding nurses' block at Manor Asylum, Epsom, Surrey. Instructions and form of tender, with contract and specification, can be obtained from the Clerk of the Committee, 6, Waterloo-place, S.W. Plans may be seen at same address on and after October 19, between 10 a.m. and 4 p.m. (Saturdays 10 and 11 p.m.). Tenders, sealed, and endorsed "Tender for New Buildings, Manor Asylum," to be delivered at the Clerk's Office, not later than noon on November 12.

NOVEMBER 20. — Cleveland. — SCHOOL.—Lancashire Education Committee invite tenders for the

erection of a new public elementary school at Clevellys (near Ectwood) to accommodate 350 scholars. The plans may be seen, and bills of quantities obtained, at the office of the County Architect, Mr. Henry Little, 16, Riddlesdale place, Preston, by payment of a deposit of 2s. Tenders must be delivered before 12 o'clock noon on November 20, sealed and endorsed, to Mr. H. Stonestreet, Education Offices, Blackiston street, West, Ectwood.

No DATE.—Grosport.—COTTAGE.—Tenders are invited for renovating and raising a cottage, at Fairhead, Grosport. Apply personally to William Schuch, Ingleside, Grosport.

No DATE.—Leeds.—ADDITIONS TO FARMSTEAD.—For additions to farmstead at Leatholm, Yorkshire, for Sir Francis Ley, Bart., comprising two loose boxes, cart shed, tool house, and granary. Written application for the quantities to Ridgway & Smith, architects, Long Eaton, near Nottingham, together with a deposit of 1s. 1s.

No DATE.—Leeds.—CLASS-ROOM.—Leeds Education Committee invite tenders for the whole of the works required (in one tender) for the erection of an additional class room at the Cross Stamford-street Council School. Apply to the Architect, Mr. W. S. Brathwaite, Education Offices, Leeds, for quantities.

No DATE.—Liverpool.—SHOPS.—Tenders are invited for the whole or separate parts required for the erection of four shops, New Market street, Liverpool, for Mr. R. Dilworth. Plans, specifications, and other particulars may be obtained on application to Messrs. J. W. Grundy & Son, architects and surveyors, Central Buildings, Liverpool.

ENGINEERING, IRON, AND STEEL.

OCTOBER 20.—Sudbury.—CORNISH BOILER.—The Sudbury (Suffolk) Board of Guardians invite tenders for the supply and fixing of a Cornish boiler, 12 ft. in length by 5 ft. 6 in. in diameter, suitable for a daily working pressure of 80 lb. to the square inch, fitted with double deadweight safety valve, blow off cock, stop valve, steam gauge, water gauges and fittings, fusible plug and manhole, dumper, frame, two soot doors, cover-plate, and bearings for blow-off pipe. Present boiler is to be removed and allowed for. Specifications will be on view at the Union Workhouse, where site can be inspected, between the hours of 9 a.m. and 5 p.m., or copies may be obtained from Mr. C. Canham, Clerk to the Guardians, 68, Friar street, Sudbury, Suffolk, upon payment of the sum of 1s. 1s. Tenders to be sent on or before noon on October 20.

OCTOBER 20.—Wellingborough.—PUMPING MACHINERY.—Wellingborough U.D.C. invite tenders for pumping machinery, viz. engine and suction gas pump required for their pumping station at Bushfields Waterworks. Plans and specifications may be obtained at the office of Mr. E. Y. Harrison, A.M.I.C.E., surveyor and civil engineer, Park road, Wellingborough, on payment of a deposit of 2s. 2s. Sealed tenders, on the prescribed form, endorsed "Tender for Pumping Machinery," to be delivered to office of surveyor by noon on October 20.

OCTOBER 23.—Bethnal Green.—FURNACE.—Bethnal Green Borough Council invite tenders for the erection of an additional furnace in connection with dust-screening apparatus at Marian-square. Plans and specification can be seen and form of tender obtained, upon application to the Borough Engineer and Surveyor, at the Town Hall, Church Lane, Bethnal Green, between the hours of 10 a.m. and 4 p.m. Tenders, sealed, and endorsed "Furnace," must be delivered to Mr. Robert Voss, 1, Watling Town Hall, Watling, London, E., not later than 12 o'clock on October 23.

OCTOBER 23.—London.—UNDER WORK.—The Secretary of State for India, a Council invites tenders for the supply of bridge, of 20 ft., 40 ft., and 60 ft. spans. 1. Conditions of contract may be obtained on application to the Director-General of Stores, India Office, Whitehall, S.W., and tenders are to be delivered at that office by 2 o'clock p.m. on October 23.

OCTOBER 23.—Manchester.—RAILWAY WORK.—Manchester Corporation and Tramways Committee invite tenders for the strengthening of Phillips Park Road Bridge over the Ashton Canal. Drawing may be seen, and specification, bill of quantities and form of tender obtained, on application to the City Surveyor's Office, Town Hall, Manchester, on payment to the City Treasurer of 2s. 2s. All cheques or postal orders are to be made payable to the order of "The Corporation of Manchester." Tenders, enclosed in the official envelope, and addressed to the Chairman of the Improvement, etc., Committee, to be delivered at the City Surveyor's Office not later than 10 a.m. on October 23.

OCTOBER 23.—Warrington.—TRAMWAY TRACK.—Warrington Electricity and Tramways Committee invite tenders for the maintenance of the paving on the tramway track for a period of twelve months. Specification and form of tender can be obtained on application to Mr. F. V. L. Mathias, Borough Engineer and Tramways Engineer, 10, Howley, Warrington. Tenders, addressed to "The Chairman of the Electricity and Tramways Committee," Town Hall, Warrington, must be sealed with wax, and endorsed "Tender for Paving," and delivered not later than 12 o'clock noon on October 23.

OCTOBER 24.—Southwark.—HEATING.—The installation of heating apparatus and other alterations and repairs to the Southwark Church Sunday School. A plan may be seen, and bills of quantities obtained, at office of Messrs. and J. C. Fox, architects, 7, Rayson-street, Holfax, from October 19 to 24, on which last-named day sealed tenders must be delivered not later than 4 p.m.

OCTOBER 25.—Bournemouth.—CONCRETE PAVING.—The Bournemouth Town Council invite tenders for the construction of sea-wall, undercliff drive, and other works in connection therewith. Full particulars, and form of tender, can be obtained, and plans may be seen, at the office of the Borough Engineer, provided that a 10s. Bank of Eng. and note has been previously deposited with him. Tenders to be sent, in envelopes provided for the purpose, to the Town Clerk, Mr. Geo. Wm. Bailey, on or before 10 a.m. of October 26, to Mr. F. W. Lacey, M.I.C.E., Borough Engineer, Municipal Offices, Bournemouth.

OCTOBER 27.—Bridlington.—ROAD WORKS.—The Bridlington R.D.C. invite tenders for the diversion and improvement of the Bridlington and Flamborough roads, over Duns, Dyke, and Flamborough, specification may be seen, and forms of tender obtained, on application to Mr. Alfred Beaumont, C.E., County Hall, Beverley, or Mr. J. H. Thompson, Clerk to the Bridlington R.D.C., Board-room, Offices, Long-lane, Bridlington. Endorsed tenders to be sent on or before October 27, first post, to Clerk.

OCTOBER 29.—St. Blazey.—HEATING.—The Trustees of the St. Blazey Wesleyan Church invite hot-water engineers to submit systems of heating the church and premises by hot water. Particulars, together with prices, to be sent, on or before October 29, to Mr. David Rowe, Hon. Secretary of Trustees, 20, Fore street, St. Blazey, Cornwall.

OCTOBER 31.—Lowestoft.—DESTRUCTIVE WORKS.—Lowestoft Town Council invite plans, specifications, and tenders for two additional cells and the necessary structural alterations that may be required to their destructor. Firms wishing to tender can obtain a ground plan of the existing works, and all other information, upon application to office of Mr. E. J. Hamby, A.M.I.C.E., Borough Surveyor, Town Hall, Lowestoft. The tenders, under cover, sealed and addressed to the Chairman of the Sanitary Committee, to be sent in to Surveyor not later than October 31.

NOVEMBER 1.—Portlary.—Pier.—The Council of the Administrative County of Down invites sealed tenders for the construction of a pier at Portlary, in accordance with the drawings and specifications of the County Surveyor, at a cost not exceeding 450l. Copies of the plans and specifications can be seen at the County Courthouse, Downpatrick, between 10 o'clock a.m. and 4 o'clock p.m. Tenders must be sent in on forms, obtained at office of Mr. Robert MacCallum, Secretary to the C.C. Council Offices, Courthouse, Downpatrick, and are to be endorsed "Tender for Portlary Pier." Specifications will be received until 3 o'clock p.m. on October 31, and parties sending in tenders will require to be in possession of the tenders and specifications at the Council Chamber, Courthouse, Downpatrick, on November 1, at 10.30 o'clock a.m., to enter into a bond for the due performance of the work.

NOVEMBER 1.—Swinton and Pendlebury U.D.C.—Electricity Committee invite tenders for the following work in connection with their electrical undertaking.—Contract No. 1.—Sub-station building, at the site of the Low-tension direct-current switchboard, Contract No. 3.—Mains, Contract No. 4.—Direct-current electricity meters. Forms of tender and specifications may be obtained on payment of 1s. 1s. from the Clerk to the Council, Council Offices, Swinton, Manchester. Tenders, in sealed envelopes, delivered to the Chairman of the Electricity Committee of the Swinton and Pendlebury U.D.C., Council Offices, Swinton, Manchester, not later than noon on October 20.

NOVEMBER 10.—Glasgow.—MOTOR FIRE PUMPS.—Glasgow Corporation invite tenders for the supply of two motor fire pumps required for the fire department. Full particulars may be obtained on application to the Chief Officer of the Brigade, Central Fire Station, Buchanan-street. Sealed tenders, marked outside "Tender for Motor Fire Pumps," to be lodged with Mr. W. W. Miles, Town Clerk, City Chambers, Glasgow, on or before November 10.

NOVEMBER 14.—Leeds.—PUMPING ENGINE.—Leeds Sewerage Committee invite tenders for two sets of combined engines and centrifugal pumps for pumping crude sewage from the main sewer into precipitation tanks at Knostrop Sewage Works. Copies of drawings, conditions of contract, and form of tender may be obtained at the office of the Borough Engineer (Mr. Geo. A. Hart), Municipal Buildings, Leeds, on deposit of 2s. 2s. Tenders to be addressed to the Town Clerk, Leeds, and endorsed "Tender for Pumping Engine at Knostrop," not later than 10 a.m. on November 14.

NOVEMBER 15.—Belfast.—UNDERGROUND CONVEYANCE.—Belfast Corporation Committee invite tenders for the construction of an underground conveyance in Donegal Square North. Drawings, specification, and form of tender may be obtained at the City Engineer's Office, on payment of 1s. 1s. Tenders, endorsed "Underground Conveyance," to be lodged in office of Mr. Samuel Black, Town Clerk, before 10 o'clock on November 15.

NOVEMBER 17.—Radcliffe.—PERMANENT WAY.—Radcliffe U.D.C. invite tenders for the construction of permanent way, including copper bonding, of about one and a half miles of single line. Drawings can be inspected, and copies of general conditions of contract, specification, and bill of quantities obtained, on application to Mr. W. L. Rothwell, Engineer to the Council, on payment of a deposit of 2s. 2s. Sealed tenders, endorsed "Tramways Extension," must be delivered to Mr. J. Mills, Clerk to the Council, Council Offices, Radcliffe, on or before November 17.

DECEMBER 23.—Antwerp.—PLANT AND MACHINERY.—The Mayor and Councillors of Antwerp give notice that a public meeting will be held at the Hotel de Ville on December 22, 12 noon, for the purpose of receiving sealed tenders for the construction of lots, to equip the new Town Docks with plant and machinery. Lot 1.—Machinery and fittings for the central station. Deposit required, 25,000 francs. Lot 2.—Supply of forty cranes. Deposit required, 40,000 francs. Lot 3.—Supply of forty cranes. Deposit required, 40,000 francs. Lot 4.—Laying down necessary pipes and mains. Deposit required, 6,000 francs. Plans and specifications are deposited at the Office 4 and at the Secretary's Office, Hotel de Ville.

NO DATE.—Barking.—REMOVAL OF TRANSPORTER.—For the removal of a transporter, and a transporter erected at Barking, a structure comprising a railway of steel, angle and girder section.—K. care of Messrs. F. W. Lacey, Architects, London, E.C.

NO DATE.—Farnborough.—HIGHWAY VENTILATING.—The Corporation of Eccles desire estimates, etc. for the heating and ventilating of the new school in Leicestershire, Farnborough. Plans and particulars may be obtained from Mr. John H. Russell, architect, 100, King-street, Manchester, on payment of a fee of 10s.

NO DATE.—Salford.—HEIGHING, RESERVOIR

BANKS.—The Winterbottom Book Cloth Company Ltd., Salford, invite tender for excavators and concrete work to increase the height of the banks of a reservoir at the Broadbottom Dyke Works, Salford. For copy of bills of quantities write to Mr. Stephen Kemp, 6, Princess-street, Manchester.

MISCELLANEOUS.

OCTOBER 20.—Doddworth and Old Goole.—FURNITURE.—Messrs. Ridgway & Smith, Education Department, invite tenders for certain furniture required for the Doddworth Provided School and Old Goole Provided School. Full particulars may be obtained from Mr. J. H. Thompson, Clerk to the Education Department, 10, Wakefield, Tenders must reach the County Hall, not later than October 20.

OCTOBER 22.—Pontypridd.—CABLE, ETC.—Pontypridd U.D.C. invite tenders for the supply, delivery, and putting to work of about 2,205 yds. of 75 single traction return and pilot cable, paper insulation. Specification, general conditions, and form of tender may be obtained on application to Mr. J. H. Teasdale, A.M.I.C.E., Electrical and Tramways Engineer, upon payment to Mr. J. Coleman Jones, Clerk to the Council, Municipal Buildings, Pontypridd, of deposit of 2s. 2s. Tenders, on the prescribed form, sealed, and endorsed "Tender for Cable," must be received by the Clerk on or before October 22.

OCTOBER 22.—Ware.—GRANITE SLABS.—The Guardians of the Ware Union invite tenders for the supply of 140 tons of Guernsey granite slabs, to be delivered at the Education Workhouse, Ware. Tenders, endorsed "Tenders for Granite Slabs," must be sent to Mr. Geo. H. Gishy, Clerk to the Board, not later than October 22.

OCTOBER 23.—Sedgefield.—SCAVENGING.—Sedgefield R.D.C. invite tenders for the removal of house refuse and the emptying of ashpits, ash-closets, and privies in the Trimdon and Mansfield Townships for one year, from 1st January 1907. Further information, and forms of tender may be obtained at the office of Mr. G. S. Thompson, Inspector to the Council, Eddon-terrace, Ferryhill Station, and sealed tenders, endorsed "Sedgefield Scavenging," must be delivered to Mr. J. W. Lodge, Clerk to the Council, West End, Sedgefield, not later than October 23.

OCTOBER 23.—Hampton.—RIFLE RANGE.—The Hampton and Hafford Hill Rifle Club invite tenders for the construction of a miniature rifle range, adjoining the allotments in London road, Hampton. Plans and specifications can be seen at Mr. Barker's, Chemist, Hampton. Tenders to be delivered, sealed, to the Secretary, Mr. Charles A. Brett, 42, Abchurch-lane, Hampton, not later than October 29.

OCTOBER 23.—Leeds.—BROOMS.—Leeds Markets Committee invite tenders for supply of brooms for scavenging for twelve months. Samples may be seen at the Superintendent's Office, Kirkgate Market, Leeds. Endorsed "Brooms," with marked samples, to be delivered at office of Mr. Robert E. Fox, Town Clerk, not later than 10 a.m. on October 29.

OCTOBER 23.—West Ham.—SUPPLY OF TIMBER.—The Education Committee of the County Borough of West Ham invite tenders for the supply of timber for use in the Manual Instruction Centres under the control of the Council from November 1, 1906, to March 31, 1907. Full particulars and copy of specification may be obtained from Mr. E. L. H. W. Stratford, E. Tenders in the envelopes supplied must be returned not later than 12 noon, October 29.

OCTOBER 29.—Wigston Magna.—SCAVENGING.—Wigston Magna U.D.C. invite tenders for the cleansing of earth closets, privies, ashpits, cesspools, removal of refuse from premises, the cleansing of streets and of street refuse, etc., in South Wigston (Lassett and Fairhead Wards). See certain houses in Glen Parva Parish, from November 1, 1906, to March 31, 1907. Particulars of the duties can be ascertained from Mr. J. J. Clark, Sanitary Inspector to the Council, Baby-sing, Wigston Magna. Tenders, marked "Scavenging," must be sent to Mr. J. J. Clark, not later than 10 a.m. on October 29.

OCTOBER 29.—Woodford.—FURNISHING.—Woodford U.D.C. invite tenders for the supply of furniture for their new offices at Woodford Green. Specifications and full information may be obtained from Mr. John Simpson, Clerk to the Council, on deposit of the sum of 1s. 1s. Sealed tenders, endorsed "Tender for Furnishing," to be delivered not later than 10 a.m. on October 29.

OCTOBER 29.—Caeraru.—SANITARY FITTINGS, PLUMBING, ETC.—Llandaff and Dinas Powys R.D.C. invite separate tenders for:—(1) Sanitary fittings and internal plumbing; (2) telephones and electric bells. Tenders for the Sanitary Engineer's Hospital now in course of erection at Caeraru, near Cardiff, specifications may be seen, and bills of quantities obtained, on application to Mr. J. H. James, Architect, 10, St. James's, Cardiff. Tenders, sealed and endorsed, to be sent to Mr. H. W. Jones, Clerk to the Council, Park House, Cardiff, not later than 10 a.m. on October 29.

OCTOBER 29.—Southampton.—PAINTING.—Dartmouth Education Committee invite tenders for the painting, colouring, etc., of the South Hutton Hall. Specifications and forms of tender may be obtained from the Secretary for Elementary Education, 11, St. John's, Southampton. Tenders should be forwarded, endorsed "Painting, South Hutton Council School," not later than October 27.

ROADS, SANITARY, AND WATER WORKS.

OCTOBER 20.—Bangor.—ROADS.—For making and completing three roads at Bangor, for Lord Bangor, Mr. J. H. Russell, Architects, 100, King-street, Belfast. Tenders to be lodged not later than October 21.

OCTOBER 27—**New Shoreham.** FLINTS, ETC. New Shoreham U.D.C. invite tenders for the supply of

about 500 yds. of hand-picked surface flints broken to pass through a 2 in. ring, to be delivered about middle of November, in quantities of not less than 40 yds. per day. Further particulars and forms of tender can be obtained from Mr. A. W. Nye, Town Surveyor, Town Hall, Shoreham. The Council also invite tenders for hire of steam roller in November. Particulars and forms of tender can be obtained from Mr. A. W. Nye, Town Surveyor, Town Hall, Shoreham. All tenders to be delivered to Mr. Harold Brown, Clerk to the Council, Council Offices, Shoreham, on or before October 27.

OCTOBER 30. — FARNHAM. — GRANITE. — Farnham U.D.C. invite tenders for the supply and delivery, in 50-ton lots, at Farnham, Surrey, Railway Station, of about 800 tons of Quenest granite, broken to pass a ring of 14 in. internal diameter. Tenders to be on forms to be provided by the Council, which forms may be had on application to the Council's Surveyor, Mr. R. W. Cass, Council Offices, South-street. Sealed tenders, on prescribed form, sealed, and endorsed "Tender for Granite" on outside cover, to be delivered to Mr. Richard Mason, Clerk, 95, West-street, Farnham, on or before 4 o'clock p.m. on

October 30. The Council are also prepared to consider, under the conditions as to tendering, tenders for the supply and delivery of Guernsey granite.

NOVEMBER 3. — DUBLIN. — SPONGE. — Great Northern Railway Company (Ireland) Directors invite tenders for the supply of the undecompositioned stores for twelve months, from January 1 to December 31, 1907. Butter blocks, caps, hammer handles, etc.; brass fittings for gas and water, rain water pipes, etc.; brass and copper sheets, plates, tubes, wire, tin, spelter, etc.; cement, plaster of Paris, slates, sewer pipes, fire bricks, etc.; colours; chain; castings (ordinary iron), forgings, ironmongery, crucibles, and cylinders; carriage and wagon axle guards, buffers, etc.; edge tools, saws, files, tool steel, and implements; galvanised sheet iron, buckets, emery, grindstones, etc.; glass, and lamp chimneys; hinges (wrought iron), locks, keys, and hardware (brass and iron); india-rubber goods, and loco packing; iron tubes, fittings, wire, and wire work; iron and brass screws, split pins, coach screws, etc.; iron bars, plates, angles, tees, and forgings (best Staffordshire and Yorkshire); lead (sheet, pig, white lead, etc.); nails; oil (cresosote);

oil (burning, lubricating, etc.); permanent way fastenings; pressure gauges for steam and vacuum brake; rope, twine, and flax; steel axles and tyres; steel reversal block and diamond crossings and ball-head switches, steel boiler plates, angles, forgings, cast steel engine and tender wheel centres, roof bars, etc.; steel laminated and spiral springs for engines, carriages, and wagons; timbers, timber scantlings for wagons and carriages (American white oak), timber (logs, planks, boards, mouldings, sheetings, etc.); transfers (carriage, etc.); varnishes; wagon bolts, nuts, rivets, and washers. Forms of tender can be obtained from the secretary on payment of 1s. for each form. Tenders must be for the supply of goods in accordance with the Company's patterns. These patterns may be seen at the General Stores Depot, Dundalk, between the hours of 10 a.m. and 4 p.m., except on Saturdays, when they will not be on view after 12 o'clock noon. Tenders, made out on the Company's forms, and endorsed "Tender for Stores," should be delivered to Mr. T. Morrison, Secretary, Secretary's Office, Amiens-street, Terminus, Dublin, not later than 10 a.m. on November 3.

Public Appointments.

Nature of Appointment.	By whom Advertised.	Salary.	Applications to be in
*FOREMAN AND CLERK OF WORKS	Wandsworth Guardians	2, 3s. per week	Oct. 25
*TEMPORARY ARCHITECT'S ASSISTANT	Gloucester Education Com.	2, 2s. 1st week	Oct. 27
*VISITING TEACHER OF PAINTING AND DECORATING	Essex Co Lunatic Asylum	15s. 6d. at tenders	Oct. 29
*CLERK OF WORKS		15s. 6d. at tenders	Nov. 1

Auction Sales.

Nature and Place of Sale.	By whom Offered.	Date of Sale.
*STOCK OF IRONMONGERY, CHISWELL STREET, E.C.—On the Premises	Fryer, Cooper, & Co.	Oct. 25
*FREEHOLD BUILDING PLOTS, OAKLEIGH PARK—Green Man Hotel, Whetstone	Brown & Ewin	Oct. 29
*DEALS, BATTENS, ETC.—Great Hall, Winchester House, Old Broad-street, E.C.	Churchill & Sims	Oct. 31
*MACHINERY, BUILDING MATERIALS, ETC., BATTERSEA—103, Lavelier Hill, Battersea	Joseph Hibbard & Sons	Nov. 5
*FREEHOLD BUILDING SITE, CITY OF LONDON—At the Mart	Edwin Fox & Bousfield	Nov. 7
*FREEHOLD BUILDING LAND, NEW SOUTHGATE—Railway Hotel, New Southgate	Charles Sparrow & Son	Nov. 7
*BUILDERS' PLANT AND MACHINERY, CHATHAM—Near New Naval Barracks, Chatham	Fuller, Horsey, Sons, & Cassell	Nov. 12
*ANDERSON'S PATENT DIAMOND SAW—Near New Naval Barracks, Chatham	Fuller, Horsey, Sons, & Cassell	Nov. 13
*TIMBER, MAHOAGANY, ETC., 12, MONTE PLEASANT, GRAY'S INN—On the Premises	Fuller, Horsey, Sons, & Cassell	Nov. 20, etc.
*FREEHOLD BUILDING ESTATE, PLAISTOW—At the Mart	Ward on & Green	Nov. 22

LEGAL.—Continued from page 464.

been taken out charging the defendant with carrying out works for the drainage of a new street off Warr-lane, Harborne, otherwise than in accordance with the requirements of the City Surveyor, the fact being that he laid down a small drain on each side of the road and connected the two for the purpose of draining the surface water into an open watercourse behind the houses on the east side of the road. The first summons was heard on March 20, when the works were in progress on the east side of the road. The defendant then pleaded "Guilty," but at counsel's request the matter was adjourned in order that he might remove the cause of complaint and so avoid a penalty. There had been many further adjournments from time to time in order that the defendant should put things right, but he had done nothing. On the contrary, it was found early in August that he was carrying out similar works on the west side of the road. The stipendiary said the defendant had acted foolishly and obstinately, and refused to carry out the requirements. He was fined 6l. and costs on each of the two summonses, in addition to 2l. per day since August 17, when notice was served, making the total of fines and costs 121l.

Patents of the Week.

APPLICATIONS PUBLISHED*.

18,544 of 1905.—R. CAMPBELL: Coal Savers.

This relates to a coal saver, preferably of cast iron in one casting, which is of such a construction that it can be used in four different ways or positions within the grate. It consists of two sides or cheeks with six more or less horizontal bars between the cheeks, which are triangular in shape. When the saver is in one position the shortest side is vertical or approximately so, the said vertical side being to the front of the fireplace, and the junction of the two longer sides at the back of the fireplace, the bars being at a slope from the top of the said vertical side to the back of the grate.

19,471 of 1905.—R. BOWEN: Manufacture of Bricks.

This relates to a brick-making machine comprising a slab or table, a set of partition plates adapted

to be secured to the slab or table, said partition plates being provided with notches, and pallet plates adapted to lie on the slab or table between the partition plates and enter the set of partition plates, and connected together and adapted to lie in the notches thereof, the partition plates and pallets forming the sides and bottom of a series of moulds.

23,152 of 1905.—W. HODGSON: Construction of Water-closet Basins.

This consists in constructing water-closet basins with an elevated water level thus ensuring increased water area and depth of seal, the outgo or exit being inclined for facilitating the expulsion of all matter therefrom, and with flushing arm and spreader with conical screw joint.

25,791 of 1905.—A. J. CROCKER: Screw-down Valves.

This consists in the combination of an oblique valve seat, a screwed ring for securing it in position and a screw-down valve capable of rotation on its spindle. The valve when opened by the screw gives a full way.

25,914 of 1905. T. BAMFORTH and R. B. KINNIBURGH: Fanlight and like Window Opening and Closing Apparatus.

This relates to fan-light and like window opening and closing apparatus. In a slotted socket in each side of the window frame is fitted a round rod or bar which has a portion of its circumference cut out throughout its length so that in the cross section it has a flattened part and a radial face or tooth connecting the parts of greater and smaller diameter. Each rod or bar is embraced throughout rather more than its semi-perimeter by the socket so that it cannot drop out, but can be withdrawn or replaced by turning it to bring the flattened part or portion of smallest diameter into the lateral opening or slot of the socket, and has fixed to it a lever-arm connected by a link to a bell crank or beam lever pivoted on the window frame, the beam levers extending towards the central part of the fan-light opening where they are linked to a cross head or pin forming the pivot pin of the screw spindle. The fan-light is opened and closed by swinging on its pivot, and when closed with the beaded edge against the rubber back further turning of the nut on the spindle by pull on the cross head serves to tilt bell-crank or beam levers and thereby turns the notched bars or rods until the radial face or tooth on each engages a rib or feather on the outer edge of the sash rail at each side and by pressing on it closes the sash. A stop piece is formed

in continuation of the rib or feather at the pivoted end of the sash to prevent disengagement of the tooth face when the fan-light is opened.

2,569 of 1906.—W. HENMAN: Expanded Metal Partitions for Strengthening Plaster or Cement Partitions, and the like.

This relates to expanded metal girders and the like for use in reinforced concrete or plaster partitions and the like, and consists in the employment of a length or strip of metal with or without thickened edges, slitting the same diagonally with slits short of each of its edges, and then expanding it, so as to cause one longitudinal longitudinal portion, being connected thereto by cross pieces left by the said slitting operation.

8,180 of 1906.—L. L. B. DENIS: Method of Fixing Pipes to Connecting Flanges.

This relates to a method for fixing pipes to connecting flanges, consisting in forcing two or more projections on the pipe into grooves formed in the flange, the depth of which increases progressively on the side of the flange towards the jointing so as to distribute progressively the supporting surface of the pipe in order that the sum of these supporting surface will be substantially equal to the surface of the section of the pipe.

13,382 of 1906.—H. E. VANCE: Slate for Constructing Fireproof Curtains, Screens, Shutters, Doors, and the like.

This relates to a flexible fire-resisting curtain composed of a plurality of hinged metallic sections, each having a metallic body portion, and a heat-retarding material applied to the extension of each body portion and partly covering the same.

13,566 of 1906.—E. R. PALMER: Trough Channels for Conveying Water from Waste and other Pipes to the Drain Trap.

This relates to a trough channel for conveying water from waste and other pipes to the drain trap and consists in the combination with a removable grating at the outlet end of the trough, of a socket at the opposite end adapted to receive a flushing tank discharge pipe, and a removable plate interposed between the grating and said socket and furnished with sockets adapted to receive the ends of the waste pipes.

21,605 of 1905.—J. E. KAY: Apparatus for Ventilating Cavities in Buildings Applicable for Preventing Dry Rot in the Ground Floors.

This relates to an apparatus for ventilating

* All these applications are in the stage in which opposition to the grant of Patents upon them can be made.

cavities in buildings and preventing dry rot in ground floors, and consists in the use of a draught chamber adapted to be built into and form the hob of the ordinary kitchen or other grate with a plate exposed to the fire, an air outlet into the dust flue or other flue or chimney and an air inlet pipe connected with the cavity beneath the floor.

27,185 of 1905.—H. W. TAYLOR: *Trussed Concrete or like Constructions.*

This relates to a trussed concrete or like construction wherein separate or individual bonds are used, so formed that they make such number of turns about each of the bars or of the groups of bars that are intended to be connected with the bonds, thus acting not only as ties but also as distance pieces or struts to the said bars or groups of bars.

27,165A of 1905.—H. W. TAYLOR: *Construction of Concrete Floors and the like.*

This relates to a trussed concrete floor or the like in which metal rods, preferably all of the same length, are connected to bars or braces inset in the beams or structures forming the boundary of the floor or section or to bars embedded in the floor, said rods being arranged diagonally and each connected to three sides of the floor or section.

3,062 of 1906.—J. A. MARTIN: *Pipe Joint.*

This relates to a pipe joint, formed by welding on the tube under a ring or thimble of greater length than is required for producing the flanged joint and subjecting the end thus reinforced to any usual staving or creasing process to produce a flange.

3,236 of 1906.—F. KALWEIT: *Girders, Beams, and Posts.*

This relates to girders, beams, and posts and the like, for use in buildings and other structures in which sections of metal are so shaped that when secured together back to back hollow underneath or dovetailed shaped spaces are formed between them for the purpose of receiving fillets of material to which other objects can be nailed or otherwise secured, the characteristic of which is that the metallic sections are formed by bending sheet metal to the required shape.

9,869 of 1906.—P. ECKHARDT: *Iron or Steel Skeletons for Buildings.*

This relates to a method of forming pillars and skeleton frames of iron or steel bars, the section of said pillar being of a cross-bar shape, the characteristics of which are that the upright pillars are composed of combined lengths or pieces which are formed by welding together flat iron bars, the ends of which combined pieces are formed alternately concave and convex to fit in and engage with each other, grooves being provided in the centre for receiving small iron bars to connect said pieces, and wire rings being also passed through holes into bars for the purpose of further securing.

TERMS OF SUBSCRIPTION.

"THE BUILDER" (Published Weekly) is supplied DIRECT from the Office to readers in all parts of the United Kingdom at the rate of 10s. per annum (52 numbers) PREPAID. To all parts of Europe, America, Australia, New Zealand, India, China, Ceylon, &c., per annum. Remittances (payable to J. MORGAN) should be addressed to The Publishers, "The Builder," 4, Cannon-street, W.C. SUBSCRIBERS IN LONDON and the SUBURBS, by prepaying at the Publishing Office 10s. per annum (52 numbers) or 4s. 8d. per quarter (13 numbers), can ensure receiving "The Builder" by Friday Morning's Post.

SOME RECENT SALES OF PROPERTY:

ESTATE EXCHANGE REPORT.

October 2.—By ALFRED RICHARDS (at Tottenham).	
Tottenham.—12 and 14, Lordship-ls. (s.), u.t. 74 yrs., g.r. 20l., y.r. 65l.	£150
22 and 24, The Ave., u.t. 72½ yrs., g.r. 10l. 10s., y.r. 62l. 8s.	220
55, 56, and 100, Hartington-rd., u.t. 72½ yrs., g.r. 12l., w.r. 74l. 2s.	185
15 and 16, Lawrence-rd., l. g.r. 39½ yrs., g.r. 10l., w.r. 44l. 10s.	300
1 to 10, Huntington-ter., u.t. 60½ yrs., g.r. 25l., w.r. 182l.	500
October 3.—By BELLAMY & Co. (at Fulham).	
Fulham.—17, Parsons Green-ls., u.t. 84½ yrs., g.r. 8l., e.r. 65l.	525
1, Wincledon-rd., u.t. 87 yrs., g.r. 7l., y.r. 37l.	498
Hackney.—34, Andover-l., g.r. 39½ yrs., g.r. 87 shen.—11 to 19 (odd). Church-av., u.t. 87 yrs., g.r. 27l. 10s., y.r. 139l.	1,450
October 4.—By NICHOLS, HOWES, & Co. (at Brickell).	
Banwell, Somerset.—"Caves Farm," 57 a. 8 r. 22 p.	2,600
Three enclosures of pasture, 25 a. 1 r. 36 p.	1,200
October 5.—By SPELMAN'S (at Norwich).	
Norwich.—Old Catton, "The Beeches" and 2½ acres, l. p.	1,500
A freehold cottage, p.	175
5, Brunswick-rd., l. p. y.r. 24l.	330
6, 8, 9, 10, and 12, Trix-rd., l. y.r. 76l.	1,120

October 8.—By S. H. DAVIDS & Co.	
South Kensington.—32, Thirloe-pl. (s.), u.t. 22½ yrs., g.r. 7l., y.r. 120l.	£1,220
Chelsea.—27, Millar-st., u.t. 24½ yrs., g.r. 8l., y.r. 75l.	730
3, Hobury-st., u.t. 37½ yrs., g.r. 6l., y.r. 50l.	480
190, Sloane-st. (s.), u.t. & 30½ yrs., g.r. 48l., increasing to 180l., y.r. 600l.	5,750
74, Walton-st. (s.), u.t. 24½ yrs., g.r. 8l., y.r. 65l.	660
Maida Vale.—123 a. 1 r. 15 p. 15 l. 10s., e.r. 110l.	840
By MONEY & JOHNSON.	
Norwood.—Anerley-rd., "Creedy," u.t. 75 yrs., g.r. 6l. 10s., p.	500
By RUTTERS (on the premises).	
Crays' Hill, Essex.—"The Nook" and 2½ acres, l. p.	750
October 9.—By H. DONALDSON & SONS.	
Dalston.—12 and 14, Stannard-rd., u.t. 45 yrs., g.r. 6l., w.r. 51l. 12s.	560
Old Ford.—77, Driffield-rd., l. p. 36l. 8s.	315
By E. M. THOMAS & Co.	
Kirkby, Essex.—Main-rd., a freehold site, 14 a. 0 r. 9 p.	350
October 10.—By A. G. BOSSOR.	
Kingston, Surrey.—23 to 37 (odd), Dudley-rd. (Hals), l. w.d. 17½ a. 1 r. 10 p.	1,560
Moss & JAMESON.	
Islington.—140, Balls Pond-rd., with stabling, l. w.r. 71l. 8s.	600
WESTON & SONS.	
Wandsworth.—123 a. 1 r. 13 p. 13 l. 10s. (factory premises, etc.), area 10,500 ft., l. p.	4,100
Brixton.—6 to 16 (even), 37, 39, 42, and 44, Archbishops-pl., u.t. 44 yrs., g.r. 30l. 16s., u.t. 31 yrs., g.r. 25l., w.r. 215l. 16s.	1,810
Camberwell.—74, Camberwell-gr., l. y.r. 40l.	450
73, Grove-ls., l. y.r. 40l.	430
By SKELTON & GOLDEN.	
Battersea.—8, 10, and 12, Castle-st., l. w.r. 159l. 12s.	1,170
26 and 27, Henry-st. (s.), l. w.r. 65l.	525
50 and 50A, Colonge-rd., l. w.r. 92l. 12s.	580
South Lambeth.—63, 56, and 61, Heyford-st., u.t. 31 yrs., g.r. 25l., w.r. 215l. 16s.	1,170
Southwell.—68, Hargreaves-st., u.t. 58 yrs., g.r. 6l. 6s., w.r. 36l. 8s.	275
Battersea.—48 and 49, Henry-st., u.t. 69 yrs., g.r. 12l., w.r. 187l. 4s.	1,070
Southend, Essex.—9, 10, and 11, Myrtle-rd., l. w.r. 80l. 12s.	460
61, 65, and 67, St. John's-rd., l. w.r. 169l.	610
27, Lyford-rd., l. y.r. 40l.	490
Prittlewell, Essex.—Fairfax drive, four freehold houses, w.r. 104l.	300
By READMORE & WEBB (at Richmond).	
Richmond.—15, The Green, l. y.r. 70l.	1,000
29, The Green (s.), l. y.r. 40l.	520
131 and 133, Sheen-rd., l. y.r. 51l.	925
77 and 79, Sheen-rd., e.r. 43l.	440
62, Sheen-rd. (s.), u.t. 43 yrs., g.r. 6l. 6s., y.r. 55l.	780
29 to 37 (odd), 48, and 50, Albert-rd., l. w.r. 144l. 6s.	1,955
40, Albert-rd. (s.), l. y.r. 26l.	460
Albert-rd., a freehold building plot, with shop and workrooms, e.r. 25l.	165
Kew Foot-rd., "Magnolia Cottage," with shop and workrooms, e.r. 25l.	555
Kew Foot-rd., "Gothic" and "Henry's" Cottages, e.r. 43l.	695
7, Wellington-pl., e.r. w.r. 12l. 4s.	245
45 and 45, Mount Astor-rd., u.t. 45 yrs., g.r. 14l., y.r. 105l.	975
21 and 23, Rosemont-rd., u.t. 18½ yrs., g.r. 6l., y.r. 44l.	290
24, Houlton-rd., u.t. 49½ yrs., g.r. 2l. 15s., w.r. 28l.	275
Surbiton, Surrey.—Berrylands-rd., u.t. 48 yrs., g.r. 10l., y.r. 105l.	1,090
October 11.—By CHESTERTON & SONS.	
Kensington.—64, Edith-rd., u.t. 69 yrs., g.r. 12l., y.r. 66l.	470
By NEWSON, SARGENT, & BOWMAN.	
City-rd.—30, 304 u.t. 35½ yrs., g.r. 8l., y.r. 50l.	260
Barnsbury.—17, 18, 19, and 35, Albert-st., u.t. 41 yrs., g.r. 24l., y.r. 139l.	90
Canonbury.—29, Canonbury-pk. South, u.t. 30 yrs., g.r. 7l., e.r. 60l.	415
Holloway.—20, Fairbridge-rd., u.t. 65 yrs., g.r. 9l. 5s., e.r. 40l.	470
Anerley.—St. Hugh's-rd., l.g. rents 40l., reversion in 73 yrs.	920
Tottenham.—Abbottford-av., l.g. rents 17l., reversion in 95 yrs.	131
By SIMMONS & SONS.	
St. John's Wood.—30 and 31, New-st., u.t. 21 yrs., g.r. 10l. 10s., y.r. 76l.	580
19 and 21, Barrow Hill-rd., u.t. 21 yrs., g.r. 10l., y.r. 70l.	335
18, 20, and 22, Henry-st., u.t. 10½ yrs., g.r. 15l., y.r. 139l. 14s.	395
42 and 44, Henry-st. (s.), u.t. 10½ yrs., g.r. 8l. 8s., y.r. 60l.	300
21, Townshend-rd. (s.), u.t. 10½ yrs., g.r. 10l., y.r. 42l.	190
13, Townshend-cottages, w.r. 35l. 8s., also l.g. rents 6l., u.t. 13 yrs., g.r. 10l.	120
24, 25, 26, 37, 38, 48, and 44, Townshend-cottages, u.t. 10½ yrs., g.r. 10l., w.r. 194l. 18s.	530
18 and 23, St. John's Wood-ter., u.t. 18½ yrs., g.r. 10l. 10s., y.r. 65l.	430
69 to 72 and 78, St. John's Wood-ter., u.t. 23 yrs., g.r. 24l. 10s., y.r. 250l.	1,640
1, 3, and 7, Woronzow-rd., u.t. 28 yrs., g.r. 25l., y.r. 182l.	765
4, 12, and 13, Henstridge-pl., u.t. 27 yrs., g.r. 15l., y.r. 109l.	855
Kilburn.—72, Princess-rd., u.t. 56 yrs., g.r. 8l. 10s., e.r. 45l.	300
24, Alpha-pl. North, u.t. 52 yrs., g.r. 4l., w.r. 22l. 12s.	130
Westbourne Park.—Chippendale-mews, l.g. rents 40l., u.t. 67 yrs., g.r. 2l.	610
Paddington.—9 and 10, York-rd., u.t. 21 yrs., g.r. 8l., w.r. 62l. 8s.	230

By GOTTWALTZ & PERRY (at Cardiff).	
St. Andrew's Major, etc., Glamorgan.—The Newton and Treacote Estates (portions of), 1,470 acres, f. (in numerous lots)	£52,285
"The Star Hotel," l. y.r. 43l.	1,300
October 12.—By J. & R. KEMP & Co.	
Battersea.—64, Lavender-rd., with stable, u.t. 32 yrs., g.r. 8l., y.r. 48l.	380
139, Broomwood-rd., u.t. 73 yrs., g.r. 7l. 7s., p. 390	390
Contractions used in these lists.—F.g.r. for freehold ground-rent; l.g.r. for leasehold ground-rent; l.g.r. for improved ground-rent; g.r. for ground-rent; p. for rent; f. for freehold; c. for copyhold; l. for leasehold; p. for possession; e.r. for estimated rental; w.r. for weekly rental; q.r. for quarterly rental; y.r. for yearly rental; u.t. for unexpired term; p.a. for per annum; yrs. for years; la. for lane; st. for street; rd. for road; sq. for square; pl. for place; ter. for terrace; cres. for crescent; av. for avenue; gdn. for garden; yd. for yard; g. for grove; b.b. for beach; p.h. for public-house; c. for office; s. for shops; ct. for court.	

MEETINGS.

FRIDAY, OCTOBER 19.

Architectural Association.—Mr. Alan Potter on "The Architecture of the Roman Empire," illustrated by lantern views. 7.30 p.m.

Institution of Mechanical Engineers.—(1) Discussion to be resumed and concluded on "Railway Motor-Car Traffic," by Mr. T. Harry Riches and Mr. Sidney B. Haslam. (2) Paper to be read and discussed, "Some Notes on the Mechanical Equipment of Collieries," by Mr. E. M. Hann. 8 p.m.

SATURDAY, OCTOBER 20.

Royal Sanitary Institute (Demonstration for Sanitary Officers).—Inspection at the Camberwell Infirmary, Brunswick-square, Peckham-road, S.E. 2, 16 p.m.

MONDAY, OCTOBER 22.

University of London (Imperial Institute-road).—Mr. Banister Fletcher on "The History of Architecture" (Part I.—Ancient), IV. "Western Asiatic Architecture: Babylonia, Assyria, and Persia 4000 B.C.—400 B.C." 8 p.m.

Royal Sanitary Institute (Lectures for Sanitary Officers).—Mr. W. C. Tyndale on "Sanitary Appliances." 7 p.m.

WEDNESDAY, OCTOBER 24.

Royal Sanitary Institute (Lectures and Demonstrations for Sanitary Officers).—(1) Inspection at the London County Council Municipal Lodging-house, Kenilworth-street, W.C. 8 p.m. (2) Mr. J. Wright Clarke on "Details of Plumbers' Work." 7 p.m.

FRIDAY, OCTOBER 26.

Royal Sanitary Institute (Lectures for Sanitary Officers).—Mr. A. Saxon Small on "Ventilation, Warming, and Lighting." 7 p.m.

SATURDAY, OCTOBER 27.

Royal Sanitary Institute (Demonstration for Sanitary Officers).—Inspection at Marylebone Workhouse and Public Baths. 3 p.m.

PRICES CURRENT OF MATERIALS.

* Our aim in this list is to give, as far as possible, the average prices of materials, not necessarily the lowest. Quality and quantity obviously affect prices—a fact which should be remembered by those who make use of this information.

	BRICKS, &c.	
	4 s. d.	
Hard Stocks.....	1 10 0	per 1000 alongside, in river.
Rough Stocks and Grizles.....	1 7 0	" " " "
Picked Stocks for Facings.....	2 17 6	" " delivered.
Flettons.....	1 8 0	" " at railway dep't.
Red Wire Cuts.....	1 14 0	" " " "
Best Fareham Red.....	3 12 0	" " " "
Best Red Pressed.....	5 0 0	" " " "
Bunton Facing.....	5 0 0	" " " "
Best Blue Fressed Staffordshire.....	3 15 0	" " " "
Do. Bullnose.....	4 0 0	" " " "
Best Stourbridge Fire Bricks.....	3 14 0	" " " "
GLAZED BRICKS.		
Best White and Ivory Glazed.....	12 0 0	" " " "
Stretchers.....	11 0 0	" " " "
Quoins, Bullnose, and Flats.....	16 0 0	" " " "
Double Stretchers.....	19 0 0	" " " "
Double Headers.....	16 0 0	" " " "
One Side and two Ends.....	19 0 0	" " " "
Two Sides and one End.....	20 0 0	" " " "
Slays, Chamfered, Squins, &c.....	20 0 0	" " " "
Best Dipped Salt Glazed Stretchers and Headers.....	12 0 0	" " " "
Quoins, Bullnose, and Flats.....	14 0 0	" " " "
Double Stretchers.....	15 0 0	" " " "
Double Headers.....	14 0 0	" " " "
One Side and two Ends.....	15 0 0	" " " "
Two Sides and one End.....	15 0 0	" " " "
Slays, Chamfered, Squins, &c.....	14 0 0	" " " "
Second Quality White and Dipped Salt.....	2 0 0	" " less than best.
Thames and Pit Sand.....	7 0 0	per yard, delivered.
Thames Ballast.....	5 6 0	" " " "
Best Portland Cement.....	27 0 0	per ton, " "
Best Ground Blue Lime.....	19 0 0	" " " "
NOTE.—The cement or lime is exclusive of the ordinary charge for sacks.		
Grey Stone Lime.....	11s. 6d.	per yard, delivered.
Stourbridge Fireclay in sacks.....	27s. 0d.	per ton at ry. dpt.

READING CASES { NINEPENCE EACH.
{ By post, carefully packed) 1s.

TO CORRESPONDENTS.

S. H. D. (not too late for this week).

NOTE.—The responsibility of signed articles, letters, and papers read at meetings rests, of course, with the authors.

We cannot undertake to return rejected communications, and the Editor cannot be responsible for drawings, photographs, manuscripts, or other documents, or for models or samples, sent to or left at this office, unless he has specially asked for them.

Letters or communications (beyond mere news items) which have been duplicated for other journals are NOT DESIRED.

All communications must be authenticated by the name and address of the sender whether for publication or not. No notice can be taken of anonymous communications.

We are compelled to decline pointing out books and giving addresses.

Any communication to a contributor to write an article, or to execute or lend a drawing for publication, is given subject to the approval of the article or drawing, when received, by the Editor, who retains the right to reject it if unsatisfactory. The receipt by the author of a proof of an article in type does not necessarily imply its acceptance. The Editor cannot undertake to read and cannot accept articles offered for acceptance unless they are type-written.

All communications regarding literary and artistic matters should be addressed to THE EDITOR; those relating to advertisements and other exclusively business matters should be addressed to THE PUBLISHER, and not to the Editor.

TENDERS.

Communications for insertion under this heading should be addressed to "The Editor," and must reach us not later than 10 a.m. on Thursdays. (N.B.—We cannot publish Tenders unless authenticated either by the architect or the building-owner; and we cannot publish statements of Tenders accepted, unless the amount of the Tender is stated, nor any list in which the lowest Tender is under 100*l*, unless in some exceptional cases and for special reasons.)

* Denotes accepted. † Denotes provisionally accepted.

BARKING.—For river wall, Barking outfall works, for the London County Council.

Tilbury Contracting and Dredging Co., Ltd.	J. Cochran & Sons	£1,316 8 7
W. H. Martin	D. T. Jackson	1,217 5 3
Leggett & Speight	Mathews	1,161 11 8
W. H. Martin	J. S. Smith	1,097 10 0
W. H. Martin	Barkus	1,060 0 0
W. H. Martin	W. H. Martin	1,095 15 0

BEESTON.—For private street works, Trafalgar-road, Victoria-road, for the Urban District Council. Quantities by Mr. E. A. Bush, Surveyor to the Council.

T. Smart £2,314 12 0
 G. Belshaw & Son 2,163 13 0
 R. Kewch & Co. 2,164 18 0
 H. Bennett 2,117 0 0
 H. Bennett 2,092 13 10

BRIDLINGTON.—For erecting a villa residence, Cardigan-road, for Mrs. W. Dodgson. Messrs. Brodick, Lowther, & Walker, architect, 62, Quay-road, Bridlington.

J. H. Hudson	£864 10 0	Smallwood & A. Gardam	855 2 10
A. A. Booth	855 0 0	S. Samson & Marriot	819 13 0
J. R. Stork	792 0 0	E. E. Yeomans	747 8 6
E. Wilson	746 17 6		

CHESTERFIELD.—For the construction of two small shops in the east entrance of the covered market, for the Corporation. Mr. V. Smith, Borough Surveyor. Quantities by Surveyor.

J. Wright	£327 10 0	Lee & Kirk	£225 14 6
J. Collis & Sons	292 9 10	Chesterfield	

CHILSWORTHY.—For erecting a Wesleyan church and schoolroom at Chilsworthy, near Gunnsale, for Chilsworthy Trustees Wesleyan Society. Mr. F. J. Wenden, architect, Olchampton.

W. J. Martin	£900	N. B. Roehilly	
Green, Son, & Co.	885	Albiston	£840
J. Kelly	876		

CROYDON.—For the erection of a school, Davidson-road, for the Education Committee of the Croydon County Council. Mr. H. Carter Pegg, F.R.I.B.A., architect, Thornton Heath.

D. W. Davies	£19,800	J. E. Johnson & Kerridge	£17,280
Marriot & Satter	18,298	J. Bower & Sons	17,250
Grace & Marsh	18,140	W. H. Lascelles & W. F. Bay	18,106
Patman & Greening, Ltd.	18,000	J. Smith & Sons, Ltd.	16,985
W. Johnson & Co., Ltd.	17,980	A. Faulks	16,980
Potter Bros.	17,870	G. Everitt	16,840
H. Willcock & Co.	17,850	W. Smith & Sons	16,798
E. P. Bull & Co.	17,800	F. G. Minster	16,770
W. Akers & Co.	17,600	H. S. Holloway	16,762
A. S. Ingletton	17,601	J. Barker & Co.	16,697
Oak Building Co., Ltd.	17,550	G. E. W. Wainwright	16,430
D. W. Barker	17,495	J. Chessum & Sons	17,415
Perry & Co.	17,466	W. Moss & Sons	16,340
Dowling & Co.	17,400	W. H. Martin	16,230
W. Akers & Co.	17,289	W. Lawrence & Sons	16,230
E. J. Saunders	17,285	J. Appleby & Sons	16,909
		Lambeth, S.E.*	

CORK.—For erecting new concert-hall and executing sundry alterations to School of Music, Union Quay, for the Corporation. Mr. J. F. Delany, City Engineer. Quantities by City Engineer.

D. Kelleher, 34, Sunday's Well-road, Cork £600

COWPEN.—For making-up Wimborne-road, for the Urban District Council. Mr. R. Grieves, Surveyor, Seaford-street, Walsboro, Blyth.

J. Coxon & Son £289 9 2
 J. Fisher & Son 289 9 2
 O. E. Simpson 229 14 5

DEAL.—For the erection of a new school to accommodate 240 infants, for the Education Committee. Mr. C. L. Crowther, architect, Queen-street, Deal. Quantities by architect.

J. E. Turner	£3,664 16	H. E. Phillips	£3,660 0
A. E. Goodbourn	3,610 8	Tanner & Watts	3,075 0
E. J. Bowles	3,491 10	G. Lewis & Sons	3,023 10
W. W. Martin	3,366 0	T. T. Donne	2,907 0
Gann & Co.	3,324 0	A. Hayward	2,931 0
H. Harris & Son	3,312 17	Paramont	2,988 0
G. Miriam	3,246 0	W. H. Thompson	2,980 0
J. W. Woodhall	3,200 0	W. Judges	2,942 0
E. Trever	3,150 3	G. Browning	2,906 0
S. & B. Jefford	3,133 7	W. H. Grigg	2,906 0
Sturby Building Co.	3,120 0	G. B. Cotton	2,799 0
		J. J. Wise, Deal	2,718 0

DOMESTICHOPE.—For erecting a school and out-let, etc., for Leicester-shire County Council. Mr. W. H. Simpson, architect, Corridor-chambers, Market-place, Leicester.

J. E. Johnson & Son	£4,190 0 0	T. Orton & Son	£3,834 0 0
Evors, G. W.	3,800 0 0	Sons, Ltd.	3,800 0 0
Moss	4,110 0 0	Griffin Bros.	3,800 0 0
J. J. Warner	4,085 0 0	Hugglescote	3,800 0 0
R. Weston & Son	4,052 18 6		

HOVE.—For constructing sewers, for the Town Council. Mr. H. H. Scott, A.M.I.C.E., Borough Surveyor, Town Hall, Hove.

J. Parsons & Sons, 176, Church-road, Hove. £3,046

KINGSWINFORD.—For supply of cast-iron pipes, for the Rural District Council. Mr. W. Fiddian, F.E.S.I., Old Bank Offices, Stourbridge.

Holwell Iron Co., Ltd.	£3,748 11 6		
Gray & Hill, Co.	3,683 1 9		
Sliephridge Ironworks	3,580 10 0		
Alfreton Ironworks	3,437 6 7		
Parsons, Ltd.	3,430 10 5		
Cochrane & Co., Woodstock	3,339 5 0		
Stanton Ironworks Co.	3,151 17 10		

LICHFIELD.—For sewerage works and erection of workmen's houses, for the Sanitary Committee. Mr. Emerson Brooke, City Surveyor, Lichfield.

G. Trenham	£1,507 3 0	T. B. Deacon	£857 4 4
W. H. Andrews	916 15 3	H. Smith & Sons	870 0 0
W. Sharp & Sons	870 0 0	Sons, Lichfield	758 10 0

Distributors.

Parsons & Wills £139 2 6
 Mendow Foundry Co., Ltd. 139 0 0
 J. Spencer, Ltd. 123 0 0
 Hartley & Co. 119 0 0

Colleges.

W. J. Chattle £190 12 0
 E. Sharp & Son 454 0 0
 J. H. Deacon 360 0 0

LONDON.—For bridge over New River at Rye House, for the Metropolitan Water Board.

G. Hay & Co.	£550 0 0	J. Aird & Sons	£282 0 0
W. Griffiths & Co., Ltd.	375 0 0	T. Duncans & Son	257 10 7
J. Mowlem	319 0 0	A. E. Nugent	170 0 0

Superstructure.

T. Pigott & Co., Ltd. £387 19
 J. Fraser & Son, Ltd. 348 0
 Phoenix Foundry Co., Ltd. 292 10

LONDON.—For the construction of new filters at Barn Elms, for the Metropolitan Water Board.

G. Wimpey & Co.	£46,000 0 0		
T. Duncans & Son	42,599 8 2		
J. Aird & Sons	39,852 17 4		
J. Mowlem & Co.	36,282 0 0		
Perry & Co.	32,787 0 0		
W. Mansel	27,925 17 8		
Peckitt & Co.	27,673 13 5		
W. Muirhead & Co.	27,265 9 10		
T. Adams	25,026 15 0		
A. E. Nugent	24,396 10 0		
Petrick Bros.	23,810 0 0		
R. H. B. Neal, Ltd.	22,346 18 6		
W. Hill & Co.	21,700 0 0		
C. W. Lloyd	19,800 0 0		
Kirk & Randall	19,348 0 0		
W. Moss & Sons, Ltd.	18,923 3 6		
J. Moran & Son, Ltd.	18,846 11 1		
Smith & Co.	17,935 8 5		
A. Braithwaite & Co.	17,356 15 1		
G. Hay & Co.	17,329 8 2		
Davies, Ball & Co.	17,122 13 6		
Hellett, Ltd.	16,843 9 0		
Holliday & Greenwood, Ltd.	16,749 13 3		
	Plus £2450 should a jetty be required.		

LONDON.—For the erection and equipment of the generators to be transferred from the Loughborough Junction temporary generating station to the Elephant and Castle sub-station, for the London County Council.

Siemens Bros. Dynamo Works, Ltd.	£2,428		
British Westinghouse Electric and Manufacturing Co., Ltd.	8,177		
Dick, Kerr, & Co., Ltd.	7,100		

LONDON.—For additions and alterations in the building at the Electricity Works, Osborn-street, White-chapel, E., for the Stoney Borough Council. Mr. M. W. Jameson, Borough Engineer, 15, Great Albion-street, White-chapel, E.

A. N. Coles £1,567
 Sedman & Co. 1,380
 Thomas & Edge 1,273
 Holliday & Green 1,259
 F. & T. Thorne 1,247
 A. E. Symes 1,245
 F. & F. J. Wood 1,238
 J. Calcutt 1,224

LONDON.—For pipe-laying from Child's Hill to Cranley Gardens, for the Metropolitan Water Board.

T. Duncans & Son	£42,267 18 3		
J. Mowlem & Co.	42,115 0 0		
J. Aird & Sons	38,518 15 11		
Hellett, Ltd.	38,021 4 7		
A. E. Nunn	37,851 13 10		
G. Bell & Sons	35,216 17 8		
W. Dobson	34,917 3 8		
R. C. Crawford	34,064 5 2		
R. McAlpine & Sons	33,336 18 2		
W. Muirhead & Co.	32,464 9 6		
J. Moran & Son	28,750 8 0		
T. Egan & Sons	28,697 2 4		
O. A. Zaid & Co.	26,612 8 2		
Davies, Ball & Co.	24,054 1 0		
D. Wright & Co., Leicester	22,672 2 10		

MERTHYR.—For erecting a filter-house near the Lower Neffard reservoir, Torpitan, for the Borough Council of Merthyr Tydfil. Mr. T. Fletcher Harvey, Borough Engineer.

L. Meredith	£1,963 15 6	W. Brown	£1,562 5 0
E. P. Davies	1,657 2 0	A. E. Nunn	
D. Jones	1,600 2 8	London*	1,544 17 1

ROTTERHAM.—For laundry machinery and fittings at public baths and for structural alterations, for the Corporation. Mr. J. Platts, Architect, Town Hall, Rotterdam.

W. Summerscales & Son £246 9 0

RUGBY.—For new billiard-room to be erected at Rainsbrook Manor, Rugby, for Dr. H. Nelson Harness, Mr. Albert E. Kingwell, architect and surveyor, Chislehurst, E.C.

Bloxham & Co.	£1,457 0 0	Parrell & Son	£1,373 0 0
Gray, Hill, & Co.	1,455 0 0	Peole & Son	1,273 0 0
Foster & Dicksee	1,420 10 10	Kingler & Son	1,179 0 0

ST. ALBANS.—For the erection of a villa residence, Carlisle-avenue, for Mr. Walter Freeman, Mr. S. Doddmeade Edmunds, architect, St. Albans.

Vall & Shore	£282 10 0	A. A. Ivory	£495 10 0
H. J. Skelton	569 0 0	J. Elwood*	475 0 0
	[All of St. Albans.]		

ST. ALBANS.—For the erection of a detached residence, Clarence-road, Mr. S. Doddmeade Edmunds, architect, St. Albans.

Goodchild & Son	£1,017 10 0	J. Elwood	950 0 0
	[All of St. Albans.]		

ST. ALBANS.—For the erection of a house proposed to be built in Clarence-road, Mr. S. Doddmeade Edmunds, architect, St. Albans.

H. J. Skelton	£80		
W. Goodchild & Son	864		
	[Both of St. Albans.]		

ST. ALBANS.—For the erection of a house and shop, Catherine-street, St. Albans, for Mrs. S. E. Smith, Mr. S. Doddmeade Edmunds, architect, St. Albans.

H. J. Williamson	£620	W. J. Bastin	£510
H. J. Skelton	625	Goodchild & Son*	470
J. T. Bushell	515	J. Elwood	465
	[All of St. Albans.]		

ST. ALBANS.—For sundry additions, alterations, and decorations at "The Deacons," Althorpe-road, for Mr. Jonathan Lynn, Mr. S. Doddmeade Edmunds, architect, St. Albans.

House, Motor-house, Total, etc.			
Goodchild & Jeffry	£508	£425	£1,023
E. Dunham	482	398	880
C. Meakin & Sons, St. Albans	430	360	790
H. J. Skelton	470	280	750
	Accepted for house only. Decoration contract £85 extra.		

ST. ALBANS.—For the erection of a residence and motor-house, etc., Sand Pit-lane, for Mr. F. W. H. Hutchinson, M.A., Mr. S. Doddmeade Edmunds, architect, St. Albans.

House, Motor-house, Total, etc.			
H. J. Skelton	£1,730	£385	£2,070
E. Dunham	1,498	213	1,711
Vall & Shore	1,139	145	1,387
	[Notched and accepted.]		
	[All of St. Albans.]		

ST. ALBANS.—For the erection of a detached villa residence, Blandford-road, for Mr. C. W. Little, Mr. S. Doddmeade Edmunds, architect, St. Albans.

E. Dunham	£745	Vall & Shore*	£510 0
Goodchild & Son	610	A. A. Ivory	516 15
H. J. Skelton	558	J. Elwood	516 0
	[All of St. Albans.]		

STONEBRIDGE.—For 235 lineal yds. of pipe sewers, etc., at Stonebridge, near Durham, for the Durham Rural District Council. Mr. G. Gregson, Surveyor, 38, Saddler-street, Durham.

J. G. Bradley	£178 0 0	J. Carrick, Cross-roads, Durham	
H. Meredith	175 2 0		
R. Oliver	170 0 0	Durham*	£167 13 9

SWADLINCOTE.—For the erection of lock-up shops and public conveniences, and for the pulling-down and removal of existing public conveniences and shops in Mill-lane, Swadlincote. Mr. A. J. Mason, engineer and surveyor, Swadlincote.

Vonning	£242 8 11	B. Kershaw & Cartwright Bros.	236 7 4
E. Clarke	228 0 0	Sons, Burton-on-Trent*	£220 0 0

TOOTING.—For the erection of cottages on section A, Tottenham Fields Estate, for the London County Council:—
 T. Morley, jun., £3,710 0
 C.S. Morrell & Co., 3,296 0
 W. & C. Brown, 3,170 0
 Prestige & Co., 3,068 0
 L. Lawrence & Sons, 3,041 0
 J. S. Curran & Co., 2,920 0
 C.W. H. Ltd., 2,924 0
 F.A. I. Thorne, 2,902 0
 H.L. Holloway, 2,760 0
 Jones Bros., 2,691 0
 (The estimate payable to the tenderers is £2,600)

TOOTING. For the paving of Tooting Rev. A. Allen for the M. Tottenham Assessor's Board, Mr. W. L. Ho. Engineer in-charge:
 J. Edge & Co., Stalybridge, G. Neal, 110 11 0
 E. Strover, 123 0 0
 Fry Bros., 148 1 5
 J. Smart & Son, 113 14 0
 L. Farthing, 140 0 0
 W. Shepherd & Sons, 120 15 0
 Constable, Hart & Co., Ltd., 123 16 0

WANTWAD.—For erecting a two-story school annual training centre, cottage, etc., on the Aldersbrook school site, Ingatesstone-road for the Local Advisory Sub-Committee, Mr. C. H. Bressy, architect, 75 and 77, Bishopsgate-street Within, E.C.4:—
 A. W. Robins, £16,150
 F. & E. Davey, Ltd., 13,787
 F. H. Yell, 13,700
 C. S. Foster & Son, 13,537
 A. Faulks, 13,370
 A. Monk, 13,185
 W. E. Westgate, 13,115
 Sands & Bailey, 13,033
 H. Knight & Son, 12,983
 A. E. Symes, 12,936
 J. M. Kay, 12,898
 Matlock & Parsons, 12,891
 T. J. Hawkins & Co., 12,851
 W. Ward, Ltd., 12,836
 W. Lawrence & Son, 12,744

WEALDSTONE.—For about 1,050 ft. of road and sewers, Messrs. Allen & Hoar, surveyors, 283, West End Lane, N.W.1:—
 F. G. Porter, £1,225 18 0
 J. Jackson, 1,222 0 0
 G. Winney & Co., 1,200 0 0
 A. B. Champ-ers, 1,164 0 0
 T. Watson, jun., 1,150 0 0

WIMBLEDON.—For a dep-t cart-shed, for the Wimbledon Borough Council, Mr. C. H. Cooper, Engineer and Surveyor, Town Hall, Wimbledon:—
 Fireproof Co., Ltd., 5915 0
 Croxson & Co., 580 0
 F. Smith & Co., Ltd., 549 0
 Fulham Steel-works Co., Ltd., 519 0
 Baldwin, Ltd., 507 0
 Westwood & Wrights, 504 0
 Drew-Bear, Perks & Co., Ltd., 500 5
 R. Jiles & Co., 493 0
 C. & W. Walker, Ltd., 496 0
 Darlington Construction Co., Ltd., 467 0
 W. A. Baker & Co., Ltd., 465 0
 Stevenson & Co., 461 0
 Newton, Chambers & Co., Ltd., 460 0
 Sands & Son, 453 0
 Cadogan Ironworks, 450 0
 F. Braby & Co., Ltd., 449 0
 J. Lyne, Ltd., 440 0
 Measures Bros., Ltd., 445 0
 Mulliner & Co., 442 0
 J. Ellis, 440 2

† Alternative tender.

WATFORD.—For the erection of four villas, Whippendell-road, Watford, for Mr. L. T. Simmons:—
 H. Brown, Watford, £1,650

WINCHMORE HILL.—For cleaning and painting at the Northern Convalescent Fever Hospital, Winchmore Hill, N., for the Metropolitan Asylums Board, Mr. W. T. Hobbs, Lincoln-in-the-Clough:—
 W. H. Wagstaff & Sons, £3,835 0 0
 W. G. Ridgway, 3,107 9 3
 Skevington Bros., 2,654 12 6
 Gavin Bros., 2,428 18 9
 J. M. Turpin, 2,370 12 0
 J. Christie, 2,324 2 5
 T. Carr, 2,165 0 0
 W. Dingley, 2,098 8 6
 E. E. Nightingale, 2,000 0 0
 P. Smith & Co., 1,854 10 1
 R. T. Burnell & Sons, 1,820 10 7
 W. Mills, 1,770 0 0
 R. Proctor & Son, 1,760 0 0
 R. W. Broadbank, 1,663 14 9
 M. McCarthy, 1,397 0 0
 W. J. Simms & Sons, 160, Derby-road, Nottingham, 1,394 10 0
 Wright & Co., 1,288 8 3

WOOLSTON.—For providing and laying Coverach, svenite concrete paving in four roads, for the Iichee Urban District Council, Mr. T. A. Collingwood, Surveyor:
 Empire Stone Co., Ltd., 4 5
 Dan Stone Co., Mutton-grove, Devonport, 4 6
 W. Standing, 4 5

WOOLWICH.—For covering heaters and piping at Brook Fever Hospital, Shooter's Hill, for the Metropolitan Asylums Board, Mr. W. T. Bache, M.D., C.B.:—
 H. G. H. Ltd., 443 0 1
 S. T. Taylor & Sons, 39 12 7
 London Sealing Co., 29 15 0
 Turner & Malville, Ltd., 21 1 2
 P. Levy & Co., 20 1 0
 Mica Boiler Covering Co., Ltd., 22 1 7
 Lonsdale Bros., Ltd., 224 8 7
 S. Smith, 222 6 0
 "E. Hughes" Engineering Co., 222 4 11
 Ditch's Asbestos Co., 220 8 4
 A. Haacke & Co., 196 11 8
 G. Padlock & Co., 184 1 10
 Reid, McFarlane & Co., Ltd., 177 11 11
 Toupe's Asbestos Covering Co., Ltd., 176 17 2
 Bell's Asbestos Co., Ltd., 161 18 11
 Boldred, Way & Co., Ltd., 118 1 6
 J. B. Lawes & Co., Ltd., 146 3 7
 J. W. Kitson, 10, Brunswick-street, Blackwall, E., 136 4 7

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ILLUSTRATIONS.

Interior of Selby Abbey.....Drawn by Mr. W. Monk.
Premises, 19, 20, & 21, Hatton Garden.....Messrs. Niven & Wigglesworth, Architects.
Proposed Town Hall, Dartmouth, Devon.....	.....Mr. E. Vincent Harris, A.R.I.B.A., Architect.
Monument in Lugs Cemetery, Ayrshire.....	.....Mr. J. J. Stevenson, F.S.A., F.R.I.B.A., Architect.
Illustrations of Roman Architecture.....	.....From Photographs.
Church of St. George of the Latins, Famagusta, Cyprus.....Measured and Drawn by Mr. Geo. Jeffery.

Illustrations in Text.

Church of S. George the Latin, Famagusta, Cyprus:—

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Church of S. George the Latin, Famagusta, Cyprus.



THE great seaport of the Eastern Mediterranean during the XIVth century was Famagusta, in the island of Cyprus. There, after the fall of

Acra and the final abandonment of the Holy Land by the feudal lords who had carried on for two centuries the kingdom of Jerusalem and the principalities of Antioch, Tripoli, Galilee, etc., the noble families and rich merchants of the Syrian and Palestinian Littoral found a refuge. Abandoning the warlike character of their crusading ancestors, these people, who constituted a very mixed community of all the Levantine races, and whose only tie in common was an elastic pre-Reformation Christianity, seem to have set themselves to cultivating the arts of peace and commerce. The Cathedral of Famagusta is dated by the famous inscription in 1311. This remarkable building—remarkably preserved in spite of Turkish destruction and partial "restoration" by the English Government of the past twenty-five years—was evidently designed as the crowning-place of the putative kings of Jerusalem, and the representative monument of the great Gothic art of the Middle Ages planted down in the very midst of the Mohammedan Levant.

As a grand "point d'appui" for the commerce of the Levant and for maintaining

the theoretical kingdom of Jerusalem, the "Franks" or "Latins" of the closing years of the XIIIth century were obliged to create an entirely new city for the purpose. There are no records of the site of Famagusta being occupied at any early period, and there are no monumental traces of such an occupation. Very possibly there may have been a small Byzantine village standing on the shore of the lagune or natural harbour long before the coming of the crusaders, but such a village of mud-huts surrounding some poor little Byzantine church would disappear with the building of the city walls in the XIVth century.* But for some time preceding the building of the great Cathedral and the magnificent fortifications, which latter date perhaps from a period long subsequent even to the year 1311, the site of Famagusta seems to have been occupied by the Latin lords of Cyprus. Attracted by the natural port, they seem to have built the four square castle which, with its four massive angle towers, still survives embedded within later earthwork fortifications as a defence to the harbour mouth. Just across the castle ditch on its southern side they erected the beautiful church of S. George.

The very remarkable fact that this church was built with a crenellated parapet—in other words that it was a fortified building—leads to the supposition that it must have been built before the city walls, and when the open country still

surrounded the harbour and the castle. By the time the Latin Cathedral was in building the city had come into existence, and the city wall was probably in course of construction (circa 1325). We may, perhaps, date this church of S. George as a building of the last years of the XIIIth century, but as to its history we have not a clue of any kind. No inscription remains upon its walls, and no distinguishing emblem or coat of arms is preserved amongst its numerous ornamental details. M. Enlart, in his careful researches amongst the records of Cyprus churches still preserved in Europe, has failed to discover its history, and the earliest mention of it by name is in the curious representation of the famous siege of Famagusta, where it is clearly enough identified by the old Italian "S. Giorgio Latino," or "S. George the Latin."

Amongst the peculiarities of its construction must be mentioned first the very remarkable way in which the remains of some old Classic temple (probably from the neighbouring Salamis) have been made use of. The Classic temple was probably of considerable size, and evidently one of those built in the later style of Roman imperial art—perhaps a multicolumnar example in the style of Hadrian's great temple at Athens. Its columns were constructed in drums of the yellow sandstone of the district. It is perhaps curious that these drums were originally all cut to a uniform

* It is perhaps just possible that the small church known as the old Greek "Metropolis," which stands at the side of the great church, illustrates and accounts of which appeared in the *Builder* of last year, may have been the village church of such a settlement.

* This curious copperplate broadsheet was published by a certain Stefano Gibellino in Brescia the same year as the famous siege and martyrdom of Bragadino. The church is very clearly represented and designated under the name of S. George the Latin.

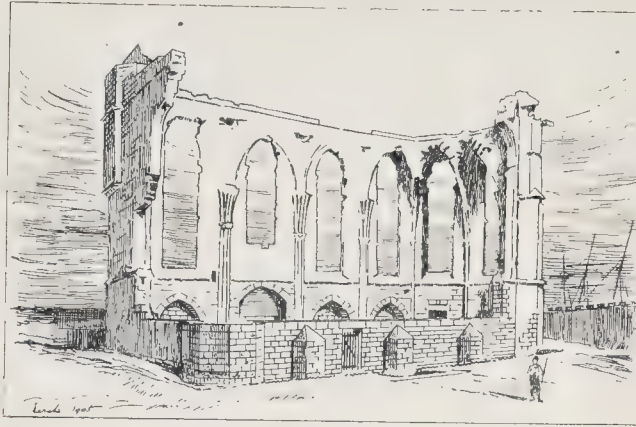


Fig. 1. St. George the Latin, Famagusta; after enclosure, 1905.

thickness of 33 centimètres, and the capitals (judging from fragments discovered in the walls of the church) were also formed out of two thicknesses of 33 centimètres each. The masonry of the XIIIth century church is absolutely exact, and the courses have evidently been arranged to fit in with this measurement of 33 centimètres. Every stone in the walls seems to have been cut exactly cube, with all six faces clean, like the masonry in marble of the Parthenon. Every three courses with the thin mortar-joints form exactly 1 mètre of modern measurement.*

But the most curious detail of construction is the way in which the circular drums of the Classic columns have been adopted as the stones on which to cut the slender shafts of the Gothic style. This is best explained by a reference to the sketch of the wall shafts in Fig. 2; the ancient drums are ingeniously made to bond in with the wall masonry.

The stonework of the church, although largely derived from the ruins of Salamis, was also quarried elsewhere, the arch stones of windows and some other parts are evidently of a different quality, and the weathering of the stones has been very different in some places. As a piece of XIIIth century masonry the building is a most interesting study, and whilst representative of XIIIth century beauties it also exhibits some of the defects of that style. For instance, the extreme slenderness of the window mullions, merely tied in by iron supports, strikes the eye at once. The evident haphazard design of the whole, and of its parts, which may be charming as a contrast with the formalism of other styles of architecture, can hardly be defended on the ordinary grounds of artistic criticism as applied to monuments of such importance. The building seems to have been carried out more by instinct than by any exact pre-arranged plan. The irregular way in which the north-west turret fits on suggests its having been an accidental afterthought.

The mortar in use at Famagusta in the XIVth century was evidently of a

very superior quality; although merely lime and sand of the seashore, its strength at the present day is sufficient to support large stones perhaps a quarter of a ton in weight by mere adhesion. This ruin of St. George, like many others in the city, is remarkable for its cohesion considering all through which it must have passed, battering by artillery, innumerable earthquakes, and probably a powder magazine explosion. During the famous siege of Famagusta by the Turks in 1571 the church was covered over with an immense quantity of earth to form a bomb-proof protection against the Turkish artillery. The sterility on the north side, which is still covered with its vault, is also still protected in this fashion. The cannon-shots fired from the batteries on the south-east of the city seem to have reached as far as this church, as there are marks of cannon-balls within the ruin. But the collapse of the roof and the complete destruction of the south side seem more probably to have been the result of an explosion of gunpowder stored within the building. Only in this way can one realise how the immense masses of the vaulting and its supports have been

thrown to a considerable distance on the southern side. On the collapse of the vault the earth which it supported formed a grass-grown mound covering up the debris, and after this event the ruin, like most others in the city, afforded the Turks an easy means for obtaining well-cut stones without the trouble of quarrying. On the sketch (Fig. 1) will be noticed the outline of the enormous mass of masonry at the west end which still stands in mid-air, as it has stood for the last three centuries.

The plan of the church was evidently very much influenced by the necessity to constitute it a fortified building. At the west end there seem to have been two turrets, one of which formed a staircase leading up to the flat roof—the other a mere covered sentry-box at the north-west corner forming a protection to the soldiers "going the rounds." It is probable that these two turrets were alike in design; that on the north-west angle is still almost intact. The rather singular buttresses with their angular outline were also probably intended to admit of a wide scope for the cross-bow fire from the flat roof.

The various architectural features of this building are all of great interest; the curve of its vaulting ribs, the character of its mouldings, which have an appearance at first sight of being somewhat "later" than the XIIIth century, and the remarkable way in which so many of its details (for instance, the niche-tabernacle over the altar) have been preserved, attract the attention of the architectural student, and afford a delightful object of study.* During the past spring the ruin has been carefully enclosed—an operation which was comparatively easy to accomplish. The gaping holes made by the Turks in search for building-stone were carefully closed up with old stones found in clearing out the rubbish

* M. Enlart claims this church as of purely French origin—as, in fact, he claims all the other buildings of any importance remaining in Famagusta. But although the characteristics of design closely resemble the great churches of Provence, details common to other shores of the Mediterranean enter the composition. For instance, the carved arch mould covering the plan mouldings of a doorway is particularly characteristic of the South of Italy.

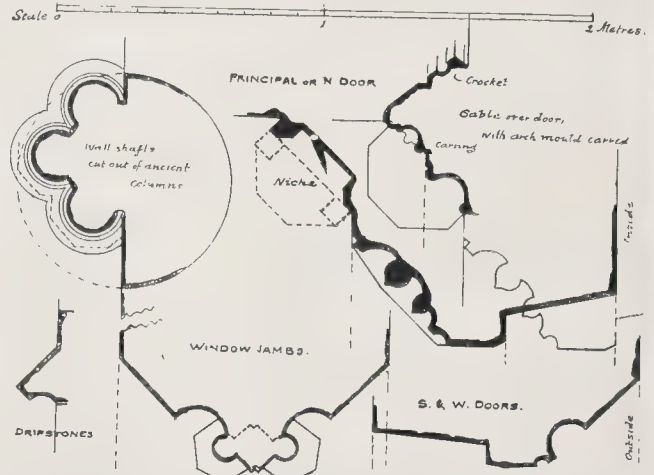


Fig. 2. Details, St. George the Latin.

* Although the metric system is usually supposed to be a comparatively modern invention, it is often remarkable to find buildings of the Middle Ages and even earlier times which seem to have been built with the use of a standard measure practically the same as the metre.

which filled the interior of the building. Then on digging away this immense mound of earth and debris the lower portion of the south and west walls was found standing intact to a height of about 6 ft.; this merely required clearing along its base and an additional course of old stones replacing on the top, and the reclamation of the building was practically complete. The old south doorway was filled with a plain iron gate, and the whole monument is now preserved from being turned into a receptacle for filth and from further spoliation.

Amongst the curious details of its ornamentation the church possesses a capital to one of the wall shafts on the north side, which represents a cluster of bats (Fig. 3). This singular "motif" is

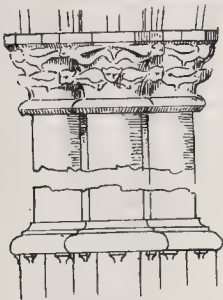


Fig. 3.

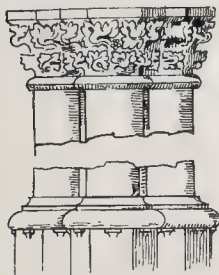


Fig. 4.

Caps and Bases, St. George the Latin.

referred to by M. Enlart in his great book on Cyprus art. M. Enlart has also published most of the details of the carving on this church with all the charm of his careful drawing, and with the addition of his exact description. He does not, however, give complete drawings of the buildings. Many years ago Messrs. l'Anson and Vacher, who seem to have visited Cyprus just after the British occupation, included St. George the Latin amongst their collection of drawings in the *Proceedings* of the Royal Institute of British Architects. The present drawings are, however, the first complete illustrations on a large scale of this interesting monument, which is now the property of the British Government.

MISSION CHURCH, LEYTON. — Emmanuel Mission Church, at Leyton, was opened recently by the Bishop of Barking. It has been erected from plans designed by Mr. E. C. Frere (architect) by Mr. F. J. Coxhead, and will accommodate about 500 people. The cost of the building was 2,600l.

NOTES.

Irish Architectural Association for Ireland. The new President of the Architectural Association of Ireland, in a spirited but somewhat over-emphasised address, has called upon the Irish architects to be true to their country in using Irish materials for their buildings, and in endeavouring to evolve an Irish national style instead of adopting English architecture. As to the first plea we are quite in accordance with him. The materials of the country always harmonise best with the landscape of the country; and it seems, as he says, absurd that buildings should have been kept waiting two or three months for granite from Scotland when there is plenty of granite in Ireland. We have on our table at this minute some excellent samples of granite from the "Galway Granite Quarry and Marble Works," which, one would suppose, could be got more quickly and cheaply than granite from Aberdeen; unless, indeed, there is want of capital to work the quarries efficiently. But when Mr. Holloway exhorted his hearers to evolve an Irish style of architecture, we fear he is Utopian; and we suspect (reading between the lines) that political feelings have something to do with his enthusiasm. He recalls the fine buildings that were erected in Dublin in the days of the National Parliament, and suggests that this efflorescence of fine architecture would re-appear under Home Rule. But were the Parliament House (now the Bank of Ireland) and the Custom House, and the other noble buildings of that period (we quite share his enthusiasm in regard to them), in any sense national Irish architecture? They were simply the architecture of the Classic Revival, carried out in Ireland just as it was in England. They will hardly lend themselves to a plea for an indigenous Irish style. Irish architects will have to begin at Celtic for that, and develop it anew. That might be possible, if they think it worth while.

The Fire at Selby Abbey.

IN addition to the slow processes of decay and subsidence which threaten the continued existence of ancient ecclesiastical buildings, the risk of sudden ruin by fire is one that must always be recognised. That it has received insufficient consideration in the past is practically certain, and the disaster that overtook the historic abbey church of Selby on Saturday last should have the effect of encouraging the adoption of more efficient equipment than exists in the majority of similar buildings for dealing with outbreaks of fire. Except in the case of cathedrals in which rooms have been built above the main floor level, the greatest risk of fire is to be found in the choir, where timber work abounds, and the organ contains material arranged in a manner specially favourable for combustion. By eliminating gas lights and heating stoves from the body of a church, and by the exercise of ordinary care, it ought to be easy to guard against fire, and by the aid of suitable appliances to suppress any local outbreak before serious harm is done. Therefore, given proper precautions, we do not see that the fire at Selby affords ground for any widespread uneasiness.

One point, however, certainly requires explanation. It is reported that the cause of the disaster was a mishap in connexion with the blowing apparatus of the organ. Possibly an electric motor was used for operating the bellows, and if so the fire may have resulted from short-circuiting between the conductors owing to contact with moisture. In any event, we should like to know how it came about that an apparatus likely to cause flame or intense heat was installed without being completely isolated from combustible material.

Labour Returns.

THE labour returns for September still show an improvement in trade on a year ago, the percentage of unemployed being 3.8 as compared with 5.3. The number of workpeople affected by old or new trades disputes during the month showed, however, an increase of 6,491 on September of last year, but the aggregate duration of disputes was 109,900 working days less. The great strike on the Clyde does not come into the figures for September, having commenced with the first of this month. It is earnestly to be hoped that both employers and employed will use their utmost endeavours not to check the much-needed improvement in trade by engaging in trade disputes. An improvement in trade generally means an increase of strikes, as workpeople are too apt to forget the long period of inactivity during which their employers have kept works open at a loss in order to retain their workmen; whilst, on the other hand, the employer is equally anxious to recoup his losses before he raises his workpeople's wages. Both sides, however, have to remember that disputes mean the work going out of the country, and it is satisfactory to see that conciliation, arbitration, and mediation have played an important part in the past month.

The Dover Harbour Collision.

AS we have frequent occasion to point out, the daily Press seem quite unable to report any occurrence relating to structural work without giving the public an entirely wrong impression as to what has actually happened. The paragraphs which appeared on Monday last on the collision outside Dover Harbour constitute a case in point. Under the heading, "Damage to Dover Harbour Works," one paper says that a Swedish steamer "crashed into the piling of the works of the southern breakwater," causing "serious damage to the harbour works," and that "two bays were completely carried away." Another paper says that the steamer "crashed into the southern breakwater works," and publishes a photograph of the "damaged breakwater." The fact is that the steamer did not touch the breakwater at all. What actually happened was that it collided with the temporary staging erected by the contractors for completion of the breakwater, a massive granite-faced concrete-block structure to which no vessel afloat could cause any injury beyond purely superficial scratches or dents.

Southwark Bridge.

IN spite of the relief afforded to foot passengers, the widening of London Bridge has been of no benefit to vehicular traffic,

which becomes more congested every year. The Tower Bridge is too far east to become a popular route between the City and the Borough, and Southwark Bridge is more or less deserted owing to its impracticable gradients. Three years ago the Bill of the City Corporation providing for the rebuilding of Southwark Bridge was rejected by Parliament owing to opposition on the part of some City Companies, but one failure ought not to cause the total abandonment of the scheme. It certainly would not deter the London County Council, whose pertinacity in similar circumstances is almost proverbial. The City authorities have ample funds available in the Bridge House estates for execution of the works, and it is clearly their duty to bring the project forward again with the object of affording more adequate facilities for the rapidly-increasing cross-river traffic, especially as the construction of a new bridge with suitable approaches is a work that will necessarily occupy several years.

The New Cathedral copalian Church of America.

WE learn that the Episcopal Church of the United States has invited Mr. Bodley to prepare the designs for a cathedral to be erected at Washington. We presume that the American Episcopal Church wishes to show an outward and visible sign of its hereditary connexion with the Church of England, which in its turn has desired to keep up the outward expression, through its buildings, of its hereditary connexion with the mediæval church. We should have preferred to have seen an attempt, in a cathedral built on American soil, to produce something new and more essentially modern. Of course, we do not know that Mr. Bodley may not take the same view; but his church architecture has hitherto been of the mediæval stamp, his design for the Liverpool Cathedral having been almost absolutely archaeological in treatment; and it is probably on that account that he has been invited to undertake the work. If the American Church desire that their cathedral should more or less reproduce the mediæval cathedral of the old country, of course they could have selected no architect more capable of the task than Mr. Bodley.

The Law Courts.

It is surprising how long a desire for picturesqueness over convenience predominated in the Law Courts, for it was not until the present year that the corridors of the offices attached to the Courts were artificially warmed. This work has been done during the recent Long Vacation, and will, no doubt, be found not only an improvement, but a cause of economy in the consumption of fuel in the various offices. An addition to the number of lifts is unquestionably required before these offices can be considered in an up-to-date condition. Better light and ventilation in the Court corridors are also matters which should engage the attention of the authorities. The post-office accommodation is likewise exceedingly defective, and causes no little inconvenience and delay. That a post-office and telegraph-office would be required was entirely overlooked when the building was built, and so wooden

shanties capable of holding only one or two clerks disfigure the north corridor.

Supports for Roof Superstructures.

LAST week we mentioned two examples indicating the importance of ordinary foundation work. The cases quoted below may be taken as supplementary illustrations of the same point. The first is that of a large tank recently erected on the roof of a factory in Brooklyn, where some 300 persons are employed. Soon after the tank had been fixed and filled with water, it fell through five floors to ground level, almost completely wrecking the building. Fortunately the mishap occurred after business hours, or the loss of life and personal injuries would have been most serious. So far as can be ascertained the cause is to be attributed to the inadequate strength of the brick foundations provided for the tank. The second case is that of a steel chimney on the roof of a building in Pittsburg, which suddenly fell over owing to failure of the stays. By good fortune the chimney was prevented from falling into the thoroughfare below, as its upper end was intercepted by an adjacent building. One accident was evidently due to faulty design or workmanship, and the other to neglect of inspection and maintenance.

Mr. Hunt's "Lady of Shalott."

WE are very glad to see, by a letter in the *Times* signed by Mr. H. G. Woods and Canon Rawnsley, that an endeavour is being made to secure the purchase of Mr. Holman Hunt's "Lady of Shalott" for the nation. It would be a most appropriate and fitting climax to the arduous work by which this great picture has been produced, that it should be placed in our national collection of works by eminent English artists. It is far more worth purchase for the nation than M. Rodin's somewhat ungainly figure of John the Baptist, about which such jubulations were made a little while ago; but then that was by a foreign artist and this is by an English one, which makes all the difference, of course! And M. Rodin is a fashionable idol and Mr. Hunt is not. A subscription list for the purchase of the picture has been opened at the Leicester Galleries with the object of raising the funds necessary for the purchase.

The Fence, Regent's Park.

WE are entirely in sympathy with the objection which has been publicly raised against the removal of the oak fence round Regent's Park and the substitution of an iron fence. As has been truly urged, the impression of a country park, while an iron fence will give it only the appearance of an enlarged London square. The proposal is altogether a foolish one.

College of Art sketching Club.

AS AN exhibition of students' work, with here and there a really mature production, the exhibition of the South Kensington Sketching Club for students of the Royal College of Art is, as usual, full of promise. Most of the exhibits are sent in to compete for the prizes offered by the professors and other instructors connected with the College, and again this year a very large proportion of the work consists of

oil and water-colour sketches. The competition for the Principal's prize for a set of sketches in colour attracted 119 exhibits, the prize going to Mr. Harry Morley for some clever landscape studies, truthful in colour and full of atmospheric feeling. Mr. Oliver Senior takes second place with a pleasing set, and among the rest are several sketches which, bearing in mind the nature of the exhibition, are very creditable. Mr. Harry Morley also carries off the prize for landscape in combination with architecture, though in this class we preferred a clever early morning study of the Boston "Stump" by Mr. A. Mackinder, which is certainly more what was asked for by the subject set. Of works of decorative design and craftwork there is not much to notice, the only competitor for the prize for an embroidered card-case sending up an exhibit beautiful in execution but lacking in harmonious colour. A striking heraldic panel by Mr. G. E. Kruger, an illuminated title-page by Mr. H. Rosse, and some excellent jewellery by Mr. G. E. Sedding are among the best of the exhibits of work designed and wrought by students. The architectural designs are disappointing. The only satisfactory work in this class is a set of measured drawings of the Renaissance screen in Carlisle Cathedral, by Mr. J. A. Baxter.

Exhibition of Applied Art.

AT No. 9, Maddox-street, the Gallery of the Artificers' Guild, an exhibition has this week been opened containing various articles of craft work gathered together by Mr. Montague Fordham. Many of the more important exhibits are works executed by the Guild itself at its workshops at Hammersmith, but there is also a fine collection of Martin ware from this year's firing. Among the pieces shown are some interesting and effective lustre jars of a particularly fine tone. There are several excellent pieces of church plate by members of the Guild, including a brass cross, candlesticks, and alms-dish, with symbolical ornament of a high order of design and execution, for St. Peter's Church, Harrow; some small chalices for South Africa; and the silver chalice with jewelled knob exhibited at the Church Congress. In addition to some cases of jewellery by Mr. H. Wilson, and others, most of which is admirable in every way, there are a few examples of lettering and rubbings from inscriptions by Mr. Gill, whose work in carrying on the revival of good lettering is wholly satisfactory. Mr. Romney Green's furniture, of which there are a few pieces, is in a style quite its own, lacking a little, perhaps, in architectural quality, but certainly the outcome of consistently sympathetic treatment of material; this is notably so in the case of the fine walnut table exhibited. Altogether this is an interesting collection.

Reredos for Zanzibar Cathedral.

A BOLD and somewhat novel departure in Church decoration is now on view at the Bloomsbury Hall, Hart-street. This is a set of repoussé copper panels, fifteen in number, which are to form part of a reredos to be erected in the cathedral at Zanzibar by the Universities Mission to Central Africa, as a memorial to Bishop Smythies. The panels, which are nearly

ft. high and over 18 in. wide, are to be fitted under an arcaded canopy of oak which runs round the apse of the cathedral; they have been designed by Miss Agnes Vyse, and the work has been carried out by Miss Vyse and Mr. Henry Ross. The subjects, containing full-length figures in every panel have one, are a series of Old Testament types of Christ, and are, on the whole, well done, some of the figures being admirable. The idea generally seems a suitable one under the circumstances, and provided there will be enough light to properly illuminate the tereos the panels should prove effective. In the same room some good wrought-iron grilles by Mr. Ross are shown, and a candelabrum executed by him and lent by the Armourers' Company, which is excellent in design and for the quality of the finished metal.

Two of the first works we come across at the Dudley Gallery Art Society's exhibition (at the Alpine Club) are by ladies; Miss Green's "Morning at Innersperlé" (2) and Miss Margaret Bernard's "Hare and Hounds Inn, Sway" (5); the latter is an excellent example of broadly handled water-colour; the greater part of the view is occupied by a wide village road, just one wash of light colour, but it gives exactly the effect required, as a foreground to a bit of village architecture. Miss Bernard treats village architecture well again in "Church at Tosselin, Brittany" (49), and she exhibits also a large "Unfinished Sketch in Brittany" (214)—obviously unfinished, but her unfinished drawings are worth more than the finished ones of many other exhibitors at the gallery. "Low Tide, Leigh" (152), by Mr. Burleigh Bruhl (the President), is a good composition. Mr. Lexden Pocock exhibits a large and important work "Nature Study" (58), with figures of three girls grouped on a lawn examining something through a microscope; the colour of the dresses makes a good harmony, and the composition is a pleasing one in a rather flat and decorative style. A large proportion of the works exhibited are meritorious rather than interesting. Among those which are of special interest are two by Mr. Fraser, "Newhaven Harbour" (33) and "Harwich" (80); "A Street in St. Moritz" (29), by Mr. E. A. Jardine, in which there is a powerful effect of sunlight on snow; "Ganmon Head" (45), by Mr. S. W. G. Roscoe; "Among the Welsh Mountains" (46), by Mr. James T. Watts; a very good study of an old-fashioned three-decker under sail (81), by Mr. Donne; a beautiful little landscape by Mr. David Green, "Near Thursley, Surrey" (199); and "Evening in Normandy" (239), by Miss Janet Fisher. Mr. Cafe's large interior of Westminster Abbey (43) is careful and painstaking rather than artistic. Mr. Block's piece of still life study of old books (39) is perhaps the best we have seen of his many studies of this kind; the manner in which the engravings and lettering on open pages, seen foreshortened, are represented, is a most clever piece of perspective drawing, though perhaps the result was hardly worth the ability exercised upon it.

At Messrs. Tooth & Son's Gallery (now in Bond-street), the winter exhibition includes some fine little landscapes by Harpignies, Mauve, and Maris, unfortunately not seen under nearly so good a light as they would have been in the old gallery in the Haymarket. Israel's "A Sewing Maid" (21) is an interior with one figure, in his best style, and there is more of interest and sentiment in the figure than is sometimes the case with him. W. Steelink's "Spring" (12), a landscape with a large tree in the foreground, has really the brightness and freshness of spring, which is often totally wanting in Dutch landscapes of this class. T. Tadama's "Gathering Seaweed" (29) is a good coast picture, reminding one of the Ambleteuse neighbourhood. As for the large landscapes by Mr. Leader, and one of Heffner's stage sunsets, we have no use for them; but those who want something stronger will find it in a landscape by Mr. Syer, which is on view in one of the small rooms, though not included in the exhibition catalogue; this is a really fine and vigorous work, and makes the Leaders and Heffners look very tame. In the upstairs room is Sir. L. Alma-Tadema's well-known large work, "A Picture-Gallery of Ancient Rome"; an Oriental interior by Benjamin-Constant; a good winter scene by Mr. Thaulow, which we have seen somewhere before; and Mr. H. W. B. Davis's "Loch Maree"—finely-painted cattle in front of a finely-painted landscape.

It was right that a collective Stuart Wortley's exhibition should be made of the works of so talented a man as the late Mr. Stuart Wortley, which are now to be seen at the Grafton Gallery. Though Mr. Wortley did more of painting than of anything else, he may be said to have been essentially a brilliantly gifted and hardworking amateur; his passion for sport was as great as his passion for painting, and in fact he seems to have set before him at first, as his object, to paint sporting pictures with the knowledge of a sportsman and the insight of an artist. In the pictures of this class he did not, however, quite keep the balance; they mostly strike one as sporting pictures rather than as art; and the two which are most successful as landscapes are two in which the figures of sportsmen are not introduced, "Grouse on the Moors" (66) and "Rooks at Sunset" (68); these are good landscapes which one enjoys solely from the landscape point of view; so is "Wharcliffe Chase, Winter" (56). We rather doubt whether sporting interests and art can be completely combined in the same picture; the landscape will always look as if it was painted for the sake of the shooting party. The numerous portraits show a great gift in portrait painting, as far as finish and a happy arrangement of the lines of composition are concerned; we see this in the portrait of "Mrs. Duncombe," in a crimson dress and half kneeling with one knee on a chair or sofa; in the portrait of "Lady Hastings," seated and holding a rose drooped from her hand; in that of "Mrs. E. Stuart Wortley," seated, holding a large feather fan, and with a well introduced landscape background. But we do not think there

is any portrait in the collection which could rank as a work of art of the highest class. It shows what a difficult, what an exacting art painting is, that all this high natural talent did not avail to make its possessor a great portrait painter; all that could be said was that he was a capable and a pleasing one, as far as the character and arrangement of a portrait are concerned; the portraits want the *je ne sais quoi* which artistic genius alone can furnish. But we are glad to see his works collected, nevertheless; it was a tribute which he merited.

At the new Dudley Gallery there is a collection of oil, tempera, and pastel paintings by Mr. Edgar Willis. They are more noteworthy for composition and a certain poetic feeling for landscape than for colour, which is heavy and loaded in effect in some, and in others, as in No. 16, "The Mouth of the Burn," colour is overdone and rather crude; "Sunset's Golden Flush" (30) rather suggests a conflagration. What we do like are some of the smaller landscapes of wooded scenery—"A June Day" (48); "The Avon Below Stratford" (70); and "The Road to the Valley" (76); "Painswick, Afternoon" (37), is also a good composition. "Midnight" (47) is a good piece of night effect, except that the white houses are a little too bright for night; painters sometimes forget how very little can really be seen at night, in any decided manner.

At this small gallery, the special abode of modern aestheticism, there is at present a collection of water-colour drawings by Mr. A. W. Rich. They give rather the impression of having been painted with a sponge on blotting-paper, but in spite of their total absence of detail and sometimes of intelligible form, there is a fine feeling for landscape composition in many of them. "Near Clayton, Sussex" (32), is a most powerful and effective sketch, where much is conveyed by very slight handling. "Windmills" (3), "On the Adur" (4), and "On Salisbury Plain" (53), are among others that show powerful effect. "A Stormy Day" (34) looks rather as if the inkpot had been spilt over it. Most of them are what would once have been regarded as merely memoranda for the portfolio, to be worked up afterwards for exhibition. Now it seems to be considered that first thoughts are of more value than finished work. In some cases no doubt they are; but the principle may be carried too far.

HOLY TRINITY CHURCH, HULL.—A town's meeting, convened by the Mayor, was recently held at the Hull Town Hall for the purpose of inaugurating a fund for the restoration of the south-west portion, including the tower, of Holy Trinity Church. Mr. Brodick, the architect, said that the settlement had not taken place all at once, but had been continuing for some time. About two years ago he found the settlement was becoming a serious matter, and at his suggestion Mr. Francis Fox, the engineer, examined the church, the latter coming to the conclusion that they should shore up the church immediately to remove the danger imminent. The firm of Messrs. Thompson & Co., of Peterborough, was employed, and the shoring was very nearly completed. The timber supports in the foundations were very much decayed, as were also the pillars in the nave. It was decided to carry out the proposed works and to open a fund for that purpose.

NOTES ON MOSAIC AND MARBLE INLAY.—VI.

In S. Sophia, Constantinople, the walls are decorated with elaborate panelling of marble slabs of different colours enclosed in a carved framing, and varied with "opus sectile" as high as the springing of the great arches and vaults. The marbles appear to be mainly porphyry or rosso antico and serpentine, with giallo antico and a grey marble, according to Salzenberg, and the patterns are often very elaborate. He gives the method of working as follows:—"The sheets of marble sawn thin, for leaf and flower work only 6 to 7 millimetres thick, are cut to the required shapes, and then arranged in order on the bottom of a shallow box, backs upward, on which the design of the intended mosaic has been drawn out, so that the polished side is below and the rough above. The box is now filled with a mixture of melted dark-brown resin, marble, and brick dust to the height of two centimetres, which binds the pieces of stone firmly together, and so produces slabs of 25.30 millimetres thick, which are fastened to the wall by the help of similar binding materials. The resin used, which smells like incense when burnt, acquired the hardness of stone, and held the pieces together with great tenacity." The large slabs of marble or porphyry, 25 to 50 millimetres thick, were fastened to the wall with iron clamps and lime mortar. To keep the colours separate from each other they are surrounded with white marble ornamented with a lightly-chiselled ornament. Plant forms were used above the columns.

The "opus sectile" in the Baptistery, Ravenna, is of porphyry and serpentine, with a narrow white line dividing the two materials, which are cut into rather elaborate shapes. In S. Vitale, there used to be a band of ornament of various coloured marbles and hollowed-out patterns, some of which were particularly beautiful in colour, but these have now been removed to the museum.

In the apse of the church of the monastery of Daphni, near Athens, are marble incrustations; green, white, and red marbles are used, and the forms are triangles, squares, stars, and crosses. This is the only 11th-century example known.

At Monreale and the Capella Palatina, Palermo, the lower parts of the walls are sheathed with marbles ornamented with occasional perpendicular bands of marble mosaic inlay, and crowned with a corresponding frieze of Saracenic trefoils, which are filled in with the same kind of mosaic in great variety of geometric pattern. It was the custom in the 11th and 12th centuries to ornament choir screens, ambos, pulpits, and other permanent church furniture with marble inlays, both of slabs and small bands, and many examples are to be seen scattered up and down the Italian peninsula, but more frequently in the south than in the north.

This kind of decoration is known as "Cosmati work," so called from a member of a family of Roman marble-workers who devoted themselves for several generations to its production, but who were not the first to produce it. It was called "Lavoro da scarpello," was made by monks very frequently, and appears in the 11th century at Castel S. Elia, in the tympanum of the ciborium, which was remade at that period, but was not common until the beginning of the 12th century. At S. Michele, Bevagna (1195), and in the side façade of the cathedral of Foligno, it appears incrustated in the masonry. Rodolphus and Binellus sign the former, and mention the name of the emperor, but not that of the pope. The latter is so like the former in style and so near in date that there is little doubt that it is the work of the same artists. There is also mosaic incrustated in the early ciborium of S. Ambrogio, Ferentino. The door of S. Maria in Castello, Corneto, and that of S. Pietro, Toscanella, which much resembles it, are similarly incrustated. The former was made by Peter, son of Ranucius, another of whose sons, Nicolaus, signs the window above, dated 1208. The ambo inside of the same date is, however, signed "John son of Guido, Roman marble-worker." At Alba Fucense the ambo is signed "John Clivis Romanus, doctissimus arte," assisted by Andreas, who signs the beautiful much-incrustated marble screen as "Mag. Romanus et cives." The celebrated Vassalletus, who completed the cloister of

S. John Lateran, was son of another marble-worker of the same name, who was living in 1185 or 1186. He made the episcopal seat at Anagni and the Easter candlestick about 1265.

At Ara Celi one sees the first work of the Cosmati family. The ambo, now divided into two, bears on one part the inscription "Laurentius cum," and on the other "Jacobus filio suo vivus hujus operis magister fuit." This Laurentius lived between 1140 and 1210. He was working at Falerii about 1190, and appears afterwards directing the works at Civita Castellana. He had four sons, Jacopo, who worked with him and also by himself at the last-named place, where there is a very fine example of their work, and Cosmas (whose name designates the whole family) was working there also in 1210, Deodatus, and Lucas. He lived to a great age a simple and laborious life. Jacopo was still alive in 1293, when he was directing the works of Orvieto Cathedral. Their work was largely architectural, and only used the inlay which is associated with their name as accessory, but the invention which they displayed in the arrangement of form and colour was very great, and their general schemes often had great dignity and beauty. They disappear after the popes removed to Avignon. The façade at Civita Castellana may be taken as a typical work. It consists of central triumphal arch, flanked by a portico of three ionic columns on each side, the ends being piers as well as the supports of the central arch. The doorways within are much like those of S. Maria at Corneto and S. Pietro at Toscanella. One of them has in the lunette a bust of Christ in mosaic which is quite Byzantine in style; this door is signed by Jacopus. There is a fine band of inlay around the door and along the frieze. The portico resembles S. Giorgio in Velabro and S. Lorenzo fuori at Rome, except for the central arch. The inscription on the upper architrave of the triumphal arch is in golden letters on a red ground of mosaic, and has an unusual touch of feeling in its terms: "Magister Jacopus, civis Romanus, cum Cosma filio suo carissimo fecit hoc opus Anno Dni MCCX." In the sacristy two pieces of marble panelling are preserved which probably belonged to the choir enclosure, square slabs of porphyry and serpentine, surrounded by narrow bands of marble mosaic and borders of white marble, separated by relatively broad spaces of enamel mosaic on a gold ground. Carving mingles in the effect in the form of surrounding mouldings to the groups of panels, and cornice and base are treated in the same manner. The ends are formed by twisted columns inlaid in the usual way, with carved caps, and bases of lions and sphinxes. These are signed by Deodatus and Lucas.

Cosma's work is well seen at Anagni, where he restored the cathedral under Innocent III., finishing it in 1226, and worked for five years more at the crypt, till 1231, the date of the translation of the body of S. Magnus. Giovanni made many tombs, the earliest is that of Durand, Bishop of Mende, buried in S. Maria Sopra Minerva, Rome. The best known is that of Stefano de Sordis, chaplain to Boniface VIII., placed in S. Balbina in 1300 (where the fine bishop's throne is which is so much like that at S. Lorenzo fuori). This has a sprinkling of ornaments enclosed in circles inlaid over the drapery. The tomb of the Cardinal de Braye, in S. Domenico, Orvieto, has been ascribed to him as carrying out Arnolfo del Cambio's design, and the connexion of his brother Deodatus with Arnolfo in making ciboria from his designs makes it possible, but the inlay is just as much like the beautiful tombs of Hadrian V. and Clement IV. at Viterbo, in which neither had a hand.

Between 1220 and 1243, under Popes Honorius III., Gregory IX., Innocent IV., and Alexander IV., a great impulse was given to building and decoration, and at this period several important cloisters were constructed, decorated with this kind of mosaic and with carving. The cloister was then considered (after the church) the most important part of the monastery; it was the place for meditation, and it was there that the monks passed the greater part of the time which was not consecrated to prayer. The Sicilian cloisters, such as Monreale

(1182) and Cefalu, no doubt influenced the Roman designs, and the cloisters of S. John Lateran, S. Paolo fuori, at Rome, S. Scolastica, Subiaco, and Sasso Vivo above Foligno show the most extraordinary similarity, though the work of different men. The existence of a guild, such as that of the Cosmacine masters, who we know were employed in Apulia and at a later date in Sicily, is the only explanation which seems sufficient. The same capitals are found in Sicily and in Rome, the same motifs in the spandrels, the same slender columns channelled in spirals, and sometimes almost entirely encrusted with mosaic.

At S. John Lateran the cloister was begun in 1190 under the first Vassalletus. In 1227 it was still building under his son. At Sasso Vivo is a cloister which resembles it most closely, and its architect, Petrus di Maria, is not known by any other work. At S. Scolastica, Subiaco, the cloister is almost exactly like the last except that the columns are alternately coupled and single; the architects were Cosmas and his sons Luca and Jacopo—it was finished by the last in 1235. At S. Paolo fuori the cloister was commenced between 1193 and 1209, and not finished till 1241, according to the inscription on the wall. The architect is not known, but his taste was less pure than that of the others named, and the decoration is overdone.

In South Italy there are many very fine ambos and Easter candlesticks worked in this manner. They appear to have been produced principally during the time of the Norman dominion, and those at Salerno, made under Bishop Romuald, the chronicler, may be mentioned as a particularly fine example which suggests that Saracenic workmen may have been employed as they were in Sicily, and in the earlier ambo at Ravello fragments of Oriental basins or plates are used as material for the mosaic, which rather points in the same direction. On the other hand, the Amalfitans had commercial relations with the East and with Constantinople at least as early as the 11th century, so that the Oriental influence might have been direct; or the stimulating cause of the design might have been Byzantine, as the similarity of line in the patterns of inlay to the earlier Byzantine pavements seems to suggest.

In later Renaissance times a good deal of expensive marble inlay was done. The Certosa, Pavia, shows a good deal of this sort of work, made by a family of the name of Sacchi, who were engaged at a regular salary. This kind of pietra dura work was practised in Milan, and Giacomo de Trezzo, who did the tabernacle in the Escorial, was taught there. The marbles came from the Swiss mountains. The manufacture of Florentine pietra dura commenced in the second half of the 16th century, coloured marbles having been discovered in the Tuscan mountains. Cosmo I. encouraged it by statute in 1561, and in 1580 the Medici chapel was done by Giovanni Bianchi at the cost of Francis I. As a rule the effect of this later work, whether on floor or wall, is not satisfactory. The aim was often to imitate such things as curtains with patterns on them, wonderful examples of which may be seen both in Venice and Sicily, in which extraordinary dexterity in the cutting of the marbles and the realistic carving of the folds was shown, and it was demonstrated quite perfectly that the imitation of Nature is not art. Perhaps the Jesuits were the greatest offenders in this direction, but some of the other religious orders ran them close.

The external decoration of buildings by means of inlays, or encrustings of coloured marbles has often produced very charming effects. The black and white stripings, so common in Tuscany, said to typify the healing of the feud between the Neri and the Bianchi of Pistoia, are not always pleasing, but the more complicated arrangements, such as those of the Baptistery at Florence, which shows a foretaste of the Renaissance, the façade of S. Miniato, which is a masterpiece of workmanship both inside and out, or the pretty little Badia Fiesolana, between Florence and Fiesole, must excite the admiration of all; and such an instance as that of the Cathedral of Messina, where to variety of colour is added the enrichment of lace-like bands of sinkings and inlaid patterns, gives a glimpse of what may be done in a kinder climate than ours in the way of external

lour and texture decoration. The camellia, known as Giotto's, but really due to 'Alenti, is another excellent example of such decoration, and in another mode the Venetian alaces of the Lombardi type, and the *Jadonna dei Miracoli* in the same city. Nor must the magical palace tombs of Agra be forgotten, with their jewel-like inlays of precious stones and floral forms on the milk white marble, once assigned to a European designer, Austin de Bordeaux, but certainly the work of craftsmen from Shiraz, Baghdad, and Samarkand, whose names are given in the Indian records of the building of the Taj. In the list of the principal workmen given by the MS. in the Imperial Library, live mosaic workers with Hindu names are mentioned.

Earlier examples in which inlay is mingled with carving may be seen at Pisa, where much of the cathedral façade is inlaid with patterns in grey and white, and where the internal fittings of the baptistery show great boldness in the relief of the carving joined to minuteness in the patterns of different coloured marbles which fill up the flat sunken surfaces (1153); and at Lucca, where in the façades of the cathedral and of S. Michele the richness of effect is somewhat overdone, and one feels that one would rather that either much of the carving or much of the inlay were away, beautiful as both are in themselves.

Another mode of wall decoration with applied and constructed detail is seen in the Norman churches of Sicily and S. Italy, as in the eastern ends of the cathedrals of Palermo and Monreale, and the lantern of the Cathedral of Caserta Vecchia. In all these cases a flat arading of interlacing arches is used, of marble and lava, and beneath them circular plaques and rosettes are inserted in the wall. At Taormina the same materials are used in several palaces in a different manner, chequers and inscriptions, and bricks and tiles are also used in conjunction with marble and stone in many places in a similar manner. Other examples of lava inlays occur on the apses of S. Maria del Patiro, near Rossano, and S. Giovanni in Venere in the Abruzzi; on the campanile at Melfi are winged griffins inlaid, and the side wall of S. Benedetto, Conversano, is ornamented with similar work on a more delicate scale, in which hard stones and cubes of enamel are employed. Several of these churches are Greek in plan, and M. E. Bertaux thinks it proved that the practice was an importation from Greece and Asia Minor.

THE ROYAL INSTITUTE OF BRITISH ARCHITECTS.

We take the following information from the last issue of the Royal Institute of British Architects' Journal:—

Arrangements for the new session are nearly complete, and the programme will shortly be published. Mr. T. E. Colclutt will take the chair for the first time as President and deliver his inaugural address on Monday, November 5. Among the papers so far arranged for the ordinary meetings are the following:—November 19, "The Cressus (VIth century a.c.) Temple of Artemis at Ephesus," by Mr. A. E. Henderson (Owen Jones Student, 1897); December 17, "The Strength and Composition of Mortar," by Mr. W. J. Dibdin; January 21, 1907, "Marbles: Their Ancient and Modern Application," by Sir Lawrence Alma-Tadema, O.M., R.A., and Mr. Wm. Brindley; February 18, "Modern Church Building," by Sir Charles Nicholson, Bart., M.A., and Mr. Charles C. Corlette; March 18, "Libraries," by Mr. Henry T. Hare, and Mr. J. Duff Brown; April 8, "Hotels," by Mr. Stanley Hamp. The award of prizes and studentships is to be announced January 21, and the distribution of prizes takes place February 4. Mr. Herbert W. Wills has given notice that at the business meeting, December 3, he will bring forward resolutions on the subject of public officials acting as architects for public buildings.

The following appointments to the Standing Committees of the Institute have been made by the Council under by-law 46:—

Art Committee.—Sir L. Alma-Tadema, O.M., R.A., Messrs. T. Raffles Davison, George Frampton, R.A., William Flockhart, and John W. Simpson.

Literature Committee.—Messrs. J. D. Craze, Colonel Lenox Prendergast, G. H. Fellowes Pryne, Cecil Smith, LL.D., and C. Harrison Townsend.

Practice Committee.—Messrs. Ernest Flint, A. H. Kersey, Charles Reilly, H. A. Satchell, and W. Charles Wymouth.

Science Committee.—Messrs. Wm. Dunn, F. N. Jackson, Wm. Jacques, F. T. Reade, and Edmund J. Bennett.

On the recommendation of the Board of Examiners the Council have sanctioned the following changes in the days of sitting for the examinations:—

The Preliminary and Intermediate examinations will begin on Monday instead of Tuesday as formerly, and there will be an interval of one day between the written and the *vivâ voce* portions of the Intermediate.

The Final and Special Examinations will begin on Thursday instead of Friday as formerly, and there will be a similar interval between the written and the *vivâ voce* work.

These changes, which have been made in order to give the examiners more time to go through the candidates' written work, will come into operation at the examinations next month.

THE ARCHITECTURAL ASSOCIATION.

The first ordinary general meeting of the Architectural Association for the present session was held on Friday evening last week, at Trafalgar-street, Westminster, S.W., Mr. R. S. Balfour, President, in the chair.

New Members.

The minutes of last meeting were read, and the following seventy-eight gentlemen were elected members, i.e.:—

D. C. Langford, Finchley	R. A. Abbott, Bayswater
C. A. Farcy, Hampstead	C. G. Clifton, Camden Town
E. Davies, N. Wales	G. W. Bacon, Croydon
R. A. Cram, New York	H. F. Saunders, Margate
S. A. Neave, London	A. G. W. Tickle, Willesden
A. R. Poyss, Norfolk	H. Willey Reigate
N. Warwick, Gray's Inn	N. W. Hick, Scarborough
F. R. Barry, jun., Richmond	H. F. Moore, Ealing
H. G. Courtney, Dublin	F. V. Sowerby, Grimsby
M. J. Tapper, London	H. W. Colman, Streatham
R. E. Elliott, Hampstead	A. E. Beswick, Regent's Park
R. J. Wylie, Chelsea	A. F. Hinde, Chelsea
E. E. V. Knights, Kensington	C. F. Butt, Paddington
F. Dowdeswell, Palmer's Green	L. M. Parr, Clapham
G. G. Wormum, Hampstead	A. Cooper, Slough
B. Watson, London	A. F. Spencer, Tunbridge Wells
H. W. Mann, W. Ham	W. W. J. Calthrop, London
W. H. Jones, Hoxsey	A. J. Hazegrove, Surrey
R. Priest, Clapham	W. Dunn, Gravesend
J. D. Callicott, London	H. A. Thomerson, Clapton
J. M. Pritchard, Chiswick	J. V. Stephenson, Kennington
W. E. Bonvass, Dorset-square	W. J. Durnford, Queen's Park
D. G. Preston, Dulwich	R. Cromie, Clapham
W. Mullerhausen, Forest Gate	L. H. Glencross, Norwood
H. J. Wilson, Finchley	T. E. Legg, Essex
A. E. Gunn, Leyton	C. C. Darson, London
E. H. Hawkins, Clapham	A. W. Stelfox, Belfast
J. Dore, Woodford	T. Spencer, Putney
C. B. Skerry, Maidstone	T. A. Lodge, Hants
W. J. Pywell, Havelland	L. E. Monteuiss, Putney
T. S. Linton, Denmark Hill	F. Scott, Kensington
G. A. Fortescue, Putney	F. A. Silk, Portland-place
H. J. Benians, Earl's Court	C. R. Hall, Highgate
J. R. B. Smith, Stockwell	A. G. Hodgkins, Hounslow
F. A. R. Rahbula, Clapton	D. W. Ditchburn, Leyton
B. do Carle Jackson, Beckenham	R. G. Kirkley, Natal
T. McConnell, Ireland	F. Harrell, Kent
W. H. Scott, Enfield	F. H. Swindells, Preston
H. J. L. Barcroft, Wandsworth	F. S. Hulbert, London

Council's Report and Balance-sheet.

Mr. Francis Hooper then moved the adoption of the Council's Report and Balance-sheet for session 1905-6. He said that, as their Treasurer for the year 1905-6, he rose, at the first ordinary meeting of the session, to propose the adoption of the accounts and balance-sheet for the past session, which had been printed in the Brown Book on pages 198-207. The income and expenditure account contained but few items which demanded comment from him. The contribution voted to the expenses of the International Congress of Architects held this summer in London would, he was sure, be approved by them as a small but fitting recognition of their gratitude to the Royal Institute of British Architects for their valued and timely support of the evening school work and of their generous contribu-

tion to the premises fund. The smallness of the item under the head of legal expenses was testimony to the generous manner in which Mr. Jamieson had conducted his work during the session. The increased cost of the *Journal* under its new management was scarcely one which could be begrudged. The five years during which he had had the honour of holding the position of Treasurer had been marked by an increase of membership from 1,392 to 1,665, of members' subscriptions from 1,048l. to 1,406l., of entrance fees from new members from 243l. to 294l., whilst arrears of subscription had fallen from 158l. to 100l. Turning now to the premises' fund, as the President reminded them in his address, 767l. was still required to free them from their obligations, which at the outset amounted to 8,332l. The contributions made to the fund comprised most generous gifts from Mrs. Arthur Cates, Sir Aston Webb, Messrs. J. Macvicar Anderson, H. L. Florence, Arnold Mitchell, and many other valued friends of the Association. Whilst, in addition to the grant from the Royal Institute of British Architects already mentioned, kindred bodies, such as the Birmingham Architectural Association, the Wolverhampton Architectural Association, and the Nottingham Architectural Society, had encouraged them by grants, and some of the City Guilds, viz., the Merchant Taylors, the Cloth Workers, the Carpenters, and the Fishmongers, had made contributions, for which the Association were much indebted. He (the speaker) had fervently hoped this debt might have been wiped out during his tenure of office, so that his friend and successor, Mr. Hare, might have been free from the outset to devote himself to the improvement of the library, reading-rooms, and school equipment, which increasing popularity now urgently demanded. He would, however, remind them that more than this sum had been spent upon the repairs and rehanging of the museum casts, together with the payments of a pension to the respected curator of the museum—these outgoings being encumbered upon them under their agreement with the late Council of the Royal Architectural Museum. In conclusion, whilst thanking every member of the Council and the Secretary, Mr. Driver, for their help and valued advice during his term of office now concluded, he must express very heartily his appreciation of the vote of thanks for his services as their Treasurer passed at the close of last session, and of the far too indulgent remarks of the President in his address a fortnight ago.

Mr. Arthur Keen seconded the motion, which was unanimously agreed to without further discussion.

The Association Rifle Club.

The Chairman said he desired to announce the inauguration of the Architectural Association Rifle Club by Major-General Lord Chylesmore, to be held at the headquarters of the London Scottish Volunteers, 59, Buckingham-gate, on the 27th inst., at 3.30 p.m. Sixty members of the Association had already joined, and all members were cordially invited to do so.

Mr. Tanner, jun., Hon. Secretary, announced a meeting of the Discussion Section, to be held on October 31, at 7.30 p.m., when Mr. G. M. Nicholson would read a paper on "Quantities and Cost."

The Architecture of the Roman Empire.

Mr. Alan Potter then read the following paper:—

"In reading this paper to-night, I am very conscious of my unworthiness to speak here at all, and more especially on such a broad and uncertain subject as 'The Architecture of the Roman Empire,' and I ask the indulgence of those many members who have a more personal acquaintance with the subject than I have. From them I hope to learn much in the after-discussion, and, in the meantime, I trust they will not be hopelessly bored by my restatement of old facts.

I have no intention of discussing the origin of Roman architecture or the contrivances of Roman construction; but I have collected the facts and theories of experts and, as far as possible, have marshalled them in a chronological order, as it is in the historical aspect that I intend to present them to you to-night. The Roman Empire became, as you know, an Empire in fact through the energies of

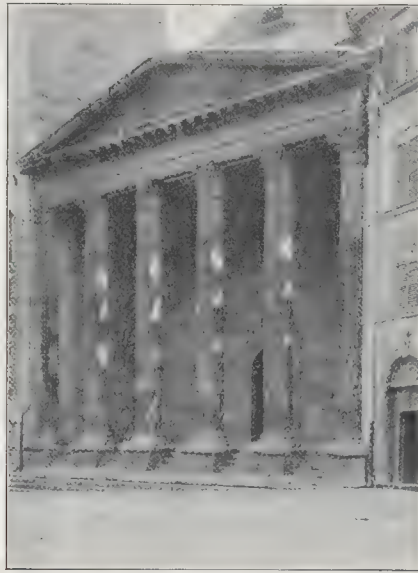


Fig. 1. Temple of Minerva, Assisi.

Julius Cæsar and the generals of the Republic. It was not till after Augustus had been three years the sole ruler of the Roman world that he accepted, from the Senate, the title of Emperor. His policy was one of peace; to confine the Empire within its natural boundaries which were the Atlantic on the west, the Rhine and Danube on the north, the Euphrates on the east, and the deserts of Africa to the south; and only in two instances was this policy set aside by his successors in the occupation of Britain, and the conquest of Dacia. It is in the neighbourhood of Rome that we find the chief remains of the Augustan era.

The Forum Julium.

The Forum Julium, the first of the Imperial Fora, was founded by Julius Cæsar, but not completed till after his death; situated north of the Forum Romanum it formed the close of the Temple of Venus Genetrix, an octostyle temple of Corinthian design.

North-east of this, backing up against the Quirinal hill, Augustus built the Temple of Mars Ultor, vowed to the God who avenged the murder of his uncle Julius.

As it could be seen from three sides only, the fourth side or back has no colonnade, but terminates in an apse; and its whole arrangement ought to be considered in conjunction with the Forum of Augustus, at one end of which it stood; the chief feature of which forum was the two hemicycles, one each side of the temple; a very favourite device of the Romans in after years. Canina restores these without the colonnade running across as a screen, giving thereby an effect of spaciousness where it is required. Three columns on the east side of the temple and remains of the hemicycle walls are all that is now left.

The Basilica Julia.

The Basilica Julia, used as a law court, in which four tribunals sat, was also founded by Julius, and completed by Augustus; its plan was that of a large oblong court, open in the centre, surrounded by a double colonnade of piers in two stories. The most complete portion is the west corner, with brick piers and a suggestion of vaulting. One of the piers of the façade facing the forum has been built up from fragments, and gives one some idea of the design (see lithograph plate).

To the east of this stands the octastyle peripteral Temple of Castor, rebuilt at this time by Tiberius, on a podium of concrete and marble 22 ft. high, which was decorated by pilasters, placed under the columns above.

Two circular buildings, the Temple of Mater Mututa at Rome, and the Temple of Vesta at Tivoli, are interesting to compare; the former, in the low-lying ground of the Forum Boarium, has a peristyle of twenty Corinthian columns of the very light proportion of 1½ diameters; whereas in the latter, perched on the edge of a precipice, the columns are only 9½ diameters.

The Temple of Minerva at Assisi.

The Temple of Minerva at Assisi (Fig. 1) is the only instance in Italy where the steps to the entrance are carried back between the columns, which are here raised on pedestals.

Continuing on the via Flaminia, there is the arch erected at Rimini by Augustus in B.C. 27 to commemorate the restoration of that road, where he also built a bridge over the river, constructed in five arches with slightly sloping approaches at each end, contrary to the usual Roman custom of carrying the road through level (Fig. 2).

The little tetrastyle Corinthian temple at Pola, in Istria, seems also to be of this period; as well as the triumphal arch at Susa, in Piedmont.

The Palaces on the Palatine.

Returning to Rome, we read that Augustus, before he became Emperor, lived in the house of Hortensius on the Palatine, "a simple and modest house with pavements of rubble work and simply whitewashed walls," and that it was not till after the battle of Actium that he contemplated building the palace which was dedicated in January, A.C. 26.

In A.D. 2 this was burnt down, but rebuilt in a more magnificent manner, but on the same plan. Tiberius, his successor, continued these buildings, and added a new wing near the north-west corner of the hill, overlooking the Velabrum. Caligula afterwards built another palace between this wing and the Forum Romanum, the remains of which are now visible from the forum, and through the substructures of which (see lithograph) one passes on the way up the Palatine.

On the east side of these buildings was the semi-underground passage, the crypto-porticus, where he was murdered, by the officer of the guard, in January, A.D. 41, while returning from the theatre. He was succeeded by Claudius, who made no alteration or addition to these palaces, but is more famous for his huge hydraulic enterprises.

The Hydraulic Enterprises of Claudius.

The *Acqua Claudia* was built during his reign (38-52 A.D.) to bring water from the

Alban Hills, forty miles away, and was raised high enough to supply the highest hills in Rome. The *Anio Novus*, a channel built on the top of this aqueduct, was fifty miles long.

He also built, in opposition to the Council of Government engineers, a large harbour two miles west of Ostia, enclosed by two jetties, each 800 yds. long, the area of which was 690,000 sq. yds., with a varying depth of 15 ft. to 18 ft., necessitating the removal of 112,000,000 cubic ft. of sand. Nero proposed connecting this harbour to Rome by a canal, but the scheme was never carried out. His ambition was to lay out Rome on modern lines, but he found himself checked on every hand by the owners of private property, and the numerous small temples and shrines absolutely inviolable in the eyes of the people.

Nero's Rebuilding of Rome.

After arranging a new plan with his architects, Severus and Celer, and having provided temporary accommodation for the people, he set fire to the city, as the easiest way of getting out of his difficulties, and succeeded so well that he reduced ten wards of the city to ruins out of fourteen without a single life being lost.

Hasty rebuilding was forbidden, as all frontage lines had to be approved, the new streets being planned at right angles to each other as far as the lay of the land would allow. The height of houses was restricted to double the width of the street, and each had to have a portico across the front.

Nero's Golden House.

Of this land of ruins, he appropriated, for his own palace, an area of about a square mile, where he built the Golden House, in the grounds of which there were sulphur and sea-water baths, a huge lake with harbours and docks for the imperial galleys, besides colonnades 3,000 ft. long, zoological and botanical gardens, not to mention streams, woods, vineyards, and farms.

Otho, on the day of his election, signed an order for 250,000, to complete these buildings; but after his murder, Vespasian, the first Flavian Emperor, of low birth and more parsimonious character, at once began to give back this land to the people. He and Titus founded the colosseum on the very spot of Nero's lake, and the latter afterwards built his baths on the foundations of the Golden House itself.

I will not weary you with a description of that famous amphitheatre, and will only mention that the authorities seem now to have entirely abandoned the idea of an awning being carried by the masts, which rested on the external row of corbels in the topmost story, and believe them merely to have been used for banners.

Baths of Titus.

The baths of Titus are of the usual plan: a main block of buildings containing the baths proper, enclosed within an outer court, part of which was set aside for games and part for promenades and gardens. In the centre of this block was the *Tepeidarium*, and, on the same axis, were the *Calidarium* on the one side and the swimming-bath on the other, the other sides being occupied by open courtyards surrounded by colonnades. The swimming-bath here was more than twice the size of others of later date, and enclosed on three sides by colonnades.

The arch of Titus, erected on the via Sacra, to commemorate the final subjection of the Jews in A.D. 70 is particularly interesting on account of the representation of the ornaments of the Temple at Jerusalem, as carried in the triumph of Titus.

It was Titus and his brother, Domitian, who filled in the gorge between the palaces of Caligula and Tiberius and the house of Augustus, and built over it the Flavian Palace, which is the finest group of all the Palestine buildings, chiefly composed of banqueting-halls and reception-rooms, with the Imperial basilica at the north-east corner.

Domitian also rebuilt the Augustan palace and added the Stadium on the west side of it; the walls of the latter still remain, and some small fragments of the encasing marble.

The Forum of Nerva.

When Nerva was placed on the throne by the assassins of Domitian he was already an old man, and his forum and the Temple of

Minerva within it were nearly completed. It was situated between the Fora of Augustus and Vespasian, a long, narrow rectangle in shape, with the Temple of Minerva at the northern extremity. The enclosing walls are decorated with detached Corinthian columns of Greek marble, the entablature and attic of the wall being broken out over them; only two of these columns now remain, but at the beginning of the XVIIth century, a great part of the portico of the temple was also standing.

The Forum of Trajan.

On the further side of the Augustan Forum was built the Forum of Trajan, from the designs of the architect, Apollodorus, together with the Ulpian Basilica and Trajan's column and temple. The forum proper was nearly square in plan, with a colonnade running round three sides, flanked by two large hemicycles of shops and offices, and approached from the east by a gateway having one central archway with three Corinthian columns on each side.

The basilica was a large hall enclosed on all four sides by a double aisle, beyond which at each end was an apse, used as a law court, and probably screened off from the rest of the building. On the far side of the basilica stood the Column of Trajan, the sculptures of which represent his campaigns against the Dacians, enclosed by a small courtyard between the Greek and Latin libraries, and facing the octostyle temple of Corinthian design dedicated to Trajan, but probably built by Hadrian at a later date.

The Harbour of Ancona.

In order to facilitate the embarkation of troops to the East, Trajan built the harbour of Ancona on the east coast of Italy, to commemorate or adorn which the Ancona arch was built. He also continued the work of Claudius at Ostia, building inside the Claudian Harbour a huge hexagonal dock, 18 ft. deep, some 390,00 sq. yds. in extent, with nearly 6,500 ft. of quay. It was to this harbour that the fleet of despatch boats plied, and here was situated the central post-office for provincial letters.

The harbour at Civita Vecchia was also built at this time, and still remains among the best and safest harbours of the Mediterranean.

Trajan's reign was also responsible for the bridge across the Tagus at Alcantara, in Spain, erected by a few Lusitanian communities, and consisting of six arches, 650 ft. long in all, the two central arches having a span of 110 ft. and a height of 210 ft., the material being granite laid without mortar.

Of the same date, probably, is the Segovia aqueduct, with its 520 arches, and the Tarragona aqueduct, 1,000 ft. long, with thirty-nine arches.

The arch at St. Remi in France seems to be of this date, and is similar to the Arch of Titus, except that it has sculptured trophies instead of niches between the columns.

In Africa the triple arch at Timgad, dedicated to Trajan, the son of Nerva, is especially interesting in that each side of the lesser archways there are detached columns with the entablature broken out over them, surmounted by broken segmental pediments, and that over these archways are niches flanked by small columns of coloured marble with diminutive entablature complete.

At Beneventum, in Italy, the Senate in 114 built an arch in expectation of the Emperor's triumphal return from the East, where he was adding many new provinces to the Empire; but in 116 he died out there without returning home.

The Buildings of Hadrian.

The first act of Hadrian, his successor, was the restitution of these provinces; and his whole reign seems to have been a perpetual journey, as he visited, in person, every province of the Empire, from Scotland to Egypt. He was keenly interested in the arts, and is responsible for the design of the Temple of Venus at Rome, built between the Forum and the Colosseum. It consists of two-tunnel vaulted shrines, each with its own portico and apse, set back to back, and surrounded by a colonnade raised above the courtyard on a podium of steps; this courtyard was further enclosed by a colonnade and wall, the latter being left open opposite the porticoes. All that now remains of this

temple above ground is just sufficient of the celloe to show the type of vaulting.

The great vaulted rotunda, known as the Pantheon, was also built by Hadrian, though previously considered to belong to Republican times. The interior is lighted by a single circular opening at the apex of the dome, which gives a window area of not quite 4 per cent. of the floor space. The portico on the south side (see lithograph) was constructed of materials taken from the Temple of Agrippa, previously standing to the north of the rotunda.

At Nîmes, in the south of France, there is a perfect temple of this date, pseudoperipteral in plan, and of the Corinthian order, having a deep portico at the entrance. I have not been able to discover the exact method of lighting the interior, but presume it to be top lighted, as it could hardly be used as a museum, as it now is, if the only light came through the doorway.

The Two Antonines.

Hadrian adopted as his successor the senator Titus Antoninus, on the condition that he, in his turn, adopted Marcus Aurelius, then a youth of seventeen. These men, generally known as the Antonines, governed the Roman world in peace for forty-two years.

Unlike his predecessor, Antoninus Pius spent all his life in Italy, his longest journeys being from his palace in Rome to his country villa. Gibbon calls the period, between the death of Domitian and the accession of Commodus, one of the most happy and prosperous in the history of the human race; and certainly it was so if the practice of architecture is any guide.

I have mentioned some of the buildings erected by Trajan and Hadrian throughout the world, and there is no doubt that private citizens were not far behind the royal example.

Herodes Atticus.

An Athenian citizen, named Julius Atticus, on the discovery of a vast treasure under his house spent most of it in building; his son Herodes, Prefect of the Free Cities of Asia, had obtained from Trajan 100,000l. for the construction of an aqueduct to the town of Troas, but, unfortunately, the cost exceeding the estimate by more than 100 per cent., there seems to have been a likelihood of trouble but for the generosity of his father who asked to be permitted to make good the difference.

Herodes Atticus, besides building the Odeion at Athens, also erected a theatre at Corinth, a stadium at Delphi, baths at Thermopylae, and an aqueduct at Canusium in Italy.

The best-known building of the reign of Antoninus Pius is the Temple of Faustina (see lithograph), a hexastyle temple of white marble with a portico of cipollino columns. Canina restores it enclosed by a courtyard, though later authorities omit this, and carry the via Sacra across at the foot of the steps.

Gibbon supposes the dedication to be to the younger Faustina, the daughter of Antonine, who married Marcus, and blames that Emperor for the deification of his unfaithful wife.

The Syrian towns, at this time were tremendously wealthy, and vied with each other in the display of architecture; at Palmyra, 140 miles north-east of Damascus, there are the most numerous remains, but all the large towns, such as Antioch, Cerasa, and Damascus were laid out in a similar manner.

The most remarkable features perhaps were the colonnaded streets carefully set out with architectural intent. One at Palmyra, over 3,000 ft. long, consists of a central roadway 37 ft. wide open to the sky, and flanked by Corinthian columns 31 ft. high, with side walks 16 ft. wide, which were covered with terrace roofs extending over the adjoining shops and offices; at one part of this street, where a similar avenue crosses it at right angles, there are four pedestals, on each of which stood four Corinthian columns carrying a square of entablature.

At the eastern end of the street is a triple-arched gateway masking the junction with another street which leads away to the right in the direction of the Temple of the Sun. It is of ingenious design, being triangular in plan, so as to have one front at right angles to each street, with a coffered tunnel vault over the central opening. At least this is what Cassas shows in his perspective drawing, although he omits it in his plan. As the great pilaster of the gateway is panelled, against which the pilaster of the colonnade abuts, the arch would seem to have been in existence before the colonnade was thought of.

Temple of the Sun, Palmyra.

The Temple of the Sun, to which the second street leads, was enclosed in a huge courtyard more than 700 ft. square, having the entrance on the west side, and surrounded by a double Corinthian colonnade.

The temple itself, octastyle peripteral, stood a little to the east of the centre of this court, and had its entrance in the flanking colonnade opposite the courtyard entrance.

At Damascus the courtyard was over 1,000 ft. square, and the portico of the propylæa is the only part that remains, and here the central intercolumniation, being wider than the others, is spanned by an arch instead of by a flat architrave.

At Baalbek, near Mount Libanus, the Temple of the Sun had a colonnaded forecourt about 500 ft. square, entered on the east side from a smaller colonnaded hexagonal court with a propylæa, consisting of a portico between two towers.

This portico, Mr. Spiers suggests, was similar to the propylæa at Damascus, and had a central archway; an arrangement also occurring in the temple at Atil, which was built by Antoninus Pius, and is dated 151 A.D.



Fig. 2. Bridge of Augustus, Rimini.



Fig. 3. Amphitheatre at Pola.

The Triple Temple at Steilla.

In Africa, of this date, there is the triple temple at Steilla also standing within a colonnaded enclosure 200 ft. square, entered from the south-east by a triple arched gateway. Each of the three temples is tetrastyle pseudoperipteral, the centre one of the composite order being slightly larger, with half columns on the side, whereas the two smaller have pilasters and are Corinthian in design.

Belonging to the next reign is the Temple of the Capital at Dougga, in Africa, likewise tetrastyle, built of a fine limestone as hard as marble, and dedicated to Marcus Aurelius and Lucius Verus.

An arch at Marcouna, dedicated to the same Emperor, is of the one-arched type, and has two pilasters and a detached column on each side of the opening.

The arch at Orange is also attributed to Marcus Aurelius, erected to commemorate his victories in Germany and on the Danube, and is designed to obtain effect, rather by the grouping of masses than by the display of the orders.

The Reign of Commodus.

The reign of Commodus, the son of Marcus, quickly undid the results of the good government of his predecessors. After an attempted assassination, he revenged himself by executing the noblest members of the senate and their friends; a pastime he varied by fighting as a gladiator in the amphitheatre. The only building I have discovered belonging to his reign is an arch at Lambessa, of very simple design.

In 193 he was murdered by his domestics, who set on the throne Pertinax, one of the few remaining friends of Marcus, but, after a reign of only eighty-six days, he was killed by the pretorian guards, who objected to his reforming energy after the license they had enjoyed under Commodus. They then offered the Empire for sale, and accepted the offer of the highest bidder, one Didius Julianus, who gave a sum of 2000, to each soldier.

Septimius Severus Seizes Rome.

At this, the three provincial armies each declared their own general emperor, and it was the leader of the Pannonian army, Septimius Severus, who, by a rapid march, seized Rome, banished the pretorians, defeated his rivals, and, by a just and vigorous rule, temporarily revived the era of prosperity. He restored Domitian's Stadium on the Palatine (see lithograph), and built further west a new palace, the façade of which faced the Appian Way, and consisted of seven colonnaded stories 210 ft. in height, three of which still remained in the XVIth century. The arch erected at the west end of the forum to commemorate his Parthian victories is well known, and the Arch of Janus and that erected by the silversmiths are hardly worthy of special mention.

He died at York in 211 after an unsuccessful campaign against the Scotch, and it was

there that the quarrelsome brothers Geta and Caracalla assumed the purple; a quarrel which was settled within the twelvemonth by the murder of Geta. The baths of Caracalla testify to the luxury of this emperor, being the most extensive in the empire; the central block alone had an area of 270,000 square ft., and in plan was similar to the baths of Titus, except that the swimming-bath here was greatly reduced, being rather smaller even than the tepidarium. The enclosure of the grounds was over 1,000 ft. square, in the two hemicycles of which were lecture theatres and libraries.

In Africa, at Djemila, there is an arch dedicated to Caracalla, his mother Donna, and the divine Severus, his father. In design it is a single arch between two pairs of detached Corinthian columns, over each of which the entablature is broken out.

At Tebessa there is a four-sided arch with the same dedication, each side of which is similar to the arch at Djemila.

It is from now onwards that we continually hear of the great Temple of the Sun at Emessa, in Syria, of which there are no particulars, and I have wondered whether it has been confused with the temple at Baalbec, which has already been mentioned, especially as they are both situated close to the foot of Mount Libanus. It was in Syria that Caracalla was murdered while on a pilgrimage to the Temple of the Moon at Carrhoe.

At Zana there is an arch dedicated to Macrinus, his successor, who reigned little more than a year, till he was defeated by the Syrian army, who had set up the boy Elagabalus, the son of Caracalla's wife.

During the next fifty years there were no less than fourteen emperors, who followed each other in quick succession at the will of the all powerful armies.

Amphitheatre at Verona.

It was during this half century that the amphitheatre at Verona was probably built, the interior of which is so well preserved, although the exterior wall has disappeared with the exception of four bays; unlike its contemporary at Pola (Fig. 3), where the interior is entirely gutted, leaving the exterior wall intact. Here a slight deviation is made from the usual plan, there being four projections on the diagonal lines which contained staircases.

The Thousandth Anniversary of the Foundation of Rome.

Mr. Alexander Graham in his book "Roman Africa" suggests that the amphitheatre at Thrysdus was built under the third Gordian, and it is possible that the great festivities at the thousandth anniversary of the foundation of Rome, commemorated in the reign of Philip, gave the necessary stimulant for these buildings in an otherwise non-architectural age.

After the reign of Valerian, who died a captive in Persia, the men of Palmyra, led by Odenathus, twice defeated the Sapor, the

Persian king, the former being made joint Emperor by Gallienus. His wife, Zenobia, after his death, ruled over the whole of Syria and Egypt, an arrangement which satisfied Claudius II., who had his hands full fighting the Goths; but as soon as Aurelian came to the throne in 270 he laid siege to Palmyra, brought Zenobia captive to Rome, after which she retired into private life at Tivoli.

No doubt influenced by the buildings he had seen in the East, he erected on the Quirinal at Rome a large Corinthian temple dedicated to the Sun, which had a portico of twelve columns, and was enclosed in a courtyard similar to the Syrian examples.

The little circular temple at Baalbec is supposed to be of this date, and possibly also the Temple of Jupiter.

His successor, Probus, is credited with building temples, bridges, porticoes, and palaces in Egypt, as he attempted to keep the army in order by thus occupying them in times of peace.

At Tebessa there is a little tetrastyle pseudoperipteral temple built about this time, where the architrave frieze is divided into sections by small projecting panels over the columns, each panel being separately carved, as is similarly done in the attic above the small cornice.

Accession of Diocletian.

After the short reign of Carus, and Carinus and Numerian, Diocletian was proclaimed emperor on September 17, 284, who, with his associates, Maximian, Galerius, and Constantius, re-established order and tranquillity throughout the empire.

Of the baths he built in Rome there are considerable remains, the tepidarium or central hall being preserved as the nave of Santa Maria degli Angeli, the Christian dedication possibly resulting from the fact that Christians alone were employed in the building.

The emperor himself spent only two months of his reign actually in Rome, but occupied most of his spare time building the city of Nicomedia, in Bithynia, situated on the verge of Europe and Asia, and to such an extent did he enrich it that it was only surpassed by the magnificence of Antioch, Alexandria, and Rome.

In 306 he abdicated and retired to the coast of Dalmatia, near the city of Salona, where he had built himself a palace. In plan it was nearly square, and covered 9½ acres. The royal apartments extended the whole width of the south side and were entered from the north through a circular, top-lighted vestibule, from an arched approach which extended as far as the intersection of the streets leading from the three gateways. To the west of these arcades stood the small tetrastyle Temple of Aesculapius, and to the east the domed Temple of Jupiter, circular in plan internally though octagonal without, with a low peristyle and portico.

The north, or Golden Gateway, has a large semicircular relieving arch over a lintel arch enriched with carving, which is flanked by two small niches, above the whole being an ornamental wall arcade carried on brackets. The other gateways are similar in design, but not so rich.

It is instructive to see what a mediæval designer made of the same forms, a good illustration being the door to Sant Guisto at Lucca.

The finest feature of the whole palace was the colonnade on the south side, facing the sea, but, even as they were in Robert Adam's time, the remains are disappointing.

Emperor Constantine.

After the retirement of Diocletian the empire fell again into great disorder, at one time there being no less than six emperors, but eventually, after the defeat of Maxentius, Constantine became sole ruler.

The basilica built to the west of the Forum at Rome by these two emperors was practically a copy of the tepidarium of Caracalla's baths, with an apse at the eastern end, and deep barrel-vaulted recesses between the eight main piers and their buttressing walls, these latter being pierced by arches, so as almost to form continuous aisles. At the Colosseum end, opposite the apse, there was a projecting vestibule, and it was, not until a later date that the south entrance was made and another apse built opposite it.

The Arch of Constantine (see lithograph) is too well known to need remark, except perhaps to say that most of the sculpture belongs to an earlier date, ruthlessly taken from the buildings of Hadrian and Marcus Aurelius.

Building of Constantinople.

For Constantine, born on the banks of the Danube, and raised to the throne by the army of Britain, Rome had little attraction, and it was his great ambition to perpetuate his memory by building a new capital further east. When he came to the actual building of Constantinople he soon found that the skill and number of his architects were not equal to the carrying out of his ideas; so much so that he founded schools of architecture in all the provinces of the empire, and by offering prizes and rewards encouraged capable men to make themselves known.

The immediate result at Byzantium was a number of elaborate buildings, hurriedly erected on narrow streets, to adorn which he ordered that the ancient buildings of the empire should be robbed of their carvings and statues.

No remains of these buildings now exist, but we can imagine the size and magnificence of the city a little from the list of structures given by Gibbon as being executed in the first century from its foundation by Constantine. It includes a huge elliptical forum, a hippodrome over 300 yds. long, a circus, two theatres, eight public and 150 private baths, fifty-two porticoes, five granaries, and eight aqueducts, besides fourteen churches, fourteen palaces, and 4,388 houses, which were, on account of their size or beauty, worthy of special mention.

The chief thing to be learnt from Roman work, besides the use of classic details in many ways not dreamed of by the Greeks, is the habit of designing buildings with due consideration of their surroundings and the neighbouring structures. Thus in laying out the large area covered by the Imperial Fora at Rome, where each forum is of different design and date, the existing buildings were always kept in mind and worked up to what additions were made.

We are, perhaps, apt to consider a building or a monument too much as a whole in itself, whereas the Romans considered one building merely as an item in a general scheme.

The column of Trajan now stands alone, but originally it was backed up by buildings of the same scale, set out on a symmetrical plan; the very opposite to our Nelson Column or City Monument.

In designing a temple the enclosure was arranged in keeping with it, with a proper approach, and was not allowed to grow up anyhow of any shape or colour.

But then, of course, architecture was popular, and added to the fame of a sovereign, whereas now such is obtained more by social reforms or the active development of fresh fields for commerce.

In the discussion which followed, Mr. Hugh Stannus said he had great pleasure in proposing a vote of thanks to Mr. Potter for his valuable and useful paper. This was Mr. Potter's first lecture to them, and he must congratulate, first of all, Mr. Potter that he had been able to put together such a very interesting history of the development of the Roman art, and, secondly, the Association that they had been privileged to listen to it, and he looked forward with a good deal of expectation to seeing the paper in print. He felt, as the lecturer went through this history, annotating it with the various contemporary buildings raised by the various emperors, that Mr. Potter was putting together and giving them the benefit of a history such as exists in no other form. He could not remember having read an account of the Roman Empire at once so short, succinct, and yet so very complete in its list of buildings which the various emperors erected, and in that way it would be of use to all of them, because all of them were students. Another thing they could thank Mr. Potter for: he went the grand tour which every architectural student looked forward to make, and, because of the shortness of his time and not because he despised his ability to sketch and measure—ability which he possessed in a high degree—

he took a photographic camera with him, and they saw round the walls not a tithe of the views he took. If he had sat down before the Colosseum and sketched it the work would have taken him one or two days, and the photographic views did not take more than twenty minutes, and in that way he greatly economised his time, and was able to bring before them the splendid collection of views which they had seen. And he had not kept the collection to himself, but, with a generosity which was highly to be commended and very much to be imitated, he had given the Association prints of a great number of them, and the members would be exceedingly grateful to him for that. More than that; in at least one case he had lent his negatives in a very generous way, and had enabled a number to possess lantern slides. Mr. Potter closed with one remark which they could not lay too much to heart. They might none of them ever have such great works to build as were carried out by the Romans, but all of them could look on every building in reference to its surroundings. They could take a broad view not only of the building but of its surroundings; or, in the words of one of our British statesmen, they could "think imperially." It was not given them, he regretted to say, to build imperially, but they could all of them think imperially, and the more imperially the better for their delight. He entirely sympathised with Mr. Potter in his remarks—not put exactly as a lament, although they might have been—that people were occupied in other ways now, and were not concerned with building buildings the grand remains of which had made Roman architecture such a splendid model for our imitation in this XXth century.

Mr. Arthur Keen, who seconded the vote of thanks, said he could not follow Mr. Potter over the wide area he had covered, but he had listened with the greatest interest to him, and he should be glad of the opportunity of reading the lecture at leisure. He wished that Mr. Potter had made more reference to the Roman work existing in the north of Africa. He (the speaker) had been trying to get a copy of an American magazine which he saw about a year ago, containing a very good, well-illustrated article on the Roman remains in the north of Africa, and he remembered that there were two or three illustrations which showed large towns with a single modern building in them, as far as he could remember; there was nothing but Roman work left, and there were great colonnades and arches still standing. He hoped that Mr. Potter would turn his attention on some future occasion to the Roman remains in Africa.

The Chairman, in putting the vote of thanks to the meeting, said he admired the charming photographs Mr. Potter had shown them. In talking about the architecture of Rome, he was always reminded of what an old friend said to him before he went to Rome, i.e., "Always remember that there is nothing in Rome except what you take there yourself"; while that applied to every place it applied more particularly to Rome, and he commended to those who were going the desirability of studying the history of a place. Mr. Potter's lecture would help in that direction.

The vote of thanks was then heartily agreed to.

Mr. Potter, in reply, said, as to Roman remains in North Africa, he had shown that night all he could find of real interest. At Timagad there was the old Roman town, but, except for the Arch of Trajan, which he had illustrated, there was little remaining more than 3 ft. above ground. At Lambessa in the XVIIIth century there had been forty triumphal arches, but only about twelve now remained, and he had not found any traces of colonnaded streets. For interesting reading he recommended Mr. Alexander Graham's book "Roman Africa," which was both instructive and nicely written. He also recommended the French book by M. Gsell, to be seen in South Kensington Arts Library, from which he had taken some of his illustrations.

The Chairman announced that at the next meeting on November 2, Mr. Hugh Stannus would read a paper on "The Corinthian Order."

The meeting then terminated.

THE ARCHITECTURAL ASSOCIATION DISCUSSION SECTION.

The first meeting of this section was held on Wednesday evening (17th), at 7.30 p.m., when a paper, entitled "Motor Houses and Garages," was read by the senior Secretary, Mr. M. G. Pechell.

He divided his subject into three classes:—

- (1) The private motor-house;
- (2) The trade and repair garage; and
- (3) Public service garages, i.e., for omnibus and heavy service generally.

The first consideration in planning a car-house was the question of size. For a single car a house 18 ft. long by 10 ft. wide may be put as a minimum, and 24 ft. by 14 ft. as a fair maximum. For two cars a width of 24 ft. to 28 ft. is desirable, giving ample room for working benches, cupboards, etc. The large modern car with top, or hood, measures about 7 ft. 6 in. in height, so that an 8 ft. to 8 ft. 6 in. doorway should be the minimum; and as much height as possible for the sake of airiness in the house itself. Cars are often fitted with removable covered tops, which are slung by tackle from the roof-beams above their respective cars when not in use, so that obviously extra height must be allowed if this is anticipated.

The ideal floor surface is light in colour, non-absorbent, non-slippery, and fireproof. White tiles might be a good surface; of those the lecturer had seen he preferred a finely-finished granolithic surface in large squares. If drip-pans are used under all cars oil-drippings are avoided.

The car-house floor is best slightly raised above the washing-yard floor, the step being sloped downwards outside. In London, to meet the views of the London County Council, the step only is raised and a slope put both sides. The peculiarity of this floor lies in the pit, which is sometimes constructed with a raised kerb, the cover being flush with the top of kerb, or the cover is recessed with floor. The former is best where the car can be run straight in, the latter where the car must be manoeuvred into place. If a kerb is used this is best of hard wood, but a good substitute is a guide-rail of L-iron bolted to the floor. The floor should be made to fall to a gully if a drain is permissible, but in London drains either to the pits or in the car-house are discouraged. The sides of the pit are usually limewashed, but white glazed bricks are obviously better. Steps should be arranged in a private garage of brick construction. At the Wolsley Garage, Westminster, pits have been discarded, raised "runs" being substituted.

The car-house doors are either folding or sliding; the latter are handy where space is cramped. In trade garages the rolling shop-shutter has been used.

The car-house must be amply lit both from sides and roof, but, direct sunlight being harmful, rolled-plate or similar glass should be used. The windows should be high up except one required for the work-bench, all sashes made to open and transoms lights arranged if possible.

Ample ventilation is very desirable.

The ideal artificial light is electricity, and with this a long cable provided for use in the pit. Where electric light is out of the question a closed lantern for oil or gas, ventilated only from the outer air, can be used, and a miner's lamp for inspection purposes. Sand-boxes must not be forgotten for fire extinction; and fittings for one of the many special chemical fire-extinctors now made.

Allied to the lighting question is that of heating. Low-pressure hot-water or steam is the best available, the boiler being outside, away from risk of fire, and water-troughs should be fitted to radiators or pipes to prevent too dry an atmosphere. Where electricity is available electric radiators might be worth fitting as a supplement to hot-water heating. A stove, made by Norton, of Llandrindod Wells, burning patent fuel, is claimed to be safe.

The fittings of a car-house are simple, viz., Benches, cupboards, and shelves. The cupboards should be about 16 in. to 18 in. deep and 3 ft. 2 in. high, the top, 21 in. wide, being continued along one side or end of house as a working bench. One cupboard should have kerbed racks for tyres and tubes, and the other fitted with one or two

drawers for small parts, and both should have locks. Strong shelving should also be fitted wherever there is space for them.

The washing-yard should have a glass roof where possible, amply ventilated, a cement floor, sloping to a centre silt-pit, trapped from drain, and a recess for stand pipe, with rack for hose. Rain-water should be filtered and stored for water-tanks of cars.

Mr. Pechell gave descriptions of several important private and trade garages, as types of their class. In conclusion, he said we might summarise the requirements of every variety as safety, convenience, and economy in work.

Mr. T. L. Dale, in opening the discussion, said tile paving had been suggested for floors of car houses; this, he should say, would be much too slippery, and thought granolithic very much better. Dr.rips he thought would stand a chance of being damaged. Sawdust he had seen under the cars, and this was easily put and renewed. The question of the kerb round the pit depended on what sort of place you were building; if a private garage, you might have to reduce your space. The only use he saw in the kerb was in keeping the water from getting into the pit. Infinitely better were the raised runs. The only other thing that might be done was in the case where the carriage-way is above the surrounding ground; then you would have a basement, and run your cars on the floor over. As to the cubicles, it would seem that these should be fireproof, as you get valuable cars sometimes, which would be a great loss. The rolling shop-shutters he thought were not convenient, but a steel shutter would make it fireproof. Bestwick gates were convenient, but not fireproof.

Mr. Hamp considered that though Mr. Pechell had said it was not altogether necessary for sheds to be drained, still the floor should be made with a fall, so that it could be well washed down without injuring the cars. Then with regard to the doors, most were either folding or sliding, but at one garage he knew of they had the revolving shutter.

Mr. Gammell suggested that if you had a geyser you would have difficulties with the insurance companies, and the requirements of insurance companies had to be studied.

Mr. M. Maberly Smith, who is the designer of the Maberly car, spoke more of private garages, and said there was the chauffeur point of view, and thought the floor ought to be of wood. On the question of pits, he said there was a general feeling when you are manoeuvring to get about with the least obstruction, and anything like a kerb was not good; the kerb was in the way. The best thing was to have the place as clear as possible. There was no difficulty in manoeuvring a car over a pit. The raised run spoken of he considered took up too much space for a private garage, for with this you had an inclined plane that takes up 10 ft. of your space and increases the depth of your garage. For a private garage, therefore, a pit was essential. One point had been omitted, viz., the necessity for a charging board. If you had an electric main you require a charging place, with door. Heating Mr. Smith considered very important, as its effect on tyres was great. India-rubber was delicate; a cold floor chills the tyre, and he thought they should rest on wooden floors, and the heat tempered, so as to get the rubber to a uniform temperature, in the same manner as is done for a billiard table. For this hot-water was the simplest method. Generally in car-houses he thought obstructions should be avoided, and he considered these kerbs amongst obstructions, and also such a thing as a stanchion, or even a jamb. As large a space as you can get should be provided, as these long cars take much room in turning. Petrol storage in the country you can construct by sinking the whole thing in the ground only 1 ft. 6 in. deep.

Mr. Harding described the usefulness of locked cubicles, into which the foreman can look and see the car, but cannot touch it, the owner of the car keeping the key. Sometimes these have master keys for use in case of fire.

Mr. Trant Brown spoke of a garage with one long pit with electric light. He also noticed the increasing height of motor omnibuses, and noted recently one was

13 ft.; this had to be provided for. With regard to cubicles, these he considered should be made fireproof.

Mr. Turner thought a hot-water-heated cupboard should be provided for rugs.

Mr. Pechell, in replying, stated the petrol store must be fireproof, and should contain 60 gallons and be ventilated with air bricks, and the regulation distance for it is 20 ft. from any other building. Mr. T. Norton's stove costs about 2l. As to drains, you need them in the washing yard, but not in the running shed. With regard to insurance regulations, the main point was an equipment of chemical extinguishers. Respecting kerbs, he would only use these where he could get a straight run in.

THE LONDON COUNTY COUNCIL.

The usual weekly meeting of the London County Council was held on Tuesday in the County Hall, Spring-gardens, S.W., Alderman Spicer, Chairman, presiding.

Loans.—On the recommendation of the Finance Committee it was agreed to lend Camberwell Borough Council 1,652l. for housing purposes, and Fulham Borough Council 5,900l. for paving works.

Wandsworth Technical Institute.—The Education Committee recommended:—

"That the estimate of expenditure on capital account of 5,500l. submitted by the Finance Committee, in respect of the purchase of a site for new premises for the Wandsworth Technical Institute, be approved."

The recommendation was agreed to.

School Places.—The Education Committee made the following recommendations, which were agreed to:—

"That the necessary steps prescribed by sect. 8 of the Education Act, 1902, be taken with a view to giving public notice, and informing the Board of Education of the Council's intention (i.) to provide 1,135 additional public elementary school places in Tooting (Wandsworth) by the enlargement of the Smallwood-road London County Council School by 219 and of the Broadwater-road London County Council School by 236 places, and by the erection of the Fountain-road and Franciscan-road projected London County Council Schools for an additional number of 340 and 320 school places respectively, and (ii.) to acquire a site for future requirements on the Furzedown estate (Wandsworth)."

That the necessary steps prescribed by sect. 8 of the Education Act, 1902, be taken with a view to giving public notice of the Council's intention to provide about 1,000 additional public elementary school places for sub-divisions (i.) of City and B and E of Tower Hamlets (School Board) divisions (St. George-in-the-East), and that the Board of Education be informed of this proposal."

Drains of Non-provided Schools.—The Education Committee also recommended:—

"(a) That the resolutions of July 17 and 24, 1906, so far as they relate to the date after which the Council will conditionally cease to maintain the schools specified in the statement separately submitted by the Education Committee, be rescinded."

"(b) That the date after which the Council will cease to maintain the schools named in the statement, in the event of the condition of the offices and drains of the schools, after the application of the smoke and chemical tests thereto, being found to constitute an immediate danger to the children, be November 16, 1906, and that the managers be informed accordingly."

"(c) That the Education Committee do report again to the Council, at a date not later than November 6, 1906, on the question of ceasing to maintain the schools specified in the statement."

"(d) That the managers of the schools specified in the statement (No. 9 (c)) separately submitted by the Education Committee be informed that if the drains and offices of the schools fail to pass the smoke and chemical tests by October 29, 1906, the Council will consider whether they shall cease to maintain the schools as from November 26, 1906."

"(e) That the resolutions of July 17 and 24, 1906, so far as they relate to the date after which the Council will conditionally cease to maintain the schools specified in the statement (No. 9 (d)) separately submitted by the Education Committee, be rescinded."

"(f) That the date after which the Council will cease to maintain the schools named in the statement (No. 9 (d)) separately submitted by the Education Committee, in the event of the condition of the offices and drains of the schools, after the application of the smoke and chemical tests thereto, being found to constitute an immediate danger to the children, be November 16, 1906, in order that further information may be received as to the progress of the work; and that the managers of the schools be informed accordingly."

Vauxhall Temporary Bridge.—The Improvements Committee recommended:—

"(a) That the estimate of expenditure on capital account of 5,220l. submitted by the Finance Committee in respect of the demolition of Vauxhall temporary bridge and of the works incidental thereto, be approved."

"(b) That expenditure not exceeding 5,220l. be sanctioned in respect of the demolition of Vauxhall temporary bridge and of the works incidental thereto; that the offer of Messrs. G. Hay & Co. to undertake for 220l. the removal of the bridge and the execution of certain works to the satisfaction of the Council and of the Thames Conservators, be accepted; that the solicitor do complete

the matter; and that the seal of the Council be affixed to the agreement (in duplicate)."

Sky Sign at the Upper Baker-street Station of the Baker-street and Waterloo Railway.—It was agreed that the solicitor do take the necessary legal proceedings, under sect. 134 of the London Building Act, 1894, to secure the removal of the sky sign on the Baker-street Station of the Baker-street and Waterloo Railway.

Having transacted other business the Council adjourned.

Notices of Motion.—The following notices of motion have been placed upon the agenda paper of the Council:—

By Mr. Jephson:—"That, having regard to the fact that rates are levied in respect of tramway tracks in the County of London, and as it appears inequitable that other public vehicles driven by mechanical traction should be exempt from taxation in respect of their use of public roads, particularly in the extensive use of such vehicles has had the effect of increasing the cost of maintenance of roads, it be referred to the Local Government, Records, and Museums Committee to consider and report as to the best means of imposing additional taxation by a tax on motor omnibuses."

By Mr. Gautrey:—"That it be an instruction to the Highways Committee to consider and report as to the desirability of erecting at the junctions of the Thames Embankment and Blackfriars and Westminster bridges tramway passengers weather shelters similar to those to be found in most continental cities."

By the Rev. L. Jenkins Jones:—"That this Council is of opinion that no male adult worker should be employed at a lower wage than 30s. per week of forty-eight hours, or what is equal to 30s. per week if employed by the Asylums Committee, and refers the question to the General Purposes Committee for consideration and report."

By Mr. Dew (to be seconded by Mr. H. R. Taylor):—"That it be referred to the General Purposes Committee to consider and report as to the advisability of amending standing order No. A 295, in order to provide that in place of the notice in the standing order, there shall be posted at all places where work is being done by the Works Department, a copy of the working rules mutually agreed to between the various trade unions and the London Master Builders' Association."

APPLICATIONS UNDER THE 1894 BUILDING ACT.

The London County Council at their meeting on Tuesday dealt with the following applications under the London Building Act, 1894. The names of applicants are given between parentheses:—

Lines of Frontage and Projections.

Fulham.—That the application of Messrs. Loud & Western, Ltd., for an extension of the periods within which the erection of a building on the northern side of Broughton-road, westward of Stephendale-road, Fulham, was required to be commenced and completed, be granted.—Consent.

Hackney, Central.—A building upon the site of No. 171, Lower Clapton-road, Hackney (Mr. J. Hamilton for Mr. F. Sherman).—Consent.

Lewisham.—A porch at No. 2, West-hill, Sydenham (Messrs. J. & C. Bowyer for Dr. A. Melville Green).—Consent.

Lewisham.—That the application of Mr. J. Webster, on behalf of the Council, for an extension of the periods within which the erection of additions in front of Nos. 4, 6, 8, and 10, Loampit-vale, Lewisham, was required to be commenced and completed, be granted.—Consent.

St. George, Hanover-square.—An addition to the porch in front of No. 41, Upper Brook-street, St. George, Hanover-square (Mr. R. S. Wormum for Mr. L. Clow).—Consent.

St. Pancras, North.—Buildings on the southern side of Swain's-lane, Highgate, westward of Brookfield-park (Messrs. Thurgood & Martin for Mr. Burdett-Coutts, M.P.).—Consent.

Wandsworth.—Buildings upon a site upon the northern side of Westmoreland-road, Walworth, to abut upon Horsley-street (Mr. E. Bates for Mr. T. W. Dobson).—Consent.

Wandsworth.—That the application of Mr. W. J. Jones, for Mr. R. H. Miller, for an extension of the period within which the erection of buildings on the northern side of the Mitcham-road, Tooting, at the corner of Back (or Rectory) lane, was required to be completed, be granted.—Consent.

Wandsworth.—A greenhouse on the north-western side of Magdalen-road, Wandsworth, at the rear of a horticultural show house on the western side of Trinity-road (Mr. A. Southam for Mr. R. Neal).—Consent.

Westminster.—The retention of a projecting oriel window in front of No. 16, Kensington-gate, Westminster (Mr. W. Flockhart for Mr. J. B. Gray).—Consent.

Lewisham.—An addition at the flank of No. 108, Bargery-road, Catford, to abut upon Thornesbeach-road (Messrs. Norfolk & Prior for Mr. J. Warr).—Refused.

Strand.—An addition to a balcony on the Victoria-embankment frontage of the Savoy Hotel

Strand (Messrs. Colclutt & Hamp for the Savoy Hotel Company).—Refused.

Width of Way.

Bermondsey.—A roof over a portion of the yard at Messrs. Gibbs & Son's premises, Decima-street, Bermondsey, such yard being at less than the prescribed distance from the centre of the roadway of the street (Messrs. E. Crosse & Co. for Messrs. G. Gibbs & Son).—Consent.

Hampstead.—For an addition to a building at "Northcott," Hampstead, to be used as a petrol pit (Messrs. Hudson & Hart for Mr. W. Scott).—Consent.

Islington, South.—The retention of a forecourt fence wall in front of a proposed two-story building to the eastward of No. 14, Barnsbury-square, Islington, at less than the prescribed distance from the centre of the roadway of the street (Messrs. F. J. Eedle & Meyers for Mr. T. Heath).—Consent.

Strand.—A one story addition at the rear of the "Window" public-house, No. 427, Strand, at less than the prescribed distance from the centre of Harvey's buildings (Mr. H. G. Leslie).—Refused.

Width of Way and Lines of Frontage.

Wandsworth.—A two-story building at the rear of No. 202, High-street, Tooting, to abut upon Blackshaw-road (Mr. W. C. Poole for Mr. W. J. Hyde).—Consent.

Hackney, North.—A building on the northern side of Amhurst-park, Stamford-hill, to abut upon the eastern side of Holmdale-road (Mr. S. C. Popwood for Mr. H. Chambers).—Refused.

Poplar.—An iron and glass shelter in front of the Queen's Theatre of Varieties, High-street, Poplar (Messrs. A. Ritchie & Co. for Messrs. F. & M. Abrahams).—Refused.

Formation of Streets.

Wandsworth.—A deviation from the plan approved for the formation or laying out of new streets for carriage traffic to lead out of the north side of Streatham-common north to Deepdene-road, Wandsworth, and in connexion therewith the widening of portions of Streatham-common north and Deepdene-road, so far as relates to an alteration in the position of streets; an alteration in the position of the two pieces of land to be reserved at the northern ends of the streets; and an alteration in the gradients of the three streets sanctioned (Mr. W. N. Dunn).—Consent.

Deviation from Certified Plans.

Marylebone, East.—Deviations from the plan certified by the District Surveyor, under sect. 43 of the Act, so far as relates to the proposed erection of No. 78, Wigmore-street, St. Marylebone (Messrs. Treadwell & Martin).—Consent.

Alteration of Buildings.

City of London.—The uniting of No. 56 and 58, Moorgate-street, City, with a building on the southern side of Queen's-key-court, without requiring the floors of Nos. 56 and 58, Moorgate-street, to be made fire-resisting in accordance with the provisions of sect. 74 (3) of the Act (Mr. W. T. Walker for Mr. G. J. Mathieson).—Consent.

Westminster.—The construction of an additional story to Idlesleigh-mansions, Caxton-street and Palmer-street, Westminster, without the consent of the building being made of the thickness required under the provisions of the 1st schedule of the said Act (Mr. H. A. Luke for Mr. W. A. Fleming).—Consent.

Spaces About Buildings.

Finsbury, Central.—Buildings upon a site on the western side of Goswell-road, Finsbury, to abut upon the southern side of Compton-street, with irregular open spaces about such buildings (Mr. E. S. Underwood for Mr. G. Redhouse).—Refused.

The recommendations marked * are contrary to the views of the local authorities.

Architectural Societies.

MANCHESTER SOCIETY OF ARCHITECTS.—The first annual meeting of the students of this Society was held at the Society's rooms on the 23rd inst. There was an exhibition of work done during the holidays, and the numerous sketches submitted showed fine draughtsmanship and an excellent taste in the choice and grouping of the subjects. Mr. Roger Oldham took the chair, and in his remarks gave much instructive advice to the numerous students present.

BIRMINGHAM ARCHITECTURAL ASSOCIATION.—The new "Green Book" of the Association indicates what a vigorous institution it is and what good work it is doing. The number of members has increased by twenty-two since last year. The programme announces classes in Architectural Design, Architectural History, Construction, Sketching, etc. The Council offer a Studentship

prize of 15 guineas for measured drawings and sketches, along with a design for a set subject—"Assembly Rooms for County Town." In respect of this is the wise advice, "Work is not to be wasted on the drawings; it should be kept in mind that architectural drawing has no other purpose than to illustrate architectural design." Some beautiful sketches by members are appended to the Report; Mr. Arthur Harrison's "Caudebec" is not only a fine sketch but a very good piece of chromo-lithography. The following is the list of papers for the session:

November 2.—Presidential address.

November 16.—Halsey Ricardo, "The Architect's Use of Enamelled Tiles."

November 30.—W. H. Bidlake, M.A., A.R.I.B.A., "English and French Gothic Architecture. A Comparison."

December 14.—Arnold Mitchell, F.R.I.B.A., "The Study of Medieval Architecture."

January 4, 1907.—A. S. Dixon, M.A., "Architectural Education. A Suggestion."

January 18.—H. P. G. Maule, F.R.I.B.A., "Farm Houses and Cottages."

February 1.—E. P. Reynolds, "Architecture East and West; a Contrast and Comparison."

February 15.—Lecturer to be announced.

March 1.—R. Weir Schultz, "Byzantine Architecture."

March 15.—T. G. Jackson, R.A., title to be announced.

March 23.—John Ward, "Excursion to Caudebec" (illustrated with lantern slides from photographs by Messrs. Ward, Cale, McKewan, and others).

WESTMINSTER CITY COUNCIL.

THE fortnightly meeting of the Westminster City Council was held on Thursday last week.

Vacant Sites.—It was resolved that instructions be given for the preparation of a return showing the net area of vacant sites of houses demolished by the Ecclesiastical Commissioners and other landlords throughout the City, with the date, owner, and former rateable value in each case.

Caxton Hall.—In connexion with a proposal of the Royal Drawing Society that an additional floor be erected over Room 18 at the Caxton Hall and let to them, it occurred to the General Purposes Committee that with alterations it was possible for the hall and the site to be utilised to much greater advantage. At present the hall barely paid its way, and there was a great deal of practically vacant space available for building. It was a matter of consideration with the Public Libraries Committee whether the hall could not be so altered as to provide ample accommodation both for the Great Smith-street Library and a central Reference Library. To this end the committee had requested Mr. J. Murray, the architect employed for the rebuilding of the City Hall, to consult with the Engineer and Chief Librarian and to prepare a plan for a scheme for giving effect to the proposal, together with an estimate of the cost.

Paving of Whitehall.—The Works Committee reported that with reference to the failure of the Acme Flooring and Paving Company to proceed with the work of repaving the roadways of Whitehall and other streets under their contract with the Council, they had taken steps in accordance with the Council's resolution of October 4, to themselves take over and complete the work in Whitehall. The tender of the Improved Wood Pavement Company for repaving Whitehall at 9s. 6d. per yard super. was the next lowest to that of the Acme Flooring and Paving Company, and they had therefore instructed the Engineer to accept the tender of the Improved Wood Pavement Company for this work, subject to the company allowing the Council 1s. 7d. per yard super. for the work already executed by the Acme Flooring and Paving Company.—The recommendation was agreed to.

Other Paving Works.—The same committee also reported that they had considered the resolution of the Council to the effect that the committee be instructed as to the question of the steps necessary to be taken for obtaining the execution of the other paving works referred to in the contract with the Acme Flooring and Paving Company of June 15 last, which the company had failed to execute and from which they had withdrawn. They recommended (a) that the repaving of Chandos-street and Charing Cross-road be deferred until next year; (b) that Kensington-road from Brompton-road westward, for about two-thirds of the length of the road, be forthwith repaved; that the tender of the Improved Wood Pavement Company of May 16, 1906 (the next lowest in price to that of the Acme Company), be accepted for the work; and (c) that in the event of the Improved Wood Pavement Company not agreeing to execute the work at the price quoted in their tender, fresh tenders be invited by public advertisement in the usual way.

Mr. Councillor Heywood moved as an amendment that the work be carried out by the Council by direct labour, under the supervision of the City Engineer.

Mr. J. E. Evans seconded the amendment.

In the discussion which ensued it was stated that the Council had not the plant at its disposal to do the work, and the amendment was rejected and the report adopted.

Fifty Years Ago.

FROM THE *Builder* OF OCTOBER 25, 1856.

SAFETY IN THEATRES.—What would be the consequence of a panic in some of our London theatres, where the arrangements are absolutely such as to prevent egress? Experience is wholly disregarded. Some years ago an alarm of fire was raised in the theatre at Newcastle-upon-Tyne. People living now remember the loss of friends on that fatal night. The staircase from the gallery was very steep, and on the cry of fire being raised, the people rushed down it. There were no other means of exit, and the confusion was terrific. It was by no means easy under ordinary circumstances to get safely down this precipitous way. The barrier at the pay-box increased the difficulty, and, if we remember rightly, more than a dozen men, girls, and women, were hurried out of life. After that various doors were made, leading from parts of the gallery, which could be thrown open in case of a similar accident.

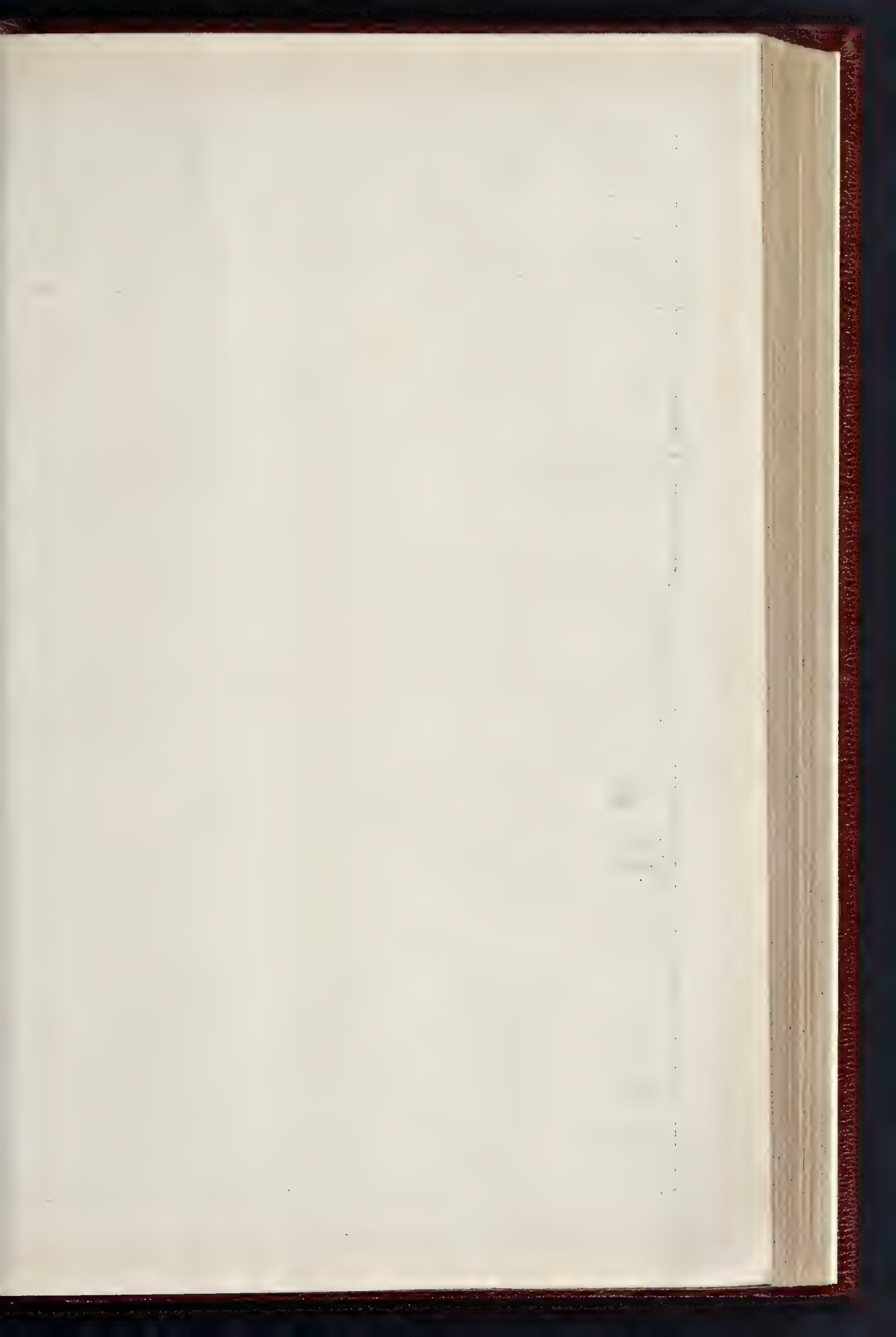
Since that time many similar calamities have taken place—those at old Sadlers Wells and at the theatre at Glasgow will be remembered—but we have not been taught by these costly lessons. The population of large towns is increasing daily, and so is the tendency to erect large halls, theatres, and other places of assembly, and a warning is now more than ever needed.

3 Illustrations.

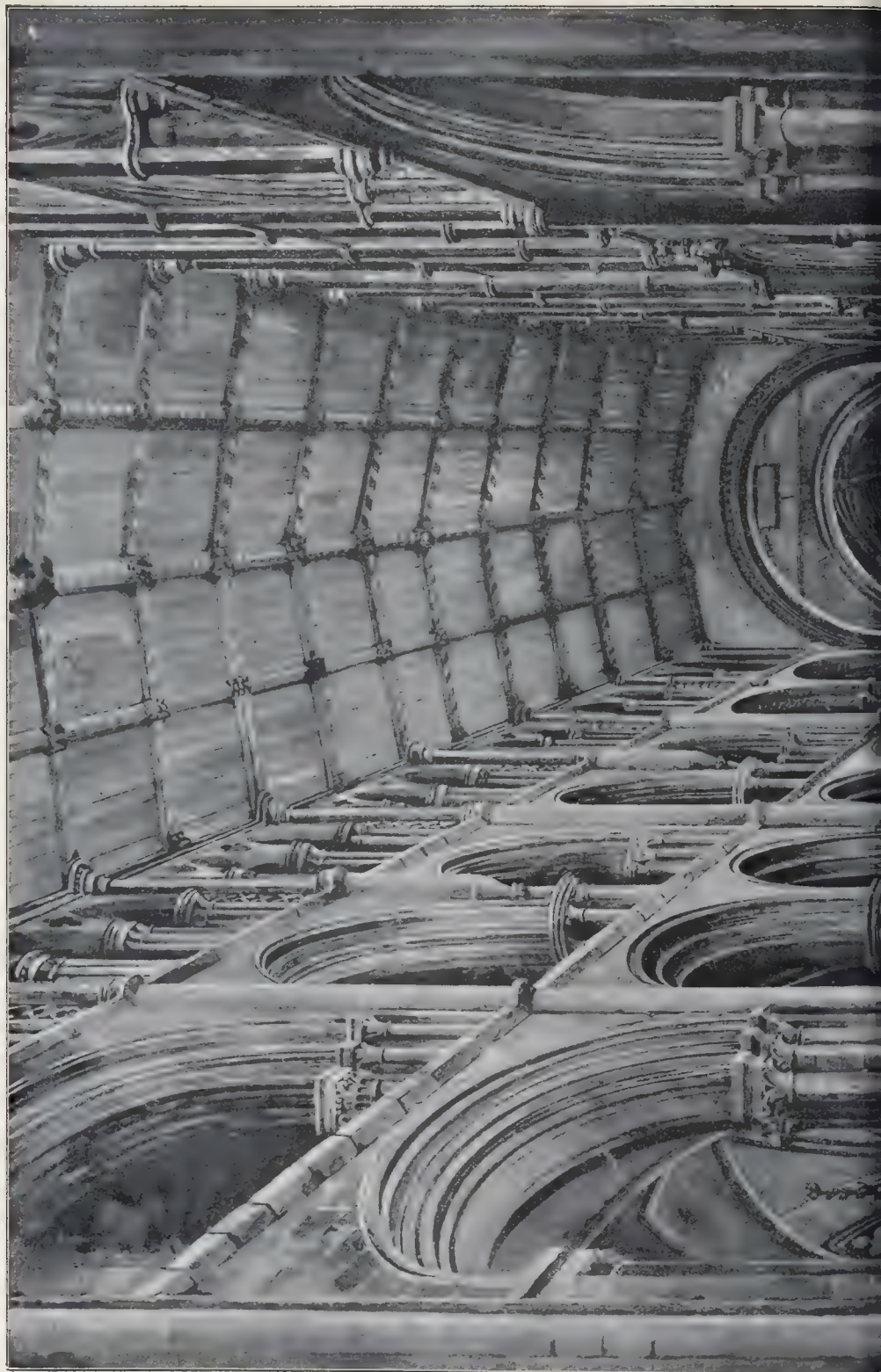
INTERIOR VIEW OF SELBY ABBEY.

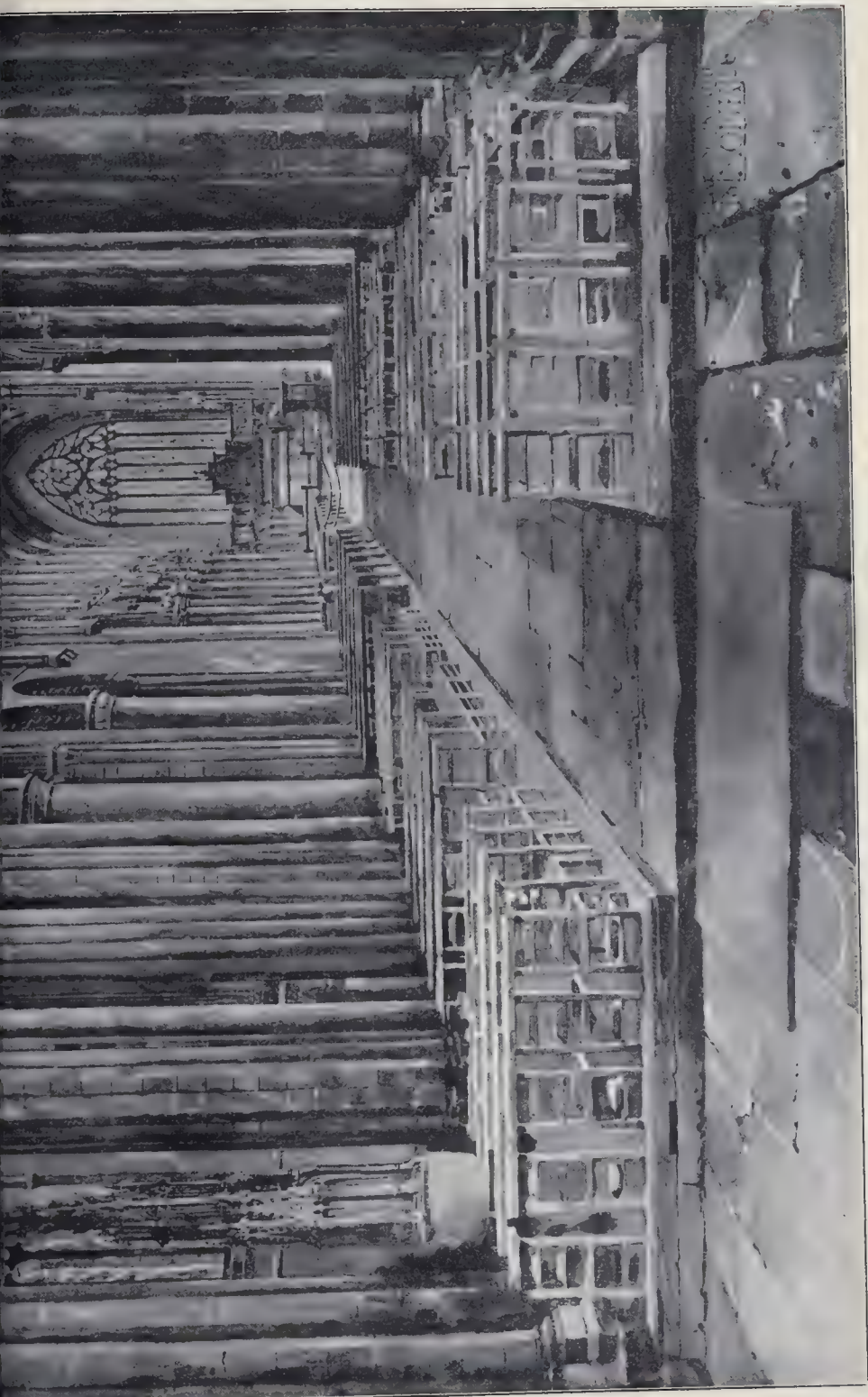
IN consequence of the lamentable catastrophe by which Selby Abbey has been all but destroyed—how far the walls and piers can be preserved without rebuilding remains still to be seen—we reproduce in this issue the view of the interior made by Mr. W. Monk for publication in our issue of July 4, 1896, where this view and the plan, with a historical article, and various sketches of detail by Mr. R. W. Paul, formed No. 18 of our series of "The Abbeys of Great Britain." That number is now out of print, and our readers may be glad to have some record of the interior of the church as it existed before the fire. In our next issue we will publish again the fine drawing of the exterior which was made by Mr. Arnold Mitchell for our issue of January 4, 1890, also out of print. This latter, a very delicate drawing, could not be reproduced and reprinted at short notice with any chance of doing justice to it; and the lithograph plates for this issue were already nearly printed off, so that Mr. Monk's drawing is in fact an extra illustration in the present issue.

The original foundation of Selby Abbey dates from 1069, when Benedict, a monk from Auxerre, built near the present site a chapel and oratory, which were probably of timber, and no remains of which, at all events, now exist. The architectural history of the fabric dates from the beginning of the XIIIth century, when Abbot Hugh de Lacey began the new church and monastery in a more monumental manner, and on a different site. The church was not finished in his time, but from the evidence of the building itself it seems probable that he completed the presbytery, the crossing, the transepts, and some portion of the nave, including the entire south wall of the nave aisle, completed first in order to shut in the monastery buildings. His crossing piers still remain, though partially added to in the late Decorated period. Four bays of the nave westward are rather later Norman, the remainder of the nave, seen in the foreground of the view, is Transitional work of very fine character, still retaining, however, the circular form of arch in the main arcade. The choir is entirely Decorated work of various dates, with the exception of a pier on the south side, which was rebuilt in



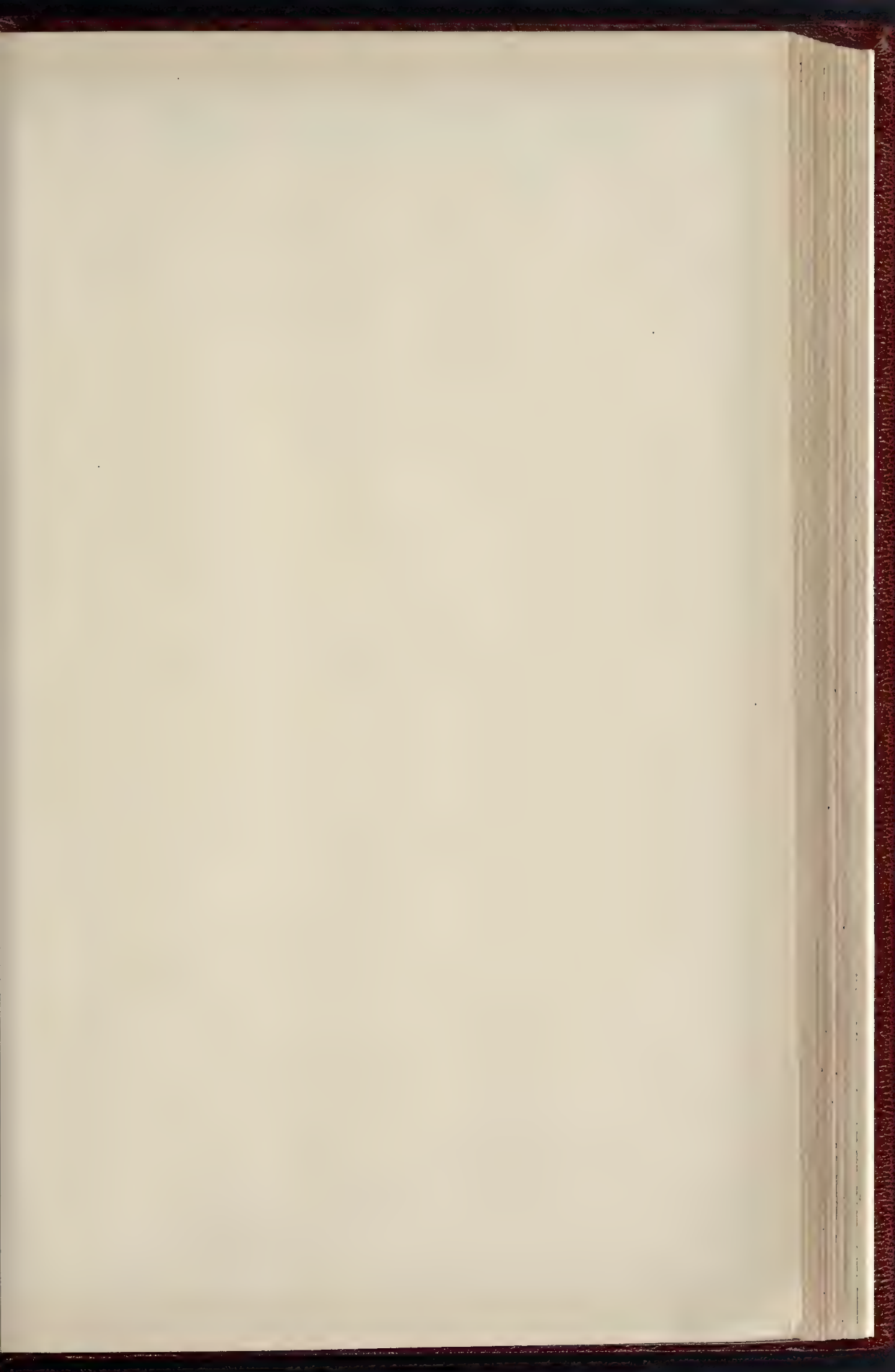
THE BUILDER, OCTOBER 27, 1906.





INTERIOR OF SELBY ABBEY, DESTROYED BY FIRE.

FROM A DRAWING MADE IN 1890 BY MR. W. MONK.

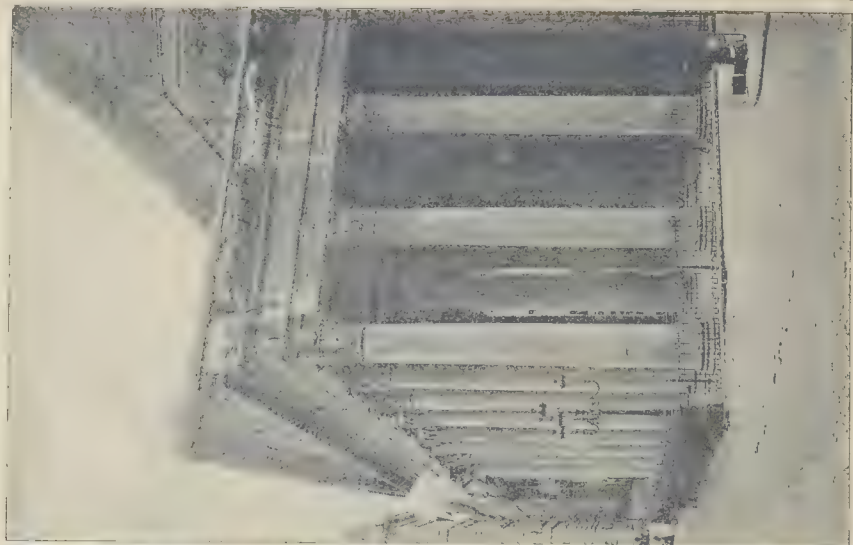




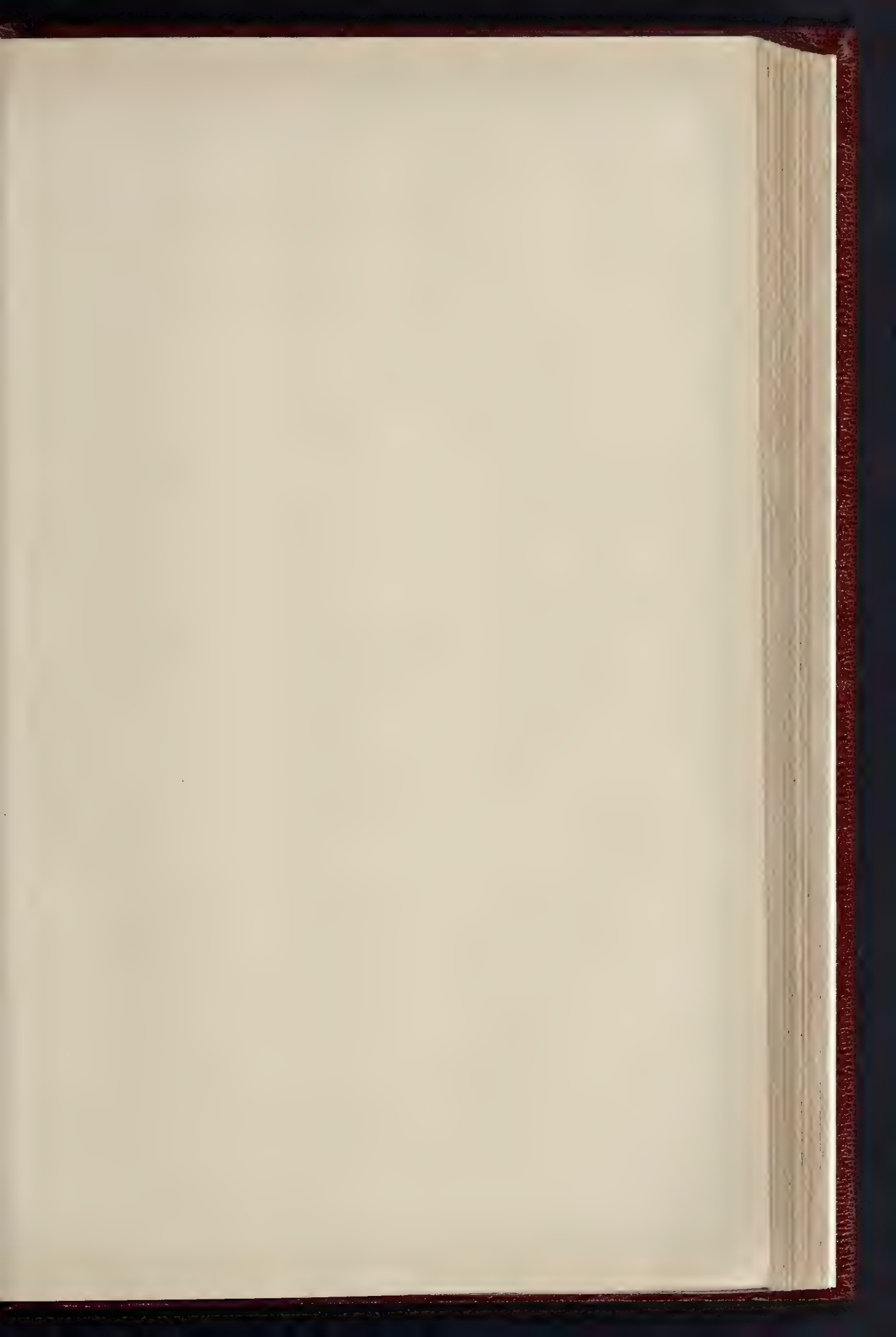
ARCH OF CONSTANTINE.



TEMPLE OF ANTONINUS AND FAUSTINA.



PORTICO OF PANTHEON.



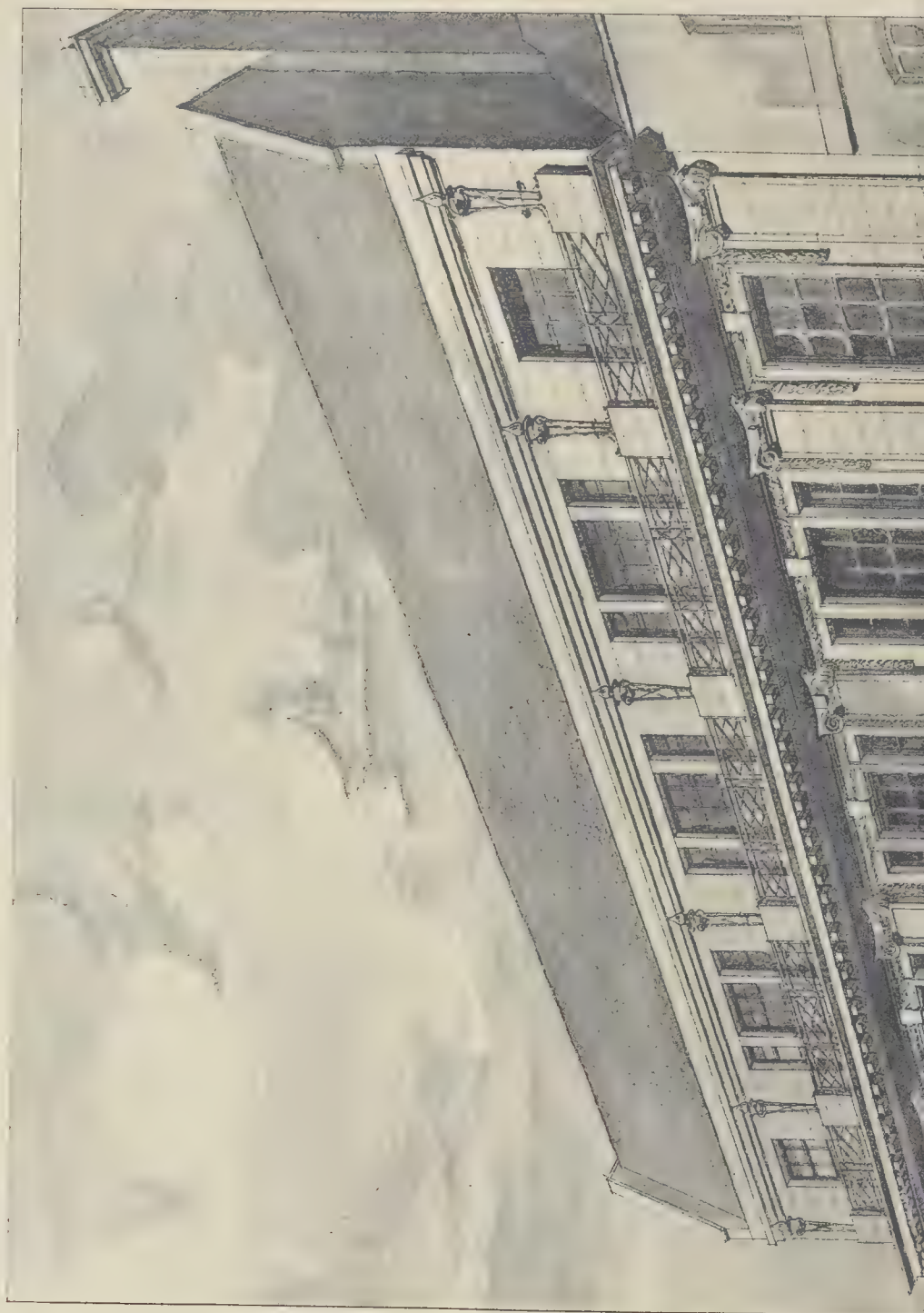
THE BUILDER, OCTOBER 27, 1906



PROPOSED TOWN HALL, DARTMOUTH, NEW YORK. M. D. WILSON, ARCHT. ADIDA. ASSOCIATES.

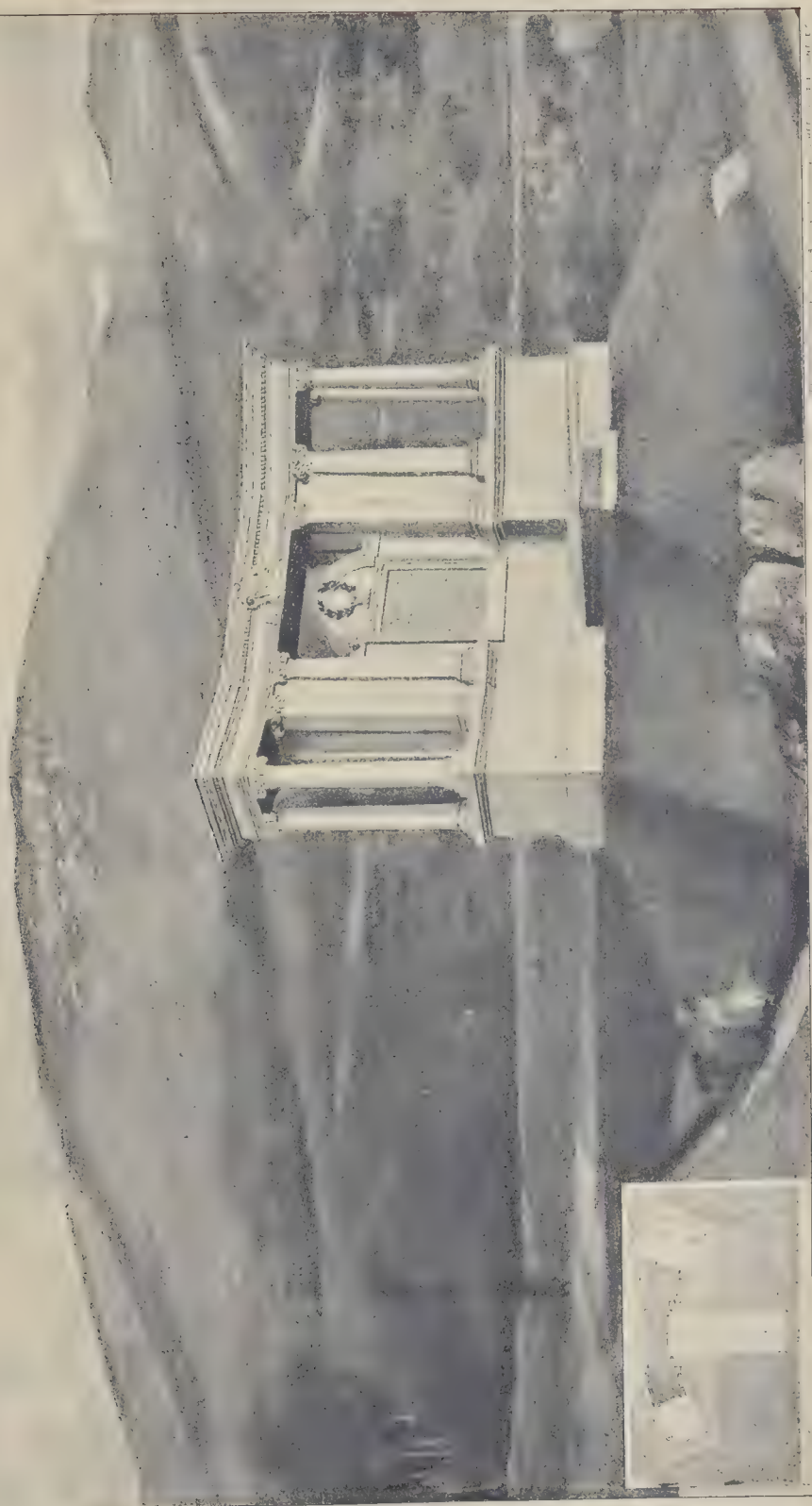


THE BUILDER, OCTOBER 27, 1906.





PREMISES, NOS. 19, 20 & 21 HATTON GARDEN.—MESSRS. NIVEN & WIGGLESWORTH, ARCHITECTS.



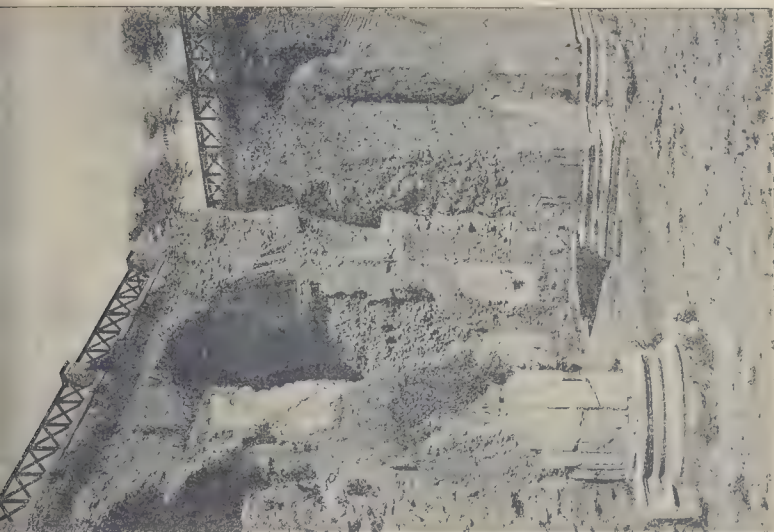
MONUMENT IN LARGS CEMETERY, AYKSHIRE MR JOHN J STEVENSON, F.S.A., F.R.I.B.A., ARCHITECT



SUBSTRUCTURES OF CALIGULA'S PALACE ON THE PALATINE.

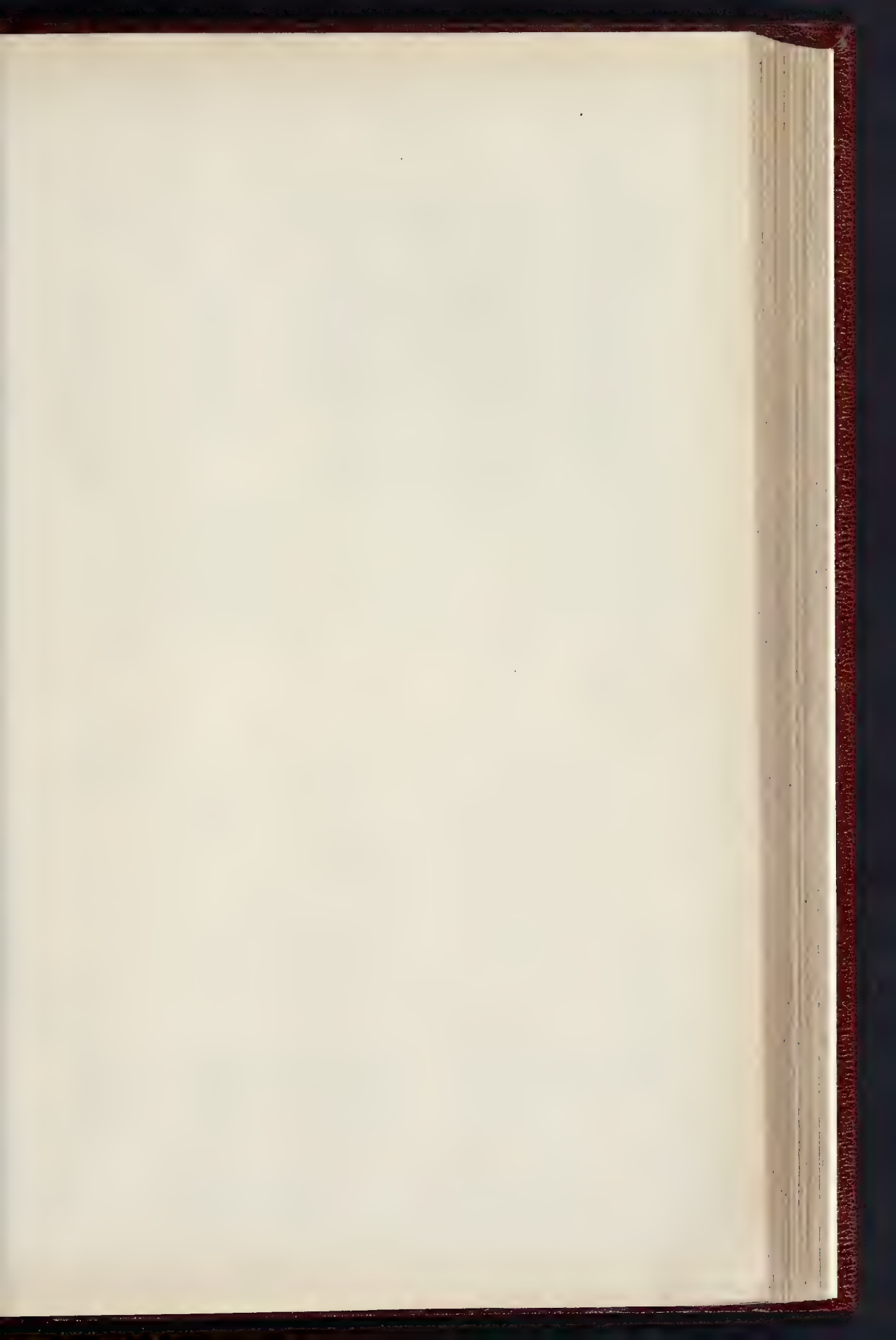


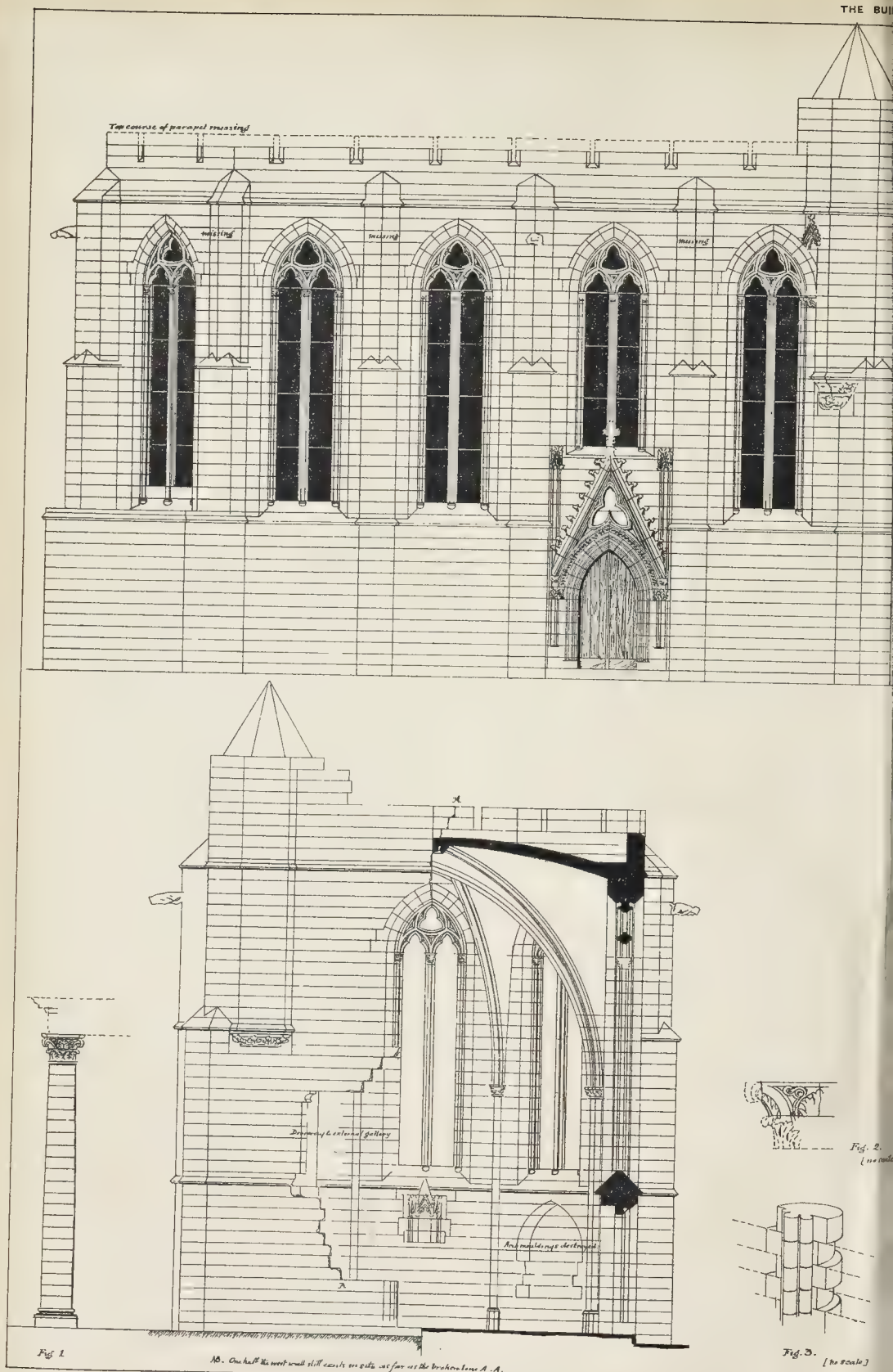
BASILICA JULIA.



STADIUM ON PALATINE.

ILLUSTRATIONS OF ROMAN ARCHITECTURE
(See report of 1900 by Mr. ALAN PORTER read before the Association.)





10. One half the west wall still exists on site as far as the broken line A. A.

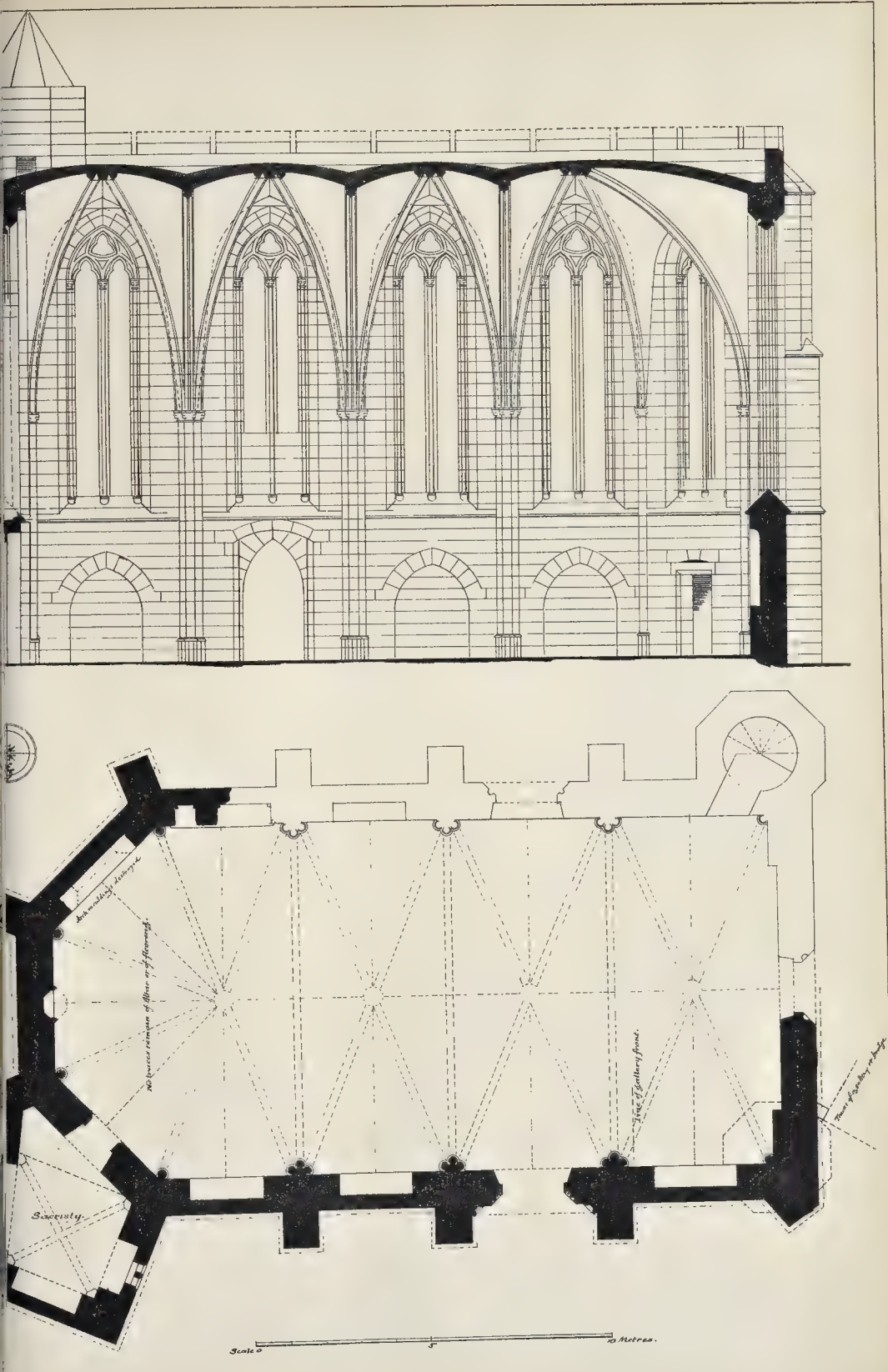


PHOTO LITHO SPRAGUE & CO. LTD. 4 & 5, EAST HARGREAVE STREET FETTER LANE, E.C.

BOOKS RECEIVED.

MANCHESTER SKETCHES. By Frank L. Emanuel. (Manchester Guardian Office. 2s. 6d.)
THIRTY-FIFTH ANNUAL REPORT OF THE LOCAL GOVERNMENT BOARD. (Wynman & Sons. 4s. 7d.)

The Student's Column.

ROOFS: STRUCTURALLY CONSIDERED.—XV.

20. Details of Queen-post Trusses (continued).

IN this article we continue the notes commenced last week on the constructive details of queen-post trusses similar to that illustrated in Fig. 150 ante.

Queen-posts.—Each of these members has to support from one-third to one-half the weight of the tie-beam, and, in addition, a corresponding proportion of the weight of the ceiling, connected with the same member, and, in cases where rooms are formed in the roof, to support the additional load represented thereby.

It is evident, therefore, that the proportions should be varied somewhat according to circumstances. As a general rule the minimum dimensions that are necessary to enable the queen-posts to contribute properly to the stiffness of the truss as a whole are such that stresses due to the weight of the tie-beam scarcely require consideration. In a roof where the ceiling is carried by the tie-beam the queen-posts must be increased in dimensions, and a further increase is necessary in cases where rooms are constructed in the roof.

The following rules give dimensions for fir queen-posts that are in accordance with general practice:—

Roofs without ceilings :
 $a = L^2 \times 0.09$ (22)

Roofs with ceilings :
 $a = L^2 \times 0.115$ (23)

Roofs with ceilings and attics :
 $a = L \times 0.145$ (24)

Where a = cross-sectional area of queen-post in inches.

L = length in feet of that part of tie-beam supported by each queen-post.

Example (1).—Find the cross-sectional area and suitable proportions for the queen-posts of a roof of 36-ft. span, two-thirds of the weight of the tie-beam being supported by two queen-posts, (a) without ceiling, (b) with ceiling, (c) with ceiling and an attic.

(a) By Rule (22)
 $a = (36 \div 3)^2 \times 0.09 = 12.9$ sq. in.

(b) By Rule (23)
 $a = (36 \div 3)^2 \times 0.115 = 16.5$ sq. in.

(c) By Rule (24)
 $a = (36 \div 3) \times 0.145 = 20.9$ sq. in.

Taking the governing dimensions at 4½ in., 4½ in., and 5 in. for (a), (b), and (c) respectively, the proportions of the three posts will be:—

(a) 4½ in. by 2½ in., (b) 5 in. by 3½ in., (c) 5 in. by 4½ in.

Table XXXIII. contains scantlings for queen-posts in roofs of various spans, as recommended by Tredgold and Seddon, and dimensions calculated by Rules (22), (23), and (24) in the last three columns where some of the lower values have been adjusted in order to make the posts uniform in width with other members of the truss.

Fig. 151 is a sketch showing a queen-post and parts of the members therewith.

As in the case of a king-post, the head is enlarged to provide abutments for the straining-beam and the head of the principal rafter, these members being connected by tenon joints. The head is notched or trimmed on the outer side at a suitable angle to permit the common rafters to be laid across it, and trimmed off on the inner side to suit the inclination of the purlin.

The joints between the post, straining-beam, and the principal rafter are completed by two T-straps, one on each side of the timbers, secured by bolts and nuts, and by a

TABLE XXXIII.—SCANTLINGS FOR QUEEN-POST ROOFS OF VARIOUS SPANS COVERED WITH SLATES LAID ON BOARDING WITHOUT AND WITH CEILINGS AND WITH CEILINGS AND ATTICS. TRUSSES 10 FT. APART CENTRE TO CENTRE.

Span of Roof.	Tredgold. Pitch 27°.	Seddon. Pitch up to 30°.		Calculated. Pitch 26° 33'.		
		Without Ceiling.	With Ceiling.	Without Ceiling.	With Ceiling.	With Ceiling and Attics.
Feet.	Inches.	Inches.	Inches.	Inches.	Inches.	Inches.
32	4½ × 4	4½ × 2½	4½ × 3	4½ × 2½	4½ × 3½	4½ × 3½
34	5 × 4½	4½ × 2½	4½ × 3	4½ × 2½	4½ × 3½	5 × 3½
36	5 × 5	4½ × 2½	4½ × 3	4½ × 2½	4½ × 3½	5 × 4
38	6 × 4½	4½ × 2½	5 × 3	5½ × 2½	5½ × 3½	6 × 4½
40	6 × 5	4½ × 2½	5 × 3½	5½ × 2½	5½ × 3½	6 × 4½
42	6 × 5½	5 × 2½	5½ × 3½	5½ × 2½	5½ × 4½	6 × 5½
44	6 × 5½	5½ × 2½	5½ × 4	5½ × 3½	5½ × 4½	6 × 5½
46	6 × 5½	5½ × 2½	5½ × 4	5½ × 3½	5½ × 4½	6 × 5½

cleat nailed in the angle formed by the post and the straining-beam.

The foot of the queen-post is enlarged on the outer side to provide an abutment for the diagonal strut, the lower end of which is secured by a tenon joint. The foot of the post is jogged into the tie-beam to prevent lateral displacement, the connexion being completed by the addition of a wrought-iron suspension strap, about 2 in. wide, and of suitable thickness, having slots for the reception of gibs and cotters, by which the tie-beam can be brought up to its bearing after the roof has fairly settled into final position.

The ends of the straining-cill are butted against the inner face of each queen-post, and kept in position by the thrust of the struts.

If the inner side of the queen-post is notched into the tie-beam, as shown in Fig. 152, the straining-cill is unnecessary. This joint is not to be recommended, as it weakens the tie-beam, in proportion, which means the use of more timber than would be required for a straining-cill.

In roofs where the principal rafters are carried right up to the ridge-plate, the queen-posts should be made shorter, so as to allow the rafters to pass over them.

Straining-beam.—This member is a strut keeping the heads of the queen-posts apart, and completing the upper part of the truss. The manner in which it is connected has already been described, and we need only draw attention to the notches in which the purlins are laid.

Tredgold's rules for the depth and breadth of straining-beams are:—

$d = \sqrt{L \times \sqrt{S} \times 0.9}$ for fir . . . (25)

$b = 0.7 d$ (25a)

Where L = unsupported length in feet.

S = span of roof in feet.

Example (2).—Find the dimensions for the straining-beam of a queen-post truss, 36-in. span, the length of the beam being one-third the span.

By Rule (21)

$d = \sqrt{(36 \div 3) \times \sqrt{36} \times 0.9}$

$= \sqrt{72 \times 0.9} = 7.63$ in.

By Rule (21a)

$b = 7.63 \times 0.7 = 5.34$ in.

Therefore, the practical dimensions would be 7½ in. by 5½ in.

For approximate guidance as to the proportions of straining-beams for roofs without and with ceilings, and with ceilings and attics, the coefficient 0.9 may be varied as follows for average construction:—

Roofs without ceilings:

$d = \sqrt{L \times \sqrt{S} \times 0.75}$ (26)

TABLE XXXIV.—SCANTLINGS OF STRUTS FOR QUEEN-POST ROOFS OF VARIOUS SPANS, COVERED WITH SLATES LAID ON BOARDING WITHOUT AND WITH CEILINGS. TRUSSES 10 FT. APART CENTRE TO CENTRE.

Span of Roof.	Tredgold. Pitch 27°.	Seddon. Pitch up to 30°.		Calculated.		
		Without Ceiling.	With Ceiling.	Without Ceiling.	With Ceiling.	With Ceiling and Attics.
Feet.	Inches.	Inches.	Inches.	Inches.	Inches.	Inches.
32	4½ × 6½	4½ × 5½	4½ × 6½	4½ × 5½	5 × 7	4½ × 7½
34	5 × 6½	4½ × 5½	4½ × 7½	4½ × 6	5 × 7½	5 × 7½
36	5 × 7	4½ × 6½	4½ × 8½	4½ × 6½	5 × 8	5 × 8½
38	6 × 7½	4½ × 6½	5 × 8½	5½ × 6½	6 × 7½	6 × 8½
40	6 × 8	5 × 7½	5 × 9	5½ × 7	6 × 8	6 × 9
42	6 × 8½	5 × 8	5½ × 9½	5½ × 7½	6 × 8½	6 × 9½
44	6 × 9	5½ × 8½	5½ × 10	5½ × 7½	6 × 9	6 × 9½
46	6 × 9	5½ × 8½	5½ × 10	5½ × 7½	6 × 9	6 × 10

Roofs with ceilings:

$d = \sqrt{L \times \sqrt{S} \times 0.9}$ (27)

Roofs with ceilings and attics:

$d = \sqrt{L \times \sqrt{S} \times 1.0}$ (28)

Table XXXIV. gives the scantlings for straining-beams, as recommended by Tredgold and Seddon, and in the last three columns values as calculated by formulae (26), (27), and (28).

In roofs where the straining-beam is of considerable length it may be necessary to afford intermediate support, as shown in Fig. 153, where the two struts proceeding from the queen-posts abut against a short straining piece. This arrangement does not interfere with the construction of rooms in the roof, as partitions can be formed where the principals occur, and the struts do not come in the way of door openings between adjoining rooms.

Straining-cill.—This is merely a piece of timber applied for the purpose of relieving the joint between the queen-posts and tie-beam from undue strain, and is of sufficient substance to enable it to withstand the inward thrust of the queen-posts without any risk of buckling. In roofs of wide spans the straining-cill is sometimes keyed upon the tie-beam, and secured by bolts and nuts.

Struts.—Being essentially similar to the corresponding members in a king-post roof, the struts in a queen-post truss require no further discussion.

Their dimensions can be determined by formula (10), p. 403.

As a matter of convenience, we give in Table XXXV. the scantlings of struts for roofs of various spans, as recommended by Tredgold and Seddon.

TABLE XXXV.—SCANTLINGS OF STRUTS FOR QUEEN-POST ROOFS OF VARIOUS SPANS, COVERED WITH SLATES LAID ON BOARDING WITHOUT AND WITH CEILINGS. TRUSSES 10 FT. APART CENTRE TO CENTRE.

Span of Roof.	Tredgold. Pitch 27°.	Seddon. Pitch up to 30°.	
		Without Ceiling.	With Ceiling.
Feet.	Inches.	Inches.	Inches.
32	4½ × 2½	4½ × 2½	4½ × 2½
34	4 × 2½	4½ × 2½	4½ × 2½
36	4½ × 2½	4½ × 3	4½ × 3
38	4½ × 2½	4½ × 3½	5 × 3½
40	4½ × 2½	4½ × 3½	5 × 3½
42	4½ × 2½	5 × 3½	5½ × 3½
44	4½ × 3	5 × 3½	5½ × 3½
46	4½ × 3	5½ × 3½	5½ × 3½

Wall-plates.—These members require no detailed mention, as they have been suffi-

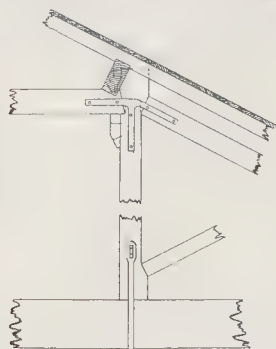


FIG. 15.

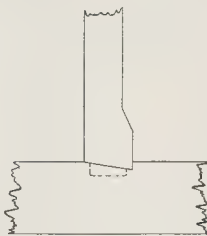


FIG. 152

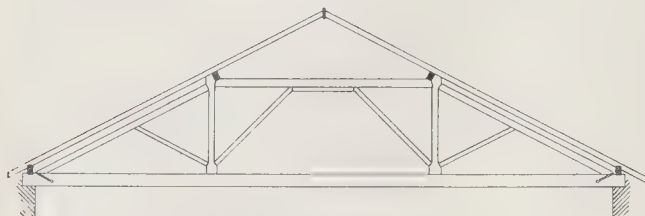


FIG. 153

Illustrations to Student's Column

ciently discussed under the head of king-posts (Article XIII.), and then proportions for queen-post roofs can be determined in the manner there indicated.

Pole-plates in queen-post trusses are essentially the same as the corresponding members in king-post trusses, and, being similarly calculated, require no detailed comment.

Purlins.—In a queen-post roof truss, as illustrated in Fig. 150, there are two purlins in each slope. Hence, in proportion to the roof span, the purlins for a queen-post truss are of smaller dimensions than in a king-post roof.

Table XXXVI. contains the scantlings for purlins recommended by Seddon, and as calculated by Tredgold's rule, formula (11).

TABLE XXXVI.—SCANTLINGS OF PURLINS FOR QUEEN-POST ROOFS COVERED WITH SLATES LAID ON BOARDING OF VARIOUS SPANS. WITHOUT AND WITH CEILING. TRUSSES 10 FT. APART CENTRE TO CENTRE.

Span of Roof.	Seddon. Pitch up to 30°.		Tredgold. Pitch 27°.
	Without and With Ceiling.		
Feet.	Inches.		Inches.
32	5 x 7½		4½ x 8
34	5 x 7½		5 x 8½
36	5 x 8		5 x 9
38	5 x 8		5 x 9½
40	5 x 8½		5 x 10
42	5 x 8½		5 x 10½
44	5 x 9		5 x 11
46	5 x 9		5 x 11½

Ridge-plate.—The ridge-plate for a roof, as illustrated in Fig. 150, is practically the same as the ridge-board in a couple or tied-couple roof, as illustrated in Figs. 111 and 112 (p. 375).

In a queen-post roof of the type illustrated in Figs. 91 to 93 (p. 346), the ridge-plate is applied exactly as in a king-post roof.

Common Rafters.—The only difference between the common rafters in ordinary queen-post and king-post construction is that in the former there are usually two intermediate supports instead of one intermediate support.

The proportions of common rafters can be calculated by Tredgold's rule, formula (5), p. 376.

Table XXXVII. gives the scantlings for common rafters, as recommended by Tredgold and Seddon, for various roof spans.

TABLE XXXVII.—SCANTLINGS OF COMMON RAFTERS FOR QUEEN-POST ROOFS OF VARIOUS SPANS, COVERED WITH SLATES LAID ON BOARDING. PITCH UP TO 30°. TRUSSES 10 FT. APART CENTRE TO CENTRE.

Span of Roof.	Dimensions of Rafter.	
Feet.	Inches.	
32	2 x 13	
34	2 x 14	
36	2 x 14	
38	2 x 14	
40	2 x 14	
42	2 x 14	
44	2 x 14	
46	2 x 15	

Roof-boarding.—For particulars see Articles II., III., IV., and XIII.

Ceiling-joists.—The dimensions of these members can be calculated by formula (12), Article XIII.

Binder-joists are horizontal beams framed between and perpendicular to the tie-beams at intervals of about 6 ft. to 8 ft. apart. They add considerably to the stiffness of a roof, and can be applied with great advantage in cases where the principals are more than the usual distance apart, thereby reducing the span of the ceiling-joists, which are then fixed parallel with instead of perpendicular to the trusses.

Binder joists should be proportioned by means of formulae (17), (18), and (19), due account being taken of the loads and spans, and the physical properties of the timber employed.

Eaves.—The notes and illustrations in Article XIII. are equally applicable to queen post roofs.

MISSION CHURCH, NEWPORT.—The Bishop of Llandaff, on the 4th inst., dedicated the new Mission Church of St. Barnabas, erected in New Ruperra-street, Newport. The building is of two stories, having on the ground floor a school-room 40 ft. by 32 ft. to accommodate 260 scholars; also a classroom 16 ft. by 12 ft., and a kitchen and store in connexion therewith. The church is on the upper floor and on the schoolroom, and the main body of this is also 40 ft. by 32 ft. wide, and is to accommodate 240 people. Externally the structure is faced with blue Pennant stone, with red pressed brick dressings and quoins. The lighting is by incandescent gas pendants and brackets. The estimate of the building, exclusive of seating and lighting, is 1,600l. The architects were Messrs. Linton & Barker, Newport, and the contractors Messrs. Jerrett & Fisher, Newport.

General Building News.

HOLY TRINITY CHURCH, HEREFORD.—The consecration of the chancel of Holy Trinity Church, Hereford, took place on the 18th inst. The chancel follows out the style of the nave, but is of a slightly later period. The roof timbers are of English oak, with carved oak bosses, and the whole covered with pitch pine boarding and felting. The slating is of Westmoreland green slates. The roof is semi-circular and close-boarded. Besides the chancel proper there is on the south side a choir aisle and on the north an organ-chamber and vestry provided. These have been paved with wood blocks, while the chancel itself has a tile floor. The church has been heated throughout by the medium high-pressure hot-water system, the system formerly used in the nave having been unsatisfactory. The total new seating accommodation provided will be approximately 220, and the whole church will now seat about 760 persons. Bath stone has been used for the dressed work throughout, and the walls have been lined internally with Bath stone ashlar. The main walling and external faces are built of Three Elms and Withington stone, to approximate as nearly as possible the stone work of the nave, which was built of stone quarried at Payre Oaks. The work has been carried out by the contractor, Mr. C. Cooke, of Hereford, whose contract amounted to 2,700l. Mr. T. A. King, Hereford, executed the stone carving, and Mr. Dredge, Hereford, was responsible for the carving of the oak bosses in the roof and the oak choir stalls. Messrs. Godwin & Sons, of Withington, were the firm entrusted with the tiling of the floor, and Messrs. Renton & Gibbs, of Liverpool, carried out the heating of the church. The whole of the work has been carried out under the supervision and to the designs of Messrs. Nicholson & Hartree.

WESLEYAN CHURCH, KENLEY.—A new Wesleyan Church has been erected and opened at Kenley. It was built by Mr. D. W. Barker, of Croydon, from the designs of Mr. J. S. Gibson, of London. The total cost of the scheme, including furnishing, lighting, and land, up to the present has been 1,760l.

CONGREGATIONAL CHURCH, WHITLEY BAY.—The foundation-stones of the new Congregational Church at Whitley Bay have just been laid. The church is situated at the junction of Park-parade and Park-avenue, and will be entered from Park-avenue through a central entrance-porch leading to an inner vestibule. The church will be 74 ft. long and 62 ft. wide across nave and outer aisles, with a width of 60 ft. across the transepts. The choir will be arranged in an elevated chancel with the rostrum in the centre, and the organ placed in a recess at the back of the chancel. At the rear of the church vestries will be provided for the minister and deacons, and at one side and facing into Park-avenue there will be a lecture-room or church parlour, with kitchen and lavatories at the rear, and a staircase leading to the ladies' room on the floor above. At the south-east corner there will be a clock-tower about 80 ft. high, which will be used as the Park-parade entrance to the church, and will contain the staircase to a future gallery. The church will accommodate 500 people, and the gallery, when added, another 100. The schools, which will be built later, will be at the rear of the church, and will consist of a two-story building with central hall and gallery, with classrooms arranged along one side and at both ends, those on the side divided from the main hall by glazed movable screens. The church is being built of red stone from Closeburn quarries, with pitch-faced blockers and chiselled dressings. The front gable and transepts have large stone tracery windows and the eaves line of side elevation is relieved by the introduction of tracery windows in clearstory with small gables. The internal woodwork is to be of pitch-pine and oak, and the windows glazed with leaded lights. The heating will be on the low-pressure hot-water system with radiators. Mr. B. Bolam, of Birtley, is the contractor for the work, and the architects are Messrs. Davidson & Phillips, of Newcastle-upon-Tyne.

CHURCH EXTENSION, SEACOMBE.—On the 18th inst. the Bishop of Chester consecrated the completed Church of St. Luke's, Poulton, Seacombe. The first portion of the church, consisting of the nave and aisles, seated for 350, was opened in 1900 at a cost of over 4,300l. Last year it was decided to proceed with the enlargement, by the addition of a handsome chancel and transepts, with a basement schoolroom, vestries, etc. This work was carried out to the plans of Mr. J. Lindsay Grant, assistant Professor of Architecture at Manchester University. The total cost of the completed edifice is over 7,000l., and the church will now seat 700, besides accommodation for 300 in the basement room.

CHURCH IMPROVEMENTS, FOUNTAINVILLE.—The Presbyterian Church at Fountainville was recently reopened after having been enlarged and renovated. A new gallery has been erected with panelled and carved front of pitch-pine. As the former plaster ceiling had become defective,

wooden one has been substituted. The flooring is also become defective, and a large portion has been renewed. This portion of the work was executed by Messrs. Robert Corry, Ltd. The interior has been painted and decorated and all the joinery cleaned and varnished by Mr. Martin Allen. The windows have been fitted with cathedral glass in lead lights, executed by Messrs. Campbell Bros., while the large windows in the gable have been put in by Messrs. Ward & Partner. Electric light has also been introduced by Messrs. Wm. Dowling & Son, and the consulting electrical engineer was Mr. John Bry. Ltd., and the architects were Messrs. Young & Mackenzie.

PROPOSED CHURCH EXTENSION SCHEME, WIMBORNE.—It is proposed, as the result of a commission appointed a year ago by the Bishop of Winchester, to enlarge the parish church to 1,000, preserving the old parts of the building on the south aisle, and at the same time to build a new church in an outlying part of the parish. The architect is Mr. T. G. Jackson, R.A. It is estimated that a sum of £8,000 will be required to carry out the scheme.

PROPOSED NEW NAVE, HEXHAM ABBEY.—A consistory court was held at Hexham on the 12th inst. respecting the application of the rector and churchwardens for a faculty to erect a nave to Hexham Abbey. The proposal is to erect a nave in the Decorated style, at an estimated cost of £22,000. Evidence in support of the petition was given by several witnesses, including Mr. C. C. Hodges Scott, one of the consulting architects, who stated that the scheme of accommodation for worshippers was adduced as the principal reason for the proposed scheme. The chief objections to the scheme were that an enlargement of the church is unnecessary, and that the proposed nave would not be worthy of the building.

CHURCH RESTORATION, BISHAM.—St. Peter's Church, Bisham, Bucks., was recently re-opened after a successful interior restoration. The work has been executed from the designs of Mr. G. Fellows Prynn, architect.

WESLEYAN CHAPEL, ORWELL.—On the 12th inst., at Orwell, a new Wesleyan chapel was opened. The building is a brick and stone structure and is Gothic in style, designed by Mr. Charles B. Jones. The adjoining school-room is so arranged as to be separated from the chapel only by a partition of shutters. The seating accommodation of the new chapel is about 150, and of the school 100. The building arrangements have been carried out by Messrs. Gimson & Co., of Royston, and Mr. J. H. Thomas has acted as clerk of the works.

CONVOY SCHOOLS, ENDEBBY.—A new County Council School has been opened at Endebby. The building has been designed upon the corridor system, for a mixed school to contain 330 pupils, with facilities for extension. It has separate entrances for boys, girls, and infants, with the respective cloakrooms, containing lavatory basins. There are seven classrooms, a teachers' room, and stores. Two classrooms in the mixed department have been divided by a sliding glazed partition, and a similar arrangement has been provided in the infants' room. The floors are of solid maple on concrete, raised for the back of the building. There is ventilation through hopper inlets to the windows, and each room is cross-ventilated by windows over the corridor flats, and further by ventilating radiators in connexion with the low-pressure hot-water apparatus by which system the buildings are heated throughout. The internal woodwork, screens, and fittings are in pine-pitch, treated with a green stain and varnished. Externally the buildings are faced with pressed sand stocks and covered with grey Welsh slates. This contract has been carried out by Messrs. W. Corah & Son, of Loughborough, Messrs. Gimson & Co. being entrusted with the heating. Messrs. Barwell & Alcock, of Loughborough, are responsible for the design; and the total cost, including site and furniture, is about £3,000.

SCHOOL, ST. ROLLOX, GLASGOW.—A new public school under the Glasgow School Board was opened in Garnagad-road, St. Rollox, on the 12th inst. Three large playgrounds are provided, one on the south side, and two of about equal area extending from the building down to Garnagad-road, for boys and girls. A new street runs along the west side, and the playgrounds are open on all sides for air and light. The building, which is 180 ft. in length, is planned with the infants' entrance from the street level, the main entrance, and the entrance to the playgrounds in the north front, each entering from its own playground. A corridor 10 ft. wide extends the whole length of the building on each flat, giving direct entrance to the classrooms, of which there are seven on each floor, all facing the south, and so arranged as to give left-side lighting to the pupils. There are for infants' and primary school two corridors towards the north, each measuring 50 ft. by 40 ft. The hall on the top flat is finished with an open timber roof. The hall on the ground level is divided up for manual and laundry classes. A

house for the janitor occupies the north-west corner of the girls' playground, next Garnagad-road. The cost of the building is £21,720. The school was built from plans prepared by Mr. Duncan McNaughtan.

SCHOOL CHAPEL, GRANTHAM.—The old school-house at the Grantham King's School has been converted into a chapel for the use of masters and scholars now at the school. The platform has been taken from the lower, or western, end, and a chancel has been erected at the east end. The original seats in the school are now choir-stalls, and the other seating consists of chairs. The heating is by gas radiators. The old roof has been thoroughly renovated. Mr. Wilfred Bond was the architect, and Mr. S. Bentley-Rudd the builder for the work.

ELEMENTARY SCHOOLS, STOCKTON.—The new schools in the Newtown district of Stockton were recently opened. They occupy a site between Durham-road and Bishopston-lane, and have been built by Mr. A. J. Cooke, of Stockton, to the designs of Mr. T. W. T. Richardson. They consist of three blocks of buildings, one each for the infants, girls, and boys, and are enclosed by walls surmounted by ornamental iron railings. The schools will accommodate 1,100 children, and the cost is approximately £2,000.

BAPTIST SCHOOL-CHAPEL, FLITWICK.—The foundation-stones for a Baptist School-Chapel were laid a short time ago at Flitwick. The building is intended to form the first part of a scheme for church and schools, and provision is made for building a future church in front. It will consist of an assembly-room 32 ft. 6 in. by 24 ft. inside, two classrooms which can be thrown into one by means of a movable partition, and a basement kitchen containing cupboards, and heating apparatus. The walls will be faced outside with Flomman's sand-faced brick, and coated inside with stucco. The roof timbers will be supported on arched ribs stained dark, and the roof covering will be tiles. The heating will be by low-pressure hot water, with ventilation by inlets at the sides as well as by window casements and extractors in the roof. The architects are Messrs. John Wills & Son, Derby, and the builder is Mr. W. T. Sharpe, Amptill.

MISSION-ROOM, BARTON-HILL, BRISTOL.—The foundation-stone of the Avonside Mission-room, which is being erected on a site at the junction of Avondale and Great Western roads, at Barton-hill, was laid recently. The building will consist of a central hall, three classrooms, vestry, and kitchen and heating chamber. The structure is in red Pennant stone with Cattybrook brick dressings, and the roofs are covered with brindle tiles. The whole of the glazing is of tinted cathedral glass in lead. The heating is by hot-water radiators on the low-pressure system. The hall is capable of seating about 600 persons. Messrs. P. Munro & Son, of Bristol, are the architects.

HUTCHER GREEN LIBRARY.—Mr. Carnegie has approved the design selected by the Libraries Committee of the Lewisham Borough Council for the proposed new branch library at Hither Green conditional upon the cost not exceeding £4,500. Mr. C. O. Robson has been appointed to take out the quantities.

ASSEMBLY ROOMS, FOREST HALL.—On the 10th inst. the new Forest Hall and Benton Assembly Rooms were opened. The building, which has been erected for Mr. Robert Herron on his estate at Forest Hall, comprises on the ground floor four large shops, with an entrance to the Assembly Rooms in the centre, and two small houses at the sides. The Assembly Rooms are on the first floor, which is reached by a wide staircase. The rooms consist of a large hall, dining-room, artists' retiring-room, cloak-rooms, etc. The hall, which is 78 ft. by 37 ft., and 24 ft. in height, will be used for dances, concerts, bazaars, etc. A stage is erected at one end, and facing it is a gallery. For the purpose of dancing the floor of the hall is covered on rubber springs. The dining-room, which will be also used as the lodge-room of the newly-formed Burdon Lodge of Freemasons, is 35 ft. by 33 ft., and 17 ft. high. At the back there is a kitchen. The building is lighted throughout by electricity, and gas is also placed in the building. The exterior of the building is of Lumley red-pressed bricks, relieved by stone dressings and overhanging bracketed eaves. The gables are rough casted. The fibrous plaster has been done by Messrs. Dean & Co., Birmingham, and the stained-glass windows by Messrs. Atkinson Bros., Newcastle. The building was designed by Messrs. White & Stephenson, architects, Newcastle, and the contractor was Mr. W. Jackson, of Gosforth.

HOME FOR WAIFS AND STRAYS, HUNSTANTON.—On the 9th inst. the Bishop of Thetford laid the foundation-stone of the new Home for Waifs and Strays. The site of the new building is at the eastern end of what is known as York-avenue. The building when completed will be a home for thirty boys, and will contain on the ground-floor a dining-room, common-room, kitchen, matron's and committee-rooms, lavatory, etc.; and above, three dormitories, matron's bedroom,

servants' rooms and "sick" room. All rooms occupied by the boys will be cross-ventilated by means of windows on two sides. Special chain bricks, made at the Heigham yards, are being used for the base of the building, the upper part being of the local brown stone. The architect is Mr. H. G. Ibberson, and the work is being carried out by Mr. F. Southgate, of Hunstanton.

PROPOSED NEW PUBLIC OFFICES, OXENHOPE.—Colonel W. R. Slacke, R.E., Local Government District Inspector, recently held an inquiry at Oxenhope into an application by the District Council for power to borrow the sum of £800, for providing and furnishing new council-rooms. At present the premises occupied by the Council are inadequate and unsuitable. It is proposed that the new building shall be placed on a site fronting to the Healden Bridge-road. The plans have been prepared by Messrs. J. Haggas & Sons, architects, of Keighley. The necessary evidence was given to the inspector by Mr. J. N. Clarkson (Clerk to the Council) and the architects.

INSTITUTE, SALTLEY.—The foundation-stone of the institute to be erected in Ralph-road, Saltley, in memory of the late Lord Norton, was laid on the 13th inst. by the Marquis of Salisbury. The present Lord Norton gave the site in Ralph-road, and the design for the new building of Mr. H. W. Hobbiss was accepted. The building, which is to cost £2,400, exclusive of furniture, will include, among other features, a public hall to accommodate 400 persons, a gymnasium to accommodate 120, and recreation-rooms.

HALL, NEWPORT.—The Central Forward Movement hall, at Newport, abutting upon Commercial-street, was opened on the 4th inst. The main hall is 118 ft. 6 in. long by 66 ft. wide, and will accommodate about 2,000 people. The height from floor to ceiling is 40 ft. A platform and large orchestra are provided at one end, and an organ, costing £1,000, is arranged in two parts. Classrooms and cloak-rooms are provided under the orchestra and a mezzanine floor has been arranged between the back portion of the balcony and the ground floor, with additional cloak-room accommodation. Electric lighting is used throughout. The building was designed by Messrs. Habershon, Fawcett, & Co., architects, Newport and Cardiff. The clerk of works was Mr. J. Williams, of Cardiff, and the contract, which amounted to £7,000, has been executed by Mr. W. A. Linton, contractor, of Newport.

UNIONIST CLUB, SUTTON.—Mr. W. Keswick, M.P., recently unveiled the foundation-stone of the new premises of the Sutton Unionist Club. The building, which is being erected at the corner of Benhill-street and Lenham-road, will be of red brick with stone dressing, and on the Benhill-street frontage will be a stone porch. The main portion of the building will consist of two stories. On the ground floor will be the central hall for meetings and concerts, occupying a space of 50 ft. by 30 ft. Immediately above there will be a billiard-room, with three tables. A vestibule entrance from Lenham-road divides the main hall from the reading and committee rooms and lavatories on the ground-floor. Above these will be a bar and lounge and games rooms, while the stewards' apartments will occupy a third story. There will be lavatories on each floor. At the rear will be stores and the usual offices. The building has a frontage of 62 ft., and is being erected by Mr. F. J. Shopland on a contract of £2,750, from the plans of Mr. F. G. Burdett, architect.

MOTOR GARAGE, NEWMARKET.—A new motor garage has been opened by Messrs. Botwood & Egerton in the main street of Newmarket. The building and other work has been carried out by Messrs. J. Turner & Son, of Winesham, under the superintendence of Mr. Percy Turner, acting under the instructions of the architects, Messrs. Bishopp & Cautley, of Ipswich, the direction of the work falling to Mr. H. Munro Cautley.

INSTITUTE PREMISES, BATTERSEA.—The institute in Plough-road, consisting of a recreation-room, museum, gymnasium, and slipper baths, was opened a short time ago. On the ground floor of the building are a recreation-room, a well-equipped gymnasium and slipper baths. On the first-floor are a reading-room for children and a museum. Mr. T. W. Hayward (Borough Surveyor) prepared the plans of the work, the total cost of which was £1,135.

PUBLIC ABATTOIR, SOUTH SHIELDS.—The new public abattoir at South Shields has just been opened. The site is at Station-road in the centre of the borough, and adjoins the North-Eastern Railway goods and cattle sidings. The area is 4,500 sq. yds., or, say, one acre in extent. Communication with the cattle docks or sidings of the railway company has been established by the construction of a subway bridge, thereby providing access directly into the slaughter-house premises. This will obviate the driving of cattle through the streets of the borough, as they will be driven directly from the landing docks in the subway. The goods station through the docks or sidings slaughtering blocks are planned on the large slaughter-house and hall system without any cross walls or screens, instead of the cubical or sectional system, where each butcher has a separate department to himself. The lairage abuts both the

railway embankment and subway. Each air is separated from the adjoining one by 9-in. cross-walls 8 ft. in height. The building is lighted from the north by skylights in order to keep the place as cool as possible. Sliding doors are fixed to this building in order that the cattle may be seen without the necessity of opening the door. The main slaughter-hall is 146 ft. long by 27 ft. broad, with no cross-walls or projections in the hall, so that there is no tendency to harbour any deposit, and the whole building is under the complete supervision of the officials in charge. The building is lighted by semi-circular windows at the sides and ends and also by skylights, and fitted with the latest appliances used in connexion with slaughter-houses. At a height of 13 ft. 6 in. from the ground, and at intervals of 8 ft. throughout the whole length of the building, steel cross girders are fixed on to stone templates. To these girders the overhead trolley lines which run from the slaughter-hall across the ventilating alley into the cooling hall are fixed. After the beasts are killed the carcasses (after dressing) are lifted by means of patent winches on to hooks attached to the trolley rail, and on these overhead trolley lines carcasses are conveyed in an easy manner to the cooling-hall without inconvenience or trouble. Along the whole length of the northern side of the building a glass veranda 8 ft. from the ground and projecting 6 ft. is provided, constructed on cantilevers. Under this veranda the space between each of the doors into the slaughter-hall is utilised for open standage for cattle, formed with posts and railings. The floor inside the standage is paved with in situ concrete and grooved and throated. The refrigerating plant in the cold stores is by the Linde Refrigerating Company, capable of maintaining a temperature of 35 deg. in the two rooms, which have a combined cubical capacity of 6,500 cubic ft. These rooms are insulated throughout, i.e., the walls, ceilings, and floors are packed with slag wool and made proof against the outside atmosphere. The apparatus consists of an ammonia compressor, air cooler, and fan. The belt of the compressor is driven by a 14-h.p. Crossley gas-engine. The air is driven over the coil which is fixed in a duct by a Blackman's fan belt driven and cooled by the evaporation of the ammonia in the coil and is then as cold air discharged from the duct by a series of openings into the chilling-rooms. These openings can be regulated to suit the varying requirements of the rooms. The building has been carried out in brickwork with Pelaw double-pressed facing bricks. All the floors, with the exception of the superintendent's house, are of Portland cement concrete, chambered and graded towards channels at the sides so as to assist in the general cleanliness of the premises. The roofs are carried on steel principals with close boarded sarking, and covered with Dinoric slates. Quoins, copings, sills, heads, and water-tabling is carried out with compressed concrete. The windows and door heads and sills are of reinforced or armoured concrete. The buildings are ventilated by means of louvres fixed along the entire length of the ridges. All the buildings which it is advisable to keep cool are lighted only from the north. Through ventilation has been carried out in every case. The lighting throughout is by electricity. All the roadways are paved with granite setts on a concrete foundation and grouted with bitumen. The cost of the scheme, including the site, is about 17,500l. The work has been carried out by Messrs. Robert Neill & Sons, builders and contractors, Manchester, the local representative for the contractors being Mr. G. Bernard Hartley. The whole of the work has been designed and carried out under the direct supervision and control of Mr. S. E. Burgess, M.Inst.C.E., F.R.S.L., Borough Engineer and Surveyor, South Shields, who has been assisted by his Building Inspector, Mr. William Ridley, and also by his Drainage Inspector, Mr. James Sloan.

HIGHGATE BRANCH LIBRARY.—The library in Chester-road, opposite the cemetery gates, which was opened on October 18, has been erected by the St. Pancras Borough Council after plans and designs prepared by Mr. W. N. Blair, Borough Engineer, at an estimated cost of 4,000l. The building includes a lending department and a special room for children.

NEW BUILDINGS, MANCHESTER UNIVERSITY UNION.—At a meeting on October 17 of past and present students a resolution was carried on the motion of the Lord Mayor to raise a sum of 100,000l. to complete the fund for the erection of new University Union buildings, which will include a men's union, a women's union, and a refectory, at an aggregate cost of nearly 25,000l. For the refectory a sum of 8,000l. is promised by the Victoria University Council.

THE READ DISPENSARY, BRISTOL.—On the 23rd inst. the opening of the Read Dispensary, the institution for women and children founded by Miss Read, of Clifton, took place. The new buildings are situated at the junction of St. George's-road and Anchor-road. The walls of the ground floor are faced with Hollybrook

red facing bricks with a red joint. The walls of the first floor are rendered in yellow roughcast, and the gable ends have half-timbered work. The roof is covered with special hand-made, work-faced red tiles. Wrought-iron windows and frames are used throughout, and leaded glass, except in the windows of the consulting rooms, which have plate glass. The main entrance from St. George's-road opens into a lobby, and thence into a waiting-hall, another door leads to the chief consulting-room, another to a staircase to the basement, in which there are two offices, the coal cellar, and the boiler for the hot-water supply to the doctors' basins. The hall is also connected to a waiting-room by folding doors. There is another consulting-room, and the two are connected by a dressing-room and also by a dark room for "eyes." The caretaker's rooms on the first floor comprise a kitchen, a double bedroom, a bedroom, larder, store, workhouse, and a flat roof as a garden. The consulting-rooms are fitted with "Kern" Welsbach radiators. The panels of the interior woodwork are oiled and varnished; the framing, etc., is treated with dark "Solignum." The walls are done with Hall's washable distemper. The premises were designed by Mr. P. Hartland Thomas, of Messrs. J. P. Sturge & Sons, Bristol.

HOSPITAL EXTENSION, SUDBURY.—St. Leonard's Hospital at Sudbury has recently been enlarged. The plans were prepared by Mr. A. Howard, and the work was given to Mr. Fred Bennett, of Ipswich. The enlargement has taken the form of adding a story to the men's ward, and this necessitated the removal of the roof of the old building, pulling the walls down to within 8 ft. of the ground, and the rebuilding of the walls to the requisite height.

PROPOSED NEW TOWN HALL, HARWICH.—The Harwich Town Council have decided to adopt the revised plan as prepared by Mr. H. H. Packe for a new Town Hall at an estimated cost of 4,714l., exclusive of bank fixtures, fittings, strong-room, door, and shelves; and further to make application to the Local Government Board for leave to borrow a sum, not exceeding 6,000l., for carrying out the proposed works.

COLLEGE LIBRARY, GLENALMOND, N.B.—On the 20th inst. the new library erected at Glenalmond College to the memory of the eleven old Glenalmonds who died in the South African War, was opened by Field-Marshal Lord Roberts, V.C. The projected cloister, which forms part of the projected cloister, is paved with stone, and has five archways in its stone walls—an archway under the oriel of the library, two for the cloister, one leading to the classrooms, and another on the circular tower staircase by which the library is approached. In the panels beneath the oriel window are two bronze plates, with inscription, raised in low relief. The library proper is 60 ft. long by 20 ft. broad, with 18 ft. between floor and wood ceiling. It is divided into three portions. The first, which is lighted by an oriel window, is allotted to the newspaper readers; the centre portion contains four bays for study, each equipped with a table and two benches; the southern portion contains the magazine tables and benches, and is lighted by three large south windows. A carved wood ceiling, carried from wall to wall above the bookcase line, forms a division between the newspaper room and the other portions. The building was designed by Mr. Heiton, architect, Perth.

NEW LATS, SHEPHERD'S BUSH.—A building to be called "Green Court" is to be erected on a site having a frontage to Shepherd's Bush-green of 225 ft. The building is to contain 156 self-contained residential flats of from three to five rooms each, and will be built in three sections, of fireproof construction, seven stories high. Each block will have electric lifts approached from a spacious lounge hall. The grounds will be laid out with garden-courts, two playing fountains, etc. Messrs. Palgrave & Co. are the architects.

TOWER, SOULDERNE CHURCH.—The Bishop of Reading laid the chief foundation-stone a few days ago of a new tower and belfry of Soulderne Church. This will complete a restoration scheme costing about 2,500l. The work is being done on the advice of Mr. G. F. Bodley, R.A.

Sanitary and Engineering News.

OXFORD TRAMWAYS.—After somewhat protracted negotiations with the proprietors of the City of Oxford and District Tramway Company the City Council, who agreed in June, 1905, to purchase the existing undertaking at the end of the current year, have accepted a tender from the National Electric Construction Company to take a forty-two years' lease of the lines and to work them by electricity, upon the Dolter surface contact system, instead of the trolley traction. The lessees will covenant to defray expenses involved by the conversion, to pay the purchase price of the present route of about 5½ miles, and to pay an annual rent increasing from

800l. to 1,500l. in the course of about seven years until the expiration of the lease, when the city will have the option to buy the tramways at their then market value.

HARBOUR EXTENSION, KIRKCALDY.—On the 8th inst., at a meeting of Kirkcaldy Town Council, a minute of the Harbour Committee was submitted with regard to the further extension of the harbour on plans which had been prepared by Messrs. Rendal & Robertson. The scheme consists of (1) the formation of a dock partly of the site of the present dock and commercial part of the harbour; (2) a south pier, built partly outside the south pier of the Parliamentary plan; (3) a further extension of the east pier for a length of 50 ft.; (4) the construction of a spur, 30 ft. long, to the east pier; and (5) a tidal basin forming a protected approach to the dock. The engineer's estimate for this work is 78,610l., while the contract for the extension of the east pier, at present being carried out by Messrs. C. Brand & Sons, is 26,000l. The committee recommend that this work be carried out, and that the contract for the new work should be placed in the hands of the present contractors for the east pier, Messrs. C. Brand & Sons, at a scale to be approved by the engineer. The committee's recommendation was approved.

NEW DOCK, GRANGEMOUTH, N.B.—The Grange Dock at Grangemouth has just been opened. The docks will be capable of accommodating vessels of 7,000 tons and over. The entrance lock is 635 ft. long, 80 ft. broad, and there is a depth of 32 ft. of water on the sill of the lock at high-water ordinary spring tides. The lock is provided with three pairs of gates, dividing it into two lengths of 140 ft. and 375 ft. respectively. Immediately inside the new lock is a basin of about 10 acres area, which will be used for ships waiting till it is convenient for them to get out to sea, and thus relieving the dock proper of all ships not actually being loaded or unloaded. Between the lock and dock is the eastern channel with a width of 200 ft. at the toe of the slopes. The new dock has a minimum width of 750 ft. at its eastern end. The western portion is divided into two arms by a quay extending for a length of 1,200 ft. The quayage extends to 2,583 lineal yds. Four hydraulic hoists, capable of lifting a gross weight of thirty-two tons, have been erected on the east quay. The dock has also been equipped with a number of hydraulic cranes, varying in lifting capacity from two to five tons each, for the discharge of iron ore, pig iron, timber, etc. Sheds are in course of erection round the new dock, with lines of rails running along both sides of these. The docks, both old and new, are lighted by electricity. The new works have involved an expenditure of about 1,500,000l. Sir John Wolfe Barry, K.C.B., was the engineer, and Messrs. Charles Brand & Sons, Glasgow, the contractors.

SWING BRIDGE, ASHTON, BRISTOL.—A new swing bridge has been erected at Ashton over the New Cut. There are two decks, the lower carrying two lines of railway, and the upper a roadway 20 ft. wide and two footpaths each 5 ft. 6 in. wide, making a total width of 31 ft. The railway approaches the lower deck on the level. The roadway approaches the upper deck on inclines, being carried over the railway by fixed spans, which, including the movable portion, make the total length of the bridgework about 600 ft. When it is necessary to open the bridge for the passage of vessels, it is swung round by hydraulic engines placed in a cabin erected over the bridge, the power being supplied from the pumping engines in the Underfall Yard. The masonry was executed by Messrs. E. Nuttall & Co.; the steel work by Messrs. John Lyaght, Ltd.; the hydraulic machinery by Sir W. G. Armstrong, Whitworth, & Co.; the navigation lights by Messrs. Chance Bros. of Birmingham; the interlocking gear by Messrs. Saxby & Farmer; and the telephones and bell signals by Messrs. Buchanan & Curwen, of Bristol. Mr. T. Yabbicom is the City Engineer.

NEW WATERWORKS, PENRITH.—At their meeting on the 15th inst. the Penrith Urban Council discussed the proposal to obtain a supply of water by gravitation from Hayewater Tarn, on the hills in the High-street range. With only one dissentient the Council decided to promote a Bill in the coming Parliamentary session. Mr. Baldwin Latham, C.E., the engineer for the scheme, put before the Council two projects, one to cost (exclusive of land, engineering, and legal charges) 25,000l., and another to cost nearly 40,000l. The Council decided to take up the cheaper and more direct route.

SEWERAGE WORKS, SOUTHERN.—The Southend Town Council have appointed a committee to consider, and report upon, a scheme for providing a new system of sewerage, adequate for a population of 100,000, which embraces an outfall sewer to be laid across the fore-shore, and a covered tank in the east quarter of the borough to contain 1,200,000 gallons. It appears that the project is undertaking a new law of the recent judgment, adverse to the corporation, in the matter of the pollution of oysters on the

reshore at a distance of 3 miles westwards on the pier.

CASLE CARY AND LANGPORT RAILWAY.—The Great Western Railway Company recently opened a line, nearly 16 miles long, which completes their new routes westwards. They have also reconstructed the line from Langport to the wharf across Sedgemoor, for a distance of 10 miles. Beyond East Langport a viaduct having ten spans of 55 ft. carries the new line, which crosses the river Parret by means of a steel bridge having a span of 110 ft., and two arches at each end. A cutting near Charlton Mackarel necessitated the excavation of 400,000 cubic yds. of rock and black shale; a viaduct of five arches 60 ft. high spans the valley beyond, and in leaving Somerton there is a tunnel rather more than 1,050 yds. long. Messrs. C. J. Williams & Sons were contractors for the works.

DRAINAGE IN BATTERSEA.—Mr. I. Young, the Chief Sanitary Inspector of Battersea, in his annual report just issued, says that a great improvement continues to be noticeable in the way the plans and sections with regard to the drainage or readrainage of buildings submitted to the Council are drawn. Although there are several persons who fail to comply with the by-laws until the plans have been returned to them in some instances three or four times—and others fail to send them in until threatened with proceedings, the by-laws made under the Metropolitan Management Acts Amendment Act have already proved to be of great advantage in placing in the hands of the sanitary authority correct records of the drainage of the properties in the district. As regards combined drains as sewers the expenditure during the year was £2,127, or 747l. less than in the preceding year. In each case where claim was received careful search was made for plans or records which would relieve the Council from the responsibility, and in cases where the Council was not responsible the owner has been required to intercept, reconstruct, and ventilate his system of drainage pursuant to the by-laws of the London County Council as would be required if such drains had been separately connected with one of the Council's sewers beneath the public way.

Appointment.

APPOINTMENT.—The Dean and Chapter of St. Paul's have appointed Mr. Morvyn Macartney as their consulting architect in the place of Mr. Somers Clarke, who has resigned.

Foreign.

FRANCE.—The jury commissioned in the fifteenth competition opened by the Société Nationale d'Architecture "has awarded the prize to M. Fernand Hamel" the subject of the competition being "the subject of the Railway Terminus for a town of 8,000 to 10,000 inhabitants."

The jury in the competition for the proposed Hôtel de Ville at Troyes have awarded the first premium to M. E. Robert; but as this architect has left for Peru, the building will be carried out by the winners of the second premium, MM. Bailley & Moncau. A new post-office is to be built at L'Orient, at an estimated cost of 270,000 francs. The Municipality of Roubaix have voted 6 million francs for carrying out important works in architecture and street improvement.

The works are shortly to be commenced for the enlargement of the Mairie of the 14th arrondissement, in the Rue de la Banque, Paris. The cost is estimated at 240,000 francs. A competition has been instituted, open to architects of the Departments of l'Ain, Jura, and Haute Savoie, for a new hospital at Nantua, at an estimated cost of 300,000 francs. M. Bernard, Departmental Architect at Saint-Etienne, has been elected President of the Société des Architectes de la Loire, for 1906-1907. The Section of Painting at the Académie des Beaux-Arts has presented three candidates to fill the place of the late Jules Breton, in the following order of merit:—MM. Raphaël Collin, Gervey, and Tony Robert-Fleury. The election will take place at the close of this week.—The nephew and heir of the painter Henner has assigned to the credit of the Société des Artistes Français (Old Salon) a "rente" of 3,000 francs to form an annual prize for an artist who is a figure-painter, and who is more than 30 years of age.—M. Willette, the painter, has been commissioned to decorate several rooms in the new "Maison des Etudiants," which has been installed in the former Ecole de Médecine, Rue de la Boucherie.—M. Paul Seck has completed the pictorial decoration of the Salle des Fêtes in the Faculté de Droit at Paris.—Some interesting archaeological discoveries have been made in the Ile de Batte (Brittany), where MM. Toudouze & Delassalle found some prehistoric Celtic objects, including flint arms and some pottery. The death is announced, at the age of 68, of M. Adolphe Lalauze, the engraver, a former pupil of

Gauchere. He produced much important work and illustrated many books. He was Chevalier of the Legion of Honour since 1895, and had received medals in various exhibitions, including a gold medal in connexion with the Universal Exhibition of 1900.

GERMANY.—The fourth Congress of the International Society for Testing Materials has just taken place in Brussels. About 500 members, attended under the presidency of Herr Beyer, of Vienna. The suggestion was unanimously approved of appointing a commission for testing ferro-concrete. The difficulty of such an undertaking lies in the large selection of the material used, and only a judicious restriction can lead to practical results. In the Palais des Académies, where the meetings were held, a small laboratory had been fitted up for mechanical testing and for microscopic examination of metals. The next congress will be held in 1909 in Copenhagen.—Interesting excavations have lately resulted in laying bare the foundations of a Christian monastery at Georghenthal in Thüringen. Up to 1840 the ruins were completely buried in rubbish, and were only accidentally discovered while stone was being quarried for. This total annihilation of such a large site was due to the peasant war of 1525, when the monks were driven away and the monastery pulled down to provide material for buildings elsewhere. The monastery was founded in 1140, and the present Parish Church was originally built as the chapel for lay worshippers.—MM. Fauser and Wernle, of Stuttgart, have won in competition the first prize of 2,000 marks for designs for buildings surrounding Ulm Cathedral.—Out of 109 designs submitted for competition for a syndicate at Frankfurt-on-Maine, the first place was accorded to that of MM. Graf and Roedel, Stuttgart.

NEW ZEALAND INTERNATIONAL EXHIBITION.—About October, 1906, operations in connexion with the exhibition were commenced in Hagley-park, Christchurch, and on November 1 of this year the doors of the buildings will be opened to the public. The exhibition will not be closed until towards the end of April, 1907. The City of Christchurch with its suburbs has a population of some 60,000, and is the chief city of the Canterbury district. Hagley-park is a public domain of over 300 acres immediately contiguous to the city. The main building of the exhibition, 1,000 ft. by 365 ft., runs parallel with the river Avon, and between the frontage of the building and the banks of the river, which is an average distance of about four chains, all the ground is being laid down in grass lawns, flower-beds, and generally presents a very attractive appearance.

The next important building is the machinery hall, which provides floor space to the extent of 95,000 sq. ft. The art gallery is admirably adapted for the display of pictures, and contains two large and twelve small rooms. Eight rooms have been allotted for the exhibition of pictures, sculpture, and works of art from the United Kingdom. The other rooms in the art gallery are reserved for the Art Societies of Australia and New Zealand. In connexion with the art gallery, it is proposed to organise an art union. Prize-winners will be permitted to select pictures to the value of the prize won, and, if desired, can supplement the value of the prize won and thus obtain some of the more valuable pictures which are for sale. A concert-hall has been erected which provides a seating accommodation for about 1,000 people. It will be used for various kinds of entertainments during the whole progress of the exhibition. The frontage of the main building is being covered with "stuccoline," which in appearance resembles white marble. The central dome and the tops of the various towers will be covered with bronze paint. The buildings and grounds are being lighted up with electricity and gas. A most complete scheme for lighting up the grounds of the exhibition has been arranged, and it should cause the exhibition grounds to be very attractive at night. A complete electrical plant is being erected within the exhibition grounds, which will supply all electric power required by exhibitors and also generate the power required to run the electric lighting. It is intended to make music one of the particular features of the exhibition. An International Band Contest has been arranged and, as far as one can judge, it promises to be supported and participated in by a great number of bands from the colony and from Australia. Already thirty-five New Zealand bands have entered for the competition. Displays of fireworks, to the number of eighteen, have been arranged with the firm of James Paine & Co., of London. Such displays being very uncommon in New Zealand, it is expected that they will be a source of considerable interest. The Home Industries section of the exhibition will be quite a feature in itself, much trouble having been taken to make it most comprehensive and thorough.

SWITZERLAND.—On July 20 died Benedikt Plattner, State Architect and Engineer for the Tyrol and Vorarlberg. He was awarded the gold cross of merit for the signal services he

rendered during the floods that devastated the Tyrol in 1882.—The law concerning patents has just been revised by the Swiss Government, so that now the chemical industry will be protected. Up to the present the law only extended to those inventions which could be represented by models.

Miscellaneous.

THE PROPOSED TECHNICAL COLLEGE FOR THE NORTH.—There has now been issued the report by Mr. Charles Stewart, M.A., headmaster of Robert Gordon's College in Aberdeen, and Mr. J. A. Ogg Allan, architect to the Aberdeen School Board, on the subject of the Technical College for Aberdeen and the Northern Counties, which was remitted to them in May last at a largely-attended representative meeting. The discussion at the conference in question showed a strong feeling in favour of taking active steps to carry out such a scheme with as little delay as possible, especially in view of the grants which it may be expected the Scottish Education Department might be disposed to make in aid of it. In fulfilment of the remit to them, Mr. Stewart and Mr. Allan visited various technical colleges throughout the country, and the result is the exhaustive report, fully illustrated. It is proposed that there should be two schools established in Aberdeen—one on the grounds in front of Robert Gordon's College, the other in the vicinity of Aberdeen harbour. In the former of these institutions, provision is made for (1) a school of engineering, (2) a school of architecture, (3) a school of chemistry, and (4) a school of artistic crafts. This last-mentioned school would be allocated chiefly in the present existing Gray's School of Art. Besides providing accommodation for these schools, the institution would also provide space for a museum of applied art, a library and reading-room, and an examination-hall, also rooms for administration, etc. It is estimated that the cost of erecting the building, exclusive of value of site and architectural expenses, but including equipment, would be not less than £2,000. It is estimated that the total annual expenditure involved in carrying on this institution would fall little short of 10,000l. An interesting part of the proposed scheme is the establishment in the vicinity of the harbour of a Fisheries Institute and School of Navigation. It is proposed to build a large school, covering about three-fourths of an acre, at a cost of 20,000l. as a capital charge, with probably 5,000l. of an annual outlay.—*Scotsman.*

CHURCH OF ST. PAUL, LIVERPOOL.—Under provisions of the Act for the closing and sale of the Churches of All Souls, St. Mark, St. Paul, St. Thomas, St. Titus, Christ Church, St. Columba, and St. Bartholomew in Liverpool, and St. George in Wigan, the demolition of that of St. Paul, Liverpool, will, it is stated, be proceeded with shortly. St. Paul's Church was built in 1765-6, at a cost of 13,000l., destroyed by the inhabitants, after the designs in the Classical style of Thomas Lightholder, the architect of many buildings and houses in Bath. The church has a central lead-covered cupola, and a western tetrastyle portico of the Ionic order.

HAMPTON COURT PALACE.—During the works of renovation of the principal staircases, which we recently adverted, Honthorst's large allegorical pictures in the Queen's Great Staircase has been taken out of its frame and affixed to the wall opposite the landing. In Vanderdoort's catalogue the painting is described as "the King and Queen of Bohemia in the clouds, and the Duke of Buckingham coming to present to the King the Seven Liberal Sciences under the persons of their children." That account is corroborated by Mr. Ernest Law in his "Historical Catalogue" of the pictures in the palace; but Walpole says that the figures are of Charles I. and Queen Henrietta Maria, in the characters of Apollo and Diana, receiving the Duke of Buckingham as Mercury, who introduces the Arts and Sciences to them.

MEMORIAL OF THE LATE SIR JAMES STEEL.—A memorial of the late Sir James Steel has just been completed and erected in the Dean Park Cemetery, Edinburgh. It is the work of Mr. John S. Rhind, sculptor, whose design was selected by the trustees out of about 200 competitive designs submitted. The monument is in polished red granite and bronze. From the base an ornamental obelisk, terminating in a central obelisk with four buttresses, rises to a height of 22 ft., the final being an urn. From near the apex depend festoons of laurels in bronze. Surmounting a die in front of the main base is a bust of Sir James Steel.

AN INVISIBLE HINGE.—A sample of a hinge entitled the "Soss" hinge has been sent to us by a company trading as "Hinges, Ltd.," the special feature of which is that when the door is closed the hinge is not visible, but a close joint shows between the heel of the door and the frame all the way up. The hinge is formed by three concentric pieces of metal, the bearing portions of

which are screwed into mortises on the door and in the frame, the parts sliding over each other when the door is opened and shut. It is a neat and ingenious device, and quite practical. We see no particular objection to the hinges showing, but those who prefer to have them hidden will find this form of hinge meets the case very well.

ST. PETER-LE-PÈRE CHURCH.—On Broad-street.—The demolition of this church, of which a brief historical account lately appeared in our columns, is soon to be effected, in pursuance of an Order in Council of May last. Measures are being taken for removal of all human remains either to the City of London cemetery at Ilford, or to such other consecrated ground as relatives or friends of the deceased may desire. The church was built in 1791-2, after Jesse Gibson's designs.

CHURCH OF ST. THOMAS, CHARTERHOUSE.—Two years ago a Commission appointed by the Bishop of London reported in favour of the demolition of the church of St. Thomas, and the union of the benefice with that of St. Mary's, Charterhouse, in Playhouse-yard, Golden-lane. Under an Order in Council of May last the pulling down of the church of St. Thomas is about to be proceeded with, and all human remains will be removed from the vaults for re-interment (failing the request of those concerned for their interment elsewhere) to the City of London cemetery at Ilford. St. Thomas Church was erected on the west side of Goswell-road, near Aldersgate-street railway-station (the parish being on the opposite side), in 1842, after Blore's designs in the Anglo-Norman style, for a congregation of 500 persons; the organ, 1863, was built by Gray & Davidson. St. Mary's (Charterhouse) church was built by 700 sittings, in 1867-8, from designs, after the Italian manner, of Banks & Barry.

OFFICE KEYS AND THE CITY POLICE.—On November 1 an arrangement will come into operation, of which many hundred occupiers have already availed themselves, for the deposit of the keys of offices, warehouses, and shops in the custody of the police at Bridewell-place, Snow-hill, Moor-lane, Cloak-lane, Minories, and Bishopsgate stations. For an annual payment of one guinea the keys will be ready for use by the police in cases of leakage of water, suspected housebreaking, or burglary, and fire. Each key deposited with the police will be returned in exchange for the "tally," and in the meantime can be used only by special authority of the police and under their direct supervision.

BREAKING-UP OF STREETS.—The Islington Borough Council considered last week a letter from the London County Council asking for suggestions with regard to the proposal that they should seek powers to regulate the breaking-up of streets. The Borough Engineer and Surveyor (Mr. J. Patten Barber) submitted a report stating that in his opinion enlarged powers should be conferred upon Metropolitan Borough Councils in the direction indicated. The following are among the principal suggestions made:—

"The making of all openings in the roads, the placing of all pipes and other works under or in the surface, and the resurfacing of the roads affected by such works, should be under the control of the Borough Councils, and should be carried out in accordance with their directions and, in all respects, to their satisfaction. A Borough Council, which is about to pave or repave a road or part thereof, or to make-up or pave a new street, should have power to require, by a reasonable notice, all companies or authorities having statutory powers for opening roads to carry out all necessary works to their existing mains, etc., and to construct such new works as they may require, within a stated time. And, failing compliance with the Council's requirement, the companies or authorities should be prohibited from opening the road for the purpose of laying new works for a period of three years after the completion of the paving, repaving, or making-up, and from opening for any other purpose during the same period, except with the consent of the Borough Council. Twenty-eight days before any new main, pipe, duct, or other work is laid, fixed, or constructed, detailed plans and particulars showing the course, position, depth, and the space to be occupied by such main, pipe, duct, or other work, should be submitted to the Borough Council, together with sections and such other information as they may require for the purpose of enabling them to understand the nature of the proposed work; and the laying, fixing, or constructing of the main, pipe, or duct, or other work should not be commenced until the consent, in writing of the Borough Council has been given thereto. The Borough Council should have full power to prescribe the position and depth of all proposed mains, etc., in the roads. The covers to the valves, chambers, boxes, etc., and all works or fittings in the surface of the roads should be such as shall be approved by the Borough Council. In giving consent to the laying or fixing of any main, etc., the Borough Council shall have power to prescribe such conditions as may seem to them necessary. No deviations should be made from an approved plan without the consent of the Borough Council. Persons opening the roads should be required to keep in repair, to the satisfaction of the Borough Council, so much of the roads as may be affected by such openings for not less than twelve months after the openings have been filled in. Provisions similar to those in sects. 111, 112, 113, 114, and 115 of the Metropolitan Management Act, 1855, should be continued."

The suggestions of Mr. Barber are to be forwarded to the London County Council, and the

Spring Garden authorities are to be informed that the Islington Borough Council will support them in promoting legislation provided that the regulations made shall be subject to the approval of a majority of the local authorities concerned, and that their administration shall be entrusted to such local authorities.

A NEW COMPOSITION.—Some samples of a composition made by mixing plaster of Paris with metallic iron in a fine state of division have been sent for our inspection. The composition is the invention of Mr. Frederick Hamer, of Hayes, and according to his provisional patent specification the invention "has for object to impart to plaster of Paris power to retain its cohesive properties, to render it weatherproof, and also to prevent disintegration if placed in damp situations and subjected to the action of the weather." Further, "the plaster of Paris has a considerable degree of hardness imparted to it." It is proposed that blocks or slabs of the composition shall be used for exterior walls of buildings. Judging from the samples submitted to us, the composition certainly appears to possess a cohesive strength never attained by plaster of Paris alone; but as plaster is soluble to a very appreciable extent in water, and the iron does not render the plaster insoluble, we cannot regard the composition as suitable for outdoor use in a humid climate. For internal work the composition may be serviceable if not exposed to acid vapours. As a cement the mixture of iron and plaster may in many cases prove very useful.

PARK-LANE.—It is announced that Mr. Otto Beit has decided to dispose of No. 28, Park-lane, which was built for his brother, the late Mr. Alfred Beit. The house was erected upon the entire plot of land between Aldford (formerly Chapel) and South streets, in 1895-6, by Messrs. Trollope, after the plans and designs of Messrs. Belcourt & Turner. For the exterior Portland stone was used, the ashlar being left from the saw; the moulded work was left rough-tooled, only the inside of the mullions being rubbed and painted to accord with the decoration of the rooms; a black-toned granite from Aloa, unpolished, was adopted for the entrance. The main staircase, of oak, ascends to only the first floor; the upper floor partitions, of coke breeze concrete, were formed on scaffold-board centring with gas-barrel uprights for stiffening. The one-story annexe, being an addition to the original plan, contains the billiard-room and winter-garden; it has some intersected lunette windows, and is in three courses of tile in cement, finished with plaster, and having mouldings at the groins. The external decorative panels are by Mr. Harry Pegram, the general interior carving being by Mr. L. A. Turner. The roughly-finished iron of the wall around the grounds are noteworthy. It is said that the site of the house cost 170,000.

Capital and Labour.

CONDITION OF THE BUILDING TRADES.—Employment continued dull, and was not so good as a month ago. It was slightly better than a year ago. In London employment showed, on the whole, a decline as compared with a month ago, and a decline as compared with a year ago. Returns received from fifty-one London employers show that in the last week of September 10,359 workpeople were paid wages, as compared with 10,525 a month ago, and 12,136 in September, 1905. From trade union returns relating to carpenters and joiners it appears that the percentage of unemployed in London at the end of September was 6.6, as compared with 5.5 a month ago, and 7.1 a year ago. With plumbers the percentage for September was 9.2, for August 7.5, and for a year ago 9.9, the improvement shown last month not having been maintained. With painters and builders' labourers a considerable decline was shown. There was little change with bricklayers, but with plasterers and masons a slight improvement was shown. Returns received from sixty-nine employers' associations in towns outside London show that in these towns employment continued slack generally, and showed little change compared with a year ago. The following information, relative to the whole of the United Kingdom, is based on returns received from the general secretaries of trade unions and from the union reports:—Employment with bricklayers continued to decline; with stonemasons it improved slightly. With carpenters and joiners it continued slack, showing a slight decline on the previous month, but it was better than a year ago. The percentage unemployed of trade union carpenters and joiners was 5.9, as compared with 5.1 a month ago, and 7.1 a year ago; with plumber the percentage was 7.8, as compared with 7.5 a month ago and 8.9 a year ago. With plasterers the improvement shown last month was maintained; with slaters, painters, and with builders' labourers a slight decline was shown.—*Labour Gazette.*

Legal.

CASE UNDER THE WORKMEN'S COMPENSATION ACT.

The case of Stanland v. the North Eastern Steel Company, Ltd., came before the Court of Appeal, composed of the Lord Chancellor, the Master of the Rolls, and Lords Justices Collins, Hardy and Farwell, on the 24th inst., on an application of the respondents for an order for security for the costs of the appeal of the applicant from the award of the County Court judge of Middlesbrough, sitting as arbitrator under the provisions of the Workmen's Compensation Act, 1897.

Mr. Ellis Hill, in support of the application, said the facts were as follows: The applicant was the widow of a workman who was killed whilst in the respondent's employment, and the question in issue in the arbitration was whether or not the widow was dependent on her husband at the time of his death, they having lived apart, and the woman receiving no money from her husband at the time of the accident. The affidavit in support of the application stated that the applicant had failed in her previous unsuccessful attempts to obtain an order for security for the costs of the appeal if the arbitration was unsuccessful, and that she had not paid their costs in the court below.

Mr. Hamilton, on behalf of the applicant, admitted that it was a case in which an order for security should be made, and said that if the other side had applied to them before serving the present notice of motion, an order for security in the sum of 10*l.* would have been given. In the circumstances the present application would not have been necessary.

The Lord Chancellor said it was obviously a case in which security for costs should be given, and the Court ordered applicant to give security in the sum of 10*l.* He thought, however, that in these cases when poor people were appealing, no notice of motion for an order for security of costs should be given before a request for security had been made and refused. In the circumstances, if Mrs. Stanland succeeded in her appeal, she would get the costs of the present application, and if she failed on the appeal she would not have to pay the costs of the application.

Order accordingly.

THE STRAND BUILDING DISPUTE.

In the Chancery Division, on the 24th inst., the case of *Draper v. Lorden* was mentioned to Mr. Justice Warrington on a motion on behalf of the plaintiff to attach the defendant for alleged breach of an undertaking which he gave to Mr. Justice Buckley (now Lord Justice Buckley) on August 10 last to the effect that he would not diminish the support enjoyed by certain premises in the Strand and belonging to the plaintiff save as required by proceedings under the London Building Act.

Counsel of both parties stating that their evidence was not yet complete, it was arranged that the motion should be tried by his lordship on Friday, November 2 next.

Patents of the Week.

APPLICATIONS PUBLISHED*.

1,245 of 1906.—F. J. KOBUSCH: *Heat Radiators for Use in Connection with Stoves for Heating Buildings.*

This relates to a heat radiator for use in connection with stoves for heating buildings, and consists of a heating drum comprising an outer cylindrical casing, uprights constructed of metal bars bent in such a manner as to form supports, conical deflectors carried by the upper and lower supports, a substantially conical ring carried by the intermediate support, and means for attaching said deflectors to said supports.

1,687 of 1906.—W. ELLIOTT and J. B. ELLIOTT: *Domestic Fireplaces and the Like.*

This relates to a domestic fireplace, the back being formed with a convex protuberance on its upper face, receding to a sloping concavity on its lower face constituting the bottom of the fire chamber, which is completed by an abutting upturned curved grating.

2,256 of 1906.—W. FIRMIN: *Ball or Float Cocks or Valves.*

This relates to a ball or float cock or valve wherein the motion of the float lever is transmitted to the valve through the medium of an intermediate lever or levers, and consists in the provision of an adjustable coupling or contact

* All these applications are in the stage in which opposition to the grant of Patents upon them can be made.

PATENTS.—Continued on page 496.

List of Competitions, Contracts, etc.

For some Contracts still open, but not included in this List, see previous issues. Those with an asterisk (*) are advertised in this Number: Competitions, iv.; Contracts, iv. vi. viii. x.; Public Appointments, xviii.; Auction Sales, xxx. Certain conditions, beyond those given in the following information, are imposed in some cases, such as: the advertisers do not bind themselves to accept the lowest or any tender; that a fair wages clause shall be observed; that no allowance will be made for tenders; and that deposits are returned on receipt of a bonâ-fide tender unless stated to the contrary.

Competitions.

DECEMBER 12.—Glasgow.—LAYING-OUT ESTATE.—Glasgow Corporation invite from architects and others competitive designs for laying-out the estate at Liddie belonging to them, situated on the west side of Camburnhill-road, by the erection thereon of small self-contained houses. Premiums of 75*l.*, 50*l.*, and 25*l.* respectively will be awarded to the first, second, and third of the designs adjudged first, second, and third in order of merit. A ground plan showing the situation and boundaries of the estate, along with a copy of the terms and conditions of the competition, may be obtained on application to Mr. A. W. Myles, Town Clerk, City Chambers, Glasgow, and competitors must lodge their designs with him not later than 10 o'clock on October 30.

FEBRUARY 1.—Sunderland.—CHILDREN'S HOSPITAL.—The Sunderland Infirmary invite designs for a children's hospital at The Barnes, Sunderland. Premiums of 100*l.*, 50*l.*, and 25*l.* are offered to the first, second, and third of the designs adjudged first, second, and third in order of merit. Plans may be obtained from Mr. T. Robinson, Secretary, Infirmary Offices, Bank-buildings, Sunderland, and must be delivered at the offices of the Secretary before noon on February 1, 1907.

NO DATE.—Ash-ton-in-Makerfield.—BATHS.—The U.D.C. of Ashton-in-Makerfield are prepared to consider competitive plans, report, and estimate of cost from architects within the Wigan and Leigh Poor Law Union for the erection of public baths within their district. Plan of the site, showing levels, together with a copy of the conditions and instructions to competing architects, may be obtained from Mr. Albert Sykes, Clerk to the Council, at the Council Offices, Bryn-street, Ash-ton-in-Makerfield.

NO DATE.—Sheffield.—ALTERATIONS TO UNION OFFICES.—The Guardians invite competitive plans from Sheffield architects for alterations to the Union and Vestry Offices in Westbar, Sheffield, in order to extend and improve the accommodation. The conditions of the competition have been prepared by Mr. Edward Holmes, 38, Church-street, who has been appointed as assessor. Premiums of 25*l.*, 15*l.*, and 10*l.* will be awarded to the first, second, and third of the plans placed first, second, and third in order of merit, in accordance with the "Conditions of the Competition," copies of which, together with the "Schedule of Requirements" and lithographed copies of the plans, may be obtained on application to Mr. Albert Edwd. Booker, Clerk to the Guardians, Union Offices, Westbar, Sheffield.

Contracts.

BUILDING.

OCTOBER 27.—Ashington, New Hirst.—SCHOOL.—Northumberland Education Committee invites tenders for the work of erecting a new Council School to accommodate 60 scholars, together with caretaker's dwelling house and cookery centre at Ashington, New Hirst. Particulars of their name and address to Mr. C. Williams, Buildings, Newcastle-on-Tyne, not later than October 27, together with a deposit of 2*l.* 2*s.* Plans of the work may be inspected at the Committee's offices, and tenders endorsed "Tender for New Hirst Council School" must be forwarded to the Secretary not later than 4 p.m. on November 12.

OCTOBER 29.—Gorseinon.—VILLAS.—For erecting eight semi-detached villas at Gorseinon for Dr. Trafford Mitchell and others. Plans and specifications may be seen at offices of Williams & Henton, architects and surveyors, Bank Chambers, Heathfield-street, Swansea. Endorsed tenders to be sent to architects not later than October 27.

OCTOBER 29.—Elgin.—ALTERATIONS TO PREMISES.—The mason, carpenter, plumber, plaster, painter, and iron works of shop front and alterations at 35 and 35, High-street. The plans and specifications may be seen with Mr. John Witter, architect, Elgin, with whom estimates must be lodged on October 29.

OCTOBER 29.—Kells.—ADDITIONS TO PARISH CHURCH.—Erection of additions to the Parish Church of Kells, Co. Meath, for the Very Rev. Dr. Dooley, P.P., V.F. Plans and specification can be seen at the offices of the architects, Messrs. Hague & McNamara, 59, Dawson-street, Dublin, and at the latter on October 29, and addressed to the Very Rev. Dr. Dooley, P.P., V.F., Kells.

OCTOBER 29.—Poole.—ALTERATIONS TO BRANKSOME ISOLATION HOSPITAL, BINGHAM ROAD.—(1) Addition of bath-room and coal house to the Branksome Isolation Hospital, Bingham Road. (2) providing and fitting to Oakdale School, (3) providing of urinals to Branksome Heath Infants' School. Particulars may be obtained on application to Mr. Newman, Borough Surveyor, Mr. Samms, Engineer, 1, King-street, Poole. Tenders to be delivered at the Borough Surveyor's Office before 9.30 a.m. on October 29.

OCTOBER 29.—Poole.—COTTAGE.—The mason, carpenter, plumber, plaster, painter, and painter works of a cottage to be erected at Poole. The plans and specifications may be seen with Mr. John Witter, architect, Elgin, with whom estimates must be lodged on October 29.

OCTOBER 30.—Belfast.—SCHOOL.—Building of school in connexion with St. Clement's Church, Castlereagh-street, Belfast. Plans, with specification, may be seen between the hours of 10 and 5 o'clock, at the office of Messrs. C. W. Ashe & Son, civil engineers and architects, 7, Waring-street, with whom tenders are to be lodged on or before October 30, endorsed "Tender for School."

OCTOBER 30.—Dalton.—RESIDENCE.—The bricklayers' and masons', joiners', plumbers', and painters' work required in the erection of proposed detached house, off Wakefield-road, Dalton. Plans may be seen from October 23 to 30. Mr. E. W. Lockwood, architect, 37, Byram-arcade, Station-street.

OCTOBER 30.—Newcastle.—Cross and North Brancepeth.—SCHOOL BUILDINGS.—Durham County Education Authority invite sole tenders for the erection of a new school at Neville's Cross, and a cookery centre at North Brancepeth. Sealed and endorsed tenders must be delivered to Mr. W. Rushworth, F.R.I.B.A., Architect, County Education Offices, Durham, not later than October 30.

OCTOBER 30.—Pontrhyall.—CHAPEL.—A new chapel adjoining Pontrhyall Station for the Llanrug M.C. Chapel Committee. Plans and specification to be sent at the secretary's address, Mr. O. Roberts, Eryri-tre, Llanrug, to whom sealed and endorsed tenders are to be sent on or before October 30.—Mr. Ellis F. Whitaker, architect and surveyor, 27, Abchurch-lane, Carnarvon.

OCTOBER 30.—Sennen.—SCHOOLROOM.—The erection of a new schoolroom at Sennen Bible Christian Chapel. Plans, etc., may be seen on application to Mr. J. C. Thomas, Tregiffan, Sennen, R.S.O., to whom tenders must be sent not later than October 30.

OCTOBER 31.—Aldershot.—SOLDIERS' INSTITUTE.—The erection of the first portion of Catholic Soldiers' Institute, South Camp, Aldershot. Plans and specification may be seen, and bills of quantities obtained, from Mr. W. Bevan, F.R.I.B.A., architect, 90, Parliament-chambers, Great Smith-street, Westminster, London, S.W., on payment of 1*l.* Tenders to be delivered by noon, October 31.

OCTOBER 31.—Armsley.—WORKHOUSE BLOCK.—The Bramley Board of Guardians invite tenders for the erection of new block at the Workhouse, No. 3, Armsley-road, Armsley. Drawings and specifications may be inspected, and form of tender and bills of quantities obtained, at the offices of the Architect, Mr. C. H. Redk, Wilkinson, 35, Park-square, Leeds, on deposit of 1*l.* s. Tenders must be endorsed "Erection of New Block at the Workhouse," and addressed to Mr. A. Gaunt, Clerk, Union Committee, 1, Green Hill-road, Armsley, and must be delivered before 12 o'clock at noon on October 31.

OCTOBER 31.—Belfast.—ALTERATIONS TO BATHS.—Belfast Baths and Lodging-House Committee invite tenders for alterations to Peter's Hill Baths. Drawings and specification may be seen, and form of tender obtained, in City Surveyor's Office. Sealed tenders, endorsed "Alterations to Peter's Hill Baths," to be lodged in office of Sir Samuel Black, Town Clerk, before 10 o'clock a.m. on October 31.

OCTOBER 31.—Cardiff.—LAUNDRY.—White Heather Laundry (Cardiff), Limited, invite tenders for the erection of a new laundry building, situated on the corner of Penarth-street and Mardy-street (off Clare-road), Cardiff. Plans and specification may be seen at the offices of the architects, Messrs. James & Morgan, F.R.I.B.A., architects, Charles-street-chambers, Cardiff, and bills of quantities obtained, on payment of a deposit of 2*l.* 2*s.* Tenders, sealed and endorsed "New Laundry," to be sent to H. S. Metcalf, Esq. (secretary to the company), Salisbury Chambers, Castle-street, Cardiff, on or before October 31.

OCTOBER 31.—Woolwich.—DINING-HALL.—The Guardians of the Woolwich Union invite tenders for a new women's dining-hall at the Union House, High-near, Plumstead. The plans and specifications can be inspected at the office of the Board's Architect, Mr. J. O. Cook, 14, Eleanor-road, Woolwich, where copies of the quantities can be obtained on the payment of 1*l.* 1*s.* deposit. Tenders must be sent to Mr. Tom Cutler, Clerk to the Guardians, not later than 4 p.m. on October 31, at No. 30, Rectory-place, Woolwich.

NOVEMBER 1.—East Hulton.—SHEP.—East Hulton Council School Managers invite tenders for the erection of a coal and ash-shed. Specification may be seen on application to Mr. Francis Cavill, Correspondent to Managers, to whom tenders must be sent not later than November 1.

NOVEMBER 1.—Kendal.—ALTERATIONS TO BREWERY.—Alterations and alterations to the Collin Croft Brewery, Kendal, for the Collin Croft Brewery Company, Limited. Plans and specifications can be seen, and further particulars obtained at place of sale, on application to Mr. John Stalker, architect, Kendal, and tenders (under cover) to be sent to architect not later than November 1.

NOVEMBER 1.—Portland.—CLOCK TOWER.—The Easton-square Clock Committee invite tenders for the erection of a clock tower in Portland town. Plans may be seen, and bills of quantities and forms of tender obtained, at the office of Mr. R. R. Stevens, Engineer, Henshaw, and on payment of a deposit of 1*l.* 1*s.* Sealed tenders, on the forms supplied, endorsed "Clock Tower," must be delivered at offices of Engineer not later than 12 noon on November 1.

NOVEMBER 1.—Surbiton.—WALL AND FENCE.—The U.D.C. of Surbiton invite tenders for:—(1) Erecting a dwarf boundary wall, about 80 ft. in length, in front of the Electricity Station, Ewell-road, Surbiton, (2) providing and erecting 8 ft. oak pale fence and gates, about 500 ft. in length, on the east and north sides of the Electricity Station, Ewell-road, Surbiton. Plans and specifications of the works can be seen on application to the Council's Surveyor. Tenders, made out on the forms supplied, enclosed in sealed envelopes, endorsed "Tender for wall (or fence), Electricity Station," as the case may be, must be delivered at office of Mr. F. J. Bell, Deputy Clerk to the Council, District Council Offices, Surbiton, at or before noon on November 1.

NOVEMBER 2.—Crosby.—VILLAS.—For the erection and completion of six villas in Frodingham-road, Crosby. Plans and specifications may be seen, and tender sent to office of Mr. W. R. Lockwood, architect, Chapel-street, Southport, not later than November 2, at 12 noon.

NOVEMBER 2.—Hemby.—HOUSES.—The erection of two pairs of semi-detached houses at Hemby. Plans and specification can be seen on application to Mr. A. F. Scott, architect and surveyor, 24, Castle Meadow, Norwich. Tenders to be delivered not later than November 2.

NOVEMBER 2.—Leasingthorne.—REBUILDING INN.—Rebuilding the Shamrock Inn, Leasingthorne, for Messrs. A. B. Breweries, Ltd. Plans, specifications, etc., may be seen at the Shamrock Inn. Tenders to be sent in to the architect, Mr. T. H. Murray, Consett, on or before November 2.

NOVEMBER 2.—Wallsend.—MUNICIPAL BUILDINGS.—Wallsend Corporation invite tenders for the erection of municipal buildings. Plans and specifications and conditions can be seen at the offices of architects, Messrs. Liddle & Browne, Prudential Buildings, Mosley-street, Newcastle-upon-Tyne, the sum of 3*l.* 3*s.* Sealed tenders, endorsed "Tender for Municipal Buildings," are to be delivered to Mr. W. V. Mulcaster, Town Clerk of Wallsend, 23, Sandhill, Newcastle-upon-Tyne, not later than noon on November 2.

NOVEMBER 2.—Wharfedale.—BOARD-ROOM, OFFICES, ETC.—For the erection of new board-room, offices, etc., for the Wharfedale Union. Quantities can be obtained, and the plans seen, at the office of the Architects, Messrs. Fairbank, Wall 3, Manor-squares, Otley, from October 25, to November 2, which latter date sealed and endorsed tenders are to be delivered before 10 a.m. to Mr. Edgar, at the stand, Clerk to the Guardians, Union Offices, Boroughgate, Otley.

NOVEMBER 3.—Clonmel.—ADDITIONS TO CHURCH.—The erection of new clerical vestry, sacristy, and sacristy to St. Peter and Paul's Church, Clonmel, for the Very Rev. Canon Flavin, P.P., according to the designs, etc., prepared by Messrs. Ashlin & Co., architects, 7, Dawson-street, Dublin. Bills of quantities have been prepared for the work by Mr. D. W. Morris, surveyor, 66, Harcourt-street, Dublin, and can be obtained from Mr. W. J. Williams, can be seen at the architect's offices and at the Presbytery, Clonmel. Sealed tenders, addressed to the architects, to be delivered not later than 12 o'clock on November 3.

NOVEMBER 5.—Elstead.—SANITARY OUTBUILDINGS.—The managers of the Elstead Schools invite tenders for the erection of sanitary outbuildings at Elstead, near Godalming. Plans and specification may be seen, and quantities obtained, at the office of Messrs. F. A. and A. W. Mellers, surveyors, Godalming, where tenders are to be delivered on or before November 5, endorsed "Tender, Elstead School."

NOVEMBER 5.—Rippenhorne.—HOUSES.—The mason's, joiners', plasterers', roof tilers', and plumbers' work required in the erection of a detached house at Rippenhorne. Plans and specifications may be seen, and bills of quantities obtained, at offices of Messrs. Joseph F. Walsh & Co., architects, Museum Chambers, Halifax, and at Harrogate, from October 29 to November 5.

NOVEMBER 5.—Kirkcaldy.—SCHOOL.—For the mason, joiner, plumber, glazier, plaster, glazier, and painter works of enlargement to Ballynally School. Plans may be seen, and specifications and schedules of quantities obtained, at the office of Mr. W. J. Breckell, architect and surveyor, 200, High-street, Kirkcaldy, on payment of 1*l.* 1*s.* Estimates to be forwarded to John Henderson, Esq., Clerk to the Board, Ballynally, marked outside "Tender, etc., Ballynally School," not later than November 5, at 12 noon.

NOVEMBER 5.—Wimbleton.—SHELTERS, ETC.—Wimbleton Education Committee invite tenders for the carrying out of the following works, viz.:—(1) Erection of two shelters in the playgrounds at Special School, and alterations of playgrounds at the Queen's-road School; (2) painting of railings round the Dundonald-road School; and (3) painting of external wood and ironwork of the old playground at, and specifications and form of tender obtained from the Education Office, 12, Queen's-road, Wimbleton. Tenders must be delivered to Mr. A. Steele Sheldon, Clerk, 12, Queen's-road, Wimbleton, by or before 12 o'clock noon on November 5.

NOVEMBER 6.—Aldershot.—LAUNDRY BLOCK.—For the erection of a laundry block, and also an observation wing, at the Isolation Hospital, North Town. Plans, specifications, and full particulars may be seen on application at the surveyor's

OCTOBER 29.—**Belfast.**—**SLATING.**—Great Northern Railway Company (Ireland) Directors invite tenders for slating the roof of the extension of their

or thereabouts of an 18-in. cast-iron pipe and 27 lineal yds. or thereabouts of an 18-in. earthenware pipe (this to include all necessary manholes, etc.). Full particulars, drawings, and specification

together with bills of quantities and forms of tender, may be seen at the office of the Surveyor, on personal application to Mr. J. R. Macmillan, Council Buildings, Shiremoor, between the hours of 9 and 10 a.m. and 4 and 5 p.m., on payment of a deposit of 3s. Sealed tenders, endorsed "Tender for Outfall Sewer," must be delivered to Mr. Alfred Dale, Clerk to the Council, 85-6, Howard street, North Shields, not later than November 3.

NOVEMBER 8.—Monaghan.—COVERING SEWERAGE TANKS.—The Joint Committee of Monaghan Asylum will, at their meeting on November 9, consider tenders for covering of sewerage purification tanks, in accordance with plan and specification, which may be seen at the Board-room of the Asylum between the hours of 10 a.m. and 5 o'clock p.m. Tenders to state the names of two solvent securities. Tenders to be forwarded by registered post. Mr. R. L. Donaldson, acting R.M.S.

NOVEMBER 9.—Donaghadee.—SINKING WELL.—The U.D.C. of Donaghadee, Co. Down, Ireland, invite tenders for the sinking of a deep borehole and for an alternative scheme of sinking a deep well in connexion with the proposed new water supply for the town. Stipulations, specifications, form of tenders, and schedule, and further particulars, may be obtained at the offices of the Engineer, Mr. Henry J. Weaver, C.E., F.G.S., Lipton Chambers, Gloucester, on deposit of 1s. Sealed tenders, endorsed "Waterworks," to be delivered to Mr. P. Walker, Town Clerk, Donaghadee, not later than 4 o'clock p.m. on November 9.

NOVEMBER 9.—Uddingston.—DRAINAGE.—The District Committee of the Middle Ward of Uddingston of Lanark invite tenders for the construction of an outfall sewer about one mile in length, from the junction of the Myres Burn with the Powburn to Powburn Tait. Plans may be seen, and copies of the specification and schedule of measurement obtained, at the office of Mr. W. L. Douglass, C.E., District Engineer, District Office, Hamilton, on payment of 1s. Sealed tenders, endorsed on outside "Tender for Outfall Sewer," must be lodged with the Clerk to the Sub-Committee, Mr. James Cornack, Bank of Scotland, Uddingston, not later than 10 a.m. on November 9.

NOVEMBER 14.—Grangetown.—PAVING.—Eaton U.D.C. invite tenders for the paving of Back Alexandra-road, Grangetown. Form of tender can be obtained, and specifications seen, at the Council's Office, Grangetown, S.O., Yorks. Sealed tenders, to be endorsed "Tender for Back Street, Alexandra Road," to be delivered not later than November 14.

NOVEMBER 21.—Chiswick.—MAKING-UP ROADS.—The Chiswick U.D.C. invite tenders for making-up Abinger-road, Addison-road, Blenheim-road, Beverley-road, Geraldine-road, and Stile Hall gardens. Forms of tender, etc., may be obtained and inspected on application to the Council's Surveyor, Town Hall, Chiswick, between 9 a.m. and 1 p.m., after October 26. Sealed tenders, endorsed "Tender for Making-up Private Streets," to be delivered, with schedule of prices, to the Clerk to the Council, not later than 5 p.m. November 21.

NOVEMBER 27.—Jassy, Roumania.—WATER SUPPLY.—The Municipal Council of Jassy invite tenders for the water supply and sewerage of the town of Jassy. All such tenders to be in the Roumanian language, sealed, and to reach the Town Hall by November 27, at 6 p.m. Plans and specifications may be seen, and all further information obtained, at the Chief Engineer's Office, Town Hall, Jassy. Mr. George Lascar, Mayor; Mr. A. S. Savat, Chief Engineer.

DECEMBER 1.—Horne Bay.—SEWERAGE WORKS.—The U.D.C. of Horne Bay invite tenders for the construction of about 34 miles of brick and concrete and pipe sewers with all the necessary manholes, ventilators, and flushing arrangements, the construction of a pumping station, cottage, and buildings, and the provision of pumping machinery. Plans and specification of the works may be seen, and the form of tender obtained, at the office of Mr. Baldwin Latham, M.Inst. C.E., Parliament Mansions, Victoria-street, Westminster, or at the office of Mr. F. W. Palmer, the Surveyor to the

Council, at his office at Horne Bay. The quantities of the several works have been taken out by Mr. C. E. Bruges, A.M.Inst.C.E., 1, Victoria-street, Westminster, and may be had on application, either to the Engineer or Surveyor, on deposit of 10s. Sealed tenders on the form supplied attached to the quantities, endorsed "Tender for Sewerage Works," are to be delivered at the office of Mr. Joseph Jubb, Clerk to the U.D.C. at Horne Bay, on or before noon of December 19.

STONE, MATERIALS, AND STORES.

OCTOBER 29.—Bollington.—ROAD MATERIALS.—Bollington U.D.C. invite tenders for kerb, flag, and sets, required in the repairing of Grimshaw-lane, Bollington. Specification and form of tender may be obtained from Mr. Samuel Knight, Clerk, Council Offices, Bollington. Tenders to be forwarded so as to reach the Clerk, not later than 5 p.m. on October 29, endorsed "Road Materials."

OCTOBER 29.—Croydon.—GUERNSEY GRANITE.—Croydon Guardians invite tenders for the supply of 500 tons of unbroken Guernsey granite, to be delivered by or before December 1, at Thornton Heath Railway Station (L.B. and S.C. Ry.), carriage paid. Tenders to be delivered to Mr. Harry List, Clerk to the Guardians, Union Offices, Mayday-road, Thornton Heath, Surrey, endorsed outside "Tender for Granite," not later than October 29.

OCTOBER 30.—Farnham.—GRANITE.—Farnham U.D.C. invite tenders for the supply and delivery, in 60-ton lots, at Farnham Railway Station, of about 800 tons of Quenest granite, broken to pass a ring of 14 in. internal diameter. Tenders to be on forms to be provided by the Council, which forms may be had on application to the Council's Surveyor, Mr. R. W. Cass, Council Offices, South-street, Farnham, on or before 4 o'clock p.m. on October 30. The Council are also prepared to consider, under the conditions as to tendering, tenders for the supply and delivery of Guernsey granite.

OCTOBER 30.—Hertford.—STORES.—Hertford Corporation invite tenders for the supply of oil, waste, water fittings, brooms, shovels, mop scoops, gully grates, manhole tops, etc., for a period of six months from December 1, 1906, to May 31, 1907. Form of tender and other particulars may be obtained at the Borough Surveyor's Office. Tenders, endorsed "Tenders for..." to be delivered at office of Mr. T. J. Sworder, Town Clerk, Hertford, on or before October 30.

OCTOBER 30.—London.—TOOLS, STORES, ETC.—Bombay, Baroda, and Central India Railway Directors invite, up to noon on October 30, tenders for the supply of the following stores, viz.: Miscellaneous tools and stores, and wood screws. Tenders must be made on forms, copies of which with specifications can be obtained at offices of Mr. V. Constable, Secretary, Gloucester House, 2, 3, and 4, Bishopsgate-street Without, London, E.C., on payment of 1s. each.

OCTOBER 31.—Carshalton.—FLINTS, ETC.—Carshalton U.D.C. invite tenders for the supply of 400 cubic yds. of hand-picked sandy land flints (2) for 100 cubic yds. of small sand for sanding roads, to be delivered at such points within the district as may be required before March 31, 1907. Full particulars in each case may be obtained on application to the Council's Surveyor, Mr. W. Willis Gale, A.M.Inst.C.E., at office of Council, High-street, Carshalton. Sealed tenders, addressed to the chairman, and endorsed "Tenders for..." should be delivered at office of Council not later than 12 noon on October 31.

NOVEMBER.—Glasgow.—STORES.—The Directors of the Caledonian Railway Company invite tenders for the supply of the undermentioned stores, for twelve months, commencing January 1, 1907:—(1) Barrows, (2) bolts and nuts; (5) bricks, flag, and chimney cans; (7) brooms, brushes, etc.; (11) carriage furnishings; (13) carriage trimmings, etc.; (17) colours and paints; (18) copper rivets, etc.; (20) crucibles; (21)

drysalteries; (24) gas and water fittings; (24a) galvanised iron pipes and fittings; (25) glass; (27) hammer shafts, etc.; (28) hardware; (29a) asbestos and gutta-percha goods, balata belting, and packings (various); (32) iron chain; (33) iron rivets; (34) galvanised wire (wire ropes and wire fencing requisites); (37) lamp furnishings and incandescent lamps and fittings; (40) locks; (41) nails, sprigs, and tacks; (42) oils and greases; (48) ropes, cordage, and twines; (49) screws; (50) shovels, spades, and graps; (51) joint pins, set screws, and split taper pins; (52) spelter, tin, and lead; (53) transfers; (59) galvanised iron pipes and fittings; (60) electric lighting material and fittings; (60a) tools; (72) office furniture and wall-paper; (73) cement, lime, and slates; (74) moulder's blackings, etc.; (75) enamelled name plates; (76) lorry fittings. Specifications and forms of tender, and any other necessary information, may be obtained from Mr. John Ferguson, Stores Superintendent, Caledonian Railway, Charles-street, St. Rollox, Glasgow. Patterns can be inspected from October 22 till November 2, from 9 a.m. till 5 p.m., at the Company's Stores, Charles-street, St. Rollox (Saturday, 9 a.m. till 1 p.m.), and all tenders must be to the Company's samples and patterns. Tenders, endorsed "Tender for Stores," to be lodged with the Secretary, Buchanan-street, Glasgow, not later than November 6.

NOVEMBER 6.—Aldershot.—CEMENT.—The supply of Portland cement for the year ending December 31, 1907. Specifications and full particulars may be seen at the Surveyor's Offices. Tenders, endorsed "Cement," to be sent to Mr. W. E. Foster, Clerk, Clerk's Office, Municipal Buildings, Aldershot, on or before November 6.

NOVEMBER 19.—Dublin.—STORES.—The Directors of the Midland Great Western Railway of Ireland Company, invite tenders for the supply of the undermentioned stores, under contract to commence on January 1 next, and terminate on December 31, 1907:—(1) Barrows and trucks; (2) baskets; (3) bolts, rivets, and rail fastenings; (4) brass and copper tubes, plates, shafts, etc.; (5) brass cocks and gas fittings; (6) bricks, flags, tiles, etc.; (7) brushes; (11) cements; (13) copper, tin (Ingolds), lead, gun-barrel, etc.; (15) glass; (17) iron castings; (18) ditto Staffordshire bars, plates, wire, etc.; (19) ditto Yorkshire ditto; (20) ironmongery; (21) lamps and fittings; (23) lime; (24) oils and tallow; (25) ropes, canvas, etc.; (26) springs, steel, and filers; (27) steel, axes, files, and plates; (28) timber, etc.; (29) tools; (30) tool handles; (31) varnish, paints, oil, etc.; (32) waste and wicking. Forms of tender can be obtained on payment of 6d. each, from the Stores-keeper, General Stores Department, Broadstone Station, Dublin. Patterns and samples can be inspected at the same place on and after November 1, between the hours of 10 a.m. and 4 p.m., except Saturdays. The tenders to be sent in by post, sealed, and endorsed on the envelope "Tenders for Stores," and addressed to "The Chairman, Broadstone Station, Dublin," so as to reach him on or before 10 a.m. on November 19.

NOVEMBER 26.—London.—SUPPLY OF STORES.—The London General Omnibus Company invite tenders for the supply during 1907 of the following stores, viz.: Timber, ironmongery, oil, glass, etc., coach trimmings, leather and machine belting, brushes and brooms, building materials, gas and water fittings, enamelled iron plates, motor accessories and spare parts. The schedules will be ready November 12, and may be obtained at the Company's Coach Factory, North-road, Caledonian-road, N., on payment of 2s. 6d. each, where samples also will be on view November 14, 15, and 16, between 10 a.m. and 5 p.m. Tenders, endorsed "Tender for Stores," should be addressed to "The Directors," 6, Finsbury-square, E.C. before noon, November 25.

NO DATE.—Taunton.—FLINTS.—Taunton T.C. invite tenders for the supply of best hand-picked flints for the various drains within the borough. Particulars and form of tender can be obtained on application at the office of Mr. David Edwards, Borough Surveyor, Municipal Buildings, Taunton.

Public Appointment.

Nature of Appointment.	By whom Advertised.	Salary.	Applications to be in
*CLERK OF WORKS	Essex Co. Lunatic Asylum	4l. 4s. per week	Nov. 1

Auction Sales.

Nature and Place of Sale.	By whom Offered.	Date of Sale.
*BRICKMAKING PLANT, MACHINERY, BUILDINGS, ETC., RAMSGATE—On the Premises	J. T. Skelding	Nov. 7
*ANCASTER HOUSE ESTATE—At the Mart	Chancellor & Sons	Oct. 30
*DEALS, BATTENS, ETC.—Great Hall, Winchester House, Old Broad-street, E.C.	Charles Spurrell & Son	Oct. 31
*FREEHOLD BUILDING LAND, NEW SOUTHGATE—Railway Hotel, New Southgate	Charles Spurrell & Son	Nov. 12
*BUILDERS' PLANT AND MACHINERY, CHATHAM—Near New Naval Barracks, Chatham	Fuller, Horsey, Sons, & Cassell	Nov. 13
*ANDERSON'S PATENT DIAMOND SAW—Near New Naval Barracks, Chatham	Fuller, Horsey, Sons, & Cassell	do.
*FREEHOLD RESIDENCE, THAMES DITTON—At the Mart	Fuller, Horsey, Sons, & Cassell	do.
*FREEHOLD BUILDING ESTATE, CATERHAM—Greyhound Hotel, Croydon	Chesterland & Sons	Nov. 15
*TIMBER, MAHOGANY, ETC., 12, MOUNT PLEASANT, GRAY'S INN—On the Premises	Fuller, Horsey, Sons, & Cassell	Nov. 20, etc.
*FREEHOLD BUILDING ESTATE, PLAISTOW—At the Mart	Weatherall & Green	Nov. 22

PATENTS.—Continued from page 492.

between the float lever and the valve lever whereby the position at which the float closes the valve is regulated.

9,782 of 1906.—A. JACUBSON and E. A. SVENSSON: Safety Locks.

This consists of a safety lock wherein longitudinal bars or levers are fulcrumed on the outer periphery of a central sleeve, and engage at their ends in radial notches formed in the fixed lock casing, said bars or levers being disengaged from

the notches by means of balls loosely inserted in holes in the wall of the sleeve and co-operating with the key.

9,841 of 1906.—E. H. McCLOUD: Fire-Resisting Shutters or Screens.

This relates to a fire-resisting shutter and consists of a channel comprising an angle bar to be secured by one flange at its upper end to the wall, and provided with slotted holes for the passage of fastening devices below the point where it is to be secured, and to other angle bars each

having their flanges lapped together and placed upon the other flange of the first-mentioned bar to form the channel, the intermediate of the said three flanges being slotted and fastening devices being secured to and passing through the slots of the intermediate flange.

10,187 of 1906.—J. HEMMERLING: Filter Presses. This relates to a press for peat and other moist material in which the material filling the press is divided by hollow intermediate partitions, and the liquid from the material is forced through fine

penings therein into their interior, and is characterised by the provision of partitions provided with hollow chambers and fine passages forming communication between them and the recess chambers, and so arranged that when the mass is working up by air but not the liquid used in, can escape from the hollow chambers, whilst the air-pressure in the said chambers prevents the liquid passing into them from carrying with it fine particles of peat or the like.

3,232 of 1906.—J. T. SOUTH, J. PAYNE, and E. G. PAYNE: Cement.

This relates to a cement composed of chalk, reeze, Portland cement, sand, alio-carbon, bitum sulphate or other suitable alkaline, salt, lime, sulphate and alum. In manufacturing the cement these ingredients in a pulverised or powdered condition are mixed in a wash-mill bin with sufficient water to form a milk-like slush, which is well agitated so as to effect the intimate mixture of the ingredients, after which the latter in suspension is allowed to settle. The supernatant liquid is then decanted, and the sediment is removed from the receptacle and is mixed with the coke and breeze or coal ashes in a pulverised or powdered condition, and said mixture is spread out to dry or is dried artificially in any suitable manner. When dry the residue is well mixed with the Portland cement and sand, whereupon the cement is ready for use.

7,047 of 1906.—THE LEEDS FIRECLAY COMPANY, LTD., and H. W. SCHWABEN: Bricks or Building Blocks.

This relates in the combination with a brick or building block having a circular convexity at one end, of another brick or building block having a corresponding concavity at one end, with the centres of the convexity and concavity in corresponding positions.

6,405 of 1906.—A. WINDECKERT: Sash Bar for Glass Roofs.

This relates to a sash bar for glass roofs, said sash bar consisting of sheet metal having the cross-section of an upright U, and provided with two inclined ribs, one at each side, glass plates lying upon the horizontal top ribs, bolts extending from above the glass plates into the room between the inner vertical ribs, a wedge-shaped piece fastened to the lower end of each bolt and a strap of sheet metal inserted between the bolt heads and the top surface of the glass plates.

1,609 of 1906.—A. J. BOULT (H. A. GODDARD): Mode of Building in Concrete and Apparatus therefor.

This relates to an apparatus for constructing a hollow wall of concrete, and consists of an internal and an external panel maintained in position parallel to one another, in combination with perforations in the panels through which a wooden or other plug may be introduced so that the concrete may be cast about the plug, the plug thus forming a cone adapted to be withdrawn when the concrete is sufficiently set. The hole thus formed is then plugged with a permanent plug of wood sufficiently long to extend from the external face of one shell of the wall to the internal face of the other shell of the wall, and upon this plug piston rods or other fixtures may be fastened.

6,415 of 1906.—H. W. LAKE (A. GAY): Walls and Bricks or Blocks therefor.

This relates to the construction of moulded brick structures having double walls, comprising blocks for or at the angles of the wall, which blocks are hollow at their middle and prolonged on one side by two parallel branches having a space between them connected by a metal cross-piece for reinforcing the whole.

17,436 of 1906.—R. MALANCOU: Sectional Fire-Resisting or other Partition Slabs, Bricks, and the like.

This relates to a fire-resisting or other slab, brick, or the like, for making sectional walls, partitions, and the like, comprising a number of screw-threaded holes at right-angles to one vertical edge of the slab, which holes are connected together interiorly of the slab by a transverse hole extending from top to bottom of the slab, and a second set of holes at the opposite edge of the slab in number and position corresponding with the first set of holes, so that the holes of adjacent slabs will then face one another, and may be filled with grouting which is poured in through the transverse hole.

SOME RECENT SALES OF PROPERTY.

ESTATE EXCHANGE REPORT.

October 11.—By WALTON & LEE (at Newark). Winthorpe, Notts.—The Winthorpe Hall Estate, 255 acres, f. (in numerous lots) £13,225

By MADISON, MILES, & MADISON (at Yarmouth). Yarmouth, Norfolk.—40, Middlegate-st. (s.), l. p. 400

By DRIVER, JONAS, & CO. (at Bulth Well). Nantwich, Cheshire.—The Glanusk Estate, comprising farms, lands, etc., 1,114 acres, f. (in numerous lots) 10,491

October 12.—By DRIVER, JONAS, & CO. (at Brecon). Llandellorfan, etc., Brecon.—Lord Glanusk's Estate, comprising farms, lands, etc., 2,910 acres, f. (in numerous lots) £44,238

By WINTERTON & SONS (at Lichfield). London, Staffs.—Hood Lane Farm, 132 a. 1 r. 38 p. 1, and c. 4,500

By G. B. ELLIARD & SON (at Chalmersford). Lendon, Essex.—Enclosure of land, 9 a. 2 r. 16 p. 1, f. 220

A freehold cottage, w.r. 114, 4s. 108

October 13.—By VENTON, BULL, & COOPER. Ruishill, Middx.—Manor-rd., freehold corner-site, with two cottages thereon, area 11,500 ft. 2, 28, 27, 28, 29, 30, Field-st., l. w.r. 1,682 8s. 4,500

Manor-rd., two freehold building plots 225

Manor-rd., freehold house and building plot 220

October 15.—By BRODIE, TIMMS, & CO. Hampstead-rd.—12 and 12A, Robert's-mews, and 116, Stanhope-st., v.r. 1354, also l.g.r. 154, u.t. 15 yrs., g.r. 104, f. 860

By EDWARD WOOD. Brixton.—50, Chaucer-rd., f. 1922, 8s. 1,320

Peckham.—10, Roseville-rd., u.t. 42 yrs., g.r. 51, 10s., v.r. 304, f. 300

October 16.—By DEBENHAM, TESSON, & CO. Southwark.—32A, 34, 36, 38, & 40, Earl-st., 1 to 6, Earl-pl., 13 to 22, Danzic-st., area 8,000 ft. l. d. 1,775

2 to 38 (even), Friar-st., area 4,040 ft. 6, f. w.r. 2,481, 4s. 1,150

By C. W. DAVIES & SON. Clerkenwell.—29, Red Lion-st., l. w.r. 674, 12s. 1, 2, 28, 27, 28, 29, 30, Field-st., l. w.r. 1,682 8s. 4,500

Tottenham.—Manor-rd., l.g.r. 221, 10s., reversion in 71 yrs. 485

Crouch End.—62, Palace-rd., u.t. 57 yrs., g.r. 74, v.r. 32, f. 270

288, Park-rd., u.t. 89 yrs., g.r. 74, 7s., v.r. 451, 1 to 11 (odd), Baden-rd., u.t. 93 yrs., g.r. 42, f. 1,440

1, 1924, f. 320

Hornsey.—15, Prother-st., u.t. 31 yrs., g.r. 74, v.r. 381, f. 270

Barnsbury.—73, Wellington-rd., u.t. 51½ yrs., g.r. 61, v.r. 404, 8s. 250

Holloway.—8, Corporation-st., u.t. 54 yrs., g.r. 61, w.r. 491, 8s. 250

By EDWIN EVANS. Clapham.—23, Victoria-rd., f. 892, 12s. 1,600

Battersea.—147, York-rd. (s.), u.t. 60½ yrs., g.r. 74, v.t. 404, f. 195

4, Allward-rd., u.t. 78 yrs., g.r. 61, 10s., e.r. 364, 58, Parnac-rd., u.t. 74 yrs., g.r. 84, 10s., v.r. 344, f. 290

By GIDDY & GIDDY. Dauntsey, etc., Wilts.—Portions of the Dauntsey and Christian Malford Estates, comprising farms, lands, and cottages, 675 acres, f. (third portion of the Meux Estates) 20,935

By SEDGWICK, SON, & WEAL (at Watford). Croxley Green, Herts.—New-rd., Mrs. Hurst's Croxley Green Laundry, l. y.r. 784, f. 1,920

"Cynhorpe Cottages" (Unit), l. w.r. 231, 12s. 470

By J. C. PLATT (at Hammer-mith). Chiswick.—16, Fielding-rd., l. y.r. 424, f. 400

Hammer-mith.—12, Colet-rd., u.t. 84 yrs., g.r. 81, v.r. 404, f. 580

Southall, Middx.—28 and 30, King-st. (s.), u.t. 98½ yrs., g.r. 22½, v.r. 1104, f. 1,560

October 17.—By JOHN BOTT & SONS. Herne Hill.—287, Norwood-rd., u.t. 72 yrs., g.r. 125, 10s., e.r. 454, f. 125

By MARFEN & CARNARY. Brixton.—2, Stafford-rd., u.t. 66 yrs., g.r. 31, 18s., v.t. 114, 12s. 206

Norwood.—9, Thurby-rd., v.r. 88, f. 525

By J. SHILCOCK. Stroud Green.—2, Albert-rd., u.t. 62 yrs., g.r. 81, 8s., v.r. 604, f. 425

Chick.—53, Walsingham-rd., u.t. 78 yrs., g.r. 74, v.r. 404, f. 380

By SLADE & BUTLER. Hampton Hill, Middx.—1, Albany-villas, l. y.r. 301, f. 365

By E. & S. SMITH. Clerkenwell.—18, Great Percy-st., u.t. 12 yrs., g.r. 61, e.r. 604, f. 210

39, Great Percy-st., u.t. 12½ yrs., g.r. 61, e.r. 704, f. 345

By DOUGLAS YOUNG & CO. Walthamstow.—Chaucer-rd., l.g. rents 921, 8s., reversion in 93 yrs. 1,850

Clapham.—101, Parade-rd., u.t. 68½ yrs., g.r. 61, 10s., e.r. 264, f. 290

By DAVID BURNETT & CO. Stamford Hill.—Bailey's-la., f.g. rents 1654, reversion in 93 yrs. 3,610

Stratford.—77, 79, 81, 85, 87, 89, and 97, Leytonstone-rd. (s.), l. y.r. 2334, f. 3,650

Old Ford.—30, Norman-rd., l. w.r. 334, 16s. 280

October 18.—By J. B. SONS. Bethnal Green.—54, Derbyshire-st., l. w.r. 321, 10s. 460

10, Paradise-row, l. w.r. 444, 4s. 265

Mile-end.—30, St. Andrew's-rd., l. w.r. 234, 12s. f. 265

By CARTWRIGHT & ETCHES. Balham.—Sarsfield-rd., f.g.r. 204, 14s., reversion in 99 yrs. 500

Merton.—Shaw-villas, f.g.r. 204, reversion in 99 yrs. 445

Sydenham.—7 to 12, Sunnydene-st., u.t. 96 yrs., g.r. 301, w.r. 1874, 4s. 990

By S. R. COLEMAN & SON. Havestock-hill.—33, Malden-cres., u.t. 59½ yrs., g.r. 91, 10s., y.r. 554, f. 550

By NEWBORN, SHEPARD, & EDWARDS. Kentish Town.—40, Bartholomew-rd., u.t. 62 yrs., g.r. 51, v.r. 554, f. 520

Dulwich.—30, Montague-rd., u.t. 64 yrs., g.r. 61, v.r. 361, f. 325

Lee.—11, Manor Park, u.t. 68 yrs., g.r. 124, 12s., e.r. 754, f. 165

By SIMMONS & SONS. Dulwich.—192, Friern-rd., l. e.r. 604, f. 430

124 to 206 (even), Friern-rd., l. e.r. 604, f. 320

73 to 83 (odd), Goodrich-rd., l. w.r. 2024, 16s. 1,190

Peckham.—12, 13, 14, 15, 16, 20, 22, and 24, Howden-st., u.t. 70 yrs., g.r. 404, w.r. 2734, 92 and 94, Clayton-rd., u.t. 68 yrs., g.r. 104, y.r. 654, f. 560

32 to 42 (even), 37 to 51 (odd), Furlley-st., u.t. 50 yrs., g.r. 471, 10s., w.r. 5324, 14s. 2,475

Dulwich.—19, Friern-rd., u.t. 70 yrs., g.r. 61, 6s., e.r. 284, f. 235

October 19.—By CHADWICK & SONS. Shaftesbury-avenue.—3, West-st., and 80, Litchfield-st. (s.), beneficial lease for 10½ yrs. 260

South Kensington.—44, Letcham-guns, n.g.r. 66½ yrs., g.r. etc., 141, 8s., y.r. 1404, f. 1,700

By HUNTER & HUNTER. Kensington.—Palace Gardens-ter., l.g.r. 604, u.t. 47 yrs., g.r. 11; Brunswick-gdns., l.g.r. 454, u.t. 47 yrs., g.r. 111, f. 1,980

Tooting.—136, 138, and 140, Upper Tooting-rd. (s.), u.t. 90 yrs., g.r. 354, y.r. 524, f. 4,430

By G. E. LUCE. Crouch End.—3 and 5, Lightfoot-rd., l. y.r. 624, f. 620

By PERKINS & CESAR. Bethnal Green.—25A, Vynor-st. (warehouse), l. y.r. 404, f. 510

517A, Cambridge-rd. (site), l. y.r. 404, f. 490

By W. WINDRUM. Battersea.—101, Harbut-rd., u.t. 72 yrs., g.r. 61, 10s., w.r. 414, 12s. 240

Bow.—56, Lichfield-rd., u.t. 30 yrs., g.r. 104, w.r. 394, f. 250

Contracts used in these lists.—F.g.r. for freehold ground-rent; l.g.r. for leasehold ground-rent; l.g.r. for improved ground-rent; g.r. for ground-rent; r. for rent; f. for freehold; c. for copyhold; l. for leasehold; p. for possession; e.r. for estimated rental; w.r. for weekly rental; q.r. for quarterly rental; y.r. for yearly rental; u.t. for unexpired term; p.a. for per annum; yrs. for years; la. for lane; st. for street; rd. for road; sq. for square; pl. for plots; ter. for terrace; cres. for crescent; av. for avenue; gds. for gardens; v. for vale; gr. for grove; b.h. for beerhouse; p.h. for public-house; o. for office; s. for shops; ct. for court.

MEETINGS.

FRIDAY, OCTOBER 26.
Royal Sanitary Institute (Lectures for Sanitary Officers).—Mr. A. Saxton Snell on "Ventilation, Warming, and Lighting." 7 p.m.

London Master Builders' Association.—Bricklayers' and Plasterers' Conciliation Board meeting, at 31 and 32, Bedford-street, Strand, W.C. 3 p.m.

SATURDAY, OCTOBER 27.
Royal Sanitary Institute (Demonstration for Sanitary Officers).—Inspection at Marylebone Workhouse and Public Baths. 3 p.m.

MONDAY, OCTOBER 29.
Royal Sanitary Institute (Lectures for Sanitary Officers).—Mr. W. C. Tyndale on "House Drainage." 7 p.m.
University of London (Imperial Institute-lecture).—Mr. Baister Fletcher on "The History of Architecture (Part I.—Ancient). Lecture V., 'Western Asiatic Architecture (Babylonia, Assyria, and Persia 4000 B.C.—400 B.C.).' 8 p.m.

Builders' Benevolent Institution.—Meeting of Management Committee, at 31 and 32, Bedford-street, Strand, W.C. 5 p.m.

WEDNESDAY, OCTOBER 31.
Royal Sanitary Institute (Lectures and Demonstrations for Sanitary Officers).—(1) Mr. J. E. Worth on "Water Supply, Sources of Supply, and Distribution." 7 p.m. (2) Inspection in the district of Islington. 2 p.m.
Architectural Association Discussion Section.—Mr. G. M. Nicholson on "Quantities and Cost." 7.30 p.m.

THURSDAY, NOVEMBER 1.
Institute of Builders.—Council meeting, at 31 and 32, Bedford-street, Strand, W.C. 3 p.m.

FRIDAY, NOVEMBER 2.
Architectural Association.—Mr. Hugh Stanger on "The Corinthian Order." 7.30 p.m.
Glasgow Technical College (Architectural Craftsmen's Society).—Professor Chas. Gourlay on "The Byzantine Churches of Constantinople." 8 p.m.
Royal Sanitary Institute (Lectures for Sanitary Officers).—Dr. A. Wellesley Harris on "Water—Composition, Pollution, and Purification." 7 p.m.
The Junior Institution of Engineers (Westminster Palace Hotel).—Inaugural meeting. Address by the President, Mr. William B. Bryan, M.Inst.C.E., on the subject of "Water Supply." 8 p.m.
Southern Counties Federation Master Builders.—At the "Old Ship Hotel," Brighton. 3 p.m. and 4 p.m.

TO CORRESPONDENTS.

NOTE.—The responsibility of signed articles, letters, and papers read at meetings rests, of course, with the authors.

We cannot undertake to return rejected communications, and the Editor cannot be responsible for drawings, photographs, manuscripts, or other documents, or for models or samples sent to or left at his office, unless he has specially asked for them.

Letters or communications (beyond news items) which have been duplicated for other journals are NOT DESIRED.

All communications must be authenticated by the name and address of the sender, whether for publication or not. No notice can be taken of anonymous communications.

We are compelled to decline pointing out books and giving addresses.

Any communication to a contributor to write an article, or to execute or lend a drawing for publication, is given subject to the approval of the article or drawing, when received, by the Editor, who retains the right to reject it if unsatisfactory. The receipt by the author of a proof of an article in type does not necessarily imply its acceptance. The Editor cannot undertake to read and consider articles offered for acceptance unless they are type-written.

All communications regarding literary and artistic matters should be addressed to THE EDITOR; those relating to advertisements and other exclusively business matters should be addressed to THE PUBLISHER, and not to the Editor.

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Fine Pale Oak Varnish	0 8 0
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Superfine Pale Elastic Carriage	0 12 6
Fine Pale Maple	0 16 0
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TENDERS.

Communications for insertion under this heading should be addressed to "The Editor," and must reach us not later than 10 a.m. on Thursday. (N.B.—We cannot publish Tenders unless authenticated either by the architect or the building-owner; and we cannot publish announcements of Tenders accepted unless the amount of the Tender is stated, nor any list in which the lowest Tender is under 100*l.*, unless in some exceptional cases and for special reasons.)

* Denotes accepted. † Denotes provisionally accepted.

ABERGYNFY.—For additions to Workmen's Hall, for the colliery workmen and the general public. Messrs. Evans (Blackwenny) & Jones (Swansea), architects:—
S. T. Bree, Esq., 1, 207 D. O. J. Cornhill-st., 2592 0 0
D. Davis, Esq., 1,050 0 0 Joseph & Davies, Esq., 832 0 0
J. Evans, Esq., 891 3 11 Abergynfy, Esq., 832 0 0
(Estimate of cost, £775 10*s.*)

ASHORNE (Leamington).—For the pulling down of the existing premises and rebuilding "The Cottage Tavern" at Ashorne, near Leamington, for Messrs. Lucas & Co., Ltd. Mr. C. M. C. Armstrong, architect, Warwick:—
B. & F. Bradshaw, Esq., 5996 12 0 G. F. Smith & Son, Esq., 5896 0 0
T. Bailey, Esq., 879 0 0 A. E. Sheehy, Esq., 838 0 4
Barford, Esq., 838 0 4

BANGOR.—For the construction of a reservoir, etc., at Ballyvaughan Major, and for laying pipes, for the Urban District Council, Messrs. Macneil & Sons, engineers, 7, Chichester-st., Belfast. Quantities by Mr. S. C. Hunter, Scottish Provident-buildings, Belfast:—
H. & J. Martin, Ltd., Belfast, 116,308

BRIGHTON.—For the erection of a residence, for Mr. A. Morris. Mr. W. C. F. Gillam, architect, Quantities by Messrs. Mathews & Coleman:—
G. R. Lockyer, Esq., £3,160 J. Parsons & Sons £2,940
J. Longley & Co., Esq., 3,089 W. Brown & Sons 2,898
Saunders Bros., Esq., 3,049 G. R. Wallis & Sons 2,894
W. & A. Elliot, Esq., 2,908 H. J. Pender, Esq., 2,857
J. Barnes, Esq., 2,993 W. A. Field & Co., Esq., 2,790
J. H. Hackman, Ltd., Esq., 2,950 Brighton, Esq., 2,770
Architect's estimate £2,850.

BRIGHTON.—For alterations and improvements to premises No. 40, Brunswick-road, Hove. Mr. W. C. F. Gillam, architect:—
J. Parsons & Sons, Esq., 2,568 W. Brown & Sons, Esq., 2,347
S. R. Diplock, Esq., 357 Titcombe & Son, Esq., 343
H. R. Lockyer, Esq., 357 Brighton, Esq., 343
Accepted subject to reduction.

BUCKIE (Scotland).—For erecting a semi-detached dwelling-house, West Church-street. Mr. W. Cumming, Burgh Surveyor:—
Mason: J. Dawson, Esq., 2,000
Joiners: W. Geddes & Son, Esq., 2,000
Plasterers: R. Hume & Co., Esq., 2,000
Slater: J. Barclay, Esq., 2,000
Plumbers: J. Barclay & Son, Esq., 2,000
Painter: J. Snyder, Esq., 2,000

CRUICK.—For the erection of a Baptist minister's house. Mr. J. C. Southcombe, architect, Barnstaple. Quantities by architect:—
A. Darch, Esq., 5334 12 0 H. Sullivan & Son £448 0 0
Sander & Sons £492 10 0 T. Upton, Esq., 608 0 0
Brown & Norr, Esq., 422 0 0 R. Pickett, Esq., 402 2 8
H. Elson, Esq., 394 17 0 C. & J. Jones, Esq., 386 0 0
Barnstaple, Esq., 386 0 0

FENTON (Staffs.).—For erecting public underground conveniences, for the Urban District Council, Mr. S. A. Goodall, Surveyor, Town Hall, Fenton. Quantities by the Surveyor:—
J. Bagwell, Fenton, Esq., 2338 16

HENDON.—For making up first portion of Stanley-road, West Hendon, for the Urban District Council, Mr. S. S. Sinker Grimley, Engineer and Surveyor, Hendon, N.W.:—
E. & E. Hes, Esq., 5557 17 11 F. G. Brummell £484 8 10
T. Adams, Esq., 518 17 6 Bowler Bros., Esq., 518 17 6
T. Free & Sons, Esq., 507 10 1 F. & C. H. Street, Esq., 462 14 0

HULL.—For the erection of school buildings in Belvedere-street West, for the Education Committee. Mr. J. H. Hurst, City Architect, Town Hall, Hull:—
Bowman & Sons, Esq., 215,460 0 0
H. T. Arnold, Esq., 15,498 18 1
J. Houlton & Sons, Esq., 14,820 0 0
Quibell, Son, & Greenwood, Esq., 14,548 18 6
G. Houlton, Esq., 14,500 0 0
Simmons & Sons, Esq., 14,498 0 0
Hull General Builders, Ltd., Esq., 14,392 0 0
M. Harper, Esq., 13,993 7 0
T. H. Panton, Esq., 13,979 8 0
G. H. Panton, Esq., 13,580 0 0
(All of Hull.)

ILFORD.—For laying a concrete tube sewer in Gartmore-road, Goodmayes, for the Urban District Council, Mr. H. Shaw, Surveyor, Town Hall, Ilford:—
H. W. Shaw, Essex-road, Chadwell, Esq., £696 8 2

LEITCHWORTH.—For a bungalow residence at Leitchworth, Herts, for Rev. C. Platts, M.A. Messrs. Stonebridge & Co., Messrs. Webb & Sons, B.S.O., Beds. Quantities supplied:—
Seymour & Son, Esq., £290 J. & Edwards, Esq., £788 10
Beckley & Tarpie, Esq., 918 0 M. Foster & Co., Esq., 760 0
T. Lahan & Son, Esq., 808 0 Hitchin, Esq., 760 0
Newton, Esq., 808 0

KIRTLINGTON (Oxford).—For the conversion of building into estate office for Sir George Dashwood, Bart. Mr. C. M. C. Armstrong, architect, Warwick:—
G. Wyatt & Son, Esq., £160 T. Grimley & Son, Esq., £138
A. E. Steele, Esq., 146 Blomster, Esq., 138

LEWISHAM.—For supplying and laying creosoted deal blocks, High-road, Leam, and repaving a Blackheath, for the Borough Council, Mr. E. van Putten, Borough Surveyor:—

Blackheath, High-road, 11,500 yds. super, wood paving, as specified, including, etc., at per yard super.	Leam, High-road, 11,500 yds. super, wood paving, as specified, including, etc., at per yard super.	Leam, High-road, 1,000 yds. super, wood paving, as specified, including, etc., at per yard super.
332 yds. super, wood paving, as specified, including, etc., at per yard super.	11,500 yds. super, wood paving, as specified, including, etc., at per yard super.	1,000 yds. super, wood paving, as specified, including, etc., at per yard super.
332 yds. super, wood paving, as specified, including, etc., at per yard super.	11,500 yds. super, wood paving, as specified, including, etc., at per yard super.	1,000 yds. super, wood paving, as specified, including, etc., at per yard super.
332 yds. super, wood paving, as specified, including, etc., at per yard super.	11,500 yds. super, wood paving, as specified, including, etc., at per yard super.	1,000 yds. super, wood paving, as specified, including, etc., at per yard super.
332 yds. super, wood paving, as specified, including, etc., at per yard super.	11,500 yds. super, wood paving, as specified, including, etc., at per yard super.	1,000 yds. super, wood paving, as specified, including, etc., at per yard super.
332 yds. super, wood paving, as specified, including, etc., at per yard super.	11,500 yds. super, wood paving, as specified, including, etc., at per yard super.	1,000 yds. super, wood paving, as specified, including, etc., at per yard super.
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332 yds. super, wood paving, as specified, including, etc., at per yard super.	11,500 yds. super, wood paving, as specified, including, etc., at per yard super.	1,000 yds. super, wood paving, as specified, including, etc., at per yard super.

LEWISHAM.—For road works, Savari-road, Lewisham, for the Borough Council, Mr. E. van Putten, Surveyor, Town Hall, Catford:—

Kerbing, Channelling, and Making-up the Roadway.	Leam, High-road, 11,500 yds. super, wood paving, as specified, including, etc., at per yard super.	Leam, High-road, 1,000 yds. super, wood paving, as specified, including, etc., at per yard super.
5892 10 0	11,500 yds. super, wood paving, as specified, including, etc., at per yard super.	1,000 yds. super, wood paving, as specified, including, etc., at per yard super.
5892 10 0	11,500 yds. super, wood paving, as specified, including, etc., at per yard super.	1,000 yds. super, wood paving, as specified, including, etc., at per yard super.
5892 10 0	11,500 yds. super, wood paving, as specified, including, etc., at per yard super.	1,000 yds. super, wood paving, as specified, including, etc., at per yard super.
5892 10 0	11,500 yds. super, wood paving, as specified, including, etc., at per yard super.	1,000 yds. super, wood paving, as specified, including, etc., at per yard super.
5892 10 0	11,500 yds. super, wood paving, as specified, including, etc., at per yard super.	1,000 yds. super, wood paving, as specified, including, etc., at per yard super.
5892 10 0	11,500 yds. super, wood paving, as specified, including, etc., at per yard super.	1,000 yds. super, wood paving, as specified, including, etc., at per yard super.
5892 10 0	11,500 yds. super, wood paving, as specified, including, etc., at per yard super.	1,000 yds. super, wood paving, as specified, including, etc., at per yard super.
5892 10 0	11,500 yds. super, wood paving, as specified, including, etc., at per yard super.	1,000 yds. super, wood paving, as specified, including, etc., at per yard super.
5892 10 0	11,500 yds. super, wood paving, as specified, including, etc., at per yard super.	1,000 yds. super, wood paving, as specified, including, etc., at per yard super.

LEWISHAM.—For the erection of detached house, Stormont-road, Highgate. Mr. A. W. Field, A.R.I.B.A., Norfolk House, Norfolk-street, Strand, W.C. Quantities by Mr. C. A. Kennell, Hart-street, Bloomsbury:—
E. Kerry & Son, Esq., £2,180 W. Lawrence & Son £1,770
C. E. Tucker, Esq., 2,180 Matlock & Parsons, Esq., 1,770
H. Knight & Son, Esq., 1,793 W.C., Esq., 1,771

LONDON.—For erecting a disinfectant shed at work-house, St. Leonard-street, E., for St. Stephen's Guardians:—
Williams & Son, Esq., £180 0 0
Whitlock, Esq., 180 0 0
Francis & Simon, Esq., 180 0 0
J. Scott Fenn, Esq., 139 15 0
E. F. Selby, Esq., 138 0 0
A. Herdler, Esq., 135 0 0
Co., Esq., 135 0 0
† Informal.

LONDON.—For the erection of stabling at West Green, Tottenham, London. Mr. H. R. Riches, architect, 3, Crooked-lane, King William-street, London, E.C.:—
Green & Smith, Esq., £430 Shield Bros., Esq., £395
W. Irwin, Esq., 422 Rowley Bros., Esq., 356

LONDON.—For the erection of stabling at Bermondsey, London, S.E. Mr. H. R. Riches, architect, 3, Crooked-lane, King William-street, London, E.C.:—
Clemens Bros., Esq., £1,750 J. Joselyn & Young £1,544 0 0
F. T. Thorne, Esq., 1,922 O. Courtney & Fair, Esq., 1,525 0 0
W. Downs, Esq., 1,688 0 0

LONDON.—For adapting the house, No. 91, East-lane, for the accommodation of the schoolkeeper of the East-lane school, Rotherhithe, and for fitting up the premises occupied by him as a housewifery centre, for the London County Council:—
J. Appleby & Sons, Esq., £456 J. Marelaud & Sons, Esq., £410
W. Downs, Esq., 456 H. Groves, Esq., 385
W. V. Good, Esq., 490 T. Lapthorne & Co., Esq., 379
Galbraith Bros., Esq., 425 H. Line, St. Peckham, Esq., 383
T. D. Leng, Esq., 410 7/8
J. C. Chalkey, Esq., 410
(The estimate of the Architect (Education), comparable with these tenders, is £320.)

LONDON.—For adapting the house, No. 50, Halket-road, for the accommodation of the schoolkeeper of the Halket-road school, Greenwich, and for the rooms now in his occupation over the laundry centre to be adapted for the purposes of a housewifery centre, for the London County Council:—
T. D. Leng, Esq., £223 J. & C. Bowyer, Esq., £186
J. Smith & Sons, Esq., 212 H. Groves, Esq., 186
W. Aker & Co., Esq., 204 well-street, Greenwich, Esq., 167
Grace & Marsh, Esq., 199 wick, Esq., 167
(The estimate of the Architect (Education) comparable with these tenders is £250.)

LONDON.—For new boiler, Brockley-road, Lewisham, for the London County Council:—
J. Esson & Son, Esq., £220 10 0 H. C. Price, Lea, Esq., £187 0 0
J. Delafra & Sons, Esq., 201 Cannon & Hefford, Esq., 246
G. W. Davis, Esq., 198 0 0 Stanbury Works, Esq., 153 0 0
(The estimate of the Architect (Education), comparable with the tenders, is £168.)

LONDON.—For a Cornish boiler for use in connexion with the heating arrangements of the London County Council Hammersmith Technical Institute, section "A" (Art block), for the London County Council:—
Galloway, Ltd., Esq., £645 spur, Inman & Co., Esq., £556
D. Adamson & Co., Esq., 564 J. Thompson, Wolverhampton, Esq., 460

LONDON.—For erection of a detached residence, Dollis-avenue, Finchley, for Mr. J. Phillips. Mr. A. W. Hudson, F.S.A., architect, 87, Finsbury-pavement, E.C.:—
S. & T. Inkpen, Esq., £1,658 Sheffield Bros., Esq., £1,192
W. & T. Inkpen, Esq., 1,600 Silk and Son, High, Esq., 1,273
Lawrence & Son, Esq., 1,192 N., Esq., 1,147

LONDON.—For painting exterior of casual wards, etc., Gainsborough-road, Hackney Wick, N.E., for the Guardians:—
A. Richardson, Esq., £800 0 0 Sabey & Son, Esq., £152 0 0
A. R. Greaves, Esq., 297 0 0 Ltd., Esq., 162 0 0
A. Monk, Esq., 295 0 0 S. Hayworth & Son, Esq., 148 0 0
W. S. Beaumont, Esq., 254 0 0 J. Stewart, Esq., 149 0 0
J. Sparrow & Son, Esq., 246 10 0 W. Batters, Esq., 148 0 0
W. H. Jolly, Esq., 224 0 0 Ltd., Esq., 147 0 0
H. Willmott, Esq., 215 0 0 C. B. King, Esq., 147 0 0
S. J. Collins, Esq., 207 0 0 H. Dearsley & Son, Esq., 139 10 0
J. & W. T. Luk, Esq., 202 0 0 H. Bishop, Esq., 137 0 0
A. W. Dryden, Esq., 197 0 0 Loasby & Salmon, Esq., 129 0 0
Markham & Rogers, Esq., 187 0 0 Runham Bros., Esq., 125 0 0
C. Neal & Son, Esq., 180 10 0 F. Smith & Co., Esq., 115 15 0
Asby Bros., Esq., 175 0 0 Langdon & Co., Esq., 115 0 0
E. Phillips, Esq., 169 0 0 Chudleigh Bros., Esq., 114 6 0
W. Hawtrey & Son, Esq., 165 0 0 bank, Esq., 114 0 0
W. G. Ridgway, Esq., 165 0 0 A. Herdler & Co., Esq., 109 0 0
W. Silk & Son, Esq., 165 0 0 F. Walter, Esq., 109 0 0
G. T. Jarvis & Co., Esq., 160 0 0 Barrett & Power, Esq., 102 0 0
Co., Esq., 160 0 0 W. R. Power, Esq., 93 0 0
G. Keesh, Esq., 154 0 0 B. Richards, Esq., 82 13 11
H. Robinson, Esq., 153 0 0 H. W. Bingley, Esq., 78 0 0
Sands & Burley, Esq., 152 0 0

LONDON.—For new boiler, Waldron-road, Wandsworth, for the London County Council:—
J. Deffries & Sons, Esq., £127 10 0
Ltd., Esq., 120 0 0
G. W. Davis, Esq., 115 0 0
C. Kite & Co., Esq., 115 0 0
G. & E. Bradley, Esq., 100 10 0 Peckham, Esq., 85 0 0
(The estimate of the Architect (Education) comparable with the tenders is £85.)

LONDON.—For widening South-Western Approach to Putney Bridge, and certain other works necessitated by the construction of the terminus of the Putney to Hammersmith tramways in Lower Richmond-road, including certain works for the Wandsworth Metropolitan Borough Council in connexion with the construction of an underground convenience, for the London County Council:—
G. Craig, Esq., £5,705 13 11 W. Muirhead, Esq., £5,102 16 0
J. & C. Matthews, Esq., 5,656 7 6 J. A. Ewart, Esq., 4,921 9 5
F. Parry & Co., Esq., 5,550 7 6 Old Queen, Esq., 4,921 9 5
J. Cochran & Sons, Esq., 5,453 0 0 C. A. Zadig, Esq., 4,533 11 8
Perry & Co., Esq., 5,453 0 0
G. Hay & Co., Esq., 5,235 12 4
(The Chief Engineer's estimate comparable with the tenders is £5,287 16 6.)
* Recommended for acceptance.

LONDON.—For new addition buildings at St. John's-road Workhouse. Mr. W. Smith, A.R.I.B.A., architect, 65, Chancery-lane, W.C.:—

Hedding, etc.	Barker & Co., Ltd., £353 15 0	Canon & Hefford, £349 0 0
Dargue, Griffith, & Co., Ltd., Esq., 5502 0 0	Harding, Esq., 330 0 0	Fryer & Co., Esq., 321 0 0
Johnson & Son, Esq., 462 0 0	Bright House, Esq., 321 0 0	Foundry & Engineering Co., Esq., 304 0 0
J. & F. May, Esq., 445 0 0	Bushy & Co., Esq., 295 0 0	Watford Engineering Co., Esq., 280 0 0
Vaughan, Brown, & Cook, Esq., 423 0 0	Watford Engineering Co., Esq., 280 0 0	Stubbins, Son, & Hall, Esq., 258 10 0
Keith, Blackman, & Co., Esq., 400 0 0	Bushy & Co., Esq., 295 0 0	Mellows & Co., Esq., 28 0 0
Crundley & Fraser, Esq., 395 0 0	Bushy & Co., Esq., 295 0 0	Victoria-street, Esq., 27 0 0
Pemberton, Arber, & Co., Esq., 380 10 0	Bushy & Co., Esq., 295 0 0	Westminster, Esq., 217 0 0
Canon & Sons, Esq., 377 13 0	Bushy & Co., Esq., 295 0 0	Hulet & Co., Ltd., Esq., 381 15 0
Berry & Sons, Esq., 377 0 0	Bushy & Co., Esq., 295 0 0	
Hulet & Co., Ltd., Esq., 381 15 0	Bushy & Co., Esq., 295 0 0	

LONDON.—For new addition buildings at St. John's-road Workhouse. Mr. W. Smith, A.R.I.B.A., architect, 65, Chancery-lane, W.C.:—
Fire Mains, etc.
A. Inns, Esq., £253 0 0 Fryer & Co., Esq., £289 16 0
Canon & Son, Esq., 341 15 0 J. & F. May, Esq., 280 0 0
Barker & Co., Esq., 315 10 0 Mellows & Co., Esq., 253 0 0
Vaughan, Brown, & Cook, Esq., 300 0 0 Co., Esq., 252 2 0
Johnson & Son, Esq., 295 0 0 Watford Engineering Co., Esq., 246 0 0
Merryweather, Esq., 295 0 0 ing Co., Esq., 246 0 0
Keith, Blackman, & Co., Esq., 230 0 0 Stubbins, Son, & Hall, Esq., 245 0 0
Dargue, Griffith, & Co., Esq., 230 0 0 Berry & Son, Esq., 234 0 0
Co., Esq., 230 0 0 Canon & Hefford, Esq., 230 0 0
Morwood, Sons, & Co., Esq., 230 0 0 Harding, Esq., 230 0 0
Pemberton, Arber, & Co., Esq., 226 0 0 Bird & Co., Esq., 21 0 0
Co., Esq., 226 0 0 Great Castles, Esq., 221 0 0
Regent-st., W., Esq., 221 0 0

LONDON.—For new addition buildings at St. John's-road Workhouse. Mr. W. Smith, A.R.I.B.A., architect, 65, Chancery-lane, W.C.:—
Gas Fittings, etc.
Inns, Esq., £178 0 0 Mellows & Co., Esq., £167 0 0
Perry & Co., Esq., 167 0 0 Barker & Co., Esq., 165 6 0
Keith, Blackman, & Co., Esq., 145 0 0 Fryer & Co., Esq., 98 0 0
Moorwood, Sons, & Co., Ltd., Esq., 133 0 0 Ltd., Esq., 93 0 0
J. & F. May, Esq., 125 0 0 Canon & Hefford, Esq., 89 10 0
Canon & Sons, Esq., 114 15 0 Watford Engineering Co., Esq., 87 10 0
Pemberton, Arber, & Co., Esq., 113 10 0 Harding, Esq., 82 0 0
Vaughan, Brown, & Cook, Esq., 113 0 0 Stubbins, Son, & Hall, Esq., 82 0 0
Pontifex & Co., Esq., 112 10 0 bery & Son, Esq., 75 0 0
A. Fernhead, Esq., 111 10 0 Wimbledon, Esq., 75 0 0
Johnson & Son, Esq., 107 12 0

LONDON.—For providing and fixing an additional vertical steam boiler, altering the existing heating apparatus and executing the necessary builder's work at the Upton House Truant School, Hackney:—
Wippell Bros. & Row £574 15 3 J. & F. May £330 0 0
Stevens & Sons 550 0 0 J. Yettson & Co. 316 5 0
J. Esson & Son, Ltd. 480 0 0 Brightside Foundry and Engineering Co., Ltd. 299 10 0
Sons, Ltd. 389 15 0 J. Grundy, 30, Palace Road, S.W. 267 0 0
G. & E. Bradley 385 10 0 Terrace* 267 0 0
[The estimate of the Architect (Education), comparable with these tenders, is £275.]

LONDON.—For the adaptation of mansion, Island-gardens, Poplar, for the London County Council:—
J. J. Richards & Son £592 10 0 R. Woodlston & Co. £374 0 0
W. J. Howie 547 0 0 Co. 308 0 0
Abbot & Charlton 533 10 0 Lously & Salmon 359 0 0
W. J. Clements 448 10 0 R. Harding & Son 300 0 0
Newell & Lusty 425 0 0 F. W. Western 300 0 0
Martin, Wells, & Co., Ltd. 322 0 0 Griggs & Son, 71, W. Mills 314 0 0 road, Cubitt
F. & T. Thorne 407 0 0 Town, E.* 258 0 0
W. Sustins 396 0 0
[The cost of the work is covered by the estimate of £422.]

LONDON.—For erection of lodge, Wormwood-scrubs, for the London County Council:—
J. J. Richards & Son £725 0 0 Martin, Wells, & Co., Ltd. £405 10 0
E. J. Clayton 500 0 0 J. Christie 388 5 0
W. & T. Bunn 494 10 0 Abbot & Charlton 384 10 0
F. & G. Foster 494 0 0 J. Barker & Co. 384 10 0
Colwell & Edgar 480 0 0 Ltd., High-street, Kensington, W.* 382 0 0
R. Richardson 443 10 0

LONDON.—For making-up and paving part of Dunraven-road and part of Osman-road, for Hammer-smith Borough Council. Mr. R. Blair, Borough Surveyor, Town Hall, Broadway, Hammer-smith:—
Dunraven-road, Osman-road.
F. Lowen & Co. £494 *105
J. Mowlem & Co. 704 124
W. H. Wheeler 740 —
Wimpey & Co. 735 115
H. J. Greenham, Rosebank
W. H. Greenham, Rosebank 732 155

MONKSEATON.—For 700 yds. lineal of sewer extension, etc., at Bygate, for Whitley and Monkseaton Urban District Council. Mr. J. Moore, Surveyor, Council-buildings, Whitley Bay:—
J. W. Robson, Schedule of prices.

BAVENTHORPE.—For erecting a branch store, house and boundary walls, Broomer-street, for Dewsbury Flouren Industrial Society, Ltd. Messrs. Holton & Fox, architects, Corporation-street, Dewsbury:—
Messrs.: C. Whitehead & Son, Bawenthorpe £180 0 0
Joiners: G. G. Smith & Son, Batley Carr 312 0 0
Slater: G. Fawcett, Dewsbury 27 10 0
Plasterers: A. & F. Hodgson, Dewsbury 23 9 6
Plumber: F. Newsome, Dewsbury 87 15 0
Painters: Brock, Jackson, Dewsbury 24 15 0
Ironwork: F. Fifth, Dewsbury 82 12 6
Brns.: B. Bullock, Batley Carr 46 10 6

ST. MARGARET'S BAY (Kent).—For proposed dingy-dock for Mr. C. H. Dudley Ward, Messrs. T. Dinwiddie & Sons, architects, 64, Parliament-street, S.W., and Greenwich:—

	House.	Garden and Fencing.
Turner & Watts	£1,458	£196
W. J. Adcock	1,300	220
T. T. Donne	1,260	235
G. H. Donne & Son, Deal	1,208	250

SHANGHAI.—For a residence in the Avenue Paul Brunat, Shanghai, China, for Mr. G. Nielsen. Mr. W. M. Dowdall, F.R.I.B.A., architect:—

	Ten.	Tack.
Pow Zine	29,550	25,370
Zee Kuen Koo	29,540	21,960
Yah Chong	29,928	24,930

[All of Shanghai.]
* "Koo" is the equivalent of " & Co." All are native firms except the last. The present value of the taels is 3s.1

SALISBURY.—For the improvement of St. Mark's Avenue, Salisbury, and the continuation to the higher ground on the road to Old Sarum, for the Ecclesiastical Commissioners (Messrs. Clutton, 5, Great College-street,

Westminster Abbey, London, S.W., Surveyors). Messrs. Lemon & Bilard, 29, Market-place, Salisbury, engineers, acting on behalf of Messrs. Clutton:—
G. Napier & Sons, Ltd. £3,992 0 0 J. Butt £2,532 19 11
F. W. Tinsley 3,980 0 0 W. C. Shad- 2,843 14 3
J. Crockerell 3,420 14 0 Grounds & 2,823 11 6
A. G. Osenton 3,278 0 0 Newton 2,821 0 0
Wort & Way 3,190 0 0 (Osten & Co. 2,821 0 0
G. T. Budden 3,186 0 0 J. H. Mac- 2,769 0 0
E. Ireland 3,100 0 0 donald 2,769 0 0
J. Free & Sons 2,907 10 0 J. Douglas, 2,700 0 0
F. Osmund 2,948 0 0 Southamp- 2,685 1 10
B. Cook & Co. 2,930 0 0 ton* 2,484 10 0
J. C. Trueman 2,929 0 0 Hewett & Sons 2,484 10 0
J. Riley 2,881 11 10 Tryhorn & Son 2,484 10 0
[Engineer's protecting estimate, £2,800.]

SWINDON.—For road-making, paving, channelling, etc., Montagu-street, Even Swindon, for Mr. James Morrison, J.P. Messrs. Drew & Sons, surveyors, Regent-circus, Swindon:—
W. J. Rogers, Swindon* £410 8 3

SWINDON.—For erecting a house and shop in Norris-street, Even Swindon. Messrs. Drew & Sons, architects, Regent-circus, Swindon:—
W. J. Rogers, Swindon* £288 0 0

TODDINGTON (Beds.).—For re-erection of range of farm-buildings and cow-houses, for Mr. J. R. Paterson. Messrs. Stonebridge & Foll, architects, Woburn Sands, R.S.O. Beds. Quantities by Mr. H. H. Turner, O.S.A. Sidcup:—
Sightheld £807 0 W. T. Sharpe £509 6
F. & T. Gregory 595 0 Ayre & Son, Hock- 503 17
Muckleston 514 12 life* 503 17

For Re-modelling Homestead and Repairs, etc.
Sightheld £323 0 0 Harris £225 0 0
Botsford 270 19 0 Muckleston 205 10 9
Sharpe 273 19 0 Toddington 205 10 9
Ayre & Son 265 8 6

For Galvanised Hay Barn.
Bachus £92 18 0 Crogsons, Ltd. £68 10
Hill & Smith 78 0 A. J. Main, Glasgow* 61 0

WATFORD.—For the erection of four villas, Whippendell-road, Watford, for Mr. J. T. Simmonds. Mr. S. E. Gounger, architect, 25, Market-road, Watford:—
S. Swain £2,086 11 1/2 H. Brown* £1,650 0
Clark Bros. 1,807 0
[All of Watford.]

WOBURN SANDS.—For alterations and additions to "Woodlands," and new drainage scheme, for Miss Pain. Messrs. Stonebridge & Foll, surveyors, Woburn Sands, R.S.O. Beds:—
Miles Bros., Heath* £270

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ILLUSTRATIONS.

Details of New Admiralty Buildings at East End of Mall.....Sir Aston Webb, R.A., Architect.
Selby Abbey: View from South-East.....From a Drawing by Mr. Arnold Mitchell, F.R.I.B.A.
Examples of Mosaic and Marble Inlay.....From Photographs

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The Report of the Local Government Board.



THE thirty-fifth Annual Report of the Local Government Board for the year ending March 31, 1906, has recently been issued, and it takes the form of a volume

of over 700 closely-printed pages, which contains a veritable mine of statistical information.

The Report shows what a vast field is comprised now within the powers and duties of local authorities, but it is only our intention to draw attention in the present paper to a few points which may be of interest to our readers.

At page ccxv. we find an interesting table showing the relative proportions which the balances outstanding in respect of loans raised by the local authorities in England and Wales bear to the National Debt at the end of the years 1874-1875, and again at 1903-1904. At the first-mentioned date the National Debt was 767,268,559*l.*, the local loans 92,820,100*l.*, the proportion being 12·10 per cent., whilst at the latter date the National Debt was 794,498,099*l.*, the local loans 393,882,146*l.*, and the proportion 49·58 per cent. Whilst in the above period the National Debt increased but by 27,229,540*l.*, the local indebtedness increased by 301,062,046*l.* We have frequently commented on the fact that whilst the National Debt is jealously watched, and a slight increase is held to

spell disaster, the local indebtedness is allowed to roll up unheeded, and the above figures are sufficiently eloquent to speak for themselves. The local loans now appear to represent no less than 11*l.* 16*s.* per head of the population.

The income of the local authorities has also to be considered in connexion with local expenditure, and it appears that in the years 1903-4 the amount received in rates by the principal classes of local authorities totalled the enormous sum of 52,941,665*l.*, whilst the aggregate receipts, excluding loans, total some 102,378,355*l.*

The gross value or gross estimated rental for the areas within the districts of the various local authorities in England and Wales is given as 248,426,532*l.* in 1905, as compared with 160,248,997*l.* in 1880, and the ratable value was 202,835,295*l.* in 1905, as compared with 135,644,473*l.* in 1880.

It is a relief to turn from such figures and the question of finance to simpler matters. The subject of the building by-laws having been much before the public of late, it is interesting to find that out of the total 668 rural districts in England and Wales, in 246 of them there are no by-laws in force for the regulation of new buildings; that throughout 169 districts and in parts of 114 the by-laws in respect to new streets and buildings are based on the urban model series, and in 106 districts throughout and in parts of 32 by-laws are in force based on the rural model series; whilst throughout eleven districts and in parts of six by-laws are in force not based on the models,

having mostly been made before the issue of the first model series in 1877.

The Report contains much information as to the Metropolitan Water Supply. The average population supplied during the year is given as 6,710,382, the average daily supply being 218,851,018 gallons, or 32·61 gallons per head per day, or 212·70 gallons per house. A considerable portion of the Report is taken up with reports on the sources of water supply, their relative purity and qualities, and the means of supply, which will be read with interest by experts.

It is interesting to note that next to education the largest item of expenditure incurred by County Councils other than the London County Council is in respect of main roads. In England and Wales the total length of the main roads maintained by the local authorities is stated to be 27,380, and the County Councils repaired about 16,970 miles of these roads at an average expenditure of about 72*l.* per mile. The total length of roads other than main roads appears to be 95,001 miles, and the average expenditure on ordinary maintenance and repair, excluding improvements, was about 22*l.* 1*s.* per mile. The Rural District Councils maintain about 6,856 miles of main roads, and the average cost seems to be 62*l.* 6*s.* or rather less than the expenditure on main roads by the County Councils. The subject of roads leads to the question of traffic upon them. A new order was made in August, 1905, authorising the use of "pedrills" on the wheels of road locomotives as a substitute for the driving-wheel shod with

wooden blocks, and full particulars of construction are contained in the order published in the appendix.

The total number of accidents attributable to motor-cars, excluding the Metropolis, was 1,239, of which one in every eleven occurred at night. In the Metropolitan area 2,235 accidents were reported by the police. Recent figures referred to by us seem to show a considerable increase in accidents caused by mechanically-propelled vehicles, and the statistics are not exhaustive, since no compulsory notification of such accidents is in force; but having regard to legislation in connexion with dangerous machinery it would seem that compulsory notification would be not only consistent but desirable. Under sect. 1 (1) of the Motor Car Act, 1903, proceedings for reckless and negligent driving were taken in 1,249 cases, and in 509 cases under sect. 9 for exceeding the speed limit. The above are a few of the facts contained in this bulky volume of statistics, which is one to be consulted by specialists interested in the various headings, but is incapable of being summarised. As canals are a subject of interest at the moment we may conclude our brief survey by a reference to the report on canal boats. The number of canal boats used as dwellings is given as 12,533, but the Inspector points out that this figure probably exceeds the number of boats so used.

SELBY ABBEY AFTER THE FIRE: By J. Oldrid Scott, F.S.A.

THE injury done to Selby Abbey by the fire does not extend to the outer walls, except to a small degree. Nor are the groined aisles of the nave and choir seriously damaged. The parts of the building which have suffered most severely are the choir, nave, tower, north transept, and the Latham Chapel, where the fire originated. This chapel is east of the north transept, with arches opening into it and into the choir aisle. The effects of the fire here are terrible; the roof has of course gone, as well as every trace of the organ, which filled the chapel, while the face of the stonework has practically been destroyed. Not a scrap of moulding exists in the three arches, and so great was the heat that the stone ribs of the groining in the adjacent choir aisle were completely destroyed. There can be no doubt that the fire started in the organ, spreading from it to the transept and to the choir, while the tower and nave suffered later on. The nave, owing to the fire there having started some hours after the commencement had but little injury done to its stonework, as the fire brigades from York and Leeds were by then on the spot, and were able to play on the beams of the roof as soon as they fell. The roof was destroyed, but hardly a trace of injury can be found in the arcades and piers.

Very different is the condition of the beautiful choir. Here the burning timbers of the roof fell to the floor and combined with the flames from the stalls and screens, burning the lower part of the fine piers of the arcade so severely that large quantities of the stone have fallen away, necessitating in some cases the immediate shoring of the arches.

Happily the arches themselves, with the beautiful capitals and canopies above, have hardly been touched, though all is much discoloured. The firemen concentrated their efforts to save the grand east window, and succeeded to a very large degree.

The tower is completely burnt out, all the floors and the roof having gone, while most of the bells fell to the floor and broke up, the others remaining perched up in a very insecure position on the iron girders. The whole of the fittings have gone, including the long range of stalls, the numerous screens, the reredos, pulpit and benches. The interior is a terrible sight, but those responsible for the building are full of hope that all may be reinstated in the course of two or three years.

NOTES.

CONSIDERING the enormous London population of the Metropolis it is not altogether surprising to find that the total consumption of water for the year ending March 31, 1905, was nearly 80,000 million gallons, representing an average daily supply not far short of 200 million gallons. These figures show, however, how great is the undertaking controlled by the Metropolitan Water Board, and constitute a striking testimony to the energy and skill of the engineers to the former companies in providing such enormous supplies of water of wholesome quality from quite ordinary and commonplace sources. More gratifying still is the announcement that the tests taken during the year in question indicated that the water was of satisfactory quality. Briefly summarised, the tests showed that, apart from the Kent wells, the East London (Thames Supply) and Southwark and Vauxhall contained the greatest number of bacteria per cubic centimetre, and the New River and Chelsea waters the smallest number. The New River and Lea supplies were better than those from the Thames, and the Kent well water stood in a place by itself, far above the others in respect of purity.

It was hoped that the decision of the House of Lords in the Colls' case had put an end to many disputes. This was based upon the right of the owner of a dominant tenement to bring an action for an infringement of light on the principle that he was not to be molested by a nuisance. It is doubtful if it has done so, for the recent case of Jolly v. Kine, in which judgment was given last week by the House of Lords, shows that even yet there is a difficulty in applying the principle of Colls' case. In the latest case Mr. Justice Kekewich found that a nuisance had been proved, but he went on to say that the room in question was still well lighted, though in the obstruction of the light the room had lost one of its charms and advantages, and he granted an injunction. This decision was upheld in the Court of Appeal, though that Court was divided in opinion. It was also undisturbed in the House of Lords, for that Court was equally divided. The truth is that the words of Mr. Justice Kekewich's judgment were contra-

dictory. If a man still owns a well-lighted room he has not established that another man has caused a nuisance, because there is still a sufficiency of light to this room, though the apartment itself may be less cheerful. The Colls' case does not, in fact, define what constitutes a nuisance in regard to the obstruction of light to a place, and we fear that cases will be decided by the individual views of the judges as to what amount of obstruction constitutes a legal nuisance, and thus give rise to more litigation.

When at Letchworth a number of cheap cottages were recently exhibited, which it was stated had been built for 180%, and could be built for that sum, many competent critics doubted the truth of that statement. From what occurred in the Luton Bankruptcy Court last week it is evident that these doubters were right. The person who was under examination was a builder named Wright, who had exhibited some 180% cottages at the Garden City. This bankrupt builder stated that one cause of his difficulties was this same exhibition; he had, it would appear, expended money on these show cottages for which he received no return. The most noticeable point, however, was his statement that though the cottages were shown to the public as 180% cottages, the actual cost was 230%. It is evident from this evidence that those who were responsible for the Garden City Cottage Exhibition were grossly deceived in one case, at all events. And if there was one case of deception admitted, how many have been concealed? This is all much to be regretted, because it makes the public disbelieve assertions on this important subject. It is so important, that any landowners and agents who have succeeded in building sound and useful cottages at a moderate cost will do a public benefit by enabling persons to see the plans and know the cost in detail. Small proprietors especially are greatly in need of models and guides for building.

In the Journal of the Institution of Electrical Engineers published recently, the paper by Messrs. Tweedy and Dudgeon on the "Overhead Equipment of Tramways" is of great interest. They point out that although the accidents due to a break in the trolley-wire are very rare, yet the complicated system of guard wires which is placed over them wherever they are crossed by telegraph or telephone wires is a source of danger. Apparently the Post-Office and the Telephone Company sometimes replace overhead by underground wires without notifying the tramway companies, and thus in several places there are useless and dangerous wires stretched above the trolley. The wear of the trolley-wire itself by the rolling wheel is surprisingly small. The causes of this wear are rolling and sliding friction, and arcing. As the wheel presses on the trolley with a force of about 20 lb. weight it would not have been surprising to find appreciable grooves worn on the trolley-wire, but practically the effects produced are negligible. The arcing that ensues whenever the trolley-wheel bumps over

an "ear" is plainly perceptible at night-time, especially on inclines, and this is responsible for the slight wearing away of the trolley after several years' use. The "ear" invented by the authors ought to minimise this trouble. Trolley-wire shaped like the figure 8 is sometimes used with excellent results, especially on lines where the speed is high, and grooved wire with flexible "ears" to support it is also used. In the latter case the wheel makes no noise passing over the "ear," and there is no sparking. The authors noticed that in many cases the insulators used to prevent the poles becoming "alive" had become practically useless owing to electrolysis. They suggest the insertion of a shield between the trolley-wire bolt and the hanger in order to keep the bolt dry. This is certainly a simple expedient, and ought to prove efficient in practice. An inspection of the trolley-wheel running along the wire on a wet day will show how it throws water over the insulating supports.

Accidents from Mechanically-Propelled Vehicles. THE latest return relating to accidents in the Metropolitan area known to the police covers the months of July and August. For these two months there were attributable to motor-cars and motor-cycles no less than 867 accidents, causing fatal injuries in twelve cases, and personal injury in 312 cases. Motor omnibuses caused 797 accidents, and in these six persons were killed and 149 injured. Mechanically-propelled tramcars brought about 603 accidents, which included three fatal cases, and 226 cases of personal injury. Thus the death-roll in the Metropolitan area alone for two months is twenty-one, whilst 687 persons were more or less injured. Is not this rather a high price to pay for increased facilities in locomotion? It must also be borne in mind that there is no compulsory notification of such accidents. There is a curious callousness apparent towards accidents brought about by this cause. The mechanically-minded consider persons who have lost a relative, or even an arm or a leg, through mechanically-propelled vehicles, as much the victims of prejudice as of misfortune, and the authorities consider a valuable trade must not be handicapped simply because in the course of two months it victimises some 700 persons in the Metropolis alone. Our forefathers certainly did not approach railways in the same lenient spirit, and had railways injured as many people in the whole country in a year as mechanically-propelled vehicles do in London in a month, their progress would have been arrested. We welcome the new form of traffic, but safety and not speed should be the first consideration. Our jealous legislation for safety in factories, on railways, in workshops, and warehouses is an absurdity as long as our streets are rendered so dangerous as they are at present.

Brittleness of Mild Steel. It has been known for a long time that Bessemer steel is unreliable for structural work owing to inequality in the distribution of carbon. Consequently, some of the bars and plates rolled from this make of steel are too hard, and, although they may be sufficiently ductile to withstand mechanical treatment, are

apt to become dangerously brittle afterwards. A case illustrating this point is cited by Mr. Stromeyer in his last report to the Manchester Steam Users' Association. Three ships were being built of basic Bessemer steel, two of them had been launched and sent to sea, but fractures of beams and angle-bars occurred so frequently that the third ship—not then completed—was carefully examined. As a result it was discovered that almost every frame and beam could be broken by blows from a heavy hammer, notwithstanding the fact that the parts in question had showed no signs of brittleness during the operations of bending, punching, drilling, hammering, and riveting. Of course, if Bessemer steel were found to be brittle immediately after rolling it would be rejected before leaving the makers' works, but the trouble is that it appears to possess the undesirable quality of becoming brittle during the period of rest which succeeds mechanical treatment. The causes of brittleness in mild steel are the subject of several other notes in Mr. Stromeyer's report, which is of interest to architects and engineers generally, although primarily addressed to the owners of steam boilers.

Tramway Promoters and Gas Companies. THE decision of the Court of Appeal in the case of the Hastings Tramway Co. v. The Hastings and St. Leonards Gas Co. is one of some importance to gas and water and electric lighting companies. The plaintiff company were constructing a tramway from Bopeep to Hastings, under a private Act which incorporated certain sections of the Tramways Act, 1870. Section 30 of this Act requires that the promoters of the tramway shall give notice to the owners of the mains, etc., of their intention to lay down the tramway, and the owners, if the tramway is likely to endanger the mains, may give notice to the tramway promoters to alter the position of the mains, and if any difference arises as to the necessity for such alteration may apply for arbitration. In the present case a difference had arisen between the parties, and the Gas Company had applied for arbitration, but the Tramway Company applied to the Court to stay the arbitration on the ground that it should have been applied for within seven days, the time prescribed by the Act for notice to be given to the road authority. By section 31 a time limit is imposed in the case of sewers, but the court declined to read this limitation into section 30, which relates to gas mains and other pipes, and intimated that under this section the only time limit was that involved by the words, "the construction of the tramway as proposed," and that the time for applying for arbitration only expired when the proposal ripened into execution.

A Reinforced Concrete Floor Test. THE last report issued by the British Fire Prevention Committee relates to a test conducted upon a floor constructed by the Patent Indented Steel Bar Company. The floor comprised three bays supported by the walls of the testing hut, and by two transverse beams of concrete, which together with the floor slab were reinforced by "indented" bars suitably arranged for withstanding the stresses

developed under load. As usually happens, in consequence of the high-pressure water-jet applied at the testing-station, the surface of the concrete was eroded, but with one exception the test does not add materially to the data furnished by previous trials. The exception to which we refer is to be found in the fact that some of the bars used as reinforcement were found to be actually below the under surface of the concrete, whereas they were supposed to be one inch above it. This emphasises the necessity for very great care in the fixing of reinforcement during the process of moulding, so that in the finished work the bars shall actually occupy the positions intended by the designer. In this particular case the workmanship was so bad that the defective work could be readily detected. If the floor had been applied to a permanent building, and the work had been a little better done so as to hide the steel, but still to leave it close to the under surface of the concrete, the assumed protection afforded by the latter material against overheating of the metal would have been simply a delusion and a snare.

SITTING in the Newcastle Abbey Church, Hexham. Consistory Court at Hexham, Mr. Kempe, Chancellor of the diocese, has decreed that, subject to the land being legally speaking in a proper position, a faculty should be issued for the building of the nave of St. Andrew's Abbey Church.* Mr. Charles C. Hodges, of Hexham, has prepared plans and designs, in conjunction with Mr. Temple Moore, as consulting architect. In or about 673 Wilfrid, Archbishop of York, founded a convent and built a Romanesque Church at Hexham, which, after his expulsion from York, and the division of the province, became the cathedral of a new diocese. The diocese was then united with Lindisfarne, and eventually became part of the see of Durham. The church has latterly been a peculiar of York. In 821 Tilford, last Bishop of Hexham, was expelled by the Danes, who destroyed the monastery and sacked the town. Having been restored for some Augustinian canons in 1112, and pillaged by King David I. twenty-six years subsequently, the convent and church were reinstated. A scheme for extension with a rebuilding of the nave were frustrated by the burning of the church by the Scots in 1296. Work upon the nave was resumed in the latter half of the XIVth century, but little more had been done at the time of the Dissolution when the revenues had diminished to 138l. 1s. 9d. per annum. Of the nave, which now forms a closed churchyard, the foundation walls exist. The west wall, 7 ft. 3 in. thick, stands to a height of 16 ft., and contains a doorway built up and shorn of its moulded arch-stones; the south wall, 6 ft. thick, remains for its entire length. On the north side was an aisle having an arcade of six bays. We understand that the designs provide for the building of the nave in a simple yet massive rendering of the Perpendicular style, embodying a clearstory above the arcade between the aisle and nave; a west front with one doorway and a large

* See the Builder of April 1, 1899; No. XXIX. of our series—"The Abbeys of Great Britain."

window above, and an octagonal turret over the novel stair; and a range of high windows, having traceries and tracery, in the south wall.

THE new President, Mr. Alfred East, has certainly succeeded in waking up the Society in the first exhibition since his election. This is the best exhibition we have seen at Suffolk-street for a long time; it is no longer a mere collection of commonplaces. The President has himself contributed two or three fine works, of which the most important is his large and finely composed "Evening on the Cotswolds" (60). Mr. F. Milner has paid the President the compliment of imitation in "Evening on the Ardennes, Picardy" (177); not an imitation of anything in the present exhibition, but a landscape certainly recalling, in composition and tone, some previous pictures by Mr. East. Miss Kemp-Welch is a contributor; her best work, "Children of the Moorland" (81), donkeys on a moorland, is admirable; she shows her usual vigour of action in another small picture, "The Timber Haulers" (58), not equal, however, in execution and sentiment to the other picture. The exhibition is haunted by two or three of the school of painters who seem determined not to allow you to forget that a picture is only pigments, and not intended to represent natural appearances. Some of the small ones of this class are the most prosaic; and Mr. Tom Robertson's large painting of Venice as "The Opal City" (4) totally fails to give atmospheric effect, though there is an effect of a kind—nothing of "opal" however, and the foreground ripples, loaded on in relief, are irritating. Mr. Swinestead's small pastel, "The Haystack" (12), is a really artistic little work, none the worse for owing something to Mr. Clausen. "The Avenue" (15), by Mr. Grant Rowe, is a good woodland landscape; Mr. Spenlove-Spenlove's "The Wharf" (22) is too confused in detail; Mr. Louis Grier, in "The Mill" (41), has succeeded in painting a night effect better than is usual in such attempts; it has really the effect of night, in which you can only make out uncertainly and by degrees the main lines of the scene, night pictures in general having far too much colour and detail. Mr. Paul's "A Country Road" (61) is a powerfully painted little landscape in a very broad style. Generally speaking, the figure subjects are the weakest part of the exhibition; but Mr. Footet's dim life-size figure of a man, under the title "The Accused" (88), has a pathetic power about it, which perhaps would have been weakened by further detail. There are two or three good portraits. The ugly head by Mr. Ferguson entitled "Humoresque" (174) is a vile misuse of the art of painting, yet we see that this kind of thing has its admirers in the Press. There is a collection of the works of the late President, Sir Wyke Bayliss, which we regret that we have never been able to admire much; they represent architecture in a richly coloured but very conventional manner. Of the oil paintings we like best the interior of the "Chapel in the Abbaye Royale, St. Valéry-sur-Somme" (374), which also shows excellent drawing of the vault. Speaking of architectural subjects, we may note that

Mr. Elphinstone gives an effective view of the "Temple of Concord, Pergenti" (83), seen in foreshortened perspective in a rocky landscape. There are other things that we have not space to name; and certainly the Suffolk-street Gallery has interested us far more than usual.

AT Messrs. Dowdeswell's gallery is an exhibition of the "Society of Twenty-Five English Painters," who do not seem to be possessed of any common aim in art; it is a collection of mostly small and rather sketchy pictures, and some well-known artists are not represented at their best; Mr. Bertram Priestmann's contributions, for instance, are merely small studies for pictures, of which "Sandhills" (27) is the most characteristic. Mr. Montagu Smyth's small pictures are also not such as to do him justice. Mr. Hornel's "April" (8), a kind of mosaic or inlay of children's heads, rocks, and lambs, all let into each other on one plane, is one of his best works of the kind, but it represents a false and eccentric taste in painting. Mr. Hughes Stanton's "Morning" (9) is a finely composed picture, his "Sand Dunes" (10) a good study of landscape of a special character. Mr. Anning Bell's "Cupid and my Campaspe" (12) is quite at variance with the light and delicate conventionalism of the poem; he has treated it too seriously. Mr. Houston's "October" (23) is a very carefully painted autumn landscape. Mr. Llewellyn has treated a moonlit stream in a very clever way in his "Millstream, Moonrise" (30), but what a moon! It is at least four times too large. His portrait of a child as "Red Riding Hood" (33) is a fine bit of colour. Mr. Alfred Withers does not do himself justice. Mr. Sydney Lee's "Norman Arches" (74) is an excellent forcible painting of masonry; "The White House" (73) is also a very good study of a building. Mr. Terriek Williams's "Harvest of the Shore" and "The Last Load" (77, 78) are small landscapes with poetry of effect; Miss Halford's figure paintings we would rather pass over; Mr. Grosvenor Thomas has some good landscape studies, especially "Homeward" (95), rather like Corot in respect of composition; Mr. Cecil Rea treats the nude figure well in "Water Nymphs" (99), but makes no poetic suggestiveness out of the composition; and Mrs. Isabelle A. Dods-Withers, in some small paintings of Carcassonne and one or two other mediæval towns, shows a decided faculty for the representation of mediæval architecture; her stone buildings have a remarkable reality of tone and texture.

AT Messrs. Dickinson's Gallery in Bond-street is a small exhibition with the rather too comprehensive title "Exhibition of Contemporary Scottish Art." It is hardly as representative as such a title would imply, but contains some good works, of which perhaps the best is Mr. J. Young Hunter's "The Orchard Door" (35), an interior with a girl reading, half reclined on a sofa; a white door opens on the orchard outside. The figure is admirably posed and drawn, and the texture of all the accompani-

ments—the dress, the chintz-covered sofa, etc., is very cleverly conveyed without any elaboration of finish; the bright cover of the book makes a central point in the colour scheme. A large and fine landscape by Mr. J. Campbell Mitchell, "Springtime in Galloway" (19), with a grand sky, occupies the central position. The others are no works of importance; Miss Cameron's "Martyrs Muet (sic) des Courses de Taureaux" (6), the ill-used horses mounted by matadors, is better in a moral than an artistic sense. Mr. Tom Robertson's "The Sacred Isle" (14) is a good coast landscape; Mr. David Farquharson's "September" (20) is worth a note; also Mr. Vereker Hamilton's "Elms" (28) and "The Keeper's Daughter" (27), the latter a meadow view with a figure in the foreground.

THE President of the Architects' Benevolent Society, Mr. T. E. Colcutt, issued last Wednesday a letter of appeal to all architects practising in the three kingdoms. The Society, which was founded in 1850, is the only organisation of the kind specially devoted to philanthropic work among architects who have fallen on evil days, or to their widows and orphans. Last year over 1,000*l.* was distributed in relief. Out of the total number of architects in practice scarcely one per cent. is to be found on the Society's current list of subscribers. It is difficult to believe that this number is adequately representative of the benevolent intention of an important profession. We hope that Mr. Colcutt, who as President and as a past member of the Council takes an energetic interest in the Society, and speaks from a personal knowledge of its affairs, will receive a liberal response to his appeal on behalf of so deserving a cause.

LETTER FROM PARIS.

FOR the last twenty-five years the Conseil Général of the Seine has made a practice of annually giving subsidies to artists, in whatever branch of art, who after due inquiry were found to be in possession of more talent than means, in order to assist them in prosecuting their studies. That this bounty has been not ill bestowed is shown by the fact that twelve of the Prix de Rome men during this period have come from the ranks of those who were assisted by this official liberality. But in order to illustrate publicly the results of this action, the Conseil has organised at the Petit Palais an exhibition of the works of its beneficiaries, which was formally opened last Saturday by the Under Secretary of State for Art. The exhibition includes 170 works. In the section of painting and engraving may be mentioned the views in Abyssinia and Tunisia by MM. Paul and Aimée Buffet; an Aphrodite by M. Gorguet; landscapes by MM. Guinier, Guillaume Roger, and Morisset; a finely studied "Femme Couchée" by M. Levalley; the portrait of Mdlle. Dalti, of the Comédie Française, by M. Auguste Leroux, whose brother, M. Georges Leroux, exhibits some concert and musical scenes showing considerable observation of contemporary life; a "Danse Espagnole," full of light and movement, by M. Lunois, who also exhibits some remarkable lithographs after Pavis de Clavannes and Roll; some biblical scenes by M. Rouault which recall the style of Gustave Moreau, whose pupil he was; and some fine etchings by two Prix de Rome students, M. Sulpis and M. Quider. In sculpture the "Dansense de Pompeii," by M. Paul Roussel, merits special mention. In architecture we may mention a fine decorative composition by M. Gallibert, and M. Baucourt's study for a "Salle de

Palais de Justice." Altogether, the exhibition is a very satisfactory one.

Three new ateliers are shortly to be opened at the Ecole des Beaux-Arts; that of M. Paul Maunon, for lithography; M. Valtner, for etching; and M. Pannemaker, for wood engraving. In these departments there was a deficiency in the programme of the Ecole, which M. Dujardin-Beaumetz has filled up by the appointment of three men who are each masters in their particular art. At the Académie des Beaux-Arts M. Gabriel Ferrier has been elected as successor to Jules Breton. The new academicien, who is a pupil of Pils and of Lébert, obtained the Grand Prix de Rome in 1872. He was created Officer of the Legion of Honour in 1903. Among his works may be mentioned a large ceiling at the French Embassy at Berlin, two ceilings at the Hôtel de Ville at Paris, and numerous portraits. M. Ferrier is a Professor at the Ecole des Beaux-Arts.*

The monument to Armand Silvestre, the poet, an illustration of which was published in our issue of July 1, 1905, was inaugurated last week on a site in the rue of the Petit Palais. M. Jais is the sculptor.

The Silk Exhibition at the Musée Galliera was closed after a very successful four months' duration, and will be succeeded next day by an exhibition of Ceramic art, illustrating the work of the various French districts in which pottery manufacture is carried on.

Official architecture has not many important manifestations at Paris at present. There is talk of building two "Palais des Sports" one at each side of the Champ de Mars, for which, if carried out, M. Fournigé seems to be the architect who would naturally be chosen, since he erected the two important exhibition buildings on the same sites for the 1889 exhibition. The proposal to modify the façade of the Hôtel de Ville towards the Rue de Rivoli, and to form a new Council-room in this portion of the building, has already been mentioned. But it is very doubtful how long it may be before these large projects are carried out. On the other hand, private architecture is developing in many quarters largely, and gradually modifying the architectural aspect of Paris. One of the most important works going on for private owners is the enlargement of the Crédit Lyonnais, which is being actively continued under the direction of M. Bouvens van der Boyen. This immense building, when completed, will occupy all the quadrilateral site comprised between the Boulevard des Italiens, the Rue Choiseul, the Rue de Grammont, and the Rue du Quatre Septembre, in which latter there will be a central entrance, less important than that in the Boulevard, but nevertheless on a monumental scale and in a fine style. We may mention also the important works on hand, in Rue Margère and Rue du Conservatoire, for the enlargement of the Comptoir National d'Escompte, carried out by M. Constant Bernard, as successor to Vaudoyer, who built the central block in 1878-1882, with its entrance to Rue Bergère, on the axis of the Rue de Rougemont. About three years ago M. Bernard commenced the present works, and the new buildings begin to group well with the buildings on the line of the Rue Ste. Cécile. A third group of important buildings is rising in the IXth arrondissement, for the enlargement of a Magasin des Nouveautés—"Les Galeries Lafayette," on a site bounded by the Chaussée d'Antin, Boulevard Haussmann, and Rue Mogador. The buildings, commenced some months ago, are being carried out, we believe, from the designs and under the direction of M. Chedanne, a former Prix de Rome. We shall have occasion to speak of these buildings again later when they are completed.

At the recent visit to Paris of the International Commercial Association of London, M. Sartioux, chief engineer of the Nord Railway Company, described to them the scheme put forward by the Société Française for the study of a project for a Channel Tunnel. This is the analysis of their scheme:—The tunnel would be formed in a

stratum of clay impermeable to water and of about 60 metres in thickness, the position of which is well known owing to the researches of MM. Potier and Lapparent. This stratum presents sufficient capacity for a tunnel of 5 or 6 metres diameter which will resist pressure from above. The draining off of infiltration water would be provided for by a special gallery with a continuous fall towards each end of the tunnel. The traffic tunnel would have to follow some of the vertical windings of the stratum of clay, but the gradients thus necessitated would be no obstruction with electric traction power. As at the Simplon, the tunnel would be a double one, one for each line, distant from each other about 15 metres and connected by transverse ties. In order to hasten the work, which must under the best conditions occupy seven years, the driving of the tunnel would be commenced simultaneously not only at both ends but also in intermediate sections.

The intended track would part from the line to Calais, near Marquise, and be continued first to Wissant, where the Custom-house station would be established. It would then proceed in a tunnel to Sangatte, beyond which point it would become sub-marine. On the English coast it would have its exit between Dover and Folkestone, and have connexions with the lines to both places. The total length of the track between Wissant and Dover would be 56 kilometres. 37 of them below the Channel. The lowest point would be towards the middle of the transit, where the tunnel roadway would be 100 metres below average sea level, and about 45 metres below the sea bed.

One of the last survivors of the Barbizon school of painters, M. Ferdinand Chaigneau, has died in the neighbourhood of Fontainebleau, at the age of seventy-six. He was a pupil of Picot, of Brassat, and of Léon Cogniet. His first Salon exhibit, "Souvenir des Environs de Bordeaux," dates from 1848; and for a long time he exhibited pictures painted in the neighbourhood of the Gironde, the Landes, and Auvergne. From 1860 he devoted himself to a faithful interpretation of the scenery of the forest of Fontainebleau. He was also a good animal painter and an accomplished engraver; and produced, among other works, a series of etchings under the title "Voyage Autour de Barbizon."

The death is announced also, at the age of sixty-six, of the painter Cézanne, who has been wrongfully classed among the impressionists. He was an original and powerful painter who did not sufficiently finish his works, which, in the state of sketches or *études*, showed very fine qualities of design and colour. Though never appreciated by the general public, Cézanne was a fine artist, showing in his works something of the earlier manner of Corot. Some of his pictures are at present on view in the Salon d'Automne.

NOTES ON MOSAIC AND MARBLE INLAY.—VII.

Processes Used in the Production of Mosaics.

SIGNOR GAETANO RIOLO, the head of the school of Mosaic at Palermo, published in the *Nuovi annali di Costruzione, arti, ed industrie* of February, 1870, an article on the practical working of ancient and modern mosaic, which is exceedingly interesting as giving the hereditary experience of a worker in mosaic, for his father was also head of the same school, and in that capacity restored the mosaics in the cathedral at Cefalù, as well as some of those in the Cappella Palatina, at Palermo. He distinguishes three kinds of mosaic. "I tessellato, settile, and vermicolato." The first is a putting together of small cubical stones for covering pavements, of one or more colours, of precious and hard marbles, porphyry or serpentine, granite, cipollino, etc. Many examples of this kind of work are extant, both Roman and Byzantine. The second is a kind of tarsia of marble, "lithostrata" worked with marbles of one or more colours, cut into very thin slices of the form required by the design, inlaid in a marble of a different colour to decorate and clothe the walls. This kind of mosaic was cultivated in Palermo, but the best examples are to be seen in the Florentine "pietre dure." The third, mosaic properly so called, is composed

of small fragments of stone and vitreous pastes of different colours, or gilded or silvered. He ascribes the invention of vitreous pastes to the Byzantines, and says that 17,000 tints are now made.

The ancient Byzantine mosaicists, instead of using a carton or model, painted the figures, compositions, and ornaments upon a bed of fresh plaster of simple slaked lime mixed with another calcareous substance. This plaster is about a centimetre thick, and is superposed on another of lime mixed with straw, which helps to give greater tenacity to the mortar attached to the wall. When the ground was to be of gold tesserae the plaster was coloured red, and purple was used in the case of a red ground. Bucher says that at Torvello red was found on the plaster in the part where gold tesserae were, red and light red outlines, yellow for the lighter tints and dark grey for blue, black, etc.; and Rod. Kanzler found colours in the holes from which cubes had fallen out in two places in the cemetery of Pretextatus, and also in SS. Pietro and Marcellino, showing that the Byzantines followed the antique practice. Revault also found the same traces at Aix-la-Chapelle.

The artist, having finished the painting, left to the mosaicist the task of substituting the cubes of stone or enamel on the lines of the painting, "whose colours, more lasting than those of paint, served to eternalise the conception, as one may say." The illustrations in the lithograph plate show the way the tesserae were set, and also the difference in size in more and less important details. He had thus a surer guide than a cartoon, and the painting also served to complete the harmony of effect, because without the colouring of the plaster its whiteness would have damaged the effect by appearing between the cubes. The composition of the plaster allowed it to preserve its freshness for several days sufficiently for the mosaicist to be able to work without nervousness. An analysis of a portion of the intonaco from Cefalù made by Casoria, professor of chemistry at the University of Palermo, failed to identify the substance mixed with the lime. Di Marzo thought that it was powdered travertine, but that would colour the lime yellow, and the intonaco is white. In a note Riolo says that he obtained a stucco which hardened after some time by mixing lime with the dust of "lattimusa" (a marble of varying colour, a milky or pale greyish tint, a rose, more or less deep, and yellow—found abundantly in Chiusa, Bisacquino, and Ogliastro, places near Palermo).

A second analysis by Sig. Domenico Amato, assistant in the laboratory of the University, found, besides the lime, magnesia, carbonic acid, and phosphoric acid. On trial, the mixing of lime with the last produced an intonaco which did not dry for some time, but it is impossible that in the XIIth century, in the infancy of chemistry, phosphoric acid could have been produced in sufficient quantities to mix with the lime. It was also impossible that it could have been mixed with carbonic acid, so that one may believe with the more certainty that the unknown substance was either magnesia or a stone which contained a large quantity of that substance. Vasari speaks of a mastic which was used for mosaic in his time; this stucco was to be laid thickly on the wall, and left for two days or four, according to the character of the weather. It was made of travertine, lime, pounded tile, gum tragacanth, and white of egg; after it was made it was to be kept soft with wet cloths. The gum tragacanth would redden the stucco, more or less, according to the quantity employed. He also says that they traced the cartoon on the mastic, and did not care whether it was coloured or not. This preparation had the defect of drying too quickly; the mosaicist had not time to cut and set the different cubes of which the work is composed, as necessarily slow operation, "from which the need arose of improving or modifying its composition, using linseed oil instead of white of egg, which takes longer to dry, so that the artist may work more conveniently, and the stucco may also be softened again by mixing with fresh linseed oil. The invention is ascribed to Muziano of Brescia (between 1528-92).

"For backgrounds, broad surfaces and flat bands it is probable that the tesserae were prepared and cut to shape previously, but in ornamental forms, draperies, and in heads above

* Are we to understand that this fact influenced the election? The three candidates specially named (see our Foreign column of last week) were MM. Raphaël Collin, Gervex, and Robert-Flcury. It is singular that the election should have fallen on a painter certainly of less general reputation than any of these three. —Ed.

* These opinions are Signor Riolo's, as are the technical details.

all, the variety of tints and the development of the lines, etc., point to the necessity of cutting to the tessera on the spot, adapting them to the nature of the work and of the design. The accuracy and precision with which the mosaics are worked is such (and the figures especially) that one cannot imagine it greater. Observing them from near everyone will be convinced of the excellence of those ancient mosaicists, and will be persuaded, too, of the absolute impossibility of using small and previously-shaped tesserae. Probably many parts were executed separately, the heads principally, because in the restorations at Cefalù, conducted by my father, it was observed repeatedly that the plaster of the aureoles of the saints showed traces of joins in their form; ornaments, draperies, flat bands, and backgrounds, whether gilded or coloured, were necessarily worked in their place, above all, when the surfaces were curved." The only way in which mosaic could be done was by displacing the intonaco a little at a time, and moistening it with wet cloths—practice and the rapid work of the mosaicists helped to gain time, so as to lessen the harm from the rapid setting of the mastic or intonaco. The work of the heads is most accurate, and the slight conceivably helps to concentrate the light, as we think, so that the gilded ground may reflect it in that important part of the decoration; in the draperies the work is conducted with less accuracy than in the heads, and that of the backgrounds is still less accurate.

The process of mosaic workers was divided into three ranks, of which the first, the most skilful, occupied itself with the nude parts and the figures in general, the second with draperies and ornaments, and, finally, the last with flat bands and backgrounds, and inscriptions. The painters formed a separate class of artists who had to superintend the progress of the work.

The cubes of enamel or stone which were used are not so that their apparent shape is trapezoidal when the outline is curvilinear, triangular or rectangular, according as the line was thick or thin and square or rectangular for backgrounds.

The ancient mosaicists had the process at their fingers' ends, and with simple means gained great effect. The tints used were only thirteen; the half-tints and shadows are made with two, three, or four gradations without softening, but the relief is so great that the figures seem almost to stand out from the gold ground. The colours used are white, a toned white, flesh colour, red, yellow, turquoise blue, green, purple, "ogolino," black, gold, and silver, and the mosaicists understood so well how to oppose colours and tints that the effect is never missed. In the white draperies the middle tint is dark, sometimes purple, sometimes blue, sometimes green, sometimes "ogolino," yellow, or red, and sometimes a white half-tint of enamel which is like lard, while a grey limestone, called "ciaca," is sometimes used in place of the enamel. For the carnations they used "lattimusa" of a flesh tint. In the ancient mosaics there are only two reds, of which the pale one is "lattimusa," and the darker enamel, and to break the over-sharp contrast owing to the lack of a middle tint in the passage from light to shadow, they counter-changed light and dark tesserae.

"Another proof of the cleverness of the Byzantine artists was observed by my father for the first time in Cefalù. The heads of the figures are touched with colour, helping the defective half-tints of the stones or enamel colours and obtaining the desired harmony by this means. The foresight of the artists is everywhere to be admired, in increasing the height and the size of the figures relatively to their altitude. The cubes are coloured glass, commonly called "smalti" by the ancients, made with great perfection; they are opaque, perhaps, to make them stand out the more from the gold background. The gilded ones are made on a very transparent vitreous base, either golden yellow, greenish, or brown; a thin sheet of glass above encloses the gold leaf. The other "smalti" are tinted in gradation by mixing metallic oxides with the glass, the colours varying in proportion to the amount."

The Greek and Roman mosaics are worked with little cubes of marble, of different colours, cut with the chisel from slabs sawn thin (some pieces of marble sawn in this way were found with the mosaics in the Piazza Vittoria, Palermo). "Smalti" (vitreous pastes) were not used by them, of

which we have proof in works still existing. They used the same restricted palette as in Byzantine times. They made use of Parian marble, white and flesh coloured "lattimusa" both for white and flesh colour, "paragone" marble for black, rosso antico for red, lapis lazuli for blue, malachite, serpentine, or verde antico for green, yellow "lattimusa" for yellow, and alabasters and marbles of varied and graduated colours. The form of the tesserae is always cubical or a parallelepiped, and the cement is made of lime, sand, and pounded brick, which gives it a reddish colour. They must have used a leveller to flatten the surface. The Byzantines also used hard marbles and "lattimusa" for pavements, and not "smalti." The walls were decorated everywhere with geometric friezes and bands, interposed between large slabs of white marble, or of cipollino, as well as circular slabs of porphyry and serpentine, which give the designs a relief and vivacity in harmony with the arabesques and figures above. The thickness of the material, both porphyry and serpentine, is irregular; both faces are smooth, from which one may argue that the marble was sawn into slabs, and then cut to the required size with chisel or pointed hammer. The "smalti" of the friezes of the walls are smoothed on their sides, and cut with certainty with the chisel from circular cakes. The cement of both pavements and friezes is lime mixed with sand or marble dust. The design made (there is no trace of painting on these friezes), they placed the various pieces in their proper positions, and with a wooden cylinder or flat piece of wood made all smooth. (This is the Sicilian practice.) We do not know with what implements the ancients cut the "smalti." The moderns use a little hammer with two cutting ends, and a handle of wood a little over 2 ft. long, and a piece of iron with a steel edge called "zeppa," a wedge, fixed in the middle of a square of compact limestone with wooden wedges. The form of the cakes (called "piastrelle") of enamel is either circular or square. To cut them they are held resting on the edge of the "zeppa" with the left hand, and struck from above with the cutting part of the hammer; a portion of the cake then separates, and can be further reduced in size by repetition of the process. The larger-sized tesserae are used for backgrounds, the medium-sized in ornaments and draperies, and the smallest for flesh. In England an implement with two cutting edges and a knob above is sometimes used. The cake of vitreous paste is placed between the jaws, and a smart blow given to the knob, with a similar result to the process described above. Signor Riolo continues:

The processes of modern manufacture are rather different from the Byzantine; they are nearly the same in Venice, Rome, and Palermo. In Salviati's establishment in Venice the cakes of enamel are sawn and reduced to rods by special machines, and these are cut into squares, smaller or larger, which are put up into boxes for the workmen. A plate of metal of variable size covered with a coat of plaster and surrounded with a rim a few centimetres high, is used, on which the outline of the figure which is to be worked is drawn or painted. The mosaicist cuts away the plaster little by little and replaces with Roman mastic, which adheres to that on the plate of metal which is already prepared before the plaster is put over it, and pushes the cubes into it; this proceeding is repeated until the work is finished; then it is smoothed with an emery wheel. In the paper factory at Rome a similar process is adopted, but the mosaicists cut the tessera to the required size with the lead wheel and traverse dust to make them the exact size and shape. Another more simple method is practised at Salviati's. The cubes, cut to an equal size, are glued upon the cartoon; when the work is finished the mastic is spread upon it after having acquired a certain hardness, and the paper is rubbed off, and the surface levelled. This mode of working the mosaic is used for those which are to be set up far from Venice, where the paper is used, and are glued one over the other, and the design is copied up into pieces of a manageable size which are applied to the wet mastic which has been spread on the wall in their proper order, and pushed in so that it fills the interstices between the tesserae. Among us [it is Signor Riolo who is still speaking] the mosaicists do not depart far from the Byzantine process, because we imitate their work in Palermo, and reproduce it with precision throughout the island, so that they imitate their processes in everything. With an iron spatula the stucco is spread upon the wall or upon slabs of slate. The design is copied on a small pin they use in Rome and Venice, we use a small pin to put the cubes of stone or vitreous paste well to together, which are not ground, but cut in a more or less regular square shape; the cubes are fixed in the stratum of mastic on which the design is painted, and with this guide the mosaicist arranges the model which he is copying. When the work is done, it is levelled with a straight-edge, so that the

surface may be smooth and almost uniform. As much from economy as to obtain uniformity of thickness the cubes of enamel are put in from the back, and not from the face. Gold and silver are, of course, used on the surface."

The making of Roman mastic or stucco is as follows:—Take slaked lime, seasoned and reduced to the consistency of putty, and make a paste with linseed oil, with which you mix very fine travertine dust. This unlooses the water with which the lime is saturated. The impasto being reduced to the consistency of butter, you use as described above, having first dried it for several days to get rid of the remains of the water which it may contain. This intonaco remains soft for many days; indeed, with care, the workmen are able to use it for a fortnight. In Rome they spread it with the hand instead of using spatulas and little trowels.

M. Eugène Muntz, in the *Proceedings* of the Société Nationale des Antiquaires de France of 1892, gave measurements of ancient tesserae, which show what great varieties of size were employed. In the battle of Arbelat, at Naples, there are seventy-eight to eighty-nine cubes to a square inch, and in the mosaic at Palestine from ninety to ninety-six. At S. George, Salonika, each tessera is .005 m. square, that is 40,000 to a square metre. In the tomb of Galla Placidia, at Ravenna, there are tesserae but .003 m. square. At S. Prassede, at Rome, they are generally two-thirds of a centimetre. He also gives a number of details concerning the composition of the vitreous pastes which are of considerable interest. At S. George, Salonika, the mosaics in which church date from the Vth century, the blues are composed of cobalt and blue oxide of copper, commonly called copper frit, a colour described by Vitruvius. The reds are of two sorts, one obtained with ochres or oxides of iron, the other, which is principally used in flesh tints, is an enamel, rediscovered in 1775 by Mattioli, and known in Rome as "purpurine," made of silicate of potash and protoxide of copper. Violets are made with manganese, used principally in draperies. Blacks were obtained by a process which we do not know, and which is unknown to the enamel makers of Constantinople. The green is an oxide of copper, the strength of colour is varied by the length of time the glass is left in the furnace. The yellows were obtained by the use of antimony, and the whites with oxide of tin. Texier says that he did not observe any natural stone in these mosaics; the contour of each figure is traced with a strong colour, and the middle filled with tesserae which follow the contours of the modelling. He thinks they must have used a mastic similar to the modern composition."

ROTHERHITHE TUNNEL.

An additional highway for vehicular and pedestrian traffic will before long be available between the north and south of the Thames. The new means of communication is a tunnel, of which the northern approach is in Horseferry Bridge-road, near Commercial-road East, Stepney, and the southern approach is at the junction of Lower-road and Union-road, Rotherhithe.

The general plan and section here reproduced indicate the position and gradients of the work from end to end. Commencing at Lower-road, Rotherhithe, an open approach extends for a distance of about 940 ft., and just beyond the East London Railway a cut-and-cover tunnel is entered. This portion covers a length of 549 ft., and at its further end is Shaft No. 1, whence a tubular tunnel, lined with cast-iron segments, is carried for a distance of 927 ft. to Shaft No. 2, which is situated about 60 ft. from the river front.

Now, turning to the Rotherhithe end, we find an open approach, measuring 1,060 ft. long, from Commercial-road East to the entrance-arch of the cut-and-cover section between Butcher-row and Shaft No. 4, a distance of 645 ft., whence a tubular tunnel, 1,190 ft. 6 in., is taken to Shaft No. 3 close to the northern bank of the river.

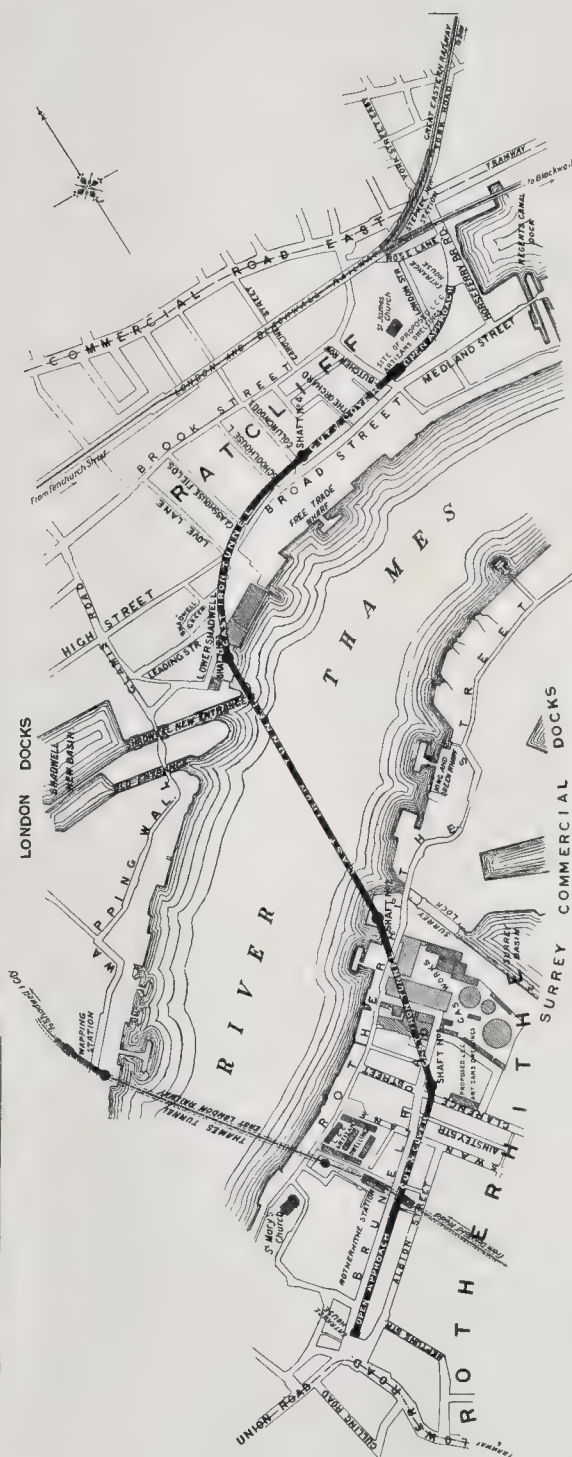
The shore-lengths of tunnel are connected by a subaqueous tunnel, 1,571 ft. 6 in. long, between the centres of the two vertical shafts. Thus the total length of the work, including approaches, is 6,883 ft., or about 14 miles.

At the Rotherhithe end the open approach

To be continued.

ROTHERHITHE TUNNEL.

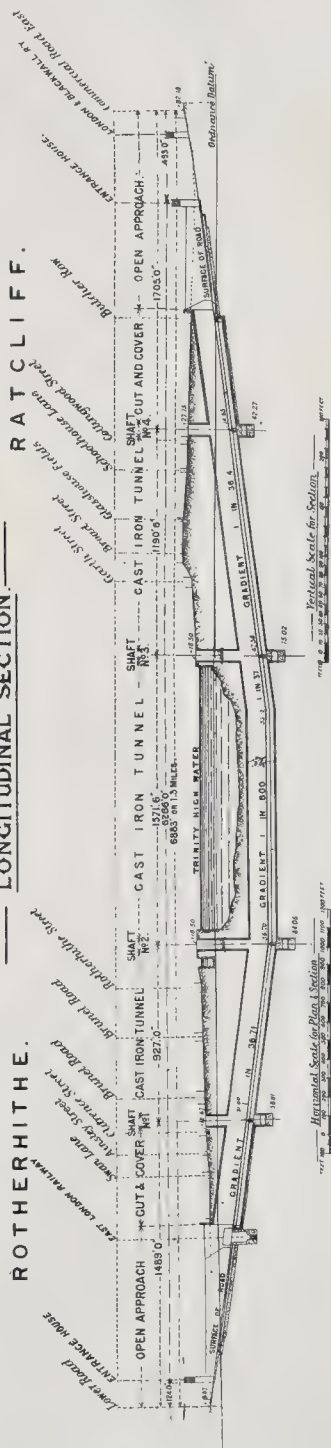
GENERAL PLAN:



ROTHERRITHE.

LONGITUDINAL SECTION.

RATCLIFF.



slopes downward with the gradient of 1 in 36.71 as far as the vertical axis of Shaft No. 2, the gradient of the Stepney approach being 1 in 36.4.

Each approach-cutting is lined with white tiles, which will be used for lining the remainder of the subway.

The diameter of the tubular tunnel is 30 ft. outside and 27 ft. inside, the level of the roadway measured on the vertical diameter being 8 ft. 6 in. above the bottom of the tube, thus giving a maximum clear headway of 18 ft. 6 in. The accommodation for traffic includes a roadway, 16 ft. wide, and two footwalks, each 4 ft. 7½ in. wide. The lower segment of the circle contains an arched subway, of 13 ft. 6 in. span, for the reception of large pipes. The remainder of the area is filled in with mass-concrete, but two covered channels are provided for water-pipes, electricity cables, as well as the necessary drain-pipes. The arch of the pipe subway has two brick rings springing from abutments of 1:4 concrete, the concrete used as filling material being in the proportions of 1:8. All the cast-iron segments used for lining the tunnel have the minimum thickness of 2 in.

Operations beneath the river-bed were necessarily conducted by the aid of compressed air in conjunction with the usual type of shield. Owing to the loose nature of the gravel through which the shield had to be forced, considerable trouble was experienced in the river-length of the tunnel. It is satisfactory to learn, however, that the two ends of the advance heading were connected early this month. A good deal of work necessarily remains to be executed before the tunnel will be ready for use by the public, but the most difficult part is now over.

By reference to the plan it will be seen that the route followed is by no means the shortest that could have been selected. No doubt a large sum of money might have been saved by carrying the subway straight across the river; but the main idea was to link up two busy districts badly in need of direct communication, and we are inclined to think that the additional outlay thereby involved will be justified by the saving of time that will be secured by the public. The approaches are situated in close proximity to railway and tramway routes, while the shipping, mercantile, and manufacturing districts on either side of the river will find ready means for the cartage of goods to or from the northern and southern docks and wharves.

The tunnel was designed by Mr. Maurice Fitzmaurice, C.M.G., Chief Engineer to the London County Council, and the contractors are Messrs. Price & Reeves, of Westminster.

BRITISH SCHOOL AT ATHENS.

LORD HALSBURY presided on Tuesday at the rooms of the Society of Antiquaries, Piccadilly, over the annual meeting of the British School at Athens.

Mr. J. Baker-Penoyre (secretary) submitted the report of the Managing Committee, which dealt with the King's visit to Athens, changes in the management of the School, the Olympic games, and the work of Messrs. F. W. Hasluck, R. M. Dawkins, A. J. B. Wace, Guy Dickens, H. J. W. Tillyard, J. P. Droop, A. C. Brown, F. Orr, and R. Traquair, and Miss Mary Hamilton and Miss E. B. Abrahams. Reference was made to the excavations of ancient Sparta (subsequently described by Mr. Bosanquet), to excavations in Boeotia and Palaikastro, and to work in the museum at Candia, etc. With regard to the plans for the coming session, it was stated that the main work should be the full excavation of the shrine of Artemis Orthia at Sparta. The work of tracing the ancient walls by means of trial trenches should also go forward, and more trial pits should be made on the Acropolis, with a view to locating the temple of Athene Chalkioikos. The *Heroon* on the river bank discovered last year should be fully excavated. Apart from the site of ancient Sparta, two places were recommended for trial excavations. The first was Helos, an early Achaean city, destroyed and not rebuilt (except for the temple of Poseidon) by the Dorians. Secondly, there was the Hyperteleatean sanctuary, where inscriptions and terra-cottas had been found. It was hoped also that the School's long connexion

with Crete would not be altogether broken. For Byzantine archaeologists the Director suggested churches in Paros and Chalcis, not yet adequately examined, that would probably repay careful study.

The Chairman, in moving the adoption of the Report, said that the physical powers of visiting these distant places had greatly increased of late years, but the young man who went out under the auspices of the School had different aims from the traveller of old, and the Report bore little resemblance either to the guide-book or to the published books describing the Long Vacation journeys of the summer traveller. For himself, he was filled with amazement at the keen sight which enabled some people to fix on some apparently unimportant grass-covered mound, and digging down, to discover a treasure-house of ancient things. It was a wonderful tribute to what he might call the scientific progress of the world to find that the scientific societies, in the very disturbed state of Southern Europe, were in such harmony with each other. Egyptian antiquities had been discovered for a long time, but a good many of them were discovered by processes which they did not want to repeat elsewhere. In Greece, however, the Germans and the French were good comrades in the great work of discovering the records of the past.

Sir Horace Rumbold, in seconding the motion, said that as British Minister at Athens he saw the beginning of that great School under the guidance of his old friend Mr. Fitzgerald. He had taken deep interest in the work, and wished the School every success.

The Report was then adopted.

Professor R. C. Bosanquet proceeded to describe the work of the School during the past year, which he said was a somewhat eventful one, since it included a visit from the King, the Patron of the School, the celebration of the Olympic games, and the beginning of excavations at Sparta, which it was hoped would add a new and important chapter to the history of Greek art, and perhaps of Greek institutions. They had been fortunate in having the services of five experienced old students. Mr. Hasluck had undertaken two fruitful journeys in Asia Minor and explored part of the district around Cyzicus, which he had now covered completely. Mr. Dawkins, who had spent the greater part of the last four years in Greece, visited Mount Athos, where he collected manuscripts, and made a journey with Mr. Wace through the Greek and Turkish islands, and he also made a remarkable discovery in the remote part of Thrace, where he found a link of the cult of Dionysus obscured under the form of a carnival festival. Mr. Hasluck, also, while in the Cyzicus district discovered an exceedingly well-preserved Roman bridge on the River Aesepus. Messrs. Dawkins and Wace for some years had been compiling information of the development of Greek embroidery, and in the last year had traced several varieties to their beginning. Mr. Dickens had continued his work on the sculptures of Damophon, and had been invited by the Greek Government to help in the re-erection of the colossal group at Lycosura. Mr. Tillyard had taken part in the excavations at Sparta, and Miss Hamilton had investigated miraculous cures practised both in Pagan temples and Christian churches. Miss Abrahams had investigated the arrangement of drapery in early Attic sculpture of the Vth century. Mr. Orr was a practised draughtsman, who for three months helped them in the preparation of material for the book on the Palaikastro excavations. Mr. Traquair had made plans and drawings of mediæval castles in the Morea and Byzantine churches in Constantinople, and Mr. Brown had investigated the topography of the battle of Delion. Proceeding to the excavations at Sparta, Mr. Bosanquet exhibited a view of modern Sparta, and said the modern town was not built on the ancient city, although a few Roman villas seemed to have extended to the site. The ancient Acropolis, the importance of which did not apparently develop until late in the classic era, was enclosed by walls of Roman date. These fortifications were begun in late Roman times after the sack of Sparta by the Goths. The upper part of the walls had been quarried away, and only the rubble core remained. A few fragments,

however, showed the original height. The wall was probably erected in the IIIrd century B.C., and raised and extended at a later period. There were many inscriptions used amongst the materials, and on digging below the level they were able to lay bare as much as 7 ft. of base and to locate several gates. There could be little doubt but that the barbarian invaders found Sparta devoid of fortifications. The Acropolis hill was hastily surrounded by walls made from materials of the buildings in the zone around it. The clue to the discovery of the Artemisium was the finding on the banks of the stream of some diminutive leaden figures by some boys. When the French surveyors visited Sparta seventy years ago they saw nothing of the temple which Mr. Dickens discovered, but they discovered a Roman building, which they planned, and it was found that this plan was remarkably accurate, although it was made at the time that the site was covered with undergrowth. They had now found the temple to which in the IIIrd century after Christ was added the horseshoe-shaped building enclosing an arena. There were many inscriptions giving accounts of musical and athletic contests in which the boys of Sparta engaged. In tracing the outline of the building they came to the foundations which supported piers, and there was a succession of arched openings recalling the Coliseum. To find a theatre attached to an early temple in this way was unique, and seemed to show that these contests continued right down to Roman times. It was impossible to resist the suspicion that one of the ceremonies for which the building was erected was the annual ordeal of scourging, by which the youths of Sparta earned their right to be reckoned amongst the citizens. A light alluvial soil now covered the site of the ancient town, and it was laid out in gardens and fields, and a millstream had been cut from the Eurotes, and apparently seemed to go through every important building. As he had said, the discovery of lead soldiers by some boys gave a clue, which Mr. Dickens followed up, and ascertained that 8 ft. below the bank of the stream was black earth teeming with lead, gold, bronze, and ivory figures and some very remarkable terra-cotta masks. They diverted the millstream and marked out 1½ acres, which was rich in figures and masks, etc., from the VIIIth to the Vth centuries. There were two principal strata; the older, characterised by geometric pottery and exquisitely-carved ivories, extended to the VIIIth century B.C., and the latter, which had yielded lead figures and grotesque terra-cotta masks, ranged from the VIIth to the Vth centuries. A figure of a horse bore a dedication to Artemis Orthia, and the offerings found showed that a cult was maintained for a length of 1,000 years. A group of ivories was discovered showing interesting affinities with some of those found by Mr. Hogarth at Ephesus. Between 10,000 and 15,000 lead offerings were discovered. They were little cast figures, flat at the back, and were evidently made in great quantities on the spot and sold to worshippers. There were figures of a double axe, a chariot, a hunter carrying his prey, a rider on a horse, numerous representations of the Goddess, or some neighbouring goddess, a figure of Pan, etc. An extraordinary series of masks were found, and the majority of these were deliberately grotesque. Many represented old men and women, but the wrinkles were so consistently present that it was possible that they took their origin from the practice of tattooing. The prominent type of the male nose was large and hooked. Some of the masks were made for actual use, and possibly were used in some kind of mystery play in connexion with the temple; others had solid noses, and were too small for wear, and they must suppose that they were made for votive offerings by the people who had played parts. The whole of these masks were found in a single trial pit, and there could be no doubt that an extension of the work would bring a much larger number to light, and it was to be hoped that later discoveries would prove or disprove whether the masks recorded the actual type of the citizens of Sparta. At any rate, the excavations promised to open to them new chapters in Greek art and Greek institutions, and the first pages they had turned were of the highest interest.

Mr. Cecil Smith made the announcement that the collection of votive offerings which had been discovered by Mr. Hogarth at Ephesus were temporarily in a room at the British Museum, and could be seen by those interested on presentation of their card. Unfortunately, the collection had to go back to Constantinople.

Mr. George Macmillan, in proposing votes of thanks to the officers of the School, referred to the death of Professor Jebb, a Trustee, and said that Dr. Leaf, who had acted as Treasurer, had been elected as Trustee, while Mr. V. W. Yorke had consented to act as Treasurer. Mr. Bosanquet was also leaving them to go to the Liverpool University as Professor of Archaeology, and they had appointed Mr. R. M. Dawkins as his successor.

Sir John Evans seconded the motion, remarking that the drawings they saw before them justified the existence of the School. He trusted they would be able to carry on the work both in Crete and Laconia.

The motion was carried, and a vote of thanks to the Chairman concluded the proceedings.

SOME HISTORICAL DETAILS AS TO SELBY ABBEY.

(FROM A CORRESPONDENT.)

THIS Abbey is stated to have been founded in 1069 by the Conqueror, and the church was dedicated to Our Lady and St. Germanus. When the King and Queen came here to settle the endowment Henry I. was born. No mention occurs of Selby in "Doomsday."

The privileges of the monks were very considerable, William I., *inter alia*, freeing them from all exactions and granting all such privileges as were enjoyed by St. Peter's at York. King Rufus gave the patronage of the Abbey to Thomas, Archbishop of York and his successors, together with the Church of St. Oswald, Gloucester, in lieu of the jurisdiction which that Archbishop claimed over Lindsey, Lincolnshire. The Archbishop re-granted the Abbey church soon after, and made the monks free from all custom *exceptio Christianitatis causâ*. They also had licence to elect Abbots.

Pope Alexander II. granted to the Abbot and his successors for ever the faculty to use the mitre, pastoral staff, dalmatic, gloves, and sandals, and of blessing the palls of the altar and other ecclesiastical ornaments, and of conferring the first tonsure (1076). The list of benefactors and donors occupies nineteen columns of Dugdale.

Of the Abbots, Benedict occurs in the Founder's Charter; Helias, 1144, resigned or was deposed, and one, Wilelmus, was elected by the monks, but rejected by the Archbishop of York; Germanus was the next Abbot, and Helias, on Germanus's removal, was reappointed, but reinstated on Helias's removal; Robert Selby, *alias* Rogers, was the last Abbot, elected in 1526. He surrendered on December 6, 1539, and the surrender was enrolled on February 6 following. He was pensioned with 100*l*.

In 26 Henry VIII., the Abbey was rated at 72*9*l. 12*s*. 10*d*. (Dugdale), 81*9*l. 2*s*. 6*d*. (Speed). The Valor gives 71*9*l. 2*s*. 64*d*. The original survey of March 25, 1540, was in the Augmentation Office, and is very quaint. Dugdale quotes it in full, occupying several columns. The site was granted, 32 Henry VIII. (1541) to Sir Ralph Sadler for 736*l*. down and 3*l*. 10*s*. 8*d*. per annum, and he obtained a licence the same year to alienate it, with the land called "Little Park" of 10 acres, and the Manor of Selby with its appurtenances, to Leonard Beckwith and his heirs. It afterwards descended to the Walsleys of Drinkhalgh, Lancashire, whose heirs married Lord Petre. Lord Lonsborough secured it in 1854.

There is an anonymous legendary history of 1184. A register perished in the fire here in 1731, and Tanner mentions three others; the Harleian MSS. contain several instruments, to one of which part of the great seal is pendant.

An impression of the Abbey seal is on a deed of 1282 in the Harleian Collection, bearing on the obverse an Abbot in pontificals seated, but without the mitre, his right hand is raised to bless, a crozier is in his left hand. The remains of the inscription are: ILLV SCI GERMANI SELEBIENSIS ECCLE. At the back is the counter-seal, in

the centre of which, indented, is a head with a diadem (apparently an ancient gem), with the words DN HONORIVS AVG in small characters; extending beyond the indentation is another inscription: CAPVD NOSTRVM CRISTVS EST, in large type. William de Askeleby was Abbot then. Another seal, earlier, exists of Richard, who possibly used the above, or a similar counter-seal. Another one of Richard is on an ancient deed formerly in the office of the Duchy of Lancaster; it is large and oval, and of red wax, with a full-length figure of an Abbot holding a crozier in his left hand and blessing a youth with his right. The inscription is: RICARDI DEI GRA MINISTER HVM ECCLE SCI GERMANI DE SELBE.

Another seal yet is on a deed of 22 Henry VIII., and was in Westminster Chapter-house, and bears a mitred Abbot, with a crozier, under rich Gothic canopy-work, and the inscription: SIGILLVM ROBTI SELBY ABBIS SELBY. A shield with arms is under him.

The Abbey church, founded in the XIIIth century by Hugh, Sheriff of Yorkshire, was restored subsequent to the appeal issued in October, 1898, at a cost of 10,000*l*. The now ruined and gutted nave and north transept are Norman, and the choir and east end Gothic. The poor tower was rebuilt in the XVIIIth century, the former one falling in with disastrous effects on March 30, 1690. The west door, which has been saved from the recent conflagration, is Norman, and of a very ornate character. The east end had a Jesse window, one of the few specimens in the country. A few fragments of it remained at the beginning of last century, and the window has fortunately been saved. The chapter-house is on the south side of the choir.

From east to west the church, which was cruciform, was 267 ft. long and 50 ft. from north to south, 100 ft. at the transepts, the east and west ends being of equal distance from the pillars supporting the tower.

In 1737 Burton wrote that the chief buildings were on the west and south sides of the church, to which they were joined by a supposed chapter-house, arched with stone, towards the east end, and by a cloister towards the west end, with a row of four round stone pillars supporting its groined vault. The first was then a vestry, over which was a chamber used as a school. The latter was an open stable, and upon the arch was a garden. A barn, with part of a granary and the chief entrance, or great gateway, facing the north still remained. On the side of the latter was the porter's lodge; over these, arched with stone, were two chambers, where the Abbots held their courts and transacted public business; and in 1825 they were still used as a Senate House.

The church was made parochial on March 20, 1618 (16 James I.). The patron is the Archbishop of York. J. A. R.

THE WORK TO BE DONE AT SELBY ABBEY.

We print on another page a short account by Mr. J. Oldrid Scott, written specially for this journal, on the state in which the building was left after the fire. The following additional particulars, taken from his formal Report (which has already appeared in some of the daily papers), may be added here:—

"Over and above the injury the tower has suffered from the fire, there is in it a source of danger which should certainly be dealt with in connexion with the other repairs, as the opportunity, if missed now, could never recur.

The tower was originally built on a most insecure foundation. Instead of the piers having been carried down to the solid clay which underlies the site, they only penetrated the upper soil to a small depth, and, as this soil consists of a kind of quicksand full of water, the great weight of the tower caused it to sink very seriously. This action began soon after it was built in the XIIIth century, the arches abutting on it being much distorted.

In the XVIIth century the mischief had gone so far that the south-east pier of the tower gave way, and the greater part of the superstructure fell, and the south transept and the adjoining destroying the choir and its south aisle. This pier was rebuilt a few years later, together with the south and east sides of the tower, while the injuries to the choir and its aisle were finally made good fifteen years ago. The weakness, however, still remains on the north side of the tower, and only a few years since gave those concerned much alarm.

The result was that it was thought necessary to remove the upper stage of the tower, which dated from the XVIIIth century, in order to reduce the weight on the foundations. The tower can never be looked on as permanently secure till this weak-

ness has been removed by underbuilding the foundations and carrying them down to the solid clay below. This happily is found at no great depth, and it is of the utmost importance that this essential work should be undertaken."

The following are the architect's approximate estimates of the cost of the work which will have to be done in order to adequately reinstate the building:—

	£	s.	d.
Nave and its Aisles and West Towers—			
New roof of the same design as the old, with the colouring of the panelled ceiling			
The general repairs to the nave, its aisles, and western towers			
New floors so far as necessary			
The temporary enclosure at the east end	5,000	0	0
Choir and its Aisles—			
The general restoration of the choir with the new roof and oak groining, following in all respects the old design			
The restoration of the injured stonework and floors			
The general repairs to the choir and its aisles	8,250	0	0
(The repair to the painted glass in the great east window is not included, being provided for by separate insurance.)			
The Fittings—			
The reedos, altar, altar rails, repairs of sedilia, aumbries, side screens, stalls, repairs of stone screens, pulpit, organ case, and other fittings	8,000	0	0
The Tower—			
Reinstatement of the roof, floors, bell beams, and ceiling			
General repairs and paving and underpinning	3,500	0	0
Recasting and hanging the bells, say	500	0	0
North Transept and Latham Chapel—			
New roof and floors, rebuilding the stone piers and the three arches, structural repairs, new tracery, etc., where necessary	6,000	0	0
(The organ is not included, as it is separately insured.)			
Architect, clerk of works, and incidental expenses	2,500	0	0
Contingencies and unforeseen expenses, say	2,000	0	0
	£35,750	0	0

The question as to the rebuilding of the tower according to its ancient design is left out of this computation. It appears that an old drawing is in existence showing the tower as it existed before its fall in the XVIth century, and Mr. Scott's design for rebuilding it, which was published in this journal, was a reproduction, as far as possible, of this. In the end it would, we think, be desirable to carry out this design; but obviously the other portions of the work are more pressing in the first instance.

NEWCASTLE-UPON-TYNE.

THE new bridge over the Tyne that the King opened with so much splendid ceremonial a few weeks ago is now in every-day use. It was not so for some little time after the regal opening. Trains now glide over it continually to and fro, and it has quite entered into its place as part of "Canny Newcastle." The great prosperity of this northern city is a matter of the same kind of marvel we bestow upon the extension of the metropolis. Since the day William Rufus built a castle upon the site of the old Roman station, called Pons Ælii, it has never "looked behind it," to use a north-country phrase, or has pursued one unvarying course of industry, enterprise, endeavour, and success. In the centuries between that time and to-day its generations of inhabitants built churches and chapels, bridges (only one, however, for some long time, though now there are four), and quays, noble streets with mansions in them that were the town dwellings of Northumbrian nobles and gentry, others scarcely less commodious for the prospering merchants, as well as smaller houses for poorer people; and they built a wall round the town 12 ft. high and 8 ft. thick, and more than two miles in circumference, and pierced it with six (some antiquaries say seven) great gateways, and on it placed stone figures of men such as we see to-day upon the walls of Alnwick Castle. They enjoyed the privilege of minting coins with the heraldic device of the town upon them (three towers); and from the reign of Edward II. were represented in Parliament by two members.

The primary source of the continuous prosperity of Newcastle is, of course, the great yield of coal in the neighbouring coalfields.

It is on record that Henry III. allowed the burgesses to dig for coal and stone in the castle fields, and that Edward III. also gave them this privilege; and we have the extra interesting fact recorded that 676 chaldrons of coals were consigned to Adam De Hertyngh-done, the clerk of the works at Windsor Castle, where considerable building operations were in progress, in the forty-sixth year of the reign of that monarch. At first coal seems to have been used only by smiths or in industrial processes. The residents in London opposed the general adoption of it in houses, and they even obtained a prohibition against its use. Stow tells us there was a time when London dames would not enter a house where coal was burned, nor eat meat that was roasted by its means. At the Coronation of Edward III., however, it was again in use in London; and French vessels bringing corn up the Tyne returned to their own ports laden with coal. After Queen Elizabeth took a lease of some coal-bearing manors, the price of the fuel immediately rose, and, notwithstanding monopolies and customs, the trade ever afterwards flourished exceedingly.

The facilities given by the coalfields led to the establishment of glass works, iron works, earthenware manufactories, soaperies, roperies (most of the great countless coils required for shipping are made here), chemical works, engineering works, shot works, and others; and in our own time we have the gigantic ordnance works, established by the late Lord Armstrong, stretching for a mile and a quarter along the river-side. For fifteen miles the banks of the Tyne are lined with industrial works, including great ship-building centres, on which depend a population estimated at 600,000 souls. Among these people we may note a particular diction and phraseology that may have been handed down from times as remote as the Heptarchy, or the invasions of Vikings that were once so frequent. There is, too, among them an intimacy, or homeliness and heartiness, that accounts for the word "canny" being applied to the town, which term does not always mean cautious, as is sometimes supposed, but "near and dear and true," expressed in this scantier and less laureate-like form. They have their own songs, of which "The Keel Row" is known to us all; and they have a particular sword-dance which is danced by miners before the Duke and Duchess of Northumberland annually, on one of the occasions when retainers and neighbours are entertained in the guest-hall in Alnwick Castle. Their plant lore—at all events in one instance in its nomenclature—is striking, as when they call the sturdy, humble stonecrop "Welcome-home-husband-be-he-ever-so-drunk."

Among the general population the number of individuals who have attained distinction is surprising. In the school kept by the late Dr. Bruce, author of "The Roman Wall" and the "Handbook to the Roman Wall," there must have been nearly a score of pupils who became baronets or were knighted. The great naval hero, Lord Collingwood, "belonged Newcastle," as it is phrased there; and the Stephensons have left another kind of radiance. Bishop Ridley was educated in the grammar school, as were Dr. Aken-side and Lords Eldon and Stowell. Earlier than these, and in the ranks of lesser celebrities, were Robert Rhodes, who is said to have been at the cost of the beautiful steeple with its flying buttresses and lantern, 195 ft. in height, on the church of St. Nicholas (since 1882 the cathedral); and Roger Thornton, who was also a munificent benefactor. The fine monumental brass of this last-mentioned merchant with that of his wife by his side is one of the many interesting relics of which the town is proud.

There are twenty-four churches in Newcastle, besides many more in the closely adjoining districts, and nine in Gateshead across the water. Five of them are legacies from the past, and have many touches from vanished hands in their canopied fonts and other details. They have many traditions, too. There is a lingering thought that Charles I., when a prisoner in Newcastle, may have taken in hand the chalice still in use in one of them, and a recorded remembrance that he called aloud for a particular Psalm (lvi.) to be read in opposition to that selected by the minister in St. Nicholas. We are told, too, that when ordered to surrender by General Leslie with a threat that

he would otherwise destroy the famous steeple the mayor placed some Scottish prisoners in it, and replied they should perish with it, which proceeding saved it. Besides the ancient churches with their monuments and legends there is much of the early city still standing looking down upon the ceaseless industry and enterprise of to-day; looking down, too, upon busy streets that were once only footpaths through the open country. There is the keep of the castle, as lofty, grim, and stalwart as ever (only darker with centuries of coal smoke), though not so likely to withstand the great guns manufactured close by as it was to repel the brave arches and spearmen who first looked upon it; there is the Black gate, which was the principal entrance of the area within the castle walls, and is now a museum; and there are fragments of the town walls here and there. The gateways have been removed, the bridge was swept away in a flood, and many of the old charitable institutions that once abounded have also disappeared, as well as several monastic buildings. But in the narrow chares or lanes, in out-of-the-way nooks, and along the river on the quays, we are still aware of the great past. (It may be mentioned here that it is a standing joke, when a man's occupation is unknown, to conclude he must be "something on the quay.") The early Nonconformists, too, made strenuous efforts in the way of chapel building in the first half of the XVIIIth century that have left their mark; and Pugin gave a specimen of his skill in the last century that is still a prominent feature on the sky-line of the canny town.

The Newcastle of to-day, however, is on a very different scale. The great black-and-white ships with their forests of masts, the hurrying steamboats churning the waters, the barges, boats, and other craft on the river are a sight to see from the bridges; the streets and open spaces lined with brilliant shops are another; the traffic of all sorts is a third, as it cautiously passes down the Side, or with greater ease makes more rapid way along the level thoroughfares; the streams of people passing to and fro, or congregating in patches or crowds on the quay-side or elsewhere, make a fourth. The markets of many sorts give another aspect of constant movement and of abundance. The new infirmary, towards the cost of which a citizen, Mr. John Hall, with a generosity equalling that of the old medieval residents, Rhodes and Thornton, gave 100,000., and Mr. and Mrs. Watson-Armstrong, now the second Lord and Lady Armstrong, gave another 100,000., and Sir Riley Lord collected more than another similar sum (108,884.), exceeds anything of the kind in the kingdom in its extent and the completeness of its equipment. The Armstrong Park continuing on to Jesmond (both gifts of Lord Armstrong), and five more parks beautified with lakes, rockeries, shrubberies, and flower-beds, to say nothing of the breezy town moor, afford fine breathing spaces. The three college buildings, the six theatres (one is after the manner of the Pantheon at Rome), the three sets of public baths, the Laing Art Gallery (due to more local munificence), the Natural History Museum with its fine collection of birds and fossils, the free library with its branches in different quarters of the town, the cosy "Lit and Phil," as the Literary and Philosophical Society's library is familiarly called, the seven clubs, the numerous banks in palatial buildings all contribute to the means of self-improvement and the general appearance of wealth and prosperity. There are statues, too, here and there—Queen Victoria, George Stephenson, Lord Grey, Joseph Cowen, and Dr. Rutherford—all bearing witness to the art-lovingness of the inhabitants. Newcastle audiences are allowed to be receptive and appreciating in all histrionic and musical matters, and one famous divine, John Wesley, was so delighted with the congregation his first open-air sermon drew around him that he declared, in after years, "Certainly, if I did not believe there was another world, I would spend all my summers here, as I know no place comparable to it for pleasantness." Novocastrians of the present day, it must be owned, though, prefer to spend their summer holidays in other places, either near at hand, as at Bamforth, Rothbury, Warkworth, and Alnmouth, or farther afield. Hence, in some degree, the necessity for the outlay on the new bridge the King and Queen

journeyed to open as a means of facilitating the ever-increasing traffic. A feature of interest in the streets is the presence of strangers from distant lands, Far Cathay and the land of the Rising Sun, who have come to study engineering and other scientific pursuits. One of them, a Japanese gentleman, gave an informing lecture on "The Spirit of Japan," a short time ago, in excellent English. As we think of Newcastle, however, it is not of these exceptions, but of the hearty, hardy, industrious population that welcomed their Majesties, and whose ancestors welcomed Plantagenet monarchs in the long ago, and rallied round the standard of William Rufus in the still more distant past; and we hear the clang, clank, clash, and thud of machinery, the thrill tones of steam-whistles, raspings, swishings, and hammerings with tools, the rush of vehicles, and the footfalls of multitudes. S. W.

THE LONDON COUNTY COUNCIL.

The usual weekly meeting of the London County Council was held on Tuesday in the County Hall, Spring-gardens, S.W., Alderman Spicer, Chairman, presiding.

Loans.—On the recommendation of the Finance Committee, it was agreed to lend Poplar Guardians 8,725l. for poor law purposes; St. Pancras Borough Council 701l. for street lighting; Southwark Borough Council 10,521l. for extension of town hall; and Wandsworth Borough Council 2,000l. for land for slop-shoot.

White Hart-lane Estate—Sale of Land.—The Improvements Committee recommended:—

That the freehold interest in a portion of the northern section of the White Hart-lane estate, lying an area of about 113 acres, and shown in red colour on the plan, be sold at the rate of 450l. an acre to the Home Workers' Aid Association; that the solicitor do apply for any necessary consent of the Local Government Board, and, subject thereto, do complete the sale.

The consideration of the matter was adjourned.

Suggested Footway Tunnel Under the Thames to Connect North and South Woolwich.—The Improvements Committee reported as follows:—

"The late Bridges Committee, on June 6, 1905, recommended the Council to apply to Parliament in the session of 1906 for power to construct at an estimated cost of 145,000l., a footway tunnel under the Thames to connect North and South Woolwich. Consideration of the recommendation was adjourned until July 25, when the matter was referred back to the Committee with instructions to report upon the question in twelve months' time.

The only present means of crossing the river at Woolwich for either vehicular or passenger traffic is the Council's free ferry, and there is no other access between the north and south sides of the river nearer than the Blackwall Tunnel, about three miles westward. It is not possible to increase the frequency of the ferry services, and these, under normal conditions, are scarcely sufficient to deal adequately with the traffic proceeding across the river at this point. Moreover, in bad weather, and during the prevalence of fog, the ferry service has at times to be entirely suspended, and on such occasions inconvenience is caused to the public. Apart from the occasions on which the ferry service has to be suspended, the service is necessarily irregular, owing to its being affected by the large amount of shipping passing up and down the river to and from the numerous large docks which are situated to the west of Woolwich. Very many persons of the working class have to cross the river from one side to the other to proceed to their work, and we feel that the hardship entailed upon them at such times is particularly serious. The Bridges Committee suggested that a footway tunnel, about 500 yds. long and about 11 ft. in diameter, similar in design to the Greenwich tunnel, should be constructed under the river at the point where the free ferry crosses. It would probably not be necessary to acquire any land in connexion with the construction of the tunnel, as the shafts on either side of the river could be sunk under land belonging to the Council, and we have reason to believe that the local authority, the Woolwich Metropolitan Borough Council, would be prepared to consider favourably the question of giving the necessary facilities therefor. We are advised that, in view of contingencies, it would be desirable to increase from 145,000l. to 150,000l. the estimate of the cost of the tunnel.

That no action be taken for obtaining, in the session of Parliament of 1907, power to enable the Council to construct a footway tunnel under the Thames to connect North and South Woolwich; and that the Woolwich Metropolitan Borough Council be informed of this decision."

School Accommodation.—The Education Committee recommended, and it was agreed:—

"(a) That the supplemental estimate of expenditure on capital account of 2,062l., submitted by the Finance Committee in respect of the acquisition of the outstanding interests, payment of fees, and expenses in connexion with the site in Rushmore road (Hackney, S.), which is being acquired for the purpose of erecting a junior mixed school thereon, be approved.

(b) That additional expenditure on capital account, amounting to 2,052*l.*, for the purpose referred to in the foregoing resolution (a), be sanctioned.

Additions to, and Removals from, the List of Contractors to Tender.—The following recommendations of the Finance Committee were agreed to:—

(a) That the names of the undermentioned firms be added to the list of contractors to be invited to tender for new schools, enlargements, structural alterations, repairs to buildings, cleaning and painting, subject, as regards Messrs. S. Wiles & Son, to the conditions that the value of the works shall not exceed 5,000*l.*, and that the name of the school shall be placed on probation for one year:—(i.) McLaughlin & Harvey, Ltd., 13, Brecknock-road; (ii.) F. & E. Davey, Ltd., Elmer-avenue, Southend-on-Sea; (iii.) S. Wiles & Son, Haveshill, Contractors.

(b) That the name of W. Silk & Son, 13, High-street, Homerton, be added to the list of contractors to be invited to tender for structural alterations not exceeding 1,000*l.* in value, and for repairs to buildings on the schedule of prices.

(c) That the name of the Thames Electrical Joinery Company, Ltd., Townmead-road, Fulham, be added to the list of contractors to be invited to tender for providing and fixing partitions.

(d) That the names of the undermentioned firms be added to the list of contractors to be invited to tender for repairs to buildings, cleaning, and painting:—(i.) W. Bailey, Pelton-road, East Greenwich; (ii.) Nowell & Lusty, 24 and 26, Wilson-street, Poplar.

(e) That the names of the undermentioned firms be added to the list of contractors to be invited to tender for heating apparatus, subject, as regards W. Simmons, to the condition that the value of the works shall not exceed 2,000*l.*, in value, and for repairs to buildings, cleaning, and painting:—(i.) Charles P. King, 44, St. Augustine, 228, Berners-street; (ii.) W. Simmons, Martin Works, Frederic-street, Stratford.

(f) That the names of the undermentioned firms be added to the list of contractors to be invited to tender for gas services, fittings, etc.:—(i.) S. Pontifex & Co., Regent-buildings, Euston-street; (ii.) Tilley Brothers, Grosvenor-buildings, Grosvenor-street.

(g) That the names of the undermentioned firms be retained temporarily on probation for a further period of one year on the list of contractors to be invited to tender for works to Council schools:—(i.) J. Richmond-road, Uxbridge-road Station, for structural alterations not exceeding 2,000*l.* in value, repairs to buildings, cleaning, and painting; (ii.) A. Stanger, 228, Berners-street, for repairs to buildings, cleaning, and painting.

(h) That J. Shebourne & Co., 70, Fenchurch-street, be not invited to tender for works to Council schools for a further period of three months as from October 24, 1906.

(i) That the name of J. W. Cooke & Co., 75, Finsbury-pavement, be added to the list of contractors to be invited to tender for the supply of special playground notice boards.

(j) That the undermentioned firms, which have been converted into limited liability companies, be allowed to tender as hitherto:—(i.) H. Bragg & Sons, 19, Robart-street, Brixton-road; (ii.) Bargman, Son, & Co., 18, Bridge-lane; (iii.) G. E. Wallis & Sons, Broadmead Works, Maidstone.

(k) That the names of the undermentioned firms be removed from the selected list of contractors so far as relates to work in connexion with Council schools:—Kennex Brothers, Erith, Kent, new schools, etc.; Aldridge & Son, 78, Harlesden-road, structural alterations, repairs to buildings, cleaning, and painting; M. Pearson, 64, Old Compton-street, So., structural alterations, repairs to buildings, cleaning, and painting; Holland Park, Bayswater, and Kensington Window Cleaning Company, 11, Silver-street, Kensington, window cleaning; W. P. Filmer, 4, Westwood-road, Westwood, heating apparatus; A. Ingram, 34, Commerce-road, Wood Green, cleaning and repairing clocks; Sainsbury Brothers, Ltd., Black Horse-road, Walthamstow, cleaning and repairing clocks; Bolton, Fane, & Co., 228 and 300, Goswell-road, heating apparatus.

(l) That the applications of the undermentioned firms to be placed on the list of contractors selected to tender for works to Council schools, as follows, be declined:—G. Wales & Co., Ltd., 130, Cassland-road, South Hackney (repairs to buildings, cleaning, and painting); W. Simmons, Martin Works, Frederic-street, Stratford (gas services and fittings); Elwood Brothers, 12 and 14, Pocklington-walk, Leicester (locks, ironmongery, etc.); Tarmac, Ltd., 20, Victoria-street (lat-paving).

Mosaic Panel, Horniman Museum.—The Local Government, Records, and Museums Committee recommended:—

"That expenditure not exceeding 135*l.* be sanctioned for repairs to the mosaic panel on the front of the Horniman Museum; that the offer by Messrs. Burke & Co. to carry out the work for the sum of 110*l.* and to guarantee its permanency be accepted; that the Council and the Council and the solicitor do prepare and obtain the execution of a contract to give effect to the offer, and that the seal of the Council be affixed to the contract, when ready; and that a sum of 25*l.* be paid to Mr. Anning Bell for supervising the work."

Theatres, etc., Works.—The following proposals were agreed to:—

"Electric heaters at the Comedy Theatre, Pantons-road, Baysmarket (Charing Cross, West-end, and City Electricity Supply Company, Ltd.).

Concert-hall, St. Paul's Church, Great Portland-street, to accommodate 750 persons in the body of the hall, and 484 in the gallery (Messrs. Joseph & Smith).

Heating apparatus at the Queen's Music-hall, Poplar (Messrs. Alexander Ritchie & Co.).

Gates at the east and west ends of the 20-ft. passageway at the Putney Hippodrome, Felsham-road, Putney (Mr. F. W. Hingston).

Exit Doors at Theatres.—The Theatres

and Music Halls Committee reported as follows:—

"At recent inspections of the Elephant and Castle Theatre, New Kent-road, it was found that hasps and staples had been fitted to certain of the exit doors, and that one of the doors was fastened in an irregular manner. We are of opinion that in order to enable the Council to take proceedings, should there be any repetition of this dangerous practice, a notice under the 45th sect. of the Metropolitan Board of Works (Various Powers) Act, 1892, should be served on the person keeping open the premises. We recommend that a notice under the 45th sect. of the Metropolitan Board of Works (Various Powers) Act, 1892, containing the undermentioned requirements, and specifying twenty-eight days as the time within which they are to be complied with, be prepared by the solicitor; that it be sealed in duplicate, and be served upon the person by whom the premises, known as the Elephant and Castle Theatre, New Kent-road, are kept open for public entertainments; and (ii.) that all such doors and gates shall be fastened during the time they are authorised to be closed by automatic bolts only of a pattern or patterns which shall have been approved for the said doors or gates by the Council; (iii.) that such doors and gates may be closed during the times fixed for the admission of the public to, or the presence of the public in, the said premises, on condition that there shall not then be upon any such door or gate any fastening other than an automatic bolt, in proper working order, of the pattern approved by the Council for such door or gate, and on condition that on every occasion when the said premises are open for the admission of the public each of such doors or gates shall, immediately prior to the admission of the public thereto, be fully opened and closed again for the purpose of ascertaining that the same is in proper working order."

The recommendations were agreed to.

Having transacted other business, the Council adjourned.

APPLICATIONS UNDER THE 1894 BUILDING ACT.

The London County Council at their meeting on Tuesday dealt with the following applications under the London Building Act, 1894. The names of applicants are given between parentheses:—

Line of Frontages and Projections.

Kensington, South.—An angle turret to a proposed building at the corner of Melbury-road and Holland Park-road, Kensington (Mr. C. J. C. Pawley).—Consent.

Kensington, South.—That the application of Messrs. Wetherall & Green, for the Trustees of the Campden Charity, for an extension of the periods within which the erection of buildings on the site of Nos. 42, 43, and 44, Hyde Park-gate, Kensington-road, Kensington, to be abutted also upon Hyde Park-gate, was required to be commenced and completed, be granted.—Consent.

Marylebone, East.—A projecting balcony in front of a proposed block of buildings between Nos. 18 and 20, Cavendish-square, St. Marylebone, (Messrs. Gilbert & Constardous).—Consent.

St. George, Hanover-square.—Two bay windows in front of No. 11, Grafton-street, Old Bond-street (Mr. W. Woodward for Mr. B. Quaritch).—Consent.

Strand.—A stone balcony in front of No. 13, New Burlington-street, Regent-street (Messrs. A. E. Hughes & Son for Mr. D. C. Apperly).—Consent.

Strand.—A deviation from the plans approved on July 24, for the erection of a projecting due to the Savoy Hotel extension, on the northern side of Somerset-street, Strand, so far as relates to an increase in the amount of the projection of such due (Messrs. Collett & Hamp).—Consent.

Woolwich.—Wooden balconies in front of Nos. 16 and 17, Glesneak-road, Eltham (Mr. D. Warry for Mr. G. Van Gysegem and himself).—Consent.

Woolwich.—Bay windows to seven houses upon the southern side of Godfrey-street and Lower Wood-street between Godfrey-street and Lower Wood-street (Mr. S. A. Devereux).—Consent.

Deptford.—A one-story building at the flank of No. 296, Queen's-road, Deptford, to abut upon Erlanger-road (Mr. A. D. Johnson for Mr. M. H. Glover).—Refused.

Lewisham.—Two houses on the northern side and two houses on the southern side of Bargery-road, and two houses on the northern side of Inchmery-road, Catford, with the flanks of three of such houses abutting upon Penderley-road (Messrs. Norfolk & Prior for Mr. J. Watt).—Refused.

Lewisham.—A building on the south-western side of Thameshead-road, Catford, with the flank of such building abutting upon Bargery-road (Messrs. Norfolk & Prior for Mr. J. Watt).—Refused.

Width of Way.

Lewisham.—The retention of a forecourt wall and the erection of a fence on the eastern side of Plassey-road, Catford, along the western side of the yard belonging to the premises marked "house and shop" (Mr. T. Buckland).—Consent.

Width of Way and Line of Frontage.

Kensington, South.—A projecting shop front on the King-street frontage of a proposed addition to Nos. 95 and 97, High-road, Kensington (Messrs. Pilditch & Co. for Messrs. J. Barker & Co., Ltd.).—Refused.

Width of Way and Height of Building.

Westminster.—A building on the eastern side of Great Chapel-street, Westminster, to abut also upon Dacre-street (Messrs. Griffin & Woolard for the Westminster Trust, Ltd.).—Consent.

Deviation from Certified Plan.

Hamstead.—Deviations from the plans certified by the District Surveyor, under sect. 43 of the Act, so far as relates to the re-erection of No. 23A, Downshire-hill, Hamstead (Messrs. P. & H. W. Curry).—Consent.

Height of Building and Cubical Extent.

Kensington, South.—A proposed addition to Nos. 95 and 97, High-street, Kensington, to abut upon King-street and Ball-street, and to exceed in height the width of Ball-street, and a modification of the provisions of sect. 75 of the Act, so far as relates to Nos. 95 and 97, High-street, when the proposed addition is made thereto, exceeding in extent 250,000 cubic feet (Mr. P. E. Pilditch for Messrs. J. Barker & Co., Ltd.).—Consent.

Buildings for the Supply of Electricity.

Marylebone, East.—A pump-house at the Grove-road generating station, Grove-road, St. Marylebone (Mr. C. B. Peach for the Central Electric Supply Company, Ltd.).—Consent.

Formation of Streets.

Woolwich.—A deviation from the plans approved sanctioning the formation or laying out of a new street for foot traffic only to lead northward out of Godfrey-street and Lower Pellipar-road, Woolwich, and in connexion therewith the erection of a Sunday School upon a site approached by such street, so far as relates to an alteration in the planning of the northern portion of the Sunday School (Mr. H. Busbridge for the Building Committee of the Fellipar-road Sunday School).—Consent.

Woolwich.—The application of Mr. M. Fitzmaurice for the Main Drainage Committee of the Council, for an extension of the time within which the roadway of a new street for carriage traffic, to lead from Church-manorway to Harrow, and thrown open to the public as a highway.—Consent.

The recommendations marked † are contrary to the views of the local authorities.

Architectural Societies.

ARCHITECTURAL ASSOCIATION RIFLE CLUB.

This Club was formally inaugurated on Saturday last at the headquarters of the London Scottish Rifle Volunteers, Buckingham-gate. Mr. R. S. Balfour, President, presided, and there was a large gathering of Architectural Association members. Lord Chylesmore (who was accompanied by Colonel Broadwood and Colonel Greig), as Mayor of Westminster and President of the National Rifle Association, expressed the view that rifle clubs did not mean militarism, but only a kind of patriotism. Colonel Broadwood spoke highly of the benefit of rifle clubs to the country, and Colonel Greig also spoke of their use. Mr. R. S. Balfour said that the Association, as citizens of Westminster, would do their utmost to preserve its ancient buildings from the depredations of the speculative builder. After the speeches the audience descended to the Morris tube range, when Lord Chylesmore fired the first shot and scored a bull's-eye. The Architectural Association Rifle Club numbers over seventy members, and there is every prospect of its being a popular branch of its work. The Association now possesses also football, hockey, cricket, and swimming clubs, all of which are in a flourishing condition. The Rifle Club members hope at a future date to compete at Bisley. Mr. A. W. Earle has been elected Captain of the new Club, with Mr. H. Squire as Honorary Secretary.

LOCAL ARCHITECTS' SOCIETY, GLOUCESTER.

A meeting of architects practising in Gloucester, Cheltenham, and Stroud was held at the Bell Hotel, Gloucester, recently, for the purpose of considering the desirability of forming a local society of members of the profession. There was a good attendance, Mr. F. W. Waller being voted to the chair, and there were present Messrs. E. J. Cullis, J. G. Crisp (Cheltenham), H. A. Dancy, S. H. Healing (Cheltenham), W. F. Jones,

T. Malvern (Cheltenham), G. P. Milnes (Stroud), T. Overbury (Cheltenham), R. S. Phillips, J. Fletcher Trew, J. Villar (Cheltenham), and H. J. Weaver. Mr. Overbury, Hon. Secretary *pro tem.*, read letters from Messrs. A. W. Probyn and W. B. Wood (Gloucester), and from Messrs. B. C. Gray and W. Ridler, of Tewkesbury, who were unable to attend the meeting, and further correspondence was received from the local architects who favoured the proposal. Discussion then took place as to the desirability of establishing a local society for the mutual help and advancement of the profession in this district, and it was unanimously decided that a society should be formed forthwith. A Provisional Committee was appointed to make preliminary arrangements and to draw up rules to be submitted to a future meeting. The Chairman expressed hearty approval of the scheme, and considered it would be of great benefit to local members of the profession. The meeting terminated with a vote of thanks to the Chairman, Mr. Waller, for presiding.

GLASGOW ARCHITECTURAL ASSOCIATION.—There was a good attendance at the opening meeting of the session, when the President, Mr. James Lochhead, delivered an address to the members. His opening remarks referred to the gratifying increase in membership during this and the previous session and the excellent quality of the papers delivered by members and others to the Association last session. The address which followed partook of the nature of a plea for greater alliance in the practice and study of architecture, his endeavour being to emphasise the necessity for a thorough understanding and collaboration, not only between architects and contractors, but between architects themselves in the pursuit of their ancient and honourable profession. It was regrettable that the public appreciation of architecture fell so short of the attention bestowed on the sister arts. That the negative qualities in the attitude of the public to architecture, as the first consideration, and the public's appreciation of architecture have been a persistent thorn in the flesh of the profession is manifest by the murmurings which have gone forth, especially of recent years, and that they are not merely the plaint of the ubiquitous grumbler is also manifest from the fact that this formed one of the most important subjects to come under the notice of the recent International Congress of Architects. There was a force identified very closely with the public which might form a valuable ally in the cultivation of greater interest in what is good in architecture, namely, the Press, the most democratic of all forces. If, according to Bishop Creighton, architecture is the most democratic of all the arts, there is a want of harmony somewhere, for generally speaking the home architect does not owe much to the members of the fourth estate. Of course, the professional Press, the lecturer maintained, had its own sphere of undoubted usefulness, but was practically limited to the profession, the public being only interested in the illustrations. Surely a little of that interest which the Press lavishes on sculptors, musicians, and painters might be bestowed upon the efforts of the architect. The President was hopeful of the future, which would bring with it more of that recognition and appreciation of architecture which is undoubtedly its due. His closing remarks referred to the projected amalgamation of the Association with the Glasgow Institute of Architects, and to the good that was likely to ensue. A vote of thanks was awarded Mr. Lochhead for his address.

MEMORIAL CHURCH, WOKING.—The foundation-stone was recently laid of the church of S. Mary of Bethany, on a site in Mount Hermon-road, Woking. The contract has not yet been placed, but Mr. R. Harris carried out the arrangements in connexion with the stone-laying. The edifice has been designed by Mr. W. D. Carde, F.S.A., of London, and when completed will accommodate 700 people. It will consist of nave, and two aisles of equal height with the nave, the whole under three open timber roofs, parallel to one another. The chancel is to continue the nave under the same roof, and have a space for the organ on the north side, and another for vestries on the south. For the present, the south aisle of the nave will not be erected, reducing the accommodation to 500. Red brick will be used, with tile arches.

Correspondence.

SELBY ABBEY.

SIR,—Every architect who knew Selby at all will, I think, feel a deep sympathy with the townsfolk in what must be a great sorrow to them, in the loss of their beloved Abbey Church. If only the east window had perished, perfect as it was in its matchless curvilinear form, second only to that of Carlisle, its "Jesse Tree," beloved of so many glass painters in old days, and the ancient glass itself, so carefully restored and put together after years of displacement, it had been bad enough.

The building may, like the phoenix, rise again from its ashes, but, with the most loving care and generous outlay, which are sure to be forthcoming, it can hardly be hoped that the charm will ever again quite come back. By the catastrophe of a few hours our country has been deprived of one of its finest interiors. Yorkshire, so full of glorious monuments of the Middle Ages, can yet but ill afford to lose one of its most beautiful fanes. The tower, perhaps, could be spared, for its exterior was unlovely, but the bells will be sorely missed by those who heard them so often.

In old days such calamities were not uncommon, but ancient piety rose to the occasion, and started again, and yet again, to turn such visitations into a means for still better things. Our many modern needs, our lack of the old meed of faith, and our want of the simple love of the beautiful for its own sake in religious art and life, all conspire to make difficult the generous aid that otherwise should not be trying to a wealthy nation like ours. May those who have the means have the will given them to do what they can; and may the warning bring about a more generous insurance against fire for the financial protection of those buildings that remain, which would be one good result accruing from this untoward calamity.

E. SWINFEN HARRIS.

THE ZODIAC IN CHURCHES.

SIR,—In the valuable notes on Mosaic (No. V., p. 454) it is said that the inscription in the Florence Baptistery is illegible. It appears that the inscription was by the astrologer, Strozzi, and thus ran: "En giro torte Sol ciclos et rotor igne" (the sun drives on oblique his fiery car); the peculiarity of it being that you can read it correctly either backward or forward, producing the same meaning.

But it has sometimes seemed singular that modern architects do not make use of the Zodiac when executing the church restorations now so common.

Viollet-le-Duc says that formerly every church in France had its Zodiac somewhere. The country churches I have seen in various parts of France give not the slightest indication of this, and I should almost venture to interpolate the word "great" before "church" in the French architect's dictum.

However that may be, the Zodiac undoubtedly formed a very common, highly interesting and distinctive feature in our own ancient cathedrals and churches, as abundant remaining evidence proves. Neither was it used as a mere decorative ornament or architectural embellishment, but as a distinctly ecclesiastical design of religious import. It appears to have been dropped out of church designs at the Reformation, but it is not connected with any teaching peculiar to the Church of Rome, as distinguished from that of the Church of England.

I have, however, met one or two modern instances of its use. When Mr. J. Houghton Spencer restored the parish church at Corfe, he had the twelve signs sculptured on six corbels on each side of the reredos. In the restored church of Upton Helton the signs are on twelve encaustic tiles on the east wall, six on each side of the table. The wooden roof of Waltham Abbey Church has them in very large circles down the nave, copied I was told, from an old design in Peterborough Cathedral roof. But it is in our old churches that the use, originality, variety, and interest of the Zodiac decoration is alone seen, as the following examples known to me will illustrate:

Outside Churches.—1. Scothways: Stoke sub Hamdon, Ave signs (Norman); S. Margaret's, Walmgate, York (Norman), formerly in S. Nicholas, York; Barreton, Kent (Norman); Dunstable; Kenilworth; Brinsop; Ely Prior's door; S. Mary, Shrewsbury.

2. West doorway. Ilfley (Norman).

Inside Churches.—3. Pavements: on encaustic tiles—Bredon chancel, Warwickshire; incised on stones—Trinity Chapel, Canterbury Cathedral.

4. On capitals: Choir pillars, Carlisle Cathedral.

5. On roofs: Wood bosses of the east wall, Lincoln Cathedral cloister. On stone bosses in Merton College passage.

6. Apparently in the ancient clock of S. Alban's Abbey.

7. On an altar cloth, now in the V. and A. Museum, No. 1313, of fine lace.

8. In windows, only single signs in painted glass seem to exist; showing that the Zodiac was formerly in windows.

9. On the pulpit cushion of Archbishop Laud, now in S. John's College, Oxford.

Of these various uses of the Zodiac in churches, perhaps the most singular is that on a Norman font, Kent, Brookland, apparently the only one in England, though I have met with it in France.

D. J.

EMSWORTH SEWERAGE COMPETITION.

SIR,—The result of this competition has been announced, and would seem to call for some comment. Schemes were sent in under motto and without the usual accompaniment of a sealed envelope, and all concerned in awarding the premiums were supposed to be in a state of ignorance as to the names of the various authors. Competitors therefore naturally expected to read that schemes sent in under mottoes "so and so" had been accepted, as no inquiries had been made by the Emsworth Council, from those who had applied for particulars as to whether they had submitted schemes, and if so under what title. The surprise of competitors must therefore have been considerable when they discovered that the Emsworth Council was in a position to state the names of those who had been successful. How was this possible? The award of the second premium to the Council's Surveyor is another point which would seem to call for comment. It must be left to the Council to decide whether or not it is fair to allow an official, who is placed in a position involving the giving or withholding of information, to compete. One thing is certain, it would have been more creditable to all concerned if the knowledge that inquiries were being made from a fellow competitor had not been withheld.

In connexion with this point it would also be interesting to know if the scheme submitted by the local surveyor was one of the late arrivals. It may or may not be known to competitors that after the date for receiving schemes had been passed, and the majority of the plans, etc., were in the hands of the Council, the time limit was extended by some considerable period in order that the work of several competitors who had failed to complete their task in the allotted time might be included. No notification of this alteration in time was given beyond a statement in the local press.

A COMPETITOR.

MATERIAL FOR SMALL CASTS.

SIR,—Is there any material or composition which can be used in the same way as plaster of Paris, cement, etc.) to cast small objects, which require to be very hard when set, to remain hard if immersed in water, and to resist the action of acids—such as sulphuric, muriatic, nitric, etc.?

It is not necessary that the material should be of an adhesive nature. J. S.

The Student's Column.

ROOFS: STRUCTURALLY CONSIDERED.—XVI.

21. The Complete Design of a Timber Truss.

WE will now deal with the various computations necessary for the exact dimensions of all the details of a timber-roof truss of given form and dimensions, and in accordance with assumed data.

The type of truss selected as the example of construction is that diagrammatically represented in Fig. 88, p. 346, and also in Fig. 154 illustrating this article.

The span of the truss is 60 ft., the pitch is 33° 40', equal to the rise of 60 ÷ 3 = 20 ft., and the trusses are spaced 10 ft. apart centre to centre.

With the exception of the king, queen, and princess ties, which are to be of mild steel, all members of the truss are to be of pine, the same material being used for the common rafters, purlins, and other members of the framework.

The common rafters are to be covered with 1½-in. pine boarding and felt, weighing together 4½ lb. per square foot, the weight in each case being on the basis of ground area covered by the roof.

Snow load is taken at 6 lb. per square foot of horizontal area, and wind pressure at 40 lb. per square foot of vertical area.

(a) Permissible Unit Stresses.—The safe working stresses taken throughout the

calculations for timber and steel are to be as stated below.

Permissible Stresses per Square Inch.

Timber.	
Tensile stress along the grain	1,200
Compressive stress along the grain	1,600
Transverse stress across the grain	350
Transverse stress	1,200
Shearing stress along the grain	150
Shearing stress across the grain	1,250
Bearing stress against bolts and pins	2,500

Steel.	
Tensile stress	16,000
Transverse stress	16,000
Shearing stress	10,000
Bending stress for bolts and pins	25,000
Bearing stress against bolts and rivets	20,000

(b) *Common Rafters.*—The three purlins in each roof slope are situated almost immediately above the junction of the vertical ties with the diagonal struts, and consequently are spaced at intervals of about 10 ft. apart measured along the axis of the tie-beam.

Hence the length of each rafter is $10 \div \cos 33^\circ 40'$, or

$$10 \div 0.8322 = 12 \text{ ft.}$$

Then the roof area, bounded by two purlins, 12 ft. apart, and two main trusses, 10 ft. apart, is $12 \times 10 = 120$ sq. ft.

We have now to compute the normal components of the various loads coming upon this area of the roof.

The vertical loads represented by the weight of the roof covering and snow are:—

Boarding and felt	$4.5 \times 120 = 540$
Tiling	$23.0 \times 120 = 2,760$
Snow	$6.0 \times 120 = 720$
	4,020

Then, by formula (2), p. 326, the normal component of the total vertical load, or weight, upon the area of 120 sq. ft. of roof surface is

$$4,020 \times \cos 33^\circ 40' = 4,020 \times 0.8322 = 3,345 \text{ lb.}$$

The wind load is $40 \times 120 = 4,800$ lb., and by Hutton's formula (see p. 327) the normal

component is about $40 \times 0.7 = 28$ lb. per square foot, or for the area now in question $28 \times 120 = 3,360$ lb.

Therefore, the total normal load to be carried by the common rafters, in addition to their own weight, is

$$3,345 + 3,360 = 6,705 \text{ lb.}$$

As shown by the tables in Articles XIII. and XV., 2 in. is a very usual width for common rafters, and may be adopted with safety in the present roof.

Disregarding the fact that the clear span between supports is actually 6 in. less than 12 ft., the depth would be thus calculated by Tredgold's rule (formula (5), p. 376)—

$$d = \frac{L}{\sqrt{b}} \times 0.72$$

$$= \frac{12 \times 12}{\sqrt{2}} \times 0.72$$

$$= \frac{144}{1.41} \times 0.72 = 8.23 \text{ in.}$$

A more exact method of calculation would be that afforded by formula (18), p. 462, assuming the load to be distributed over five rafters, 2 ft. apart centre to centre.

The equation is

$$d = \sqrt{\frac{3}{5}} \frac{WL}{fb}$$

Here

$$W = \frac{6705}{5} = 1,341 \text{ lb.}$$

$$l = 144 \text{ in.}$$

$$f = 1,200 \text{ lb.}$$

$$b = 2 \text{ in.}$$

Then

$$d = \sqrt{\frac{3}{5}} \frac{1341 \times 144}{1200 \times 2}$$

$$= \sqrt{0.6} \times 7.76 = 7.76, \text{ say, } 8 \text{ in.}$$

Taking the weight of the timber at 45 lb. per cubic foot, the weight of the five rafters will be

$$5 \times 45 \times \left(\frac{2 \times 8 \times 144}{1728} \right) = 5 \times 60 = 300 \text{ lb.}$$

If this additional weight were distributed over the five rafters it would involve a very small increase of width, even allowing for the weight of the extra material used.

The point can be demonstrated by the use of formula (19), p. 462.

Thus

$$b = \frac{3}{4} \frac{WL}{fd^2}$$

$$= \frac{3}{4} \frac{(300 \div 5) \times 144}{1200 \times 8^2}$$

$$= \frac{3}{4} \frac{8640}{76800} = 0.085 \text{ in.}$$

We have already sufficient margin between 8 in. and 7.76 in. to cover the weight of timber in the rafters, but for the purpose of being on the safe side and of making provision for the small component of the vertical load that acts along the roof slope, it will be better to employ six 2-in. by 8-in. rafters, spaced 20 in. apart centre to centre, in each bay of the roof, one rafter being situated immediately above the truss.

The weight of these, calculated as above, will be

$$6 \times 60 = 360 \text{ lb.}$$

(c) *Purlins.*—From the preceding figures it will be seen that the load on each purlin, exclusive of its own dead weight, consists of 6,705 lb., the load of the covering normal to the slope, and 360 lb., the weight of the common rafters, a vertical load.

Hence the total load on each purlin normal to the roof slope is

$$\frac{6705 + (360 \times \cos 33^\circ 40')}{5} = \frac{6705 + 299}{5} = 7,004 \text{ lb., say } 7,000 \text{ lb.}$$

As one common rafter is supported by the truss, this load is concentrated at five points 20 in. apart between the principals, the value of each part being

$$7000 \div 6 = 1166.6 \text{ lb.}$$

To determine the proportions of the purlin we proceed in the manner explained below. First the maximum bending moment

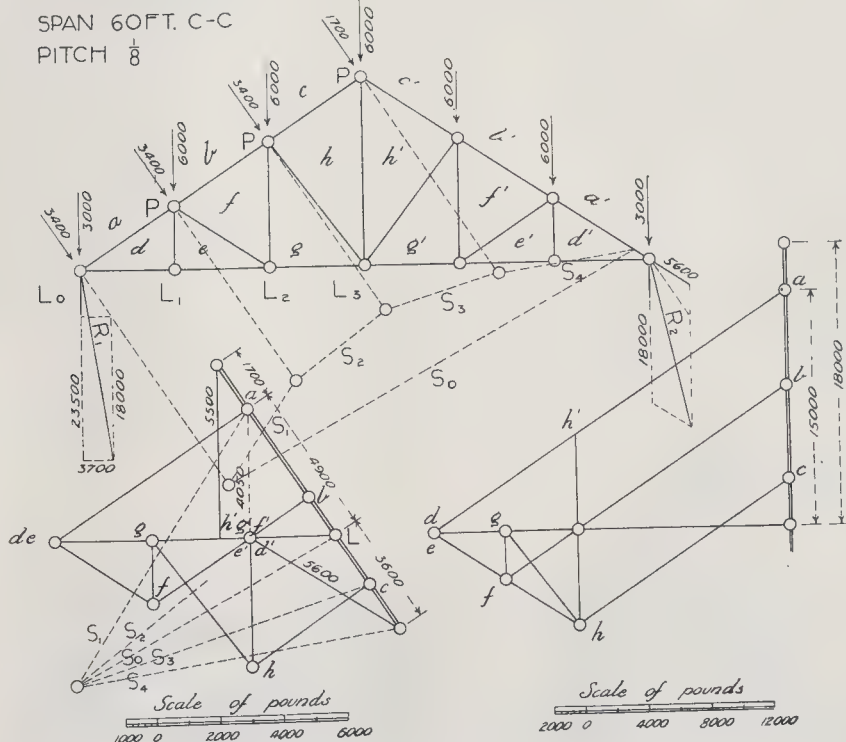


FIG. 154

developed by the loads at the centre of the purlin is thus ascertained:—

$$\begin{aligned} 1166.6 \times 20 &= 23,333.3 \\ 1166.6 \times 40 &= 46,666.6 \\ 1166.6 \times 60 &= 69,999.6 \\ \hline &105,000.0 \text{ in.-lb.} \end{aligned}$$

Then the moment of resistance of the beam is calculated by the usual formula

$$R = \frac{f b d^2}{6} \dots \dots \dots (29)$$

where, as before, f = permissible transverse stress.

Assuming the depth of the purlin at 10 in., we can ascertain the moment of resistance per inch of breadth.

$$\begin{aligned} \text{Thus } R &= \frac{1200 \times 1 \times 10^2}{6} \\ &= 20,000 \text{ in.-lb.} \end{aligned}$$

Whence the required breadth is

$$105,000 \div 20,000 = 5.25 \text{ in.}$$

To make provision for the dead weight of timber in the purlins, and for any small forces acting along the common rafters, the purlin should be made 6 in. wide by 10 in. deep.

It will now be interesting to compare these dimensions with those given by Tredgold's rule (formula (11), p. 435):—

$$\begin{aligned} d &= \sqrt[3]{L^3 \times C} \\ &= \sqrt[3]{10^3 \times 12} = 10.5 \end{aligned}$$

Making the value of $b = 0.6d$, the breadth would be $10.5 \times 0.6 = 6.3$, giving the proportions of, say, 6½ in. by 10½ in.

As we have already found, by more precise rules, that the dimensions of 6 in. by 10 in. are ample, we will adopt them, thus giving as the weight of the purlin for timber weighing 45 lb. per cubic foot

$$\begin{aligned} 45 \times \frac{6 \times 10 \times 120}{1728} \\ = 45 \times 4.16 = 187.5, \text{ say, } 188 \text{ lb.} \end{aligned}$$

(d) *Vertical Loads at Apices of Truss.*—Apart from the dead weight of the truss itself, the vertical load at each apex of the truss is the same as that already calculated in paragraphs (b) and (c) for the area of 120 sq. ft., for each roof bay is divided into six such areas.

Hence the load upon each of the apices lettered P₁, P₂, and P₃ in Fig. 154, and the two other apices, indicated but not lettered in the same diagram, is as follows:—

	lb.
Roof covering and snow...	4,020
Weight of common rafters ...	360
Weight of purlins ...	188
	<hr/> 4,568

At the present stage we must assume the weight of each truss to enable account to be taken of the total apex load. As a general rule the weight of a timber truss is somewhere between 4 lb. and 5 lb. per square foot of roof surface.

For the present case we shall take the basis at 4.5 lb. per square foot.

Then the width of each bay being 10 ft., the length of each slope is $30 \div \cos 33^\circ 40'$, or

$30 \div 0.8322 = 36$, and the total weight of the truss is

$$10 \times (6 \times 2) \times 4.5 = 3240 \text{ lb.}$$

The weight of the truss constitutes a load on each apex of

$$3,240 \div 6 = 540 \text{ lb.}$$

The total vertical load, as calculated above, at each apex is

$$4,568 + 540 = 5,108 \text{ lb.}$$

For our present purpose the total is increased to 6,000 lb. This will make very little difference to the calculated stresses in the different members of the truss, and only involves an increase of about 1 lb. per square foot of roof surface.

The calculated vertical load on the apex at each support is now

$$6,000 \div 2 = 3,000 \text{ lb.}$$

The normal component of the wind load for each apex, as calculated in paragraph (b), is 3,360 lb., but for the computation of stresses we will take it at 3,400 lb.

Assuming the wind to blow from the left-hand the normal component at the centre apex and that at the left-hand support will be $3,400 \div 2 = 1,700$.

Stress Diagram.—In addition to a general diagram, wherein are shown the horizontal and vertical components of the forces at the supports, Fig. 154 contains at the right hand a diagram of stresses due to vertical loads, and at the left hand a combined diagram of the stresses occasioned by wind pressure from the left and from the right.

Although the diagrams are drawn to scale, the size is too small for accurate reading, and for this reason we give the stresses in the subjoined table, where the combined maximum stresses are given in the last column, and the character of the stress is indicated by + and — signs.

TABLE XXXVIII.—STRESSES IN TRUSS MEMBERS (see Fig. 154).

	Vertical Loads.	Wind Left.	Wind Right.	Maximum Stresses.
L ₀ P ₁ ...	+27,200	+7,300	+5,600	+34,500
P ₁ P ₂ ...	+21,700	+5,000	+5,600	+27,500
P ₂ P ₃ ...	+16,300	+4,400	+5,600	+20,700
L ₂ L ₁ ...	-22,600	-8,700	-2,600	-31,300
L ₁ L ₀ ...	-22,600	-8,700	-2,600	-31,300
L ₂ L ₃ ...	-18,100	-5,600	-2,600	-23,700
P ₁ L ₁ ...	0	0	0	0
P ₁ L ₂ ...	-3,000	-2,000	0	5,000
P ₂ L ₁ ...	-12,000	-4,100	-4,100	-16,100
P ₂ L ₂ ...	+5,400	+3,700	0	9,100
P ₃ L ₂ ...	+7,900	+5,100	0	12,700

+ Signifies compression. — Signifies tension.

Fifty Years Ago.

FROM THE *Builder* OF NOVEMBER 1, 1856.

THE IMPROVEMENT OF THE KINGDOM.—Many of our counties have not a decent town in them, and are almost in as primitive a state as when they were formed some centuries since. The improvement of the country generally, and the increase of the

smaller towns, is an object much to be desired, as the metropolis and the manufacturing districts are over-populated—every available space being filled with buildings, to the exclusion of air and the space sufficient for exercise. In Scotland and the agricultural districts the population is comparatively scanty: they do not bear a fair proportion of the increase, which they could do by forming societies upon the limited liability system for improving the towns and public buildings aided by the principal contractors and builders of the country, and the local gentry, railway directors, and the public authorities, not upon the present system of merely erecting long lines of brick and mortar streets, without the least taste or ornament, but after the most approved designs of English and continental architects, including the latest improvements, with plenty of space and cheap railway accommodation. It is not necessary to make every town as large as London or Manchester, but were many of our towns that have a population of less than 10,000 increased so as to accommodate that number, and one here and there within a circuit of fifty miles of London to 50,000 (Brighton only within that distance having that number of inhabitants), a better distribution of the population would be made, and they would enjoy many advantages that large towns only possess.

Illustrations.

NEW ADMIRALTY BUILDINGS AT EAST END OF MALL.

Full particulars and illustrations of this building appeared last year (April 29, 1905), and the foundations have now been put in and the work built up to the ground level.

The details published to-day show in the centre of the illustration the solid ends which finish the curved façades, the special character of the plan naturally suggesting these features without in any way curtailing the light in the rooms. On either side is a bay of the elevation showing the general treatment, and also the means by which three stories are obtained on the office side and two on the residential side without materially interfering with the balance of the design. Portland stone is to be used throughout.

Sir Aston Webb, R.A., is the architect.

SELBY ABBEY FROM THE SOUTH-EAST.

THE beautiful drawing from which this illustration is taken was made in 1889 by Mr. Arnold Mitchell, as one of the illustrations for our New Year's number in January, 1890.

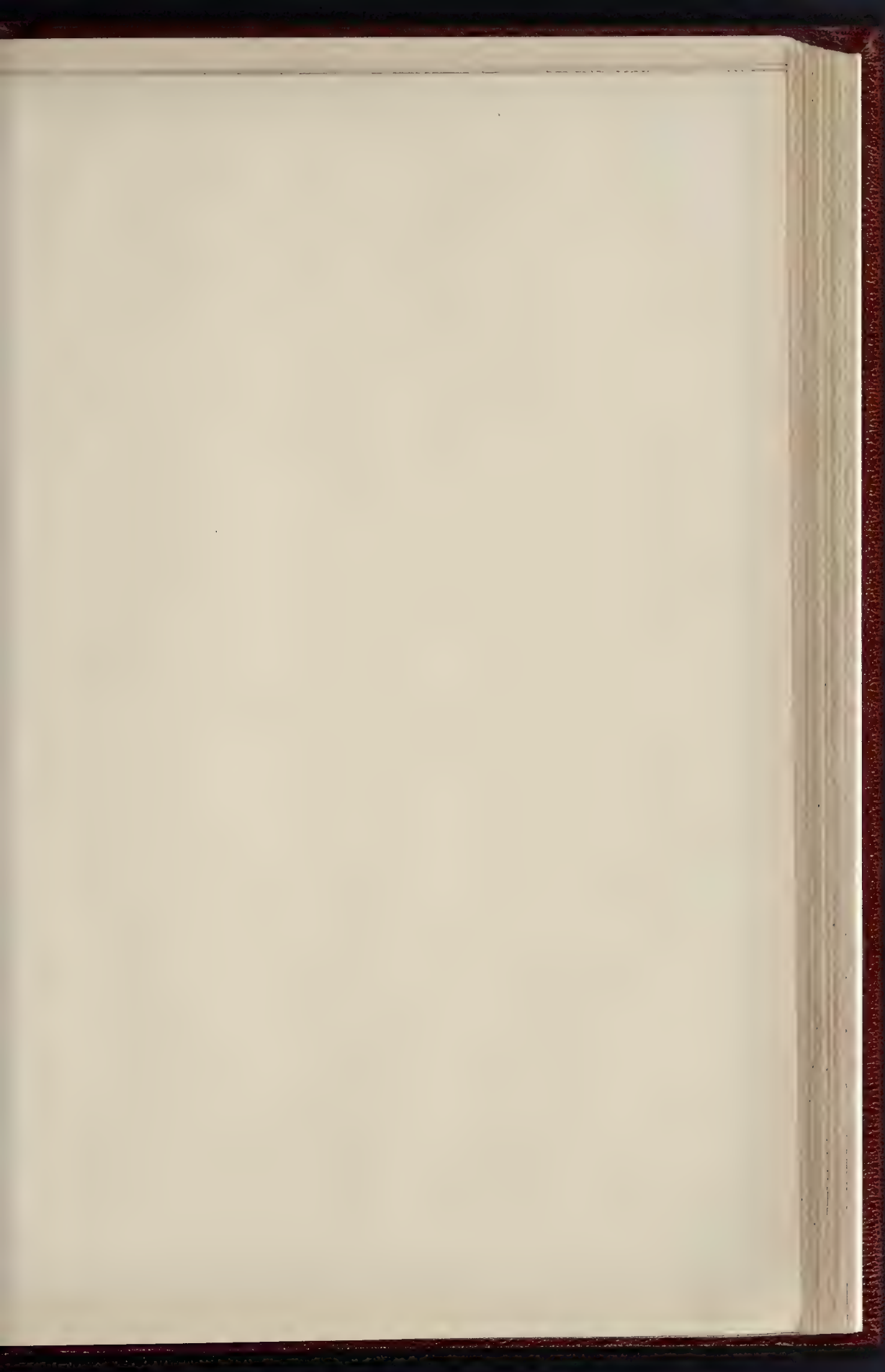
No drawing could give a better idea of the fine character, solid and yet rich, of the east-end architecture of the Abbey; and it will certainly have an extra value under the present circumstances.

EXAMPLES OF MOSAIC AND MARBLE INLAY.

THE two subjects from Ravenna show how varied the tesserae were both in size and



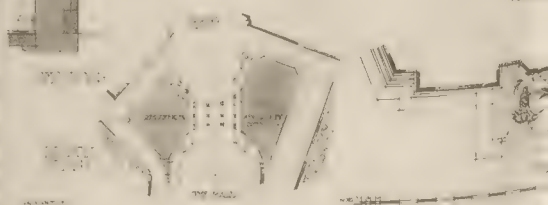
Tombstone, SS. Giovanni e Paolo, Venice.



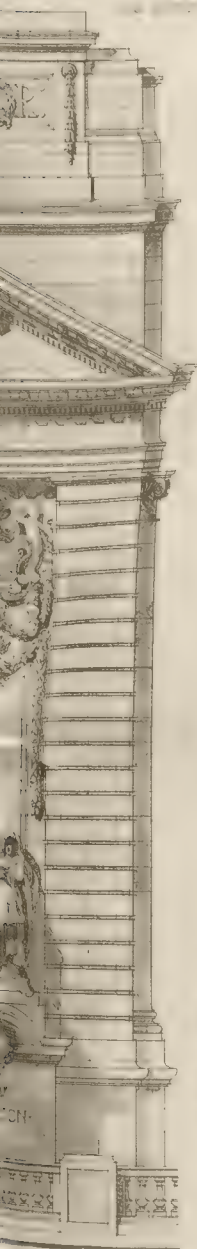
DETAILS OF INTERIOR AT EXETER



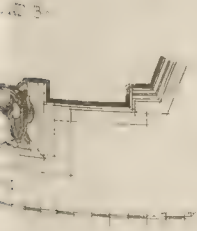
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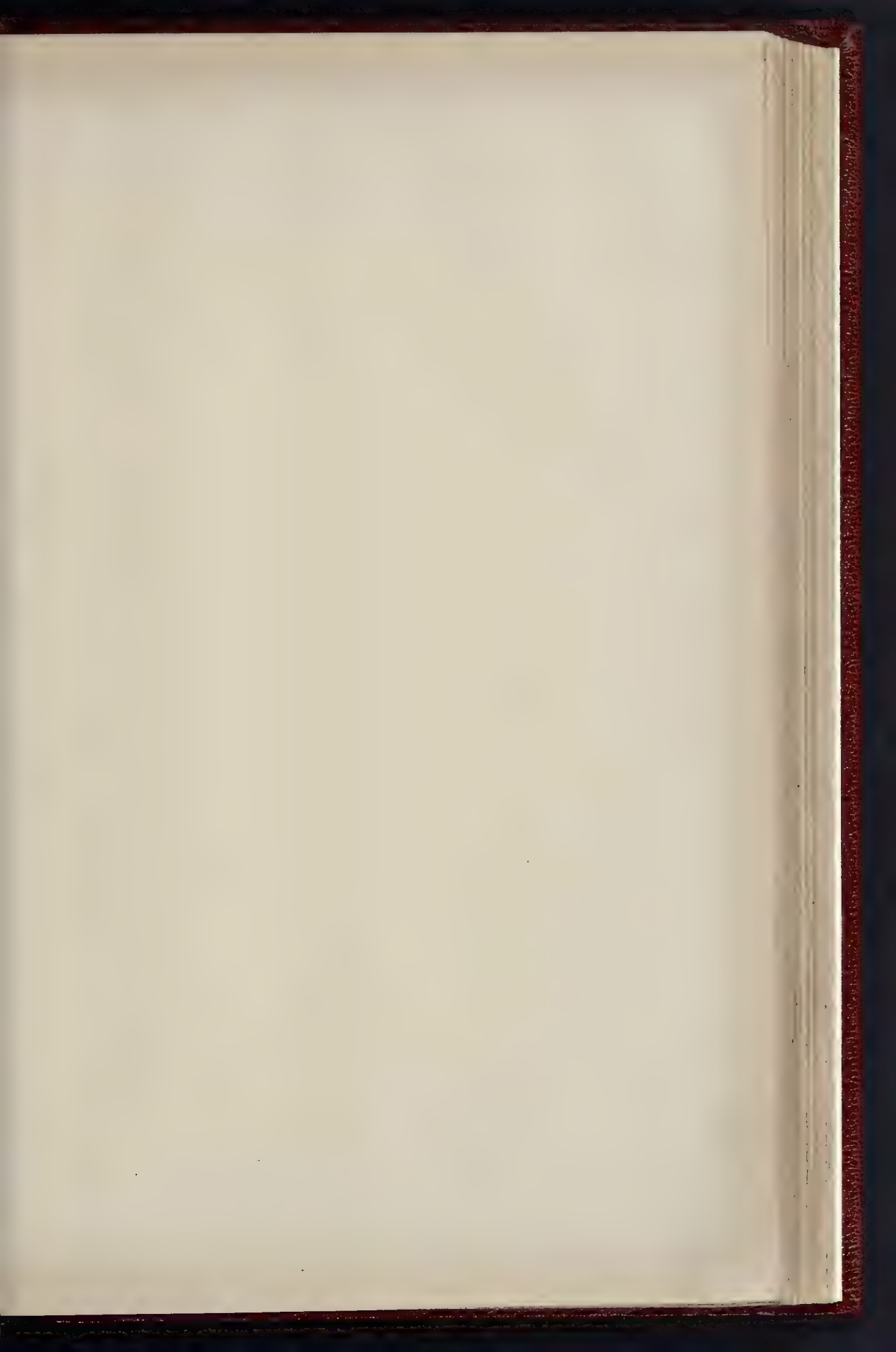
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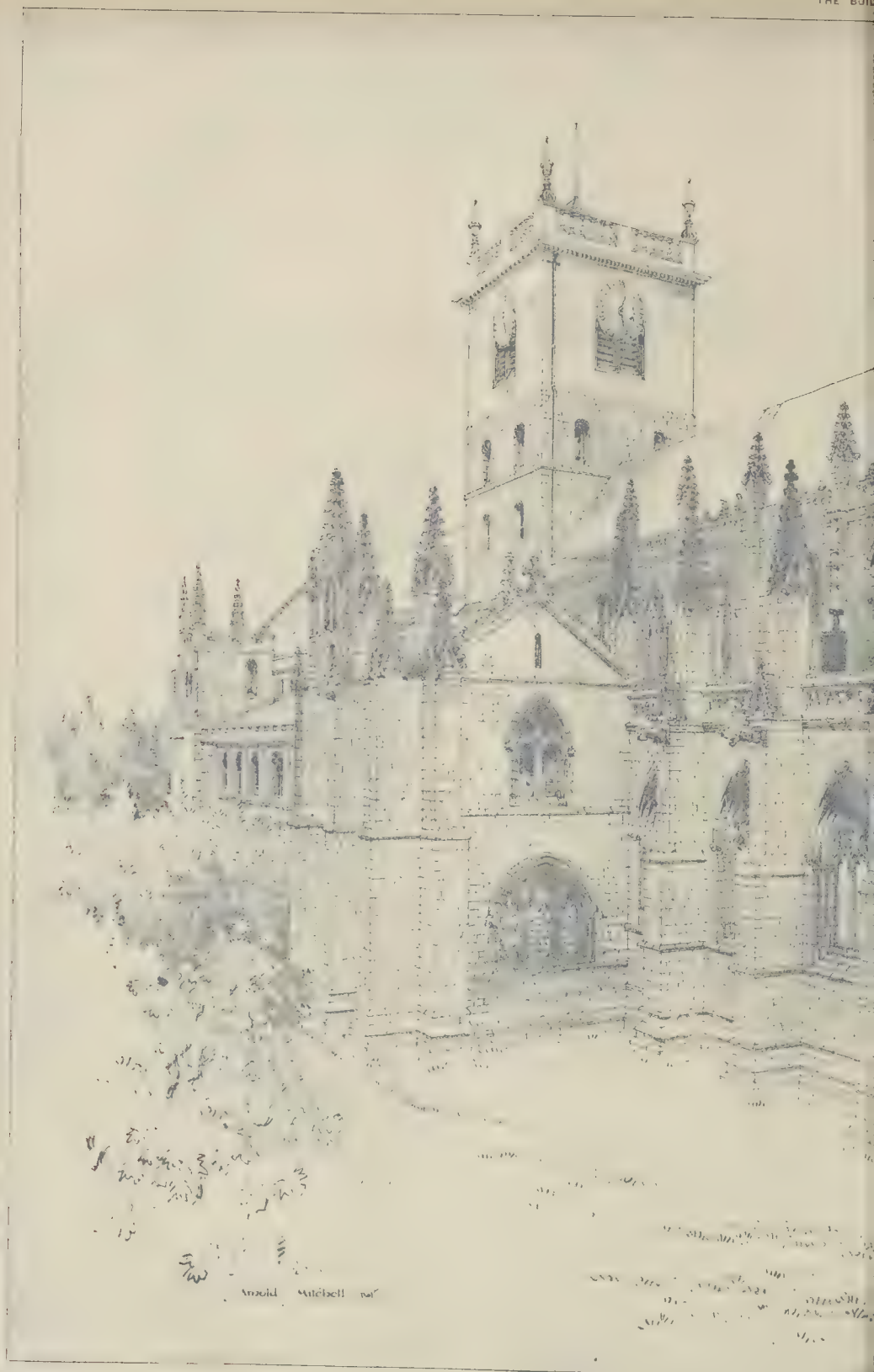


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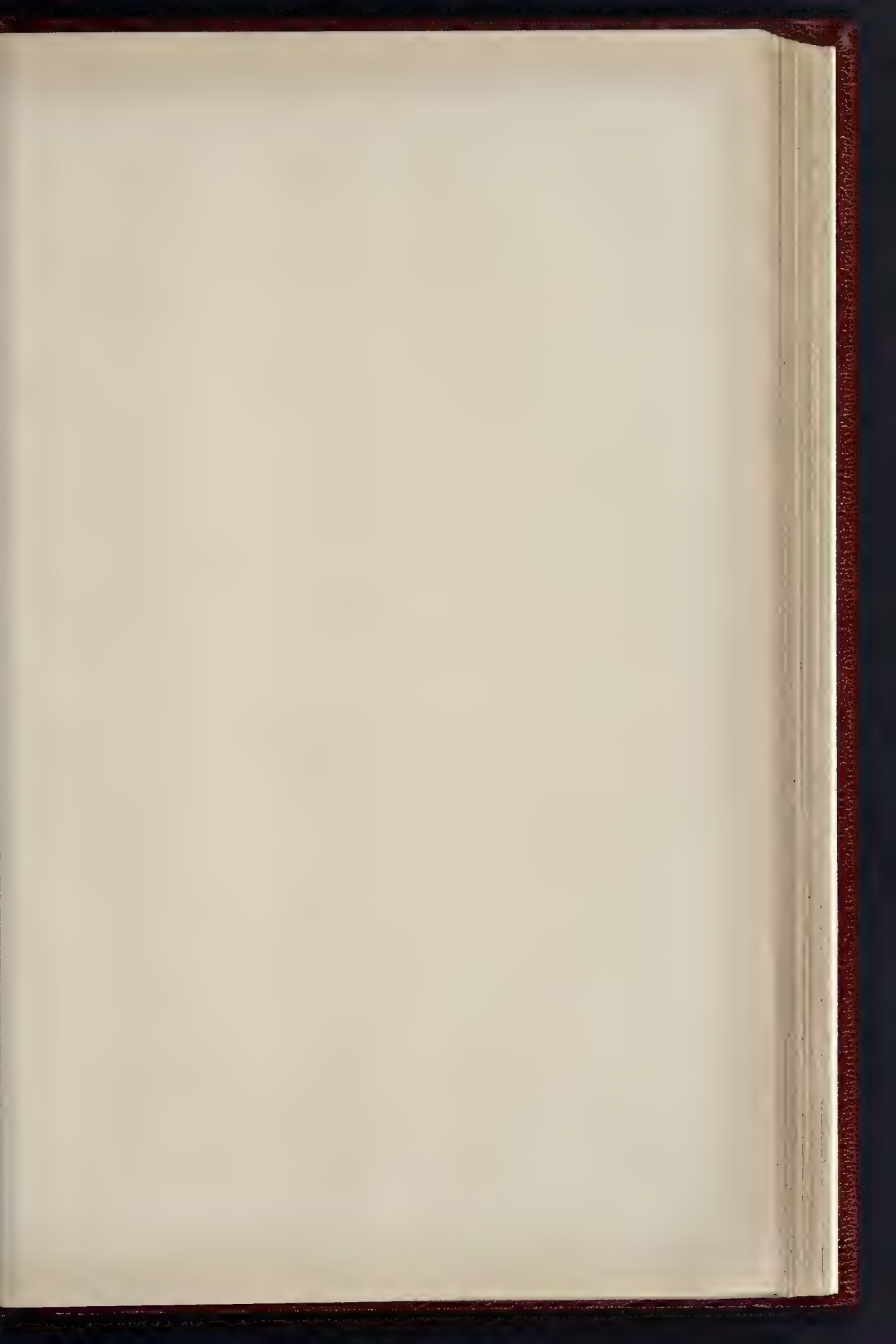




SELBY ABBEY
FROM A DRAWING MADE



SOUTH-EAST.
D MITCHELL IN 1889.



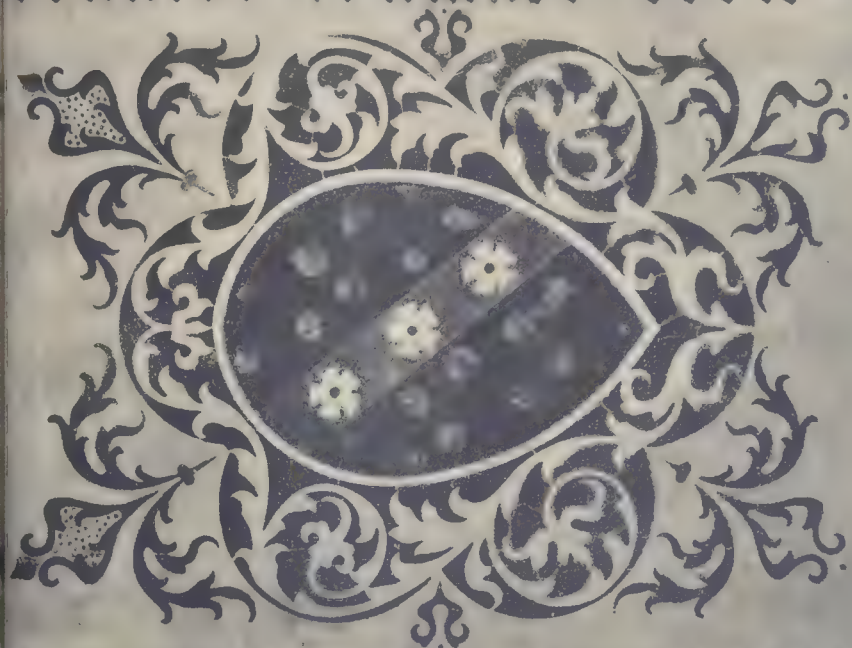


HEAD OF CHRIST, S. APOLLINARE NUOVO, RAVENNA.



ARCHIEPISCOPAL CHAPEL, RAVENNA.

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BERNARDI-TOMMASO TOMB, SANTA CROCE, FLORENCE.

THE MUSEUM OF THE HISTORY OF ART, UNIVERSITY OF CHICAGO



BORDER FROM MOSAIC OF THE INSIGNE, CATHEDRAL, SIENA.

EXAMPLES OF MOSAIC AND MARBLE INLAY

shape, and also in the mode of setting them, following the contour in one direction or another. The inlay border from Siena shows the mode of preparing the hollows in the marble with a series of drill holes to form a key for the mastic; here and in the example



Plaster, S. Giustina, Padua.

from Santa Croce four inlays of a dark marble are used for the larger surfaces.

The three similar illustrations in the text, two from Padua and one from Venice, show a very delicate use of the same process for decoration on a smaller scale.



Top of Altar, S. Antonio, Padua.

Competition.

NEW SCHOOLS, CONSETT.—For these schools for the Durham County Council the award by the assessor, Mr. W. Rushworth, F.R.I.B.A., has been made as follows:—1st, Mr. W. H. Knowles (Newcastle); 2nd, Mr. J. Garry (Hartlepool); 3rd, Messrs. Clark & Moscrop (Darlington).

BOOKS RECEIVED.

PUBLIC BATHS AND WASH-HOUSES. By A. W. S. Cross, F.R.I.B.A. (B. T. Batsford. 21s.)

MODERN PRACTICAL CARPENTRY. By George Ellis. (B. T. Batsford. 12s. 6d.)

LES ORIGINES DU STYLE GOTHIQUE EN BRABANT. Par R. Lemaire. (Vromant & Co., Brussels.)

ENGINEERS' HANDBOOK. Parts II. and III. By Professor Henry Adams, M.Inst.C.E. (Cassell & Co. 3d. per part.)

UNIVERSITY COLLEGE, READING.

The new buildings, as far as carried out, have just been opened. The scheme of the new college buildings was determined partly by the necessity of securing a principal frontage and entrance in London-road, a leading thoroughfare in Reading. In order to form an approach of sufficient width and dignity the scheme contemplates the removal of the house formerly known as Greenbank, now temporarily occupied by the Department of Music. The removal of this house will enable a deeply-embayed entrance to be constructed, and from its gates a broad avenue will lead to what will some day be the principal façade of the college. This façade will reach across the full breadth of the site from east to west. On the west it will terminate with the hall; and on the east with the library.

The College Hall consists of a hall 100 ft. in length (exclusive of the apse) and 48 ft. in width. There is a vestibule to the hall which will ultimately form the west end of the main corridor of the college; two retiring-rooms, with lavatory accommodation, and a basement partly planned for heating apparatus and partly for kitchen, coal store, etc. A large store is arranged beneath the platform of the hall. These buildings are of brick and stone construction, the bricks being specially made to the instructions of the architects, and the stone being taken from the Douling quarries for outside work, and from the Bath Stone quarries for the interior. The roofs are covered with brown tiles. The style is Georgian, with Doric detail, and externally the hall is finished along each side and at each end with buttresses terminating in a panelled parapet, in which a certain amount of gauged brickwork is used. At each corner of the hall is a turret finished with a stone domical roof; and in the centre is a large ventilating turret, covered with a copper dome.

Internally the hall has a fibrous plaster enriched and coffered ceiling. The internal walls, to a height of some 8 ft. above the floor, are panelled in Austrian oak, and above are faced with thin bricks, specially made, and stone. The flooring of hall and platform is of oak, and the entrances are also of oak, enriched with plasters and pediments of the same material. There is a system of electric light with separate control for the various portions. There are ten handsome steel bronzed electroliers suspended from the ceiling, and five two-light wall brackets to correspond with the electroliers, specially designed for the purpose. Heating and ventilation are secured by means of hot water, and air, and so arranged that no radiators or pipes are apparent,

all of them being behind the panelling in window recesses and protected with slate slabs. A creeping way beneath the floor gives access to every part of the heating arrangements, and a large fan in the basement, worked by an electric motor, drives fresh air, into the hall over the radiators, the air being first washed by a water screen. The exhaust for vitiated air is the central turret, connected with the hall by apertures in the barrel ceiling, and large trunks running above it. The whole is so arranged as to be absolutely under control, and as to prevent down-drafts, or the ingress of blasts of cold air. Ventilation also is obtainable from windows. The hall promises to be excellent in respect of acoustics. It is designed to seat 1,000 persons. The kitchen is fitted up with range and gas-cooking apparatus, sink, etc., and a lift from basement to corridor gives easy transit to the hall.

Many have contributed to the work in erection of these buildings, the principal of whom are as follows:—The architects are Messrs. W. Ravenscroft and C. Steward Smith, who have been assisted by Messrs. H. Hutt and W. R. Morris. Mr. Webber has acted as clerk of works; Messrs. Kingerlee (Oxford) are the builders; Mr. Collett acted as general foreman; Messrs. Dawney supplied and fixed the steel work of roofs; Messrs. Jackson & Sons supplied and fixed the hall ceiling, etc.; Messrs. Haden & Sons (Trowbridge) installed the electric light and heating and ventilating arrangements; Mr. Spencer (Reading) supplied and fixed the range, etc.; Messrs. Waygood the lift; Messrs. Gibbons (Wolverhampton) the metal door and window furniture; Messrs. Silver & Sons (Reading) the curtains; Messrs. Jephth (Beaconsfield) the chairs; and the St. Pancras Iron Company the pavement lights, etc.

The Cloister Buildings.

The Science Laboratories and Art Studios consist of seven separate buildings, each of which is connected with and entered from an open cloister, running from north to south. This cloister will ultimately be connected with the main corridor of the future central administrative building.

Each of the buildings, branching off from the main cloister, contains one department only, except the second building from the north, which accommodates three subjects. These one-story buildings are built of plain brickwork, left fair both internally and externally, relieved by gables, treated in a simple Georgian manner. The roofs are covered with local brown tiles. The buildings are heated by low-pressure hot water, by means of pipes and radiators on the "Reck" system. The heating of each building is governed by valves placed on the main at the entrance. Hence any one building may be disconnected, or heated independently. Further the radiators in each room are controlled by separate valves so that each room is under perfect control as regards its heating.

The ventilation is effected by means of large sash windows, many of which have opening fanlights at the top. In addition the principal rooms in each block are connected to a main exhaust flue, which terminates in a *flèche*, where an electrically-driven motor fan exhausts the foul air. The ventilation of each room is controlled by means of louvre gratings fixed in the ceiling. The buildings are lighted by means of incandescent gas burners, those in the Fine Arts Department being grouped so as to produce as nearly as possible the broad effect of natural daylight. The Physics Department has been fitted up with the alternating and continuous electric currents for lighting and demonstration purposes. A creeping way has been formed under the whole length of the cloister, in which all pipes, both hot water, gas, and cold water supply are laid. Here also are all the electric cables for supplying both these one-story buildings and the new hall. Thus periodical inspection is made a simple matter, and any future extensions or improvements are facilitated.

The buildings grouped in connexion with the cloister will be devoted respectively to Fine Arts; Crafts; Zoology, Building Construction, and Machine Drawing; Botany; Physics; Agriculture; Chemistry; and Geography. The fittings and equipment for each department have been most carefully considered in every detail.

Mr. Webber has acted as clerk of the works and Mr. Robert Curtis has been the general contractor for the buildings and their fittings, Mr. Hoilder being general foreman. Messrs. Haden & Sons (Trowbridge) carried out the whole of the heating and ventilating systems; Messrs. Hill, Upton, & Co. (Oxford) the installation of electricity to these buildings both for lighting and power; Messrs. Callas, Sons, & May (Reading) assisted Mr. Curtis in the plumbing work and in the lighting of the buildings, and Messrs. Wake & Deane (Bristol) in the fittings of the laboratories.

TOWER, MILBORNE PORT, SOMERSET.—A movement for the restoration of the ancient tower of this church has been initiated. Mr. W. D. Caröe has been selected as architect for the work

METROPOLITAN ASYLUMS BOARD.

At the fortnightly meeting of the Metropolitan Asylums Board last week it was resolved to repair the internal roads at Fountain Hospital, and a portion paved with wood blocks. The engineer's estimate for the work was £200. At the last meeting of the managers a letter was received from the Local Government Board in which they approved of their entering into a contract with Messrs. Chafin & Newinan for carrying out certain necessary works in connexion with and settlement of the pier-bank on Long Reach, for the sum of £533, 13s., without in the first instance advertising for sealed tenders. It was agreed that the work should proceed. The tender of Messrs. J. Simpson & Co. for carrying out works for the utilisation of exhaust steam under the Warren-Webster atmospheric system at a cost of £344, was accepted.

METROPOLITAN WATER BOARD.

At the fortnightly meeting of the Metropolitan Water Board the Works Committee brought up proposals for the construction of several new reservoirs, and recommended that the estimate of £48,000, submitted by the Finance Committee be approved, and that steps be taken for the construction of one of the storage reservoirs in the Lee Valley, authorised by the East London Water Works Act, 1900. The approximate contents of the reservoir will be 3,000 million gallons. Further, the same committee recommended that an estimate of £250,000, be approved for the construction of a reservoir at Island Barn, Walton-on-Thames, to hold 1,000 million gallons. Both the recommendations stood over till the next meeting.—It was resolved to apply to Parliamentary powers next session for the construction of a main for the Romney Marsh well; the construction of a tunnel under the Thames at Twickenham; and for the extension of time for the construction of works authorised by the Southwark and Vauxhall Water Company Act of 1898, and the Lambeth Waterworks Act, 1900. The cost of the tunnel at Twickenham is estimated at £4,500. The works for which extensions of time are sought include the construction of the Walton intake and pumping-station, and the construction of a pumping-station on the Barn Elms side of the river.

HOUSING CONFERENCE, BIRMINGHAM.

A CONFERENCE, promoted by the National Housing Reform Council, was held at the Birmingham Council House on Saturday last, to discuss the better planning of new housing areas. Mr. J. S. Neildfeld, Chairman of the Birmingham Housing Committee, presided, and representatives were present from Manchester, Leicester, Northampton, Hereford, Worcester, Rugby, and other places.

The Chairman affirmed that model-by-laws had failed utterly to prevent the land speculator and jerry-builder from destroying the housing of the suburbs, for the simple reason that they dealt with details but did not ensure any comprehensive control of building developments. Not only did they fail to secure efficient housing accommodation in the suburbs, but, in certain instances, caused unnecessary expense. It was, however, looking upon England as a whole, the system itself and not the way in which it was carried out that accounted for the present most unsatisfactory state of affairs. The absurdity of building towns a street at a time was only slowly dawning upon England. The death rate in English cities was admitted to be far higher than it ought to be owing to overcrowding, which was not a necessity of town life, and which could be prevented by intelligent town planning.

Mr. T. C. Horsfall (Manchester) submitted a resolution expressing the opinion that local authorities should carefully consider whether the present unsatisfactory manner in which new districts were being developed could not be prevented by intelligent and comprehensive town planning, with a view to framing at an early date a series of practical and definite suggestions to be placed before the Local Government Board.

Alderman Thompson (Richmond) seconded the resolution, and Mr. George Cadbury, who supported it, said that if, years ago, half a million had been invested in land in Birmingham, it would undoubtedly now be worth ten millions sterling. It would have been a magnificent investment, and, instead of the dreary rows of houses now in the suburbs, there would have been cottages with gardens and wide streets. He would rather die a pauper than have a hand in erecting one of the wretched suburbs around Birmingham.

The resolution was passed.

WESLEYAN CHAPEL, BLAGDON, NEAR BRISTOL.—A new Wesleyan chapel is being erected in this village. It will be of native stone with freestone dressings. The architect is Mr. F. W. Willis, Bristol.

Obituary.

MR. MICKLETHWAITE.—We regret to announce the death on October 28, at his residence, No. 27, St. George's-square, Pinlco, S.W., of Mr. John Thomas Micklethwaite, F.R.S.A., V.P.S.A., aged sixty-three years. Mr. Micklethwaite was a pupil of Sir Gilbert Scott, in whose offices he had for his contemporaries Mr. T. G. Jackson, R.A., Mr. Somers Clarke, and the late Thomas Garner. In March, 1898, he was appointed, vice J. L. Pearson, R.A., deceased, architect and surveyor to the Dean and Chapter of Westminster; he was the author of the architectural portion of Mr. H. J. Feasey's historical and illustrated work upon the Abbey, of which a review appeared in our columns of June 3, 1899. He prepared the dated ground plan of the Abbey for the collection of historical drawings exhibited during the International Congress of Architects in last July, and the plan for Mr. Charles Hatt's "Abbey and Church of Westminster," 1902, and he wrote the article upon the Abbey in this journal of January 6, 1894.—No. I. of our series, "The Abbeys of Great Britain." Seven years ago Mr. Micklethwaite undertook the repair of the towers and west front; in July last he, in conjunction with Mr. W. D. Caroe, framed an extensive scheme for an extensive repair of the exterior of the fabric chiefly upon the north side, to be executed in the course of the next four or five years, at a cost of some 20,000, over and above the current yearly expenditure of 4,000, upon the general conservation of the building. Mr. Micklethwaite was President of the Architectural Society for the meeting of the Royal Archaeological Institute, held at Lancaster in July, 1898, and acted as guide and cicerone to the members of that Institute on the occasion of their visit to York in August, 1903. He served as member of Council of the Society of Antiquaries in 1903-5, and had been Vice-President in 1902-3. Of Mr. Micklethwaite's architectural works the following have been illustrated in the *Builder*.—Church of St. John the Divine, Gainsborough, and enlargement scheme subsequently (June 28, 1884); All Saints' Church, Haydon's-lane, Wimbleton (December 5, 1885); new nave and aisles, All Saints' Parish Church, Brixham (September 20, 1890), of which he restored the tower in 1898; rebuilding the tower (excepted) of St. Paul's, Morton, near Gainsborough, with the organ-case, chancel-screen, and stalls (October 3, 1891, and February 4, 1893)—these being in conjunction with Mr. Somers Clarke. On September 11, 1886, we illustrated his "Drawing showing the true nature of the Westminster Hall Restoration." Four years ago he made designs for the east porch, and prepared the scheme for alterations and improvements of St. Mary Magdalene Church, Munster-square, St. Pancras, to include chancel-screen and loft, side-screens, returned stalls, south side-altar, new ventilation, lighting, etc., which he implemented last year. In 1891, he designed screens in the north and south aisles as a memorial to the late Rev. W. H. H. Jervois. He was engaged as architect for the restoration of Kirkstall Abbey and of the tower, Oundle Church, Northants, 1892-3; of Thornhaugh Church, Northants; and in 1888-1899 of St. John the Baptist Church, Wokingham. He was also of the Technical Schools, Wimbledon, for the Surrey County Council; the Vestry, Wiford Church, Herts; St. Peter's Church, Bocking; and a church at Church-Stretton, Burton-on-Trent—in the interval 1896-8; in the following year he made a report upon the proposed alterations and additions for Madingley Church, near Cambridge, which were carried out under his direction, and he designed also the stone altar there. Of other works we should mention Nos. 47-8, Chancery-lane, on the east side, at the entrance into Quality-court, illustrated in the *Builder* of December 30, 1899, No. XXXV. of our series, "Sketches of London Street Architecture"; St. Bartholomew Church, in Barking-road, East Ham, erected in 1902 at a cost of 10,500; and St. Paul's Church, Wimbledon Park, 1887—these being in conjunction with Mr. Somers Clarke. He repaired the Parish Church, Ranworth, Norfolk, and the beautiful rood screen, restored the chancel of St. Andrew's, Cherry-Binton, near Cambridge, in 1885-6, and restored Orford Church, in 1898-9; he was appointed architect for the rebuilding, at an estimated cost of 4,000, of the nave (with restoration work) of St. Mary's, West Malling, Kent, and the restoration of the parish churches of Lydney North, County Salop, and Cley-next-the-Sea; of the chancel, Brighton Parish Church, at a cost of about £600; and of the chancel and chancel-aisle of the XIIth-century church of All Saints', Great Sturton; in January last was completed, after his designs, the new chancel of St. John's, Wakefield, with organ-chamber and vestry, erected at a cost of some 4,000. He drew up a report four years ago upon the condition of Clifford's Tower, York, in conjunction with Mr. Basil Mott and the York County Council deputed him, together with Mr. Mott and Mr. W. H. Brierley, to co-operate in the completion of the restoration work; and reports upon the churches of St. Saviour, Scarborough, and St.

Margaret, Cley, Norfolk. Mr. Micklethwaite succeeded J. L. Pearson in 1900 as architect for St. George's Chapel, Windsor, and was one of the honorees consulted in the matter of the Incorporated Society for Promoting the Enlargement, Building, and Reparation of Churches and Chapels. For the Coronation ceremony of King Edward VII. Mr. Micklethwaite designed the copes, high-altar frontal, and pull for the Confessor's shrine, worked under his superintendence by needlewomen at Messrs. Watts & Co.'s Baker-street; and he at the same time carried out the decorations, which are retained, for the gilded carving on the west side of the Confessor's shrine. Mr. Micklethwaite contributed to the *Church Builder*, in 1900-5, a series of articles entitled "Occasional Notes on Church Furniture and Arrangement," including "Chancel Screens" and "Chapel Churches"; a tract issued by the Alcuin Club upon the subject of church ornaments rubric temp. Edward VI.; a paper upon "Parish Churches in 1548," in the *Archæological Journal* V. XXXV.; a paper upon "The Growth of an English Parish Church," with a full description of Wakefield Church, read to the Church Crafts League, and reported in the *Builder* of November 29, 1902; he was elected a member of Committee of the League in November, 1901.

General Building News.

NEW CHURCH, SPARKHILL, BIRMINGHAM.—The foundation-stone of St. Christopher's Church, Sparkhill, was laid on the 20th inst. The church, Mr. Arthur Harrison, has designed a brick building, relieved by mottled Alton stone. The church, the main body of which is 100 ft. by 48 ft., will eventually consist of a nave, side aisles, morning chapel, baptistery, chancel, vestry, organ-chamber, and heating-chamber, the latter being built on the basement. The roof is to be of rustic green slates. The contract has been given to Mr. Frank Davis, of College-road, Moseley. The church is estimated to cost 7,000, and will have seating accommodation for 705 worshippers, but the portion which is now being built excludes the chancel, the vestry, the organ and heating chambers.

WESLEYAN METHODIST CHURCH, POKESDOWN, BOURNEMOUTH.—The foundation-stones were recently laid of a new Wesleyan Methodist church on a site in Seabourne-road, Pokesdown. The contract has been let to Messrs. Mills & Sons, builders, of Pokesdown, for 1,360, and the designs are by Mr. W. T. Chinchin, architect, of Bristol. The building is of red brick with Bath-stone dressings, has a tracery window on the west front, a roof of Broseley tiles, and will accommodate 350 people. The schoolroom will provide seating accommodation for about 200 children, there will be three vestries, and the usual offices.

CONGREGATIONAL CHURCH, BURSLEM.—A new Congregational Church has been erected at Burslem on a site on the south side of the Moorland-road. The building is faced with red bricks and red Hollington stone. Internally, the church is arranged with a nave 63 ft. long and 33 ft. wide, and 34 ft. high to the ceiling, which is formed of plaster, with nook windows and elliptical in shape. The aisle is 6 ft. 6 in. deep, and the roof is open into the nave with stone arches, supported with stone columns and carved capitals. There is a gallery across the front end of the nave, approached by two stone staircases communicating with the entrance porches. The walls and ceilings are all plastered, exposed timbers being shown over the side aisles. At the south end of the nave is placed the choir, on a raised floor, and organ chamber to the west, and here is also placed the pulpit. The porches and staircases are paved with encaustic tiles, but all other floors are of pitch-pine blocks, with a gradual fall from front to back. The whole of the seating on the ground floor and the pulpit is executed in oak, the seats being circular and radding. The church will accommodate, including the choir and gallery, 610; in addition to which there is room to place 100 chairs for occasional use. Electric lighting has been adopted, and the heating is by high-pressure hot-water. There are also three vestries, placed on the west side of the building, with cloak-rooms and lavatories. The estimated cost, exclusive of site, was 3,749. The general contractors are Messrs. W. Grant & Sons, and the work has been executed from the designs and under the direction of the architects, Messrs. A. R. Wood & Sons, of Burslem.

PROPOSED NEW NAVE AT HEXHAM ABBEY.—At a consistory Court recently held at Hexham, the Rector and churchwardens applied for a faculty to erect a nave to Hexham Abbey. The proposal is to erect a nave in the Decorated style, at an estimated cost of 22,000. The inadequacy of accommodation for worshippers was adduced as the principal reason for the proposed scheme. At the principal object of the scheme was that an enlargement of the church is unnecessary, and that the proposed nave would not be worthy of the building. The Chancellor (Mr. A. B. Kempe), in giving judgment, said that the designs for the

proposed nave had met the approval of Mr. Temple Moore, Mr. Oldrid Scott, Mr. Bodley, and Mr. Jackson. The vestry and the Abbey Building Committee approved of the design, and on the citation being issued only one gentleman has appeared in opposition, and also the strongest evidence before him on the part of the Vicar and churchwardens that the church at the present time was not sufficient for the requirements of a growing town like Hexham. The Chancellor granted the faculty.

UNITARIAN CHURCH, BRADFORD.—A Unitarian church has been built in Broadway-avenue, Bradford. The building has been erected from plans prepared by Mr. J. W. Connon, of the firm of Messrs. Connon & Chorley, of Leeds. The total seating capacity is 360, the chapel accommodating about 230, and the two classrooms 130. These classrooms are arranged so that they can be thrown open to the chapel when desired, and there are also a vestry and tea room. The cost, exclusive of the site, was 1,300*l*.

CHURCH ADDITIONS, KENSINGTON-GORE.—A new chapel of SS. Simon and Jude and north aisle, which have been added to Holy Trinity Church, Kensington-gore, were dedicated by the Bishop of London on the 27th ult. The additions were designed by Mr. G. F. Bodley, R.A.

CONGREGATIONAL CHAPEL, YNSYBYWL.—A new chapel is in course of erection for the English Congregational Church at Ynsybywl from plans prepared by Messrs. Lewis & Morgan, architects, Pontypridd. It will be of native stone, with red brick facings. The chapel will provide accommodation for about 200 persons, while the schoolroom beneath another 100 persons will be accommodated. There is a basement immediately beneath the schoolroom. The work is being carried out by Messrs. Williams Brothers, contractors, Ynsybywl, at a cost of 1,150*l*.

MOULTON MEMORIAL CHAPEL, CAMBRIDGE.—On the 27th ult. the Moulton Memorial Chapel, which has been erected in the grounds of the Leys Wesleyan School, Cambridge, was dedicated by the Headmaster, Dr. Barber. In style it is late Perpendicular. It is arranged as a small church, with nave, chancel, and bell turret, and is built of red brick with Bath-stone dressings. The gables are surmounted by carved crosses, and the design provides for a series of stained glass windows, illustrating the life of Our Lord. The chapel has cost about 8,000*l*, and the architect was Mr. Robert Curwen.

PRIMITIVE METHODIST CHAPEL, BRAMPTON.—A new Primitive Methodist chapel has been erected and opened at Brampton. The contractors were—Builder, Mr. W. Rhodes (Brampton); joinery, Messrs. Lund & Swann (Eckington); glazing, Mr. Alfred Jeffrey (Sheffield); heating, Mr. W. Haslam (Harstoft); electric lighting, Messrs. Alvey & Bower (Chesham). Mr. W. C. Jackson, architect, prepared the plans for the building.

COUNCIL SCHOOL, CHELTENHAM.—The foundation-stone was laid recently of the second new Council School, which is in course of erection in Gloucester-road, Cheltenham. The building will consist of three departments, viz., boys', girls', and infants', with a central hall, 78 ft. by 35 ft., jointly for the boys and girls, and a separate hall for the infants, 48 ft. by 24 ft. The classrooms, twenty-one in all, surround these central halls, and are approached therefrom by glazed doors. In addition, there are windows in the same walls, which, with the doors, admit of complete over-sight of the whole of the classrooms from the central halls. The playgrounds will be wholly drained and asphalted, and covered shelters are provided for wet weather. The boundaries on three sides will be enclosed with walls 6 ft. high, and that to the main road with a dwarf brick wall surmounted with wrought-iron railings. The site is a little over one and three-quarter acres in extent, with a frontage to the Gloucester-road of about 250 ft. The classrooms number seven for boys, seven for girls, and seven for infants, giving a total of 1,100 scholars. The walls are plastered with Portland cement dados, and the floors laid with pitch-pine blocks upon cement concrete. The walls of laboratories, cloak-rooms, corridors, and central halls all have dados of glazed bricks, brown in colour, and plastered above. There are rooms for teachers, and also rooms where scholars may take their meals. The interior woodwork throughout will be slightly stained and varnished. The warming is by hot water upon the low-pressure system, and for artificial lighting gas will be employed. The whole of the bricks are from the Battledown brickworks, with the exception of those used for exterior facing, and these are a rich red-pressed brick, relieved with terra-cotta mouldings. The roofs will be covered with red Bursley tiles. The architects are Messrs. Charters & Smithson, of Cheltenham; and the builder, Mr. Charles Wright, of Leicester.

ROMAN CATHOLIC SCHOOLS, CORBRIDGE.—The opening of the new elementary schools, which have been erected in connexion with St. Peter's Roman Catholic Church, Corbridge, took place on the 27th ult. The schools have been erected by Mr. T. Cooke, of Burslem, from the plans of Messrs. R. Scrivener & Sons, of Hanley, the cost

having been 2,500*l*, exclusive of the site. They consist of two departments—mixed and infants—and provide accommodation for 310 children.

PRIMITIVE METHODIST SUNDAY SCHOOL, NORTHWOLD.—A new Primitive Methodist Sunday School has been erected adjoining the chapel at Northwold, from plans by Mr. E. Snares, architect, of London. The work has been carried out by Mr. F. G. Dye. The building will accommodate about 150.

MUNICIPAL TECHNICAL SCHOOL, LONDON-DERRY.—The new Technical Institute, London-derry, which is being erected at the junction of Laurence-hill and Strand-road, will be four stories in height, built of brick, with bands and dressings of tinted cement. The front to Strand will have a width of 80 ft. and extend 120 ft. from front to rear. The average width of building is 66 ft. The central corridor type of plan has been adopted. A fireproof corridor, 8 ft. wide, runs through the centre of each floor, with rooms to both sides. The principal entrance is from Strand, and the ground story contains in the front portion entrance-hall, office, cloak-room, committee-room, 28 ft. by 19 ft., principal's room, 19 ft. by 13 ft., and main staircase; and on the north or right-hand side of centre corridor, carpenter's shop, 38 ft. by 24 ft., engineering workshop, 48 ft. by 26 ft., lift for goods and back-stair annex; and on the south side electrical laboratory and engine-room, 30 ft. by 24 ft., smith's forge and experimental boiler-room, 24 ft. by 12 ft., plumber's workshop, 20 ft. by 24 ft., a store-room and sanitary annex; entrance to yard from front and corridor, and on the north side, etc. The second story will have on Strand front a classroom, 32 ft. by 16 ft., physical and mechanical laboratory, 32 ft. by 27 ft., and a room for physical apparatus; on the north side of corridor a drawing-hall and a classroom, each 36 ft. by 26 ft., divided by folding partition, and will form a hall 72 ft. by 26 ft. On the south side, physics lecture-theatre, 30 ft. by 24 ft., optics room, 24 ft. by 12 ft., cookery kitchen, 24 ft. by 20 ft., with scullery adjoining, and ladies' cloak-room, and back-stair and sanitary annexes as on ground floor. The third story has the front to Strand, and north side laid out for five large classrooms, and on the north side of corridor will be the chemical laboratory, 31 ft. by 24 ft., chemical lecture-theatre, 30 ft. by 24 ft., and a preparation-room and balance-room between the theatre and laboratory. The top story has the caretaker's apartments in part of Strand front, the art-rooms, design, elementary, and antique to the north side, with a modelling-room and store, etc., to south side, and stair and sanitary annex and lift as on other floors. The floors of laboratories, theatres, and main rooms are formed of concrete and expanded steel, and laid with maple flooring. The heating chamber and pipe passages are in cellars under ground floor. The heating will be by low-pressure hot water with ventilating radiators, ventilation on the vacuum principle. Lighting will be by electricity, with gas for power and laboratory use. The building will stand within its own grounds. The Strand front will be set back 10 ft. from footpath, and be enclosed with iron railings. Mr. R. Colhoun, Strand Derry, secured the building contract. The heating and plumbing contracts are not yet arranged for. Mr. E. J. Toye, Derry, is the architect of the building.

SUNDAY-SCHOOL, BEESTON HILL, LEEDS.—The Sunday-school of the new church of the New Connexion Methodists in the Hunstret Circuit that is being erected in Tempest-road, Beeston Hill, was opened recently. The school, which has accommodation for about 500 scholars, is the first completed portion of the scheme. The church, which immediately adjoins the school, and which has accommodation for 600 worshippers, is built in roughly dressed stone in the Decorated Gothic style, and is flanked by a tower and spire. The buildings have been erected from plans drawn by Mr. W. S. Braithwaite, and include, besides the church and the Sunday-school, eleven or twelve classrooms, vestries, a church parlour, and a caretaker's house, the whole costing about 6,000*l*.

METHODIST SUNDAY-SCHOOL, SHEFFIELD.—New Sunday-school premises are being erected for the Sheffield Free Methodists on a site at the junction of Ecclesall-road and Glensalmond-road, Banner Cross. The premises will have a central hall, 48 ft. by 29 ft., with platform, and this will be entered by two front vestibules from Glensalmond-road. In addition there are to be six separate classrooms, three on each side of the main room, each about 12 ft. 6 in. by 11 ft. 3 in., divided from one another by swivel partitions, and opening into the hall. Cloakrooms are provided for boys and girls. An infants' room, capable of division into two classrooms by swivel partitions, and another classroom and kitchen complete the building. The front and returns are faced with rock-faced stone fronts, with ashlar dressings, and the school is to have two moulded arched entrance doors, flanked by pinnacles, and a five-light traceried stone window in the gable, and moulded coping and terminal to gable. The work is being carried out by Mr.

Charles Ward, of Sheffield, from the designs and under the superintendence of Messrs. George Baines & Son, of London.

RAILWAY EXTENSIONS, FERRYHILL, ABERDEEN.—During the last few months the Caledonian Railway Company have been executing some important works and extensions at Ferryhill. For widening purposes deep and broad retaining walls have been built alongside the main lines. The bridge over Polmuir-road has been rebuilt, extended, and improved in structure. An awkward abutment on the roadway has been removed and the whole brought into line and is lined with white enamelled bricks throughout. The more important works, for which the foregoing are merely auxiliaries, are the erection of new engine-sheds and carriage workshops, and the making of a new turntable, all designed by Mr. Donald A. Matheson, M.Inst.C.E., the company's engineer-in-chief.

WESLEYAN MISSION HALL, WIGAN.—A Wesleyan Mission-hall is to be erected in this town on a site in Market-street. The large hall is octagonal in plan on the ground-floor. Accommodation will be provided for 2,000 in tip-up chairs. The fall of the land will enable a lower ground-floor to be made under the large hall. The smaller hall, surrounded by a verandah, will cost about 750*l*. Behind the platform will be the infants' room, with separate entrances. In addition there will be shops on each side of the entrance, as well as two floors of offices to let above. The cost of the scheme is estimated at 29,200*l*, including the capitalised value of the ground-lease. The architect of the scheme are Messrs. Bradshaw & Gass, of Bolton.

COTTON EXCHANGE, LIVERPOOL.—On the invitation of Mr. W. A. Willmer (Chairman of the Building Committee of the Liverpool Cotton Association, Ltd.), an inspection was recently made of the new building in Oldhall-street, which is now approaching completion. The site cost 100*l*, and the approximate cost of the building when completed, be about 200,000*l*. The architects of the new Cotton Exchange are Messrs. Matear & Simon, of Liverpool, whose designs were selected in competition, and the contract for the construction of the building was secured by the Waring-White Building Company. A tower at each end, a colonnade against a blank wall shielding the Exchange roof from view, and a loggia stretching low across the building are the principal features in the design. Each tower is surmounted by a figure supporting a globe, the figures respectively representing Neptune and the Mersey. Four smaller figures are seated at the corners of each tower, these representing Industry, Science, Agriculture, and Commerce. On the north side the elevation is carried out almost entirely with a facing of cast iron. A number of cotton sale-rooms are placed on this side of the building, and "for these," says the *Liverpool Journal of Commerce*, "an even, unobstructed light is necessary." It was found by using cast-iron attached to the steel frame, in the place of stone piers, a great reduction could be effected in the width between the windows, and so bringing about a corresponding diminution of shadow, while at the same time it also enabled the thickness of the walls to be reduced. Nearly 18,000 super. ft. of cast-iron have been used altogether. The Exchange hall occupies the main space inside the building, its dimensions being 140 ft. by 128 ft. Though differing in shape it is about equal in area to that of the Exchange news-room. The hall is carried to the top of the building, and is lighted by means of a large glass double roof. A striking feature of the interior of the large Exchange is the use which has been made of some magnificent monolithic Royal Pearl granite columns, which were quarried in Norway and shipped to Aberdeen, where they were turned and polished. The bases and capitals of the columns are of marble, and of this material alone 10,000*l* worth has been used in the building. . . . There is a complete system of telephonic communication installed, by means of which the tenants will be enabled to call each other without first ringing the bell. There will be a post and telegraph office, while the various cable companies will also have offices in the building. On each floor of the huge building facilities will be provided for the posting of letters. In addition to the board-room and the administrative offices of the association there will also be a smoking-room and a reading-room on the ground floor. The board-room will be panelled in oak, and the other rooms mentioned in walnut. The cabinet work and fittings are by Messrs. Waring & Gillow. The various other floors will be devoted to offices. . . . The whole of the building is fitted with the electric light. . . . The whole of this contract has been carried out by the Northern Electrical and Ventilating Company, Liverpool, a local firm, under the superintendence of their Engineer, Mr. C. P. L. Titherley. The floors throughout the building are formed of slightly cambered concrete blocks, made with a specially prepared fire-resisting concrete, and fitted between the rolled-steel joists without the use of any kind of centring. Some 3,000 tons of

steel have been utilised in the erection of the building. A complete system of lifts, numbering twelve altogether, has been installed, and it is interesting to note that the architects of the building have designed the cars. A restaurant is to be fitted up in the basement, while a club is being formed with premises on the top floor."

BUILDING IN PAISLEY.—At a sitting of Dean of Guild Court, held on the 17th ult., plans were passed to the Southpark Feuing Company for ten tenements of three stories each at Southpark, and to George Dobie & Son, contractors to their work at Greenhill-road. Mr. Lee, Master of Works, submitted his annual report on building in the burgh. During the past year ending October 17 there had been seventy-nine cases brought forward for disposal by the Dean of Guild Court, as compared with ninety-five the previous year. The valuation of these was estimated at £115,310, as compared with £130,040, a decrease of £14,730. In the classification of property there were twenty-seven four-story tenements, twenty-one three-story tenements, one two-story tenement, four villas, nineteen semi-detached villas and cottages, the remainder being made up with alterations to property and additions to public works. During the year plans were passed for a large mill, estimated to cost £2,000, but this had not been proceeded with. Permits have been granted in fifty-two minor cases by the Master of Works in virtue of the powers conferred by the Paisley Police Act, 1901, as compared with forty-six last year.

ACLAND HOME, OXFORD.—On October 13 was opened the new wing of the Acland Home, which was erected in memory of Sir Henry Acland, Regius Professor of Medicine in the University, as a sanatorium for use by undergraduates in cases of enteric and nervous diseases, and for those requiring prompt surgical treatment. The new buildings, planned and designed by Mr. R. Langton Cole, contain operating, sterilising, and anæsthetic rooms, with open-air balconies and a lift, and have cost about £2,500. An anonymous donor offers to provide a glass balcony with an outside spiral staircase.

EPISCOPALIAN HALL, PORTOBELLO, EDINBURGH. The foundation-stone of the new mission-hall of St. Mark's Episcopal Church was laid at Portobello on the 20th ult. The building is in the Gothic style. It measures 112 ft. in length, and embraces a chancel, a hall to accommodate 350 persons, a lesser hall or classroom to accommodate seventy, a kitchen and other offices. The fabric is of brick with an eastern front of red freestone, with dressing of pink faïence. Mr. E. C. Maule, architect, Edinburgh, was the designer, and Messrs. Wm. Gerard & Sons, Edinburgh, are the builders. The cost will be £1,100.

CLUB PREMISES, HUDDERSFIELD.—On the 20th ult. the new Conservative Club at Crosland Road, Huddersfield, was opened by Sir Savile Crossley, Bart. The architect of the work was Mr. J. Ainley.

HARROGATE INFIRMARY EXTENSION.—A new wing has just been opened in connexion with the infirmary at Harrogate. It provides a new operating theatre, with an anæsthetic room attached, and a patients' lift, an X-ray room, electrical and ophthalmic-rooms, a surgery, dressing-rooms, small laboratory, and a large general ward department. About twenty extra beds are provided. The new wing has been constructed of stone from the plans of Messrs. H. E. & A. Bown, of Harrogate, and harmonises with the general design. The total cost is £6,850.

POORHOUSE, ABERDEEN.—A new poorhouse at Oldmill, outside the city boundary, has been built by the Aberdeen Parish Council. The estate extends to fully 50 acres, and accommodation is provided for about 400 in the main building, 300 in the hospitals, 80 in the children's block, eight in cottages, and twenty in the probationary wards. There will, in addition, be provision for the staff in the house, and in a nurses' home and in cottages; and there is a governor's house and quarters for a resident doctor. The administration department and poorhouse proper occupy the central position; the children's department is to the east, and the hospitals are to the west, where there is space to expand. The building is generally a two-story in height, and there is a clock-tower. The whole of the blocks have been built of grey granite. The hospitals have concrete and wood block floors, and the walls are finished with Keene's cement. The Corporation water supply has been laid on, and the sewage joins the city system. The total cost, including the site, will be about £20,000. Messrs. Brown & Watt, Aberdeen, are the architects.

RAILWAY-STATION IMPROVEMENTS, YORK.—The North-Eastern Railway Company has erected a café and tea-room in the railway-station at York. The room was designed by Mr. Bell, the company's architect.

CHURCH RESTORATION, YETMINSTER.—The Church of St. Andrew in this town has just been restored and improved by the additions of a tower screen, ringing loft, new seats and floor, screen to the north porch, and a new heating system, at a cost of about £500. The architect was Mr. C. B.

Benson, of Yeovil, and the work has been carried out by Messrs. J. W. & H. Childs, of Yeovil. The pipe fitting for the hot-water service was executed by Messrs. H. B. & H. Petter, of Yeovil. **BATHS, NEWCASTLE-UNDER-LYME.**—The King's memorial baths, erected at Newcastle-under-Lyme, were opened on the 22nd ult. The baths have cost in all nearly £14,000. They contain a plunge bath, 100 ft. by 35 ft.; a smaller plunge bath mainly for children, Turkish baths, Russian vapour baths, etc. The building has been erected by Mr. S. Walton, jun., Newcastle-under-Lyme, to the design of Mr. J. B. Langley, architect.

FREE LIBRARY, MORLEY.—The new Free Library at Morley, which is the gift to the town of Mr. Andrew Carnegie, was opened recently in Commercial-street. The lending library has accommodation for about 20,000 volumes, and there is also a reference department and a juveniles' room. The building, which has cost £6,000, has been erected from the plans of Mr. W. E. Putman, the Borough Engineer.

THE HORNEY LIBRARY, LIVERPOOL.—The new library in William Brown-street, Liverpool, with its valuable contents of books, prints, and autographs, which were the gift to Liverpool of the late Mr. H. F. Hornby, of Huscumber, and dedicated to the public on the 27th ult. The building consists of a room 64 ft. long by 37½ ft. broad. It has been designed and erected under the direction of the Corporation Surveyor, Mr. Thomas Sheldermine.

NEW PHYSICAL INSTITUTE, GLASGOW UNIVERSITY.—New lecture halls and laboratories have been erected for the department of Natural Philosophy at Glasgow University. They are accommodated in the more northerly of the two new buildings which have been erected to the west of the University. The other and larger building, which fronts towards the West-end, and is known as the Kelvin building, contains rooms for the three departments of physiology, forensic medicine (with public health), and Materia Medica. Though as yet incomplete internally, this latter building is being rapidly fitted up in view of the formal inauguration of these extensions of the University by His Royal Highness the Prince of Wales in April next. The fittings and furniture of the Natural Philosophy building are now complete, with the exception of some special machinery and apparatus. The building has been erected from the design of Mr. James Miller, of Glasgow. The work of heating and ventilating, and of fitting up both buildings, has been, and still is, directly supervised by a committee consisting of Sir William Thomson, Mr. Henry Gordon, Mr. William Lorimer, Dr. McVail, Professor Muir, and Professor Gray.

PARISH HALL, COLCHESTER.—A parish hall has been erected in the Parish of St. Mary Magdalen, Colchester. The building has been erected by Mr. W. Chambers from the plans of Mr. C. E. Butcher.

DANCING ROOMS, PENARCTH.—The new Paget-rooms, which have been erected in Victoria-road, for balls, concerts, etc., have been opened. The architect was Mr. J. Coates Carter, of Cardiff; while the contractors were Messrs. E. Turner & Sons, of Cardiff.

TRAMWAY OFFICES AND DEPOT, WEST HAM.—The new offices and car depot of the West Ham Corporation Tramways stand on a site of 12,470 sq. yds. in Greengate-street, Plaistow. The buildings have been erected from the plans of the Borough Engineer, Mr. John G. Morley, A.M. Inst.C.E., the building contract being let to Messrs. William Gregor & Son, of Stratford, at the contract price of £9,900, exclusive of the permanent way and paving work. The general office block has a frontage of 36 ft. and a depth of 80 ft., the building being executed in stock bricks and artificial stone dressings. The basement provides cellars for the heating apparatus, coal storage, etc. On the ground floor is a general office running along the side and back of the building. This is approached through two double swing-doors and a vestibule and hall, paved with Roman mosaic. The outer swing-door and the windows on the ground floor, facing Greengate-street, and all windows surrounding the entrance hall and on the main staircase, have been supplied by the London & Glasgow Blast Company, and show in etched glass the borough arms, departmental monogram, etc. On the left of the entrance hall is an inspectors' office, and on the right a goods lift of 5 cwt. capacity, connecting both with the hall and with the side approach to the shed. Off the hall and the general office is the chief clerk's room, the claims room, separate telephone room, and lavatory accommodation. The floor of all the rooms on the ground floor is of wood blocks. The main staircase leads from the hall to the first floor. On this floor is the room of the tramways manager, safe room, and lavatory accommodation, and immediately adjoining it is the ante-room and correspondence office. On the right of the principal staircase is a cash and ticket office, leading from which is a ticket-room. From the punch and cash-rooms there is a spiral staircase leading to a portion of the second floor, which has been shut off from the remainder of that floor. This enclosed portion includes a

lunch and cloak-room and lavatory accommodation for the female staff. The remainder of the second floor is taken up by store-rooms and the caretaker's apartments. The front portion of the roof, which contains the water cistern, etc., is available for the storage of materials, and access has been provided to the remainder of the roof, which is flat. The car depot and the permanent way have been designed to enable access to every track to be obtained from either end. The depot is built of selected stock bricks and artificial stone dressings, being divided by a brick wall into two main portions—one the running shed proper, and the other the works shed and shed administrative block. The running shed proper consists of two bays of 43 ft. 7 in. and 52 ft. 8½ in. span by 21 ft. 6 in. high to the eaves. It contains nine tracks of total inside length of 300 ft., accommodating 90 cars. The track rails are supported throughout on piers, these forming piers of 4 ft. 6 in. deep under the whole area. The western wall of the running shed has been erected in corrugated iron, as land has been reserved at the other side of it for further extension of the shed. The works shed is 25 ft. high in the eaves. The machine shop and the carpenters' shop are 220 ft. long by 40 ft. wide, the shops being shut off by roller shutter doors from the paint shop, which is 80 ft. by 40 ft. Leading off the machine shop are the various mechanics' departments. The shed administrative block includes shed foreman's office and the inspectors' offices. On the ground floor is a traffic mess-room and a shed staff mess-room. Through a hall the walls of which are tiled to a height of 5 ft. with flint, access is obtained to a basement providing accommodation for heating apparatus, coal cellars, etc., and by the main staircase to the first floor. This floor contains various offices and lavatory accommodation, and a recreation-room, 56 ft. by 30 ft. All rooms in the shed administrative block are laid with pitch-pine wood block flooring. On the opposite side of the depot yard, and adjoining the main approach, is a weigh office, salt stores, oil stores, and a transformer chamber. In the south-west corner of the site is a sand drying shed. The measurement of the single track in the depot is 2,047 yds.

NEW POST OFFICE, HANLEY.—The new Hanley Post Office was recently inaugurated by the Right Hon. Sydney Charles Buxton, M.P. Mr. J. Rutherford, of H.M. Office of Works, was the architect of the new office.

Appointment.

WALSALL.—Mr. John Taylor, of the Bradford City Surveyor's department, has been appointed engineer and surveyor to the County Borough of Walsall, near Birmingham, at a commencing salary of £400 a year. There were originally 152 applicants for the position. Mr. Taylor served his articles as an engineer in Leeds. Afterwards he had experience in the municipal offices at Yeovil, Colne, and Huddersfield. He has been in Bradford about seven years.

Sanitary and Engineering News.

HOUSE DRAINAGE IN CAMBERWELL.—According to the annual report of Camberwell Borough Council, which has just been issued, 422 applications were received during the year for the drainage of 889 houses, buildings, etc., and the works in connexion therewith had been carried out under inspection. The number named included the construction and the remodelling of the drainage of 40 houses, as well as the drainage of new property, and also included 273 cases of combined drainage, which had been considered by the Committee, and afterwards dealt with by the Borough Council.

COMBINED DRAINAGE IN LONDON.—Mr. Herbert Beddall, the Chairman of the Public Health Department of St. Paul's, in his annual report, which has just been circulated, says the unsatisfactory state of the law relating to combined drainage, by which a heavy burden is cast upon the ratepayers, has again received serious consideration. The question is no recent one. So far back as 1898 a conference of sanitary authorities took place on the subject. The London County Council then took up the matter. In five sessions of Parliament they were unsuccessful in their efforts to obtain an amendment of the law so as to throw upon the owners of property, the cost of maintenance of all combined systems or other drains not approved by proper authority at severals. Later in 1903, a large deputation from the Metropolitan Borough Council waited on the President of the Local Government Board, Mr. Long, urging the necessity for legislation on the subject. A sympathetic reply was given, but nothing was done to give effect to the desires

expressed. In the following year this authority specially drew the attention of the London County Council and the Borough Councils to the practice of sub-dividing premises which by creating separate curtilages without the knowledge or sanction of the Borough Council, changes the character of the drain. The difficulties of the problem are further increased by surreptitious connexions to approved systems of drainage, which also have the effect of changing the character of the drain. Of this practice the department have had recent experience. In 1904, the position seems to be that to prevent systems of drainage being converted into sewers an army of sanitary inspectors needs to exercise the strictest supervision. To show that the burden is a real and not imaginary one, Mr. Beddall goes on to say, that for the seven years ending March 31 last the following amounts were expended on Metropolitan Borough Councils for repairing or reconstructing sewers due to combined drainage:—Battersea, 15,139. 16s. 1d.; Bermondsey, average 250l. per annum; Bethnal Green, 12,968 4s. 6d.; Camberwell, approximate expenditure for 1905 and 1906, £1,700; Chelsea, 1865. 2s. for three years; Deptford, total for three years, 3192. 9s.; Finsbury, 2322. 8s. 11d.; Fulham, 3,194. 11s. 7d.; Greenwich, approximate expenditure 1904-1906, 2571. 13s. 10d.; Hackney approximately, 2,500l. to 3,000l.; Hammersmith, 8941. 2s. 6d.; Islington, 27,366. 9s. 9d.; Kensington, 2231. 16s. 4d.; Lambeth, 3,865. 7s. 2d. for four years; Lewisham, estimated for years 1900-1904, 1,000l.; Paddington, 10,044. 18s. 6d.; Poplar, 9,649. 1s. 3d.; St. Marylebone, 421. 14s., no separate account; St. Pancras, 22,603. 10s. 11d.; Shoreditch, 3,494. 13s. 10d.; Southwark, 4,576. 16s. 11d.; Stepney, 4,797. 3s. 9d.; Stoke Newington, 244. 12s. 11d., no separate account; Wandsworth, 1,260 10s. 9d.; Westminster, estimated 250l. per annum; Woolwich, 3,845. 1s. 4d. From the foregoing (the Report goes on to say) it would be seen that a vast sum of money has been spent by the several London Boroughs in re-constructing sewers due to combined drainage. But even this does not represent the whole of the expenditure, because in several instances separate accounts are not kept, while in others the figures are incomplete. The figures, however, conclusively prove, Mr. Beddall says, the absolute need which exists for a revision of the law.

NEW WATER SUPPLY, BUCKIE.—On the 22nd ult., at a special meeting of Buckie Town Council, tenders for constructing the new water system planned by the engineer, Sir W. R. Copland, Glasgow, were considered. Out of about twenty offers from leading contractors in Inverness, Elgin, Aberdeen, and the south, the Town Council accepted the offer of Messrs. George Pirie & Son, Aberdeen. The contract price for the works amounts to 11,620l.

Foreign.

EGYPT.—A new bank is being erected at Tanta, Egypt, from plans by Mr. Robert Williams, of London. The walls are of brick with Doubling stone dressings from the City of Bed of the Ham el-Bay and Doubling Stone Company. The main entrance is of stone, and forms the chief feature of the building, which stands in a commanding position.

SOUTH AFRICA.—Builders in Natal are indignantly protesting against the compulsory Arbitration Bill which has been prepared by a Durban special meeting of the Durban Master Builders' Association, the Chairman characterised it as a wicked piece of legislation. Messrs. Milne & Sladdin's design for the new headquarters in Cape Town of the Bank of Africa, Ltd., has been accepted. The professional assessor was Mr. Reginald A. R.A., and, upon his advice, an honorarium has been awarded in equal proportions to four of the other competitors, namely, Messrs. Baker & Masey, William Black, Parker & Forsyth, and Stucke & Bannister. The Dutch Reformed Church in Adderley-street, Cape Town, has been completed, at a cost of 15,240l. The architect was Mr. M. B. Torstensson, and the builders Messrs. Hopkins & Co.

Miscellaneous.

PROFESSIONAL AND BUSINESS ANNOUNCEMENT.—Mr. Robert Stevenson, 11, Queen Victoria-street, E.C., has been appointed London agent for the Glazed Faience and Brick Company, Selby; and for the Northam Brick Company.

A DIOCESE FOR SHROPSHIRE.—Steps are being taken to promote the establishment of a new diocese for Shropshire, with the seat of the diocese for Shropshire. It is proposed to urge upon the Ecclesiastical Commissioners the expediency of applying to that purpose a portion of the

income of Edgmond rectory accordingly with the powers conferred upon the trustees to whom the late Rev. George Corbet conveyed the advowson, and that the bishop should hold the office of dean and so benefit by the late Mrs. Burton's bequest of a house for the deanery in the event of the creation of a bishopric of Shrewsbury.

CITY SURVEYOR'S REPORT, BIRMINGHAM.—The report of the City Engineer and Surveyor, Mr. Henry E. Stilgoe, for the year 1905-6 has been issued, and shows the extent and cost of work carried out by the Public Works Department for that period. During the year 2,008 inspections of factories and workshops were made, and 104 notices were served requiring additional means of escape in case of fire. Dealing with the roads and scavenging branch, the report shows that up to the end of last March there were 271 miles 155 yards of declared highways in the city, being about two miles more than in the previous year. Of these 215 miles were of macadam, and 13½ of wood. In connexion with the tramways, 36,087 superficial yards of wood and 28,329 of granite paving have been laid, while 6,705 yds. of soft wood pavement under maintenance have also been relaid. There have been 3,517 yds. of prismatic oak pavement laid by the Corporation, and nearly 27,000 yds. of new footway pavements were last year laid down. For macadam roads 28,877 tons of various materials were used, and the mud and dry sweepings removed totalled 87,447 loads, of an estimated weight of 131,170 tons. Between April and October 69,108,004 gallons of water were used on the streets, being an excess of nearly 10,000,000 over the previous year. Experiments with dust laying preparations were found to be more expensive than watering. As showing how often the streets have been pulled up, it is explained that 14,255 trenches for various purposes were opened, as compared with 11,466 in the previous year. There are now 10,092 street lamps and 3,822 court lamps, compared with 10,094 and 3,820 respectively. The total expenditure on public lighting during the year was 25,332l. Street name plates to the number of 299 and 960 old tablets on lamps were replaced at a cost of 266l. The average number of workmen receiving weekly wages was 1,638, compared with 1,677 for the previous year; the total wages amounted to 98,820. 11s. 8d., compared with 105,571. 16s. 7d., and the weekly average 1,900. 7s. 11d., compared with 2,030. 4s. 6d.

MEMORIAL TO THE LATE MARQUESS OF SALISBURY, HATFIELD.—The statue of the late Marquess of Salisbury, K.G., which has been erected to his memory by his Hertfordshire friends and neighbours at Hatfield, was recently unveiled. The statue is of bronze, and represents the late Marquess seated in an Elizabethan chair, holding a scroll in one hand, and wearing the robes of the Chancellor of the University of Oxford and the collar of the Order of the Garter. The pedestal is of Portland stone, carved, and includes the Cecil family arms and an inscription. The sculptor was Mr. George Frampton, R.A.

MAGNETIC OBSERVATORY, DUMFRIES-SHIRE.—It is stated that the erection of the new government observatory at Eskdale Muir is for a while suspended, since the presence of iron is suspected in the local blue Whinstone used for the underground work of the observatory. The progress of the other buildings was not thereby delayed.

A PICTURE ASCRIBED TO TITIAN.—Herr von Kilenyi will shortly publish a pamphlet in relation to his discovery of what he believes to be a replica by Titian of the picture of Venus, with Cupid holding a mirror, now in the Hermitage Art Gallery. Herr von Kilenyi considers that the second picture was painted for Philip II. of Spain, and that it bears traces of having been painted over by Titian. There is, we may mention, a somewhat similar picture by him in the Louvre.

WATER SCHEME, MONMOUTHSHIRE COUNTY COUNCIL.—Representatives of the Monmouthshire County Council and the various local authorities met at Newport recently to consider a scheme prepared by Mr. Baldwin Latham for supplying the county with water. The scheme is to impound the waters of the Grwyne Fawr, a stream which joins the Usk at Langrwyne, by making three great dams, which, when completed, will give a storage capacity of about 800,000,000 gallons, while there would be a daily supply of water available, after giving compensation water, of 4,000,000 gallons. The total cost will be 730,000l., but the scheme can be carried out in three sections, the first costing 200,000l. for a daily supply of 1,000,000 gallons; the second 250,000l. for an additional daily supply of 1,500,000 gallons; and the third 280,000l. for another daily supply of 1,500,000 gallons.

WAR MEMORIAL, RAMSGATE.—The memorial erected in the College Chapel to the Old Boys of Chatham House School, Ramsgate, who fell in the South African war, was recently unveiled by Gen. Sir Charles Warren. The monument is the work of Mr. Noel D. Sheffield, architect, and is of Cipollina marble.

NORTHAMPTON MASTER BUILDERS' ASSOCIATION.—On the 18th ult. this Association held its annual dinner at the Stag's Head Hotel. The

President (Mr. J. T. Powell) occupied the chair, being supported by the Mayor (Councillor James Spafford), Councillor H. Green (Vice-President), Mr. A. Fidler (Borough Surveyor), Mr. F. J. Ains (Secretary), and others. Mr. W. Heap proposed the health of "The Mayor, Magistrates, and Members of the Corporation," to which the Mayor responded, Councillor Green then gave "The Architects." Mr. S. F. Harris, who first replied, spoke of the good feeling which existed between the architects and builders in Northampton. Speaking of the slackness of trade, he pointed out that increased expenditure on the part of the town authorities would not improve it. The town would be more prosperous if something could be done to prevent at least the increase of rates. Mr. F. W. Dorman, Mr. G. H. Stevenson, and Mr. A. Fidler also responded. "Success to the Northampton Builders' Association" was given by Mr. F. W. Dorman. The Chairman, replying, said he thought there had been too much pessimism in the talk about the town. He had not a doubt that trade would improve. The signs of the times all pointed to it. He urged the Corporation to commence building the new library as soon as possible—not so much on account of the builder as the men, many of whom had been out of work for weeks. Mr. S. S. Redwood proposed "The Town and Trade of Northampton," and agreed with the Chairman in the belief that there were good times coming. Mr. G. Wilkinson replied. The health of "The Visitors" was given by Mr. E. Archer, and Mr. H. C. Palmer made response. Mr. H. W. Hanwell toasted "The President." Mr. Powell, in responding, said he felt extremely honoured that they should have selected him for the post.

STREET IMPROVEMENT, NEWCASTLE.—The Newcastle Council, on the recommendation of the Town Improvement Committee, have adopted a scheme for the improvement of the area of property lying between the Market-street extension and New Bridge-street, and of the extended thoroughfare itself. The Committee had the advice of the City Engineer (Mr. Kirkpatrick), the City Surveyor (Mr. Holford), of Mr. Cockett, Mr. Leeson, and Mr. Newcombe, all architects in Newcastle, as well as Sir Alexander Binnie, and Mr. Alex. R. Stenning, Architect. The cost of the scheme is estimated at 437,138l.

THE MARGEWOOD LOCK.—During the past fifty or sixty years numerous new types of lock have been patented, many of them ingenious, and a few practical. At the present time, however, only four forms are in general use—the ward, the slide, the pin-tumbler, and the lever. The ward lock offers very little security, but is extensively used owing to its low price. The slide lock is of ancient origin, and represented to-day by the Bramah lock. The pin-tumbler lock, employed in a simple form by the ancient Egyptians, was the prototype of the Yale lock. The lever lock, of obscure origin and improved by Barron in 1778, is far more largely used than the two preceding forms of locks, owing to its moderate price and the reliability of well-made examples. Still, the lever lock, even of the best manufacture, suffers from weakness in certain parts, owing to imperfect mechanical design. While the lever as a locking device is undoubtedly the best ever introduced, this part, which is the very heart of the lock, is most easily injured, and so countless numbers of lever locks are disorganised every year. In the Margewood lock the levers are not designed to act independently upon the pin of a bolt, but are combined in a solid strong metal casing constituting the bolt, the whole moving backwards and forwards upon a fixed horizontal bar passing across the case of the lock, and secured at each end. The levers are capable of independent vertical movement, but are prevented from moving laterally by the sides of the bolt in which they are fitted. This form of design clearly affords a valuable safeguard against the art of the lock-pick, and increased security against attempts to open the lock by force. It also promises practical immunity from accidental disorganisation, as neither the levers nor the lever bar can be displaced after the lock has been fitted. We have recently had occasion to examine the Margewood lock, and are convinced that it constitutes a most important advance in the art of lock-making.

A FIRE-ESCAPE TRAP-DOOR.—When the circumstances of a fire in an inhabited building are such that there is no escape but by the roof, an ordinary trap-door or skylight is often not available till after a great deal of delay, owing to difficulty in getting at it, in the first place, and often in opening it also; and these difficulties may cause a delay that would be fatal. "The Building Acts Fire Escape Company" send the working model of a combined trap-door and ladder which adjust themselves automatically in the mere pulling of a chain. The trap-door in the roof locks itself automatically when shut down. To work it for the purpose of exit it is only necessary to pull a chain which releases the ladder, the trap rises and at the same time the bolt, ordinarily lying flat against the attic ceiling, descends and forms the steps to reach the open trap-door. Door and ladder are both actuated by a weight at the end of a lever, which

is connected with trap-door and ladder, and raises the one and lowers the other by the same impulse. Although the model looks a little complicated, its action is really very simple in principle, and there is nothing that can easily get out of order; and of course, of all driving powers a weight is the most permanently effective and the least liable to derangement of its effect. The whole thing is closed up again by pulling another chain, in this case in opposition to the action of the weight. But to open it no exertion is required; it opens itself as soon as the catch is removed. It is a very ingenious device, and we understand is highly approved by the London County Council district surveyors. The apparatus is distinguished as the "Bafeco" trap-door.

METROPOLITAN INDUSTRIAL DWELLINGS COMPANY.—At the twenty-first ordinary general meeting, held on Friday, October 26, Mr. John Tryon, the Chairman, stated that they intended to increase the special repairs fund so as to make it 8,000, in all, in view of the fact that greater requirements have lately been imposed upon owners of house property. A balance of 8,000, remains to be carried forward after payment of a preference dividend of 4 per cent. and the usual interest of 5 per cent. upon the ordinary shares.

TINTERN ABBEY.—In his annual report, Mr. E. Stafford Howard, one of the Commissioners of Woods and Forests, states that the following works for the preservation of Tintern Abbey have been undertaken during the year 1905-1906, under the supervision of the architect, Mr. F. W. Waller. "The work in connexion with the resetting of the centre mullion and what remained of the tracery of the great east window, has been satisfactorily completed, including the protection of the gable over and walls adjoining, and the scaffolds have been removed. A scaffold has been erected and an examination made of the upper part of the staircase and the south-west angle of the south transept, and of the south wall and gable adjoining where the coping and springer to same hung over in a dangerous manner; the wall which had broken away has been reset to a sufficient height to support the springer and coping and render them secure. The tops of the walls which were exposed to the weather have been made sound and protected, and the open joints of the masonry pointed. This was an important and very necessary work requiring a considerable amount of material, and involving much labour and time owing to the great height from the ground. The stone work at the top of the west walls of the north and south sides has been secured and protected, as also the side buttresses. Considerable repair has been carried out in connexion with the passage above the arcades, the floors have been made good to exclude water from the walls and arches beneath, and some large openings which weakened the walls have been built up. A large amount of soil and rubbish which had accumulated at the west end of the building has been removed, and the view of the Abbey is thus greatly improved. A number of minor works have also been carried out for the protection of walls and other parts of the ruins, and a very large amount of such work still remains to be done, including much needed repairs to the north transept and stair, but the most important undertaking is that connected with the eastern arch of the tower.

PROPERTIES FOR SALE.—In December will be offered for sale at auction, a trust lease, for a term of eighty-four years unexpired, of No. 11, Hill-street, Berkeley-square, one of the finest of the modern houses in that quarter, which was built for the Duke of Newcastle after the plans and designs of Colonel Robert W. Edis. Another house by that architect has recently been placed in the market, "Rushall Beacon," Tunbridge Wells, with 23 acres of land, overlooking the common.—The Poplar Union Guardians have resolved to dispose of their property, about twelve acres in extent, at Forest Gate, E., upon which stand their residential industrial schools (shortly to be vacated), which comprise dormitories for 720 children, dining and recreation hall, school and classrooms, swimming bath, workshops, infirmary, administrative and other offices.—On November 7 and 8, at Winchester House, Old Broad-street, by order of the High Court of Justice, Chancery Division, the Harris Estate, consisting of a large number of freehold properties now yielding an aggregate rental of about 2,500, per annum in Berwick, Portland, Manette, Bateman, and other streets in Soho, and of freehold ground rents, amounting to 2,730, per annum derived from properties in Shaftesbury-avenue, Charing Cross-road, Dean-street, Friar-street, and adjacent localities; together with a leasehold ground rent of 335, per annum arising from Nos. 81 and 83, Shaftesbury-avenue, for the residue of a term of 20,000 years, without lessee's covenant or a right of re-entry.—Darby House, at Sunbury-on-Thames, attributed to Sir Christopher Wren, with Swans' Rest eyot, 18 acres freehold.—Deanery Garden, Sonning, a charming house, near the river, built after designs by Mr. E. Q. Lutyens.—Portman

Market, in Church-street, Marylebone, covering an area of nearly 43,600 ft. superficial, and held under a lease from Lord Portman for a term of fifty-eight years from Lady-day, 1899, at a present ground rent of 1,000, per annum. The market was established in pursuance of the Acts 11 Geo. IV. c. 71, and 2 and 3 Will. IV. c. 113; the new buildings, by Messrs. Gordon, Lowther, & Ganton, were opened on April 18, 1901, for the sale of meat, fish, and vegetables; they consist of 160 market-shops in nine avenues, and twenty-eight shops in ranged terraces along the four street frontages.

Legal.

THE ACTON ANCIENT LIGHT DISPUTE.

FULL JUDGMENT OF THE HOUSE OF LORDS.
In the House of Lords on the 25th ult. the Lord Chancellor, Lord James of Hereford, Lord Robertson, and Lord Atkinson, delivered judgment in the case of Jolly v. Kine, on the appeal of Dr. Jolly from a judgment of the Court of Appeal, varying a judgment of Mr. Justice Kekewich in the Chancery Division.

(The case was reported in the issues of the *Builder* of July 23 and 30, August 6, December 17 and 24, 1904, and May 5 and 12, 1906.)

The action was brought by the respondent, Mrs. Sarah Kine, the owner of a house and premises known as "Foodthorpe," Acacia-road, Acton, against the appellant, Dr. Jolly, the owner of neighbouring premises, for a mandatory injunction, and alternatively for damages, in respect of the alleged obstruction of the ancient lights of the respondent. It appeared that the ground floor of the respondent's house had on the west side two windows lighting respectively the drawing-room and a smaller room, and a door with glass panels, and a window of fanlight over it lighting the entrance-hall. The appellant began to build his house about the latter part of 1902. The respondent alleged that, in spite of remonstrances made on her behalf, the appellant had erected a building so near to the said windows, glazed panels, and fanlight as to materially obstruct the light entering the said dwelling-house, and so interfered with her use and enjoyment of the premises. The case had been twice before Mr. Justice Kekewich. On the first occasion he granted the respondent a mandatory injunction, which was before the decision of the House of Lords in the *Colls' case*. On appeal from that decision of his lordship to the Court of Appeal, it was admitted on behalf of the respondent that the judgment could not stand as it was, and by consent the learned judge's order was discharged, and the case sent back to him for retrial. The retrial took place before the learned judge in July, 1904, and on August 2 he delivered a considered judgment. He came to the conclusion that, although there had been interference by the appellant's building with the light of the respondent's drawing-room, he could not, in accordance with the rule laid down by the House of Lords in the *Colls' case*, deem the obstruction of light to the said room to be actionable. He also held that, taken alone, there had been no actionable obstruction of the light coming to the respondent's hall by reason of the appellant's building. The great cause of complaint was as to the obstruction of light to what had been called the morning-room in the respondent's house, and with respect to that he came to the conclusion that the obstruction of light to that room was a nuisance within the meaning of the authorities on the subject. His lordship thought that he must treat the obstruction as to the morning-room plus the obstruction of light to the hall, and he granted a mandatory injunction, ordering the appellant to pull down so much of his house as caused a nuisance to the respondent by the obstruction of the light to the windows of the morning-room and the hall, as the same existed previous to the erection of the appellant's house. His lordship also directed that the appellant should pay the costs of the action. From this decision Dr. Jolly appealed to the Court of Appeal, when Lords Justices Vaughan Williams and Cozens-Hardy held that, applying the principle laid down by the House of Lords in the *Colls' case* to the findings of fact of Mr. Justice Kekewich, there was a good cause of action by the respondent. They differed, however, from Mr. Justice Kekewich in thinking that the remedy ought to be damages, and not a mandatory injunction. Lord Justice Romer, however, dissented, being of opinion that, by applying the law to the facts found by Mr. Justice Kekewich, the respondent had failed to prove that the appellant had committed a nuisance. By a majority of the court, therefore, the judgment of Mr. Justice Kekewich was varied by the order for a mandatory injunction being discharged, and an inquiry as to damages being directed—hence the present appeal.

The Lord Chancellor: My lords—this appeal relates to an alleged interference with lights. The law on this subject has been laid down in this House in the case of *Colls v. The Home and*

Colonial Stores, Ltd., 1904, App. Cases, 179, and I understand it to be as follows:—The right of the owner or occupier of a dominant tenement to light is based upon the principle stated by Lord Hardwicke in 1792, that he is not to be molested by a nuisance, which does not obtain by his estate. He obtains a right to all the light he has enjoyed, for the ordinary purposes of inhabitancy or business, according to the ordinary notions of mankind, having regard to the locality and surroundings. To deprive him of this would amount to a nuisance, and that is the basis on which the decision of this House proceeded. In applying the doctrine of this case to the present litigation, I have felt much difficulty. Mr. Justice Kekewich adopted, as appears to me, a perfectly sound view of the law, and in dealing with the facts he found that a nuisance was proved. But he said that the room of which the main complaint had been made was still a well-lighted room. This statement might seem inconsistent with the finding. I think he must have meant that it was well lighted, not according to the standard to be expected in the actual locality and surroundings, but according to the standard of a crowded city. I find the evidence drawn in Mr. Pratt's affidavit, and the evidence given by the learned judge, and I think the learned judge was right in his mind when he spoke of a well-lighted room. Mr. Justice Kekewich evidently accepted the evidence of Mrs. Reid and Mr. Virgo, which establish a nuisance. I attach the greatest importance to the opinion on such a matter of the learned judge, who had the advantage of observing the facts. The opinion has been supported by two out of three members of the Court of Appeal, I cannot think it would be safe for your lordships to reverse this judgment on a pure question of fact. I desire to add my profound regret that in a matter comparatively small such enormous costs have been incurred.

Lord James of Hereford: My lords—I concur in the judgment delivered by the Lord Chancellor. The questions raised in the case had, in the first instance, to be determined by Mr. Justice Kekewich. He had to resolve questions of fact, after hearing evidence—and then to direct himself as to the law controlling the facts he found. I think that Mr. Justice Kekewich's judgment should be taken to be represented by its substance more than by detailed expressions. I take it that the learned judge intended to accept the decision of your lordships' House in *Colls v. Home and Colonial Stores*. He commences his judgment by saying, "This has to be considered on the lines of the recent decision in the House of Lords," and he then proceeds to think, to apply the principle established by *Colls' case* to the case before him, and he finds that the obstruction caused to the plaintiff's light amounts to a nuisance. It is true that Mr. Justice Kekewich uses some words that have been much discussed in argument, and said, "I am convinced that the character of the room is altered, and that, though still a well-lighted room, it has lost in the obstruction of light one of its chief charms and advantages." It was urged that the words "still a well-lighted room" brought the alleged cause of action within the judgment in *Colls' case*, and so deprived the plaintiff of any right to recover compensation. But the learned judge, in his character, and I do not think that the least just, by employing them, intended to bring the case within your lordships' previous decision, still less to set that decision at defiance. Lord Justice Cozens-Hardy so reads Mr. Justice Kekewich's words, for he says, "In the present case I think it is clear that the learned judge held that the letting and selling value of the house has been diminished by the defendant's building, and he also certainly found that the comfort or convenience of the occupier had been affected by it. That being so, there is nothing, I think, in the decision in *Colls' case* which in any way prevents me from arriving at the conclusion I am prepared to adopt," and after quoting the ruling of Baron Parker in *Wells & Ody*, the Lord Justice proceeds, "Is it that an answer to the case to say that the room is still a well-lighted room? I think not, if the building makes the room still less fit for occupation, and I do not think that you can bring in the phrase according to the ordinary notions of mankind to cut down the effect which would otherwise result from a building of this nature." I, for my part, accept the findings of fact of Mr. Justice Kekewich. He has found, as I read his judgment, that the letting and selling value has diminished, and that the plaintiff's morning-room is materially affected so far as the comfort and convenience of the occupiers are concerned." The Lord Justice Vaughan Williams seems to concur in this statement put on Mr. Justice Kekewich's words. For my own part, I so read them, and, having carefully gone through the evidence, I think the finding of the learned judge as construed by Lord Justice Cozens-Hardy was correct. I submit to your lordships that this appeal should be dismissed.

Lord Robertson: My lords—I find it impossible to reconcile the judgment under review with the law laid down by this House in the case of *Colls*. The facts are of the simplest; and the photographs

present the relative positions of the two houses with complete accuracy. The only room in the house on which the respondent proceeded is pronounced by the learned judge who tried the case to be in its present condition a well-lighted room. The real truth of the case is that the respondent had the singular good fortune to enjoy for a very long time an uninterrupted view and an amount of light correspondingly exceptional for a suburban villa. The inmates of her house, quite naturally, felt keenly the effect of a detached villa being built beside them, and compare their existing light, not with the ordinary light of such houses, but with their own former and favored condition. Accordingly, the very matter of diminished cheerfulness had been dealt with by Lord Cranworth long before the case of Colls, and his judgment was approved in Colls. His lordship had held this not to amount to nuisance. The standard or measure of right is quite different, and has been defined in Colls. I adhere, as I did in Colls, to the definition given by Lord Davey (in entire accordance with the judgments of the other noble and learned lords). According to that definition the quantity of light to which right is acquired in twenty years is measured by "what is required for the ordinary purposes of inhabitation or business or the tenement." My lords, when a legal question of this kind has been deliberately and unequivocally decided by this House, I do not think that it is desirable to re-discuss the question, or to express in other words the rule laid down, for this would be merely to afford fresh topics of controversy. The facts of the present case seem to me to admit of no doubt, and the judgment appealed against to be wrong.

Lord Atkinson: My lords—The parties in this case are the owners or occupiers of two adjoining plots of land, forming portions of a building estate, situated at Acton, a rapidly-developing suburban residential district. The lease under which the appellant claims shows in the map attached to it that it is bounded on the west by the building plot of the respondent. Both plots front the Acton-road, and are substantially of the same extent. The appellant's house, recently erected upon his plot, is not much higher than that of the respondent's plot, and situate so near the eastern boundary of the plot as to leave only a passage between the house and the boundary 10 ft. wide. By building this house the appellant, it is alleged, has obstructed the light which formerly entered a certain room of the respondent's house, called the morning-room, through its western window, and it is to this obstruction the action in the case is now practically confined. The room in question is a small room, 13 ft. 8 in. long by 13 ft. 7 in. wide, and has two windows of the same glass area, 27 ft. by 7 in., the one facing north and the other west. The northern window is entirely unobstructed. The eastern wall of the appellant's house subtends an angle, measured from the base of the western window of the respondent's house of less than 45 degrees, but there can be no doubt that much of the direct western sunlight which formerly entered through the western windows of the morning-room is now obstructed, and that that room is thereby rendered less light and cheerful than formerly. Mr. Justice Kekewich was of opinion that this brightness and cheerfulness was "one of the chief charms and advantages of the room," and as I understand, found as a conclusion of fact—(1) that the room had been an exceptionally well-lighted room; and (2) that it is now, notwithstanding the obstruction, a well-lighted room. And by way of commentary on or explanation of this latter finding, he states that if the test were "whether there is sufficient light left to enable the room to be used for the purposes for which it was designed, there would be no further question." It would appear to me, therefore, that this second finding of fact must have been intended to amount to, and, at all events, must be taken to amount to this, that there is still sufficient light sufficient according to the ordinary notions of cheerfulness for the comfortable use and enjoyment of the room as a sitting-room, or for its comfortable use and enjoyment as a room devoted to any of the other purposes of habitation to which, as part of the respondent's dwelling-house, it might reasonably be devoted. I entirely accept these findings of fact, as so understood, but I cannot concur with the learned judge in the statement that, according to the judgment of your lordships' House in the case of Colls v. Home and

Colonial Stores, the sufficiency in the sense above mentioned of the quantity of light left for the enjoyment of the owner of the dominant tenement is not a test. It would appear to me that that case established the principle that there must be an invasion of the legal right of the owner of the dominant tenement to suffice to amount to a nuisance, in order to give him a right of action, and that as long as he receives through the windows of his dwelling-house, or in the case of a particular room in his dwelling-house, through the windows of that room an amount of light which, to use the words of Lord Justice James, in "Kell v. Pearson (L.R., 6 Ch. 809), is "sufficient according to the ordinary notions of mankind for the comfortable use and enjoyment" of his dwelling-house or of the room in it, as the case may be, no nuisance has as regards him been inflicted upon him. Of course, in determining whether or not the quantity of light which the owner of the dominant tenement will, after the obstruction complained of, continue to enjoy is sufficient within the meaning of this decision; regard can only be had to the light which that owner is by grant or prescription legally entitled to enjoy. And light which may with impunity be at any time obstructed, windows which may at any time be almost entirely blocked up or altogether darkened, must necessarily be left out of consideration. That is the rule laid down in the case of Kell v. Pearson. In the City of London Brewery Company v. Tennant (L.R., 9 Ch. App. 212) Lord Justice James, at page 216, in giving judgment, is reported to have said, "In the case of Kell v. Pearson the Lord Justice and myself endeavored to express what he thought to be the rule applicable to these cases, and I believe the Lord Chancellor entirely agrees with the mode in which I have expressed it," and Lord Selborne, at page 218, is reported to have said, "First of all, I wish to express my complete adherence to the view of the law taken in the case of Kell v. Pearson, correcting some impressions which might have arisen from the language used in former cases by some learned judges."

It would appear to me to be perfectly clear that the rule laid down in Kell v. Pearson was also approved of by the noble and learned lords who took part in the decision of Colls' case. Lord Macnaghten refers to it, so do Lords Davey, Robertson, and Lindley, and each with approval; and Lord Halsbury does not dissent from it. For myself, I may say that I do not think there is any logical halting-place between the position of the learned judges, who founded their decisions on the old doctrine of the proprietary right of the owner of the dominant tenement to the continued enjoyment, without sensible diminution, of all the light he enjoyed for the twenty years immediately preceding the interruption complained of, and that taken up by the learned Lords Justices in Kell v. Pearson. And now that the old doctrine has in Colls' case been declared to be an erroneous doctrine, the old position taken by those who adopted and acted upon it must necessarily be abandoned and the only alternative open is to apply rationally but resolutely the rule and principle founded on the very earliest authorities, and now reasserted and reestablished by the recent decision of your lordships' House. In my opinion, on the findings of facts of Mr. Justice Kekewich, to which I have referred, this case falls within this latter rule, and is covered by this latter principle. I, therefore, think that the judgment of Lord Justice Romer was right, and that the decision of the Court of Appeal was wrong, and should be reversed. The respondent's counsel pressed upon us in argument that Lord Davey, in the passage so often quoted from his judgment in Colls' case, at page 204 of the Report, was only dealing with a case in which an extra quantity of light was necessary, and had been, therefore, enjoyed for that purpose or for some special purpose. I do not think that contention is well founded: Lord Davey's remarks appear to be of general application. As the learned lords were equally divided, the decision of the Court of Appeal was upheld, the appeal being dismissed, but, in accordance with the settled rule, without costs.

Mr. Hughes, K.C., and Mr. W. E. Vernon appeared for the appellant, and Mr. P. Ozden Lawrence, K.C., and Mr. W. M. Cann for the respondent.

ARCHITECT'S HEAVY CLAIM FOR FEES.

THE case of Cooper v. Lawrence and another came before Mr. Justice Bigham and a special jury in the King's Bench Division on the 30th ult., an action by Mr. C. J. H. Cooper, an architect, to recover from the defendants, Messrs. G. & W. C. Lawrence, the amount of fees he alleged to be due to him for professional services rendered. The defence was that there was no promise by the defendants to pay the plaintiff for a special majority of the work done by him, the plaintiff doing such work on his own initiative.

Sir Edward Carson, K.C., M.P., and Mr. G. C. Scott, appeared for the plaintiff; and Mr. C. A. Russell, K.C., Mr. A. F. Wootton, and Mr. Bliss for the defendants.

Sir Edward Carson, in opening the case, said the plaintiff had for some twenty years carried

on the profession of an architect in London, and he brought the action to recover his fees from the defendants, a firm of tailors carrying on business in Maddox-street, W. The plaintiff's account which amounted to between 4,000l. and 5,000l. was in respect of a vast amount of work which was admittedly done by the plaintiff as an architect, between the years 1900 to 1904. The extent and nature of the work was certainly beyond dispute, when he informed the jury that between 200 and 300 plans were prepared by the plaintiff. The labour expended by him was very considerable, and at the end of the four years' work he, on being asked, sent in his bill, and then he received from the defendants a prompt refusal to pay, defendants stating that there were many items in the bill—without specifying them—which they objected to, and they refused to come to any arrangement whatever with regard to the bill. The defence really was that the plaintiff would have to give his four years' work for practically nothing. Defendants said that if the plaintiff did the work he had said he had done, he had not done it on their retainer, and that it was purely speculative work on his part. They said that they were not indebted to plaintiff in respect of the greater portion of the work, and that he must bear the loss and expense incurred in the work he had done during the four years. The only question the jury would have to try in the course of the case was whether the work done ought to be paid for by the defendants, or whether the plaintiff ought to bear the expense himself. The case arose in this way. Defendants carried on business at No. 47, Maddox-street, and in the year 1900 they had acquired the house No. 51, Maddox-street, and the houses Nos. 39 and 41, Bond-street, and a large yard in the rear. The dealings between the plaintiff and the defendants first commenced by their instructing him to prepare plans for the rebuilding of No. 44, Bond-street. He (counsel) thought the defendants had acquired those premises by a lease from the Corporation. By degrees defendants elaborated much larger schemes, and they thought eventually of purchasing a number of other houses for that purpose, and on the occasions when they bought any new properties, the plaintiff was employed for the purpose of drawing plans and maps of the same. There was no trace in the correspondence, which had passed between the parties, that the work was not to be paid for by the defendants. Plaintiff was instructed as to No. 44, Bond-street and the yard at the back, to measure-up and prepare plans.

Mr. Russell said that with regard to the rebuilding of No. 44, Bond-street he would state that instructions were given for the preparation of plans for that purpose. The only question was, whether the work done in connexion with those plans was or was not merged in an agreement come to at a considerably later date between the parties, by which, in certain events, the plaintiff was to receive a very large sum of money.

Sir Edward Carson, continuing, read correspondence which had passed between the parties at great length. He said the defendants afterwards thought the site they had acquired would be suitable for a theatre, and at the beginning of 1901 plaintiff was instructed to prepare plans for a theatre. That scheme was subsequently abandoned, and it was then suggested that the site was suitable for a restaurant, with offices over, and plaintiff, on instructions, prepared many plans for the purpose.

His lordship said there was no doubt the letters showed that a retainer was given to the plaintiff for these matters.

Sir Edward Carson said that on November 12, 1901, the defendants verbally agreed plaintiff's fees at 3,000l. The arrangement was that plaintiff was to have 1,000l. for his work other than the work for the restaurant plans, for which he was to receive 2,000l. It was a term of the agreement that if plaintiff were employed to build the restaurant from his plans by the purchaser of the site, and acting as architect in regard to it, he would refund the 2,000l. to the defendants.

The restaurant was estimated to cost 100,000l., and plaintiff's fees would be 5 per cent. on that amount. On December 12, plaintiff, on defendants' suggestion, agreed not to press for the 3,000l. until defendants had realised the property, he to receive 1-23rd share of the profits obtained after a certain sum had been realised. After that, plaintiff did a great deal more work for the defendants. In November, 1902, plaintiff was instructed to try and let the site for 3,300l., and later, in December, he was told to get out a scheme for shops and offices in connexion with the restaurant site. Defendants at this time had acquired Nos. 41 and 42, Bond-street.

Mr. Russell said that with regard to the shops and offices it was only a question of *quantum meruit*.

Sir Edward Carson, continuing, said that later defendants took over No. 43, Bond-street, and told plaintiff it must be included in the scheme. Plaintiff wrote to defendants that he would get out the plans, elevations, specification, etc., of the proposed buildings, and said that his fees would be according to the scale of the Institute, half his fees to be paid the day the contract was signed,

and his out-of-pocket expenses up to date. Defendants wrote agreeing to this, provided the work was commenced a fortnight after the signing of the agreement. On May 23, 1905, defendants wrote that they had completed negotiations for the disposing of the Bond-street property, and asked for plaintiff's account in detail from the commencement, and plaintiff sent it in on May 31, 1905. Defendants wrote expressing surprise at it, and ultimately the present action was commenced. The learned counsel said that all the plaintiff wanted was to have the work actually done by him properly estimated and paid for on the usual terms.

At the close of the learned counsel's address, a long discussion took place as to the best way to try the case, the correspondence being voluminous and it being necessary to go in great detail into the several matters referred to in Sir Edward's address.

In the result it was arranged that the case should be referred in its entirety to Mr. Edward Pollock, the official referee, and that the costs of the present hearing should be reserved.

CASE UNDER THE LONDON COUNTY COUNCIL IMPROVEMENTS ACT.

THE case of *Shorts, Ltd. v. the London County Council* came before Mr. Justice Bigham, sitting without a jury, in the King's Bench Division last week, on an appeal case stated by an arbitrator, and it raised an important point as to the amount of compensation to be paid by the County Council to the plaintiffs in respect of their premises which were compulsorily acquired in connexion with the Strand improvement scheme.

Sir Edw. Boyle, K.C., Mr. Lewis Coward, K.C., and Mr. W. A. Robertson appeared for the plaintiffs; and Mr. Edward Morten and Mr. Neville for the defendants.

Mr. Coward, in opening the case, said the London County Council Improvements Act, 1889, conferred on the Council power to acquire compulsorily certain freehold property in the Strand, including Short's wine and spirit establishment. Under the statute Short's, Ltd., came to receive, amongst other things, such compensation as should be equivalent to the difference between the present value of the fee simple of the existing premises of Short's, Ltd., and the present value of a lease of eighty years at a rent of 10*s.* per annum of the same premises. This question was referred to an arbitrator, who awarded Short's, Ltd., £1,165*l.*, and declined to allow them anything in respect of compulsory sale or reversionary trade loss. The arbitrator said that if the company were entitled to compensation under that head of sale, he should award them £16*l.* for compulsory purchase, and 10,062*l.* for reversionary trade loss. The learned counsel submitted that the arbitrator was wrong in disallowing compensation for compulsory purchase and reversionary trade loss.

His lordship inquired what would be the capitalised value of 10,062*l.* at the end of eighty years?

Mr. Coward replied that his witnesses put it at 250,000*l.*, whilst the witnesses for the London County Council put it at 230,000*l.*

His lordship said that the figure mentioned started him.

Mr. Morten, on behalf of the London County Council, contented that the arbitrator had clearly performed his duty in refusing to award Short's, Ltd., that to which they were not entitled under the Act.

His lordship, in giving judgment, said he thought the arbitrator was right. There was no evidence before him that the arbitrator, in ascertaining the amount of compensation, had not taken into consideration the fact that there was a licence attached to the premises. As to the allowance of 10 per cent. for compulsory purchase, the Act did not say that Short's, Ltd., should receive it, and the arbitrator had not awarded it. There would, therefore, be judgment on the special case for the London County Council, with costs.

WEST-END BUILDING DISPUTE.

THE case of *Bower & Co. v. the Piccadilly Hotel Company, Ltd.*, was mentioned to Mr. Justice Neville in the Chancery Division on the 26th ult.

Counsel stated that the case came before his lordship on a motion by the plaintiffs for an interim injunction to restrain the defendant company from continuing to build their premises so as to obstruct the light of the plaintiff's premises. The learned counsel stated that the matter had been allowed to stand over until that day in the hope of an amicable arrangement being arrived at. The surveyors, however, had not yet completed their work, and the parties had agreed, in order that they might have a further opportunity of settling the matter, that the motion should stand over for fourteen days on the undertaking of the defendant company that they would not continue to build in respect of the part of the premises concerned in the action.

His lordship assented to the motion standing over until the 9th inst.

Patents of the Week.

APPLICATIONS PUBLISHED.*

19,509 of 1905.—J. J. THOMPSON: *Fireproof Floors.*

This relates to the construction of fireproof flooring, and consists in the combination with girders or joists of steel or iron of any suitable cross-section, of blocks of porous earthenware or other fireproof material arranged close together side by side, having flanges at their underwide to cover the full width of the girder flange, said block flange being rivetted at the end to correspond with the bevelled face on the adjoining block.

20,067 of 1905.—J. W. FERGUSON and G. W. FERGUSON: *Brick-making Machine.*

This relates to a brick-making machine, and consists in the combination of a shaft mounted in bearings on a base plate, said shaft being driven by suitable driving gear from one overhanging end, a circular disc on the other overhanging end, a sinuous groove on the circumference of the said circular disc, an eccentric disc and two disc cams on said shaft, a smaller eccentric disc on said shaft, an eccentric strap around the larger eccentric, an eccentric rod attached to said strap, a moulding ram pivotted to said eccentric rod, an eccentric strap on the smaller eccentric, an eccentric rod adapted to said strap, a compression ram pivotted to said eccentric rod, a stud or projection on the said shaft, and two smaller cams on the said shaft for engaging with studs on forked cam rods.

21,452 of 1905.—J. A. HOPE: *Fastenings for Casement Windows.*

This relates to a casement fastening comprising a handle pivotted to the window, and a keep secured to the window-frame, the handle being formed with a series of notches, any one of which can be brought into engagement with a nose or the equivalent upon the keep.

1,408 of 1906.—W. A. RICHARDS and E. R. STUTCLIFFE: *Roofing Tiles.*

This relates to a diamond shape self-lock roofing tile, and consists in the combination with the plain tile body of a series of three ribs forming between them channels for preventing the entry of water, and making a weather-tight joint with the adjoining tile, and a rib running around the bottom underneath edge of the tile.

2,396 of 1906.—J. DEWURST: *Construction of Attachments for Water Taps and the like.*

This relates to an attachment for water taps, consisting of a holder for the packing material, a part for clamping the packing material, said clamping part being provided with notches or projections, a nozzle part for screwing within said holder, and an adjustable strap or clamp for taking over said notched part, the same being constructed to be fitted together.

3,694 of 1906.—J. N. RUSSELL: *Hot-Water Circulation Apparatus.*

This relates to a hot-water circulating apparatus, consisting in the combination of a circulation water heater, a generator partly enclosed within the heater, and heated by the same fire as the heater, an injector nozzle in a rising portion of the hot-water cycle, injector apparatus for introducing a current of air into the hot-water cycle, and a tank adapted to permit of the escape of the excess steam, vapour, or air from the cycle.

4,703 of 1906.—O. C. FRITZCH and R. CROSTINO: *Internal Insulating Bearings of Metallic Pipes.*

This relates to a metallic pipe, and consists in the employment of a lining composed of segmental pieces or short drums or rings of wood applied close to the inner surface of the said pipe.

8,896 of 1906.—W. W. FESSLER: *Door Locks.*

This relates to a lock comprising a lock casing adapted to be secured to a door frame, the keeper adapted to be secured to a door frame, the keeper being provided, in the face thereof adjacent to the door when the latter is closed, with a segmental passage, both ends of which are open, and the lock casing being provided with a pivotted disc having an eccentric curved arm adapted to be projected through said passage into said casing, said disc being adapted to be operated by a key, and a spring-operated lock arm mounted in the lock casing, and adapted to hold said disc in both the locked and unlocked position.

9,153 of 1906.—W. E. LAYCOCK: *Air Inlets of Ventilators.*

This relates to a device for opening and closing the air passages to a ventilator having a dished dust-retaining cover plate operated by a quick pitch screw, and retained in various positions by a spring-actuated stud and recesses.

11,550 of 1906.—W. PADGET: *Fasteners for Windows and the like.*

This relates to a window or like fastener, comprising a spring plate lever hinged to one part,

* All these applications are in the stage in which opposition to the grant of Patents upon them can be made.

and a parabolic or other shaped stud secured to the other part, the said stud passing through a hole in the lever or plate, and having a spring locking catch provided with a releasing trigger.

12,764 of 1906.—G. S. JONES: *Combined Catch and Locking Device for Doors, Sliding Door Gates, and the like.*

This relates to a fastening device for doors and the like, comprising a catch or sneek with a locking device hinged thereto, and capable of movement in a slot, with or without a recess, such locking device constituting, in addition, an anti-friction surface for the latch.

15,775 of 1906.—A. R. GROOMER: *Draught, Dust, and Weather Excluder for Doors, Casements, and the like.*

This relates to a weather excluder fitted to and underneath the door, cast or the like, so as to be practically out of sight, and in such manner as to be lowered by a deflecting plate or like means, when the door shuts, and to be raised out of action by gravity when released.

20,070 of 1905.—T. M. THOM: *Artificial Stone.*

This relates to the manufacture of building stone artificially, by quenching the debris made in quarrying and stone-cutting to its natural granular condition, mixing the same with lime, with or without colouring matter, slaking the mixture, moulding it into blocks, drying and finally carbonating the latter.

20,358 of 1905.—T. B. PROVVIS: *Pipe Joints.*

This relates to pipe joints, and consists in providing a seating block for the respective extremities of the lengths of pipe to be joined, and within this seating block is formed a cavity advantageously of curved form, which is so disposed as to form an annular space around the lower part of the pipes to be connected together, within which cavity, cement or other jointing material or luting may be poured from either side. This cavity, it will be understood, has the upper edges or faces of its lateral walls of an annular curvature, corresponding to that of the pipes, so as thus to serve as bearings on either side of the annular cavity upon which the respective ends of the pipes are joined, may firmly rest. The seating block advantageously does not extend upwards beyond one-half the diameter of the pipes to be connected, but it may, in some cases, extend upwards beyond.

15,884 of 1906.—C. STEILER: *Apparatus for Moulding Concrete Structures.*

This relates to an apparatus for moulding concrete structures, comprising an outer and an inner shell, each composed of sections, which together constitute a cylinder, means for expanding the inner shell, means for constricting the outer shell, and frictional devices for supporting said shells upon the cast already formed. The invention also consists of a series of lever-operated friction shoes for mounting each of said shells upon the vertical wall surface of a structure moulded by said shells, and of means for adjusting or plunging said shells relatively to said piston shoes and structures.

SOME RECENT SALES OF PROPERTY:

ESTATE EXCHANGE REPORT.

October 18.—By WINCH & SONS (at Maldstone), Cranbrook, etc., Kent.—The Hartridge Manor Estate, 1,895 a. f. (in lots)	£26,930
October 19.—By FRANK LLOYD & SONS (at Whitechurch),	
Wirrwall, Salop.—The Wirrwall Hall Estate, 273 a. 0 r. 35 p. f. (in lots)	13,035
October 22.—By C. RAWLEY CROSS & Co.,	
Notting Hill.—11, Blenheim-cres. (The Blenheim Dairy), u.t. 54 yrs. g.t. 31, y.r. 50 <i>l.</i> , 203, Portobello-rd. (a.), u.t. 54 yrs. g.t. 36, y.r. 60 <i>l.</i>	445
Balling—4, Gunnersbury-av., and 1 a., u.t. 59 yrs. g.t. 40 <i>l.</i> , p.	500
By JONES, LANG & Co.,	
City.—9, New Bridge-st. (offices), area 1,080 ft. 1, p.	8,000
By T. B. WESTACOTT,	
Kentish Town.—18, Queen's-cres. (a.), u.t. 43 yrs., g.t. 81, a.r. 50 <i>l.</i>	350
Hampstead.—35, Fleet-rd., u.t. 44 yrs., g.t. 7 <i>l.</i> , y.r. 40 <i>l.</i>	345
By WOODS & SWELLING,	
Swanley, Kent.—"Mountain Hill Farm," 16 a. 2 r. 6 p. f.	2,425
Swanley-rd., a parcel of building land, f.	360
Wimbledon.—2, Denmark-rd., a freehold building site	230
October 23.—By HAMPTON & SONS,	
Chute Forest, etc., Wilts.—"The Chute Lodge Estate, 1,222 a. 1 r. 16 p. f.	24,800
By BEARD & SONS,	
Old Kent-road —10 to 28, 84 to 92 (even), 17 to 23 (odd), Bridson-st., u.t. 88 yrs., g.t. etc., 9 <i>l.</i> , w.r. 40 <i>l.</i> 14 <i>s.</i>	1,200
By H. J. BROMLEY,	
Bermondsey.—1 to 5, Earl's-cottages, u.t. 14 yrs., g.t. 3 <i>l.</i> , w.r. 14 <i>l.</i> 8 <i>s.</i>	530
Dalston.—1 and 5, Wilton-rd., u.t. 30 yrs., g.t. 4 <i>l.</i> , y.r. 60 <i>l.</i>	510
Herne Hill.—25, Bernadine-st., u.t. 67 yrs., g.t. 7 <i>l.</i> , y.r. 36 <i>l.</i>	335

SALES OF PROPERTY.—Continued on page 526.

NOVEMBER 5.—**London.**—RAILS, PLATES, ETC.—Bengal Nagpur Railway Company, Ltd., Board of Directors invite tenders for steel rails, steel fish plates, steel fish bolts and nuts, and wrought-iron spikes. Specifications and forms of tender can be obtained at the company's office, 132, Gresham house, Old Broad-street, E.C. For each specification a fee is

charged, which will not be returned. Tenders to be delivered not later than noon, November 5.

NOVEMBER 5.—Warrington.—Boulton-Warrington Town Hall, Parks, and Baths Committee invite tenders for a small boiler required for heating the Town Hall. Forms of tender and all further information may be obtained at the office of the Borough Surveyor, Town Hall, at which place tenders must be delivered on or before 12 o'clock noon on November 5, addressed to the Chairman of the Town Hall, Parks, and Baths Committee.

NOVEMBER 6.—Stonehaven.—Works in connection with a heating installation for Auncrustyshire Combination Poolhouse, Stonehaven, embracing boiler, and heating plant, mason, carpenter, and plumber work, etc. Plans, specifications, schedule of quantities, and other information may be had from Mr. Andrew Stewart, 65, Leaside-road, Aberdeen, or Mr. James Mitchell, Clerk to the Board of Management, 25, Market-square, Stonehaven, with the latter of whom offers marked "Tender for Heating" must be lodged not later than November 6.

NOVEMBER 7.—Rathdown.—PUMP REPAIR.—Rathdown No. 1 R.D.C. will, at their meeting on November 7, be prepared to receive tenders for the keeping in repair of twenty-two pumps in various parts of the district. Tenders, on the form supplied from office of Mr. Patrick Cunningham, Clerk of the Council, Clerk's Office, Longhalkin, and other forms will be entertained, and marked on the outside "Tender for Pumps," to be deposited in the tender box not later than 10.30 o'clock a.m., on the above-named day.

NOVEMBER 7.—Witnell.—PUMP.—The U.D.C. of Witnell invite tenders for the supply of a gas engine and pump suitable to lift 6,000 gallons of water per hour to a height of 150 ft. through 1,500 yds of rising mains. Tenders, endorsed "Gas Engine and Pump," to be received by Mr. J. W. Carter, Clerk to the Council, 25, Richmond-terrace, Blackburn, not later than 10 a.m. on November 7. Specification and forms of tender may be had on application to the Surveyor at the Council's Offices, Hunsall, near Chorley.

NOVEMBER 8.—Lanark.—CAST-IRON PIPES.—The District Committee of the Middle Ward of the county of Lanark invite tenders for providing and delivering about 170 tons of dry sand cast-iron pipes and special casting for a drain. Copies of the specification and schedule may be obtained at the office of the engineers, Messrs. J. & A. Leslie & Reid, C.E., 724, George-street, Edinburgh, on payment of 1/-; Tenders, endorsed "Tender for Contract No. 75," must be lodged with Mr. W. E. Whyte, District Clerk, District Offices, Hamilton, not later than November 8.

NOVEMBER 10.—Glenbeg.—WELL AND PUMP.—Midleton R.D.C. will, at their meeting on November 10, consider tenders for sinking a well and erecting a pump (which will be supplied by the Council) in the townland of Glenbeg, according to specification. Tenders to be lodged in tender box, at Meard-road, Workhouse, not later than 12 noon on above date) must contain names of two solvent sureties to join the contractor in a bond. Mr. John Stanton, Clerk to the Council, Meard-road, Midleton Workhouse.

NOVEMBER 13.—London.—RAILS.—The Secretary of State for India in Council invites tenders from such persons as may be willing to supply rails, 50 lb. per yard; dog spikes for rails. The conditions of contract may be obtained on application to the Director-General of Stores, India Office, Whitehall, S.W., and tenders are to be delivered at that office by 2 o'clock p.m. on November 13.

NOVEMBER 13.—London.—WHEELS AND AXLES, ETC.—The Southern Railway Company, Ltd., invite tenders for (1) 1,200 pairs wheels and axles, (2) 20,000 steel springs and keys, as per specifications and drawings, which may be seen at the offices of the company. The charge for each specification is 1/-, which will not be returned. Tenders must be sent in addressed to the secretary, Mr. Edw. J. Thornton, Secretary, 46, Queen Anne's-gate, S.W., marked "Tender for Wheels and Axles," or as the case may be, not later than 12 o'clock noon on November 13.

NOVEMBER 17.—Accrington.—THE BARS AND FISH BOLTS.—Accrington Tramways Committee invite tenders for the supply of manganese steel points, crossings, special track work, tie bars, fish bolts, etc. Specifications, drawings, forms of tender, and further particulars may be obtained on application to the Borough Engineer, Mr. William J. Newton, A.M.I.C.E., Town Hall, Accrington, on payment of a deposit of 2/- 2s. Sealed tenders, endorsed "Tramway Points and Crossings" or "Tie Bars and Fish Bolts," as the case may be, to be delivered at office of Mr. A. H. Aiklen, Town Clerk, Town Hall, Accrington, not later than November 17.

NOVEMBER 17.—Oakwood, Crynant, etc.—HEATING.—The Glamorgan C.C. invite tenders for the following work, viz.—Heating of 8 County Council schools at Oakwood (near Port Talbot), Crynant, and Oullwyn (near Neath). Plans and specification of the work may be obtained at offices of Mr. T. Mansel Franklin, Clerk of the County Council, Glamorgan C.C. Offices, Westgate-street, Cardiff. Tenders, made out on the form supplied, are to be delivered to the Clerk not later than November 17, marked outside "Tender for Heating Oakwood," or "Crynant School," etc., as the case may be.

NOVEMBER 17.—Wimbledon.—LATHE AND PLANING MACHINE.—Wimbledon Corporation invite tenders for the supply and delivery of a lathe and a planing machine. Particulars may be obtained on application to the Borough Electrical Engineer, Electricity Works, Durnsford-road, Wimbledon, to whom sealed tenders, endorsed "Machine Tool," are to be delivered not later than November 17.

NOVEMBER 19.—Barnsley.—SEWAGE SPRINKLERS, ETC.—The Barnsley T.C. invite tenders for the providing and fixing of revolving sewage sprinklers, distributors, and automatic distributing apparatus, together with all the necessary castings and fittings to the same, at the proposed continuous filters to be constructed near Lund-lane, within three miles of Barnsley. Further particulars with a plan of the site, may be obtained on personal application

to Mr. J. Henry Taylor, M.I.C.E., Borough Surveyor (engineer for the scheme), Manor House Offices, Barnsley, to whom tenders must be sent, sealed and endorsed, are to be delivered not later than 10 a.m. on November 19.

★ NOVEMBER 20.—Lambeth.—HEATING.—The Guardians of the Poor of the Parish of Lambeth invite tenders for heating two dining-halls and the chapel at the Workhouse, Renfrew-road, Lower Kennington-lane. Firms may suggest the system they recommend and construct the building any day but Saturdays. Tenders, endorsed "Tender for Heating," to be sent by post to the Clerk to the Guardians, Brook-street, Kennington-road, S.E., not later than November 20.

NOVEMBER 21.—Southampton.—MACHINE.—The Director-General, Ordnance Survey, invites tender for the supply and erection of a plate or paper rolling machine. Applications for forms of tender and specification should be made to the Officer in Charge of Stores, Ordnance Survey Office, Southampton. All tenders must be submitted before noon on November 21.

NOVEMBER 22.—Hackney.—STEAM DYNAMO AND ACCESSORIES.—The Council of the Metropolitan Borough of Hackney invite tenders for the following:—Specification No. 28.—One 1,500 kilowatt steam dynamo and accessories. General conditions, specification, drawings, form of tender, and form of agreement may be inspected at the offices of Mr. Robert Hammond, M.I.C.E., the Consulting Engineer to the Council, 64, Victoria-street, Westminster, S.W., and may be obtained there on making a deposit of 5/- Extra copies of the specification may be obtained by bona fide tenders at a charge of 2/- per copy, which sum will not be refunded. Tenders (sealed, and marked "Tender for Steam Dynamo") must be addressed to Mr. W. A. Williams, Town Clerk, Town Hall, Hackney, and be delivered on or before 4 p.m. on November 22.

DECEMBER 28.—Antwerp.—PLANT AND MACHINERY.—The Mayor and Councillors of Antwerp give notice that a public meeting will be held at the Hotel de Ville, on December 28, at 12 noon, for the purpose of receiving sealed tenders for the construction of lifts, to equip the new North Docks with plant and machinery. Lot 1.—Machinery and fittings for the central station; deposit required 25,000/- Lot 2.—Supply of forty cranes; deposit required 40,000/- Lot 3.—Supply of forty cranes; deposit required 40,000/- Lot 4.—Laying down necessary pipes and mains; deposit required 100,000/- Plans and specifications are deposited at office 4, and at the Secretary's Office, Hotel de Ville.

NO DATE.—Conway.—RAILWAY TRACK.—Conway Corporation invite tenders for the supply of about 600 yds of second-hand portable railway track, with points, crossings, etc., and the rails, of about 14 lb. to the yard, gauge about 20 in. Also for six tipping waggon, having a capacity of 100 cu. yd. or thereabouts, carriage paid to Conway Station. Tenders to be sent in as early as possible to Mr. F. A. Delamotte, Borough Engineer, Conway, giving particulars, and also when and where the same may be seen.

NO DATE.—London.—STEEL RAILS.—Tenders are invited for about 5,425 tons steel rails and fishplates for Norwegian State Railways. Specification and drawings may be seen, and information obtained, at the office of Mr. W. C. Wilson, Secretary, C.I.E., Palace-chambers, 9, Bridge street, Westminster, London, S.W.

MISCELLANEOUS.

NOVEMBER 5.—East Ham.—TREES.—East Ham Corporation invite tenders for the supply of trees for the ensuing season. Particulars may be obtained on application at the office of the Borough Engineer, Town Hall, East Ham, E. Tenders to be delivered to Mr. H. W. Wilson, Town Clerk, Town Hall, East Ham, E., and endorsed "Tender for Trees," not later than 12 o'clock noon of November 5.

NOVEMBER 5.—Wakefield.—FITTINGS.—The Storthes Hall Asylum Committee of West Riding C.C. will receive the names of joiners, cabinet makers, and others, with view of tendering for the making, delivering, fitting up, and fixing of certain fittings required at the asylum. Applications must be sent in to Mr. J. Vickers-Edwards, County Architect, County Hall, Wakefield, not later than November 5.

NOVEMBER 6.—Dublin.—COPPER HOODS.—Dublin Lighting Committee invite tenders for the supply of copper hoods for the arc lamps. Specification, with general conditions and form of tender, can be obtained from the City Electrical Engineer, Fleet-street, Dublin. Tenders, addressed Chairman of the Lighting Committee, 3, Cork hill, Dublin, and marked "Tender for Copper Hoods," to be delivered not later than 10 a.m. on November 6.

NOVEMBER 6.—Didsbury.—TERRA-COTTA.—Manchester Education Committee invite tenders for the supply of terra-cotta for the Beavers Road Municipal School, Didsbury, Manchester. Plans may be seen, and a copy of the bill of quantities (including specification) may be obtained at the offices of the Deansgate, Manchester, on a deposit of 1/- of tenders on the forms and in the envelopes provided, must be delivered to the Deansgate Offices of the Education Committee not later than November 7. Cheques to be made payable to the Accountant, Education Offices, Deansgate.

NOVEMBER 8.—Stretford.—ASPHALTING.—Stretford U.D.C. invite tenders for the resurfacing of Seymour Park School Playground. Specifications, plans, and particulars will be furnished by the architect, Mr. Ernest Woodhouse, of 88, Mosley-street, Manchester, on payment of 1/- of tenders in the envelopes provided, and delivered at the Council Offices, Old Trafford, not later than November 8, endorsed "Asphalting."

NOVEMBER 12.—Ryton.—SCAVENGING.—The Ryton U.D.C. invite tenders for the removal of refuse, and the cleaning of earth closets, privies, and ashpits within their district during the year ending November 30, 1907. Forms of tender and all particulars may be obtained on application to Mr.

John P. Dalton, Surveyor, Council Offices, Ryton, to whom tenders must be delivered before noon on November 12.

NOVEMBER 19.—Sandgate.—SCAVENGING.—Sandgate U.D.C. invite tenders for the scavenging of 34 house refuse within their district (including a portion of Shoreham Camp) for the year commencing January 1, 1907. Particulars of the work to be done and of the conditions to be complied with can be had at the office of the Council's Surveyor, Sandgate. Tenders, endorsed "Scavenging," must reach Mr. J. Sherz Atkinson, Clerk to the Council, Council Offices, Sandgate, Kent, not later than November 19.

DECEMBER 1.—Brussels.—METERS.—The T.C. of Brussels will receive up to December 1 tenders from manufacturers of volume meters in regard to the eventual supply of such, for the service of water distribution. For conditions apply to the Secretariat, at 1 Hotel de Ville.

NO DATE.—Dublin.—SHOP FITTINGS.—Extensive shop fittings in No. 39, Lower Camden-street, for Alderman Deane, can be seen at office of Mr. Geo. T. Moore, civil engineer and architect, 1 and 2, Foster-place, College Green, Dublin.

PAINTING, ETC.

NOVEMBER 3.—Baldon.—PAINTING.—A Durham County Education Committee invite tenders for cleaning and painting the exterior of Baldon School (inside only). Copies of specification and form of tender (which should be returned not later than November 3) may be obtained from Mr. John C. Edington, District Clerk, Highfield, Station-road, East Baldon, R.S.O.

NOVEMBER 5.—Dublin.—PAINTING.—Great Northern Railway Company (Ireland) invite tenders for the painting and decorating of the exterior of the G.N.R. (1) and D.W. and W.R. Companies at Amiens-street, Dublin. Parties wishing to tender for the work can see the specification at the office of Mr. W. H. Toller, Engineer in Charge, Amiens-street Terminus, Dublin, or copy of same at the office of the district engineer, G.N.R. (1), Belfast, and forms of tender can be obtained at either of the above-named places on payment of 1/- (not returnable) each. Tenders, made out on the forms supplied by the company, and endorsed "Tender for Painting," should be delivered to Mr. F. Murriel, Secretary, Secretary's Office, Amiens-street Terminus, Dublin, not later than 10 a.m. on November 5.

NOVEMBER 6.—Stockton.—PAINTING.—The Guardians of the Stockton Union require certain painting and other work doing at the Workhouse Hospitals. Full particulars and forms of tender to be obtained from the Workhouse Master. Tenders (in covers, endorsed "Painting") to reach Mr. Fred Yates Watson, Clerk to the Guardians, Stockton-on-Tees, not later than November 6, at 12 noon.

NOVEMBER 8.—Barnstaple.—PAINTING, ETC.—Barnstaple Guardians invite tenders for painting the exterior of the whole of the exterior parts of the Barnstaple Union Workhouse and Cottage Homes. Specifications of the required work may be seen on application to the Master of the Union Workhouse. Tenders, endorsed "Tender for Painting," must be sent to Mr. W. H. Toller, Clerk, Barnstaple, not later than November 8.

ROADS, SANITARY, AND WATER WORKS.

NOVEMBER 6.—Cheshunt.—WATER MAIN.—Cheshunt U.D.C. invite tenders for the supply and laying out 2,000 ft. run of 4-in. water main in Andrews-lane, together with valves, hydrants, etc. The plan and specification can be seen, and forms of tender obtained, at the office of Mr. A. M. I.C.E., engineer and surveyor, Manor House, Cheshunt, during office hours. Persons tendering must take their own quantities. Sealed tenders, endorsed "Water Main," and addressed Chairman, Water Committee, Manor House, Cheshunt, to be delivered on or before 4 p.m., November 6.

NOVEMBER 6.—Clayton.—PIPE SEWER.—The Clayton U.D.C. invite tenders for the construction of about 60 yds. of 9-in. earthenware pipe sewer. Drawings and specifications may be seen, and forms of tender obtained, at the office of the Clayton U.D.C. on any morning from 8.45 to 9.30 up to November 5 next. Sealed tenders, endorsed "Bright Street Sewer," are to be forwarded to Mr. Benjamin Ashton, Clerk, not later than November 6 next.

NOVEMBER 7.—Portland.—KERBING AND CHANNELLING.—Portland U.D.C. invite tenders for the supply and delivery to the Council's depot, West-street, of about 500 ft. of 6-in. by 12-in. blue flat kerbing; 500 ft. of 12-in. by 6-in. blue flat channelling; 500 ft. of 6-in. by 6-in. hand whitened channelling. Copies of the specification and form of tender may be obtained at the office of Mr. R. Stevenson, Town Engineer and Surveyor, Council Offices, New-shaw, Portland. Sealed tenders on the form supplied, endorsed "Kerbing and Channelling," to be delivered not later than 12 noon on November 7.

NOVEMBER 7.—Twickenham.—STREET IMPROVEMENT WORKS.—Twickenham U.D.C. invite tenders for the works in connexion with forming, levelling, kerbing, channelling, paving, metalling, and making good the following streets within their district: Twickenham—(1) Bridge-road, (2) Broadway, (3) Gurnee-road, (4) Laurel-avenue, (5) Lebanon-park, (6) Redwood-road. Plans can be seen, and specifications and forms of tender obtained, on application to Mr. Fred W. Pearce, Surveyor to the Council, Town Hall, Twickenham. Sealed tenders, endorsed with the name of the street, and marked "Tender for Street Improvement Works," to be delivered to Mr. H. Jason Saunders, Clerk to the Council, Town Hall, Twickenham, not later than 10 a.m. on November 7.

NOVEMBER 8.—Llwynypïa and Pen-y-graig.—SEWERS.—Rhondda U.D.C. invite tenders for the following works, viz.—(1) Stoneware pipe sewer (about 150 lineal yds.) and manholes, at Llwynypïa.

near Salem Chapel; (3) stoneware pipe sewer (about 2½ in. dia.) and manholes at Poynton, near Poynton, Pleasant-road to Mikado-street. Plans and specifications may be inspected, and forms of tender obtained, on application at office of Mr. W. J. Jones, Engineer and Surveyor, Council Offices, Pentre Rhondda. Sealed tenders, endorsed with the name of contract, to be delivered at the Council Offices, Pentre Rhondda, and addressed to the Chairman of the Council, not later than November 8.

NOVEMBER 10. — Carrigtwilhoill. — WATERWORKS.—Middleton R.D.C. will, at their meeting on November 10, consider tenders for the carrying out of certain improvements to the Carrigtwilhoill Waterworks, in accordance with plan and specification, which may be seen at the Board-room, Middleton Workhouse, or at the office of the engineer, Mr. Richard Evans, 53, Southview, York Tenders (to be lodged in tender box at Board-room not later than 12 noon on above date) must contain names of two solvent sureties to join the contractor in a bond. Mr. John Stanton, Clerk to the Council, Board-room, Middleton Workhouse.

NOVEMBER 10. — Kiveton Park. — SEWERAGE WORKS.—The R.D.C. of Kiveton Park invite tenders for sewerage and sewage disposal works in the Parish of Kiveton Park. The sewerage comprises the laying of about 1,700 yds. of 6-in. and 9-in. pipe sewers, together with manholes and other appurtenant work, and the construction of small septic tanks and percolating filters. Plans and specifications, bills of quantities, and forms of tender obtained, on application to Mr. J. P. Evans, Surveyor, Kiveton Park. Sealed tenders to be sent to Mr. J. Snow Whall, Solicitor, Clerk to the Council, Bridge-street, Workson, Notts, on or before November 10.

NOVEMBER 13. — Cheshunt. — SEWER.—Cheshunt U.D.C. invite tenders for the construction of a surface-water sewer in Longfield-lane, consisting of about 655 lin. yds. armoured concrete tubes and about 460 lin. yds. stoneware pipes, together with street gullies and inspection chambers; also the erection of a concrete retaining wall and other incidental works. Plans and specifications may be seen, and quantities and forms of tender obtained, at office of Mr. Reginald H. Jeffes, A.M.I.C.E., Engineer and Surveyor, Manor House, Cheshunt. Sealed tenders to be delivered in official envelopes, which will be supplied, on or before November 13.

NOVEMBER 13. — Leeds. — STREETS.—Leeds Highways Committee invite tenders for the paving and flagging of the following streets:—Rosenath-street, Rosenath-place, Rosenath-terrace, Lewishale, New-place, Tuf-street, Arley Park-road, Arley-road, Arley-terrace, Victoria-grove, Carr-grove, Carr-street, Hill View-mount, Hill View-place, Hill View-terrace, and Hill View-avenue. Drawings may be seen at the City Engineer's office, Municipal buildings. Forms of tender and bills of quantities may be obtained, and copies of the documents furnished, on contract inspection, at application at the Highways Office, 155, Kirkstall-road. Sealed tenders, endorsed "Tender for Private Street Works," and addressed to the Highways Committee, must be delivered at the Town Clerk's Office, Town Hall, Leeds, not later than 10 a.m. on November 13.

NOVEMBER 13. — Polegate. — SEWERAGE.—Hailsham R.D.C. invite tenders for the construction of about 410 yds. run of 9 in. pipe sewers, with five manholes, and the necessary works in connection therewith. The drawings may be seen at office of Mr. Edmund Catl, Clerk, Council Offices, 37, London-road, Hailsham, between the hours of 10 a.m. and 4 p.m., and copies of the specification, bill of quantities, and forms of tender may be obtained on the deposit of 10s. Sealed tenders, endorsed "Tender for Polegate Sewerage," must be sent to the Clerk not later than November 13.

NOVEMBER 13. — Yatton. — WATER SUPPLY.—Long Ashton R.D.C. invite tenders for providing and laying out, seven and a half in. dia. cast-iron main, together with 2 in. to 6 in. in diameter, and also 1,100 yds. of 1½-in. galvanised wrought-iron tubing, together with valves and hydrants, and the construction of a concrete and brick service reservoir to contain 150,000 gals. for the parish of Yatton, in accordance with plans and specification prepared by the Engineer, Mr. A. P. I. Cottrell, M.I.C.E., of 28, Baldwin-street, Bristol. Copies of the specification, form of tender, and bill of quantities may be obtained from the Engineer on payment of the sum of 3s. 3d. Tenders, on the forms provided, must be delivered to Mr. A. E. Hicks, Clerk, Union Offices, Flax Bourton, near Bristol, under seal, and endorsed "Tender for Yatton Water Supply. Contract No. 2," at or before 10 a.m. on November 13.

NOVEMBER 17. — Hale. — CONCRETE PAVING.—Hale U.D.C. invite separate tenders for the supply and laying of about 532 square yds. of annealed concrete paving. Plans and specifications can be seen, and bills of quantities and forms of tender may be obtained, on the payment of a deposit of 10s. 6d.

at the office of the Council's Surveyor, Mr. F. E. Box, Tenders and priced bills of quantities are to be received by Mr. J. G. Wray, Clerk to the Council, Council Offices, Hale, Cheshire, not later than noon on November 17, in sealed envelopes.

NOVEMBER 19. — Barnsley. — SEWERAGE WORKS.—The Barnsley Town Council invite tenders for the construction of collecting and detritus tanks, septic tanks, bacterial filters, conduits, and other works required to be constructed on proposed sewage works which are to be constructed near Land-lane, about three miles east of Barnsley. Drawings, specifications, and bills of quantities may be obtained on payment of 10s. to Mr. A. Newsam, Municipal Accountant, Barnsley, and tenders, properly sealed and endorsed, are to be delivered to Mr. J. Henry Taylor, M.I.C.E., Borough Surveyor (engineer for the scheme), Manor House Offices, Barnsley, not later than 10 a.m. on November 19.

NOVEMBER 19. — Glasgow. — DRAINAGE.—The Corporation of Glasgow invite tenders for the work necessary in the construction of sewer No. 6 (being 3 ft. by 2 ft. brick sewer) extending about 100 yds. from Dumbreck-road from Manor-road to Flocks-avenue, a distance of about 825 lineal yds. Plans, specifications, and schedule of quantities and forms obtained, on application to the City Engineer, at his office, City Chambers, 64, Cochran-street, Glasgow, on or before November 19. Sealed tenders, endorsed "Tender for Sewer No. 6," must be lodged with Mr. A. W. Myles, Town Clerk, City Chambers, Glasgow, not later than November 19.

NOVEMBER 20. — Milton. — SEWERAGE.—R.D.C. of Lyntonham invite tenders for carrying out the necessary works required in the provision of a sewerage system for the parish of Milton, in the county of Hants. The specification is for the following works:—For the construction of about 1,150 yds. of 6 in., 4,900 yds. of 9 in., and 1,250 yds. of 12 in. stoneware pipe sewers, and about 40 yds. of 9 in. and 150 yds. of 12 in. cast iron sewers, all necessary manholes and flushing chambers, and for the erection of thirteen ventilating columns. For the construction of sewage disposal works, comprising of grit chamber, septic and storage tanks, twelve contact beds, and a storm-water overflow drain and filter bed. Copies of the specification and bill of quantities can be obtained, and plans may be seen at the offices of the Clerk to the R.D.C., Lyntonham, Hants, or at the offices of the Engineer, Mr. H. C. H. Shenton, of the firm of Messrs. Anson & Shenton, of 28, Victoria-street, Westminster, S.W. 1, on payment of a cheque for 5s. Tenders must be received by Mr. J. Davis Rawlins, Clerk, at the office of the Council, Lyntonham, Hants, before 11 o'clock a.m. on November 20.

NOVEMBER 21. — Middlewich. — SEWER DISPOSAL WORKS.—Middlewich U.D.C. invite tenders for centrifugal pumping plant and erection of pumping station and caretaker's house, and their sewage disposal works. Middlewich. Specifications, drawings, etc., may be inspected by appointment at the office of Mr. Frederick W. Stocks, the Council's Engineer, Town Hall, Middlewich. Sealed tenders, endorsed "Sewage Disposal Works," to be delivered to Mr. C. P. Lawrence, Clerk to the Council, Town Hall, Middlewich, on or before November 21.

NOVEMBER 27. — Jassy. — ROUMANIAN. — WATER SUPPLY.—The Municipal Council of Jassy invite tenders for the water supply and sewerage of the town of Jassy. All such tenders to be in the Rumanian language, sealed, and to reach the Town Hall by November 27, at 6 p.m. Plans and specifications may be seen, and all further information obtained, at the Chief Engineer's Office, Town Hall, Jassy. Mr. George Lascar, Mayor, Mr. A. S. Savul, Chief Engineer.

No Date. **Gabalfa, Cardiff. — ROADS AND SEWERS.**—The construction of roads and sewers on Heathfield Estate, Gabalfa, Cardiff. Plans and specifications can be seen, and quantities obtained, at the offices of Mr. Edgar Down, A.R.I.B.A., 31, High-street, Cardiff, on deposit of 2s. 2d.

STONE, MATERIALS, AND STORES

NOVEMBER 5. — Romford. — ROAD METAL.—Romford R.D.C. invite tenders for the supply of 450 tons of best quality blue Guernsey granite broken to 1½ in. cube, and 300 tons of best quality blue Guernsey granite broken to 2 in. cube, also 700 tons of Rhineland blast stone broken to 2 in. cube. Specification and form of tender may be obtained from Mr. George Lapwood, Highways Surveyor, Victoria-chambers, Romford. Sealed tenders (endorsed "Tender for Granite, etc."), together with samples of granite and stone proposed to be supplied, which must be sent carriage paid, to reach Mr. William Smith, Clerk to the Council, 13, North-street, Romford, on or before November 5.

NOVEMBER 5. — Aldershot. — CEMENT.—The supply of Portland cement for the year ending December 31, 1907. Specifications and forms of tender may be seen at the Surveyor's Office. Tenders, endorsed "Cement," to be sent to Mr. W. E. Foster, Clerk.

Clerk's Office, Municipal Buildings, Aldershot, on or before November 6.

NOVEMBER 7. — Cowpen. — ROAD MATERIALS.—Cowpen U.D.C. invite tenders for the supply and delivery of about 1,000 tons of 2½ in. hand broken road whinstone, 4 in. whinstone chippings, etc., and also for the hire of a steam road roller, water cart, and scarifier. Further particulars and forms of tender may be obtained at the office of Mr. Robert Grieves, Surveyor, Seaford-street, Watlington, Blyth. Sealed tenders, endorsed "Tender for Road Metal" or "Tender for Roller, etc.," as the case may be, must be delivered on or before November 7.

NOVEMBER 8. — London. — BUILDING MATERIALS.—The Guardians of the Poor of the Parish of St. Mary, Islington, invite tenders for the supply of building materials and timber till March 25, 1908. Sealed tenders, endorsed "Tender for Building Materials," must be delivered to the Guardians' Offices, St. John's-road, Upper Holloway, on or before November 7. Printed forms of tender, with conditions of contract and estimated quantities required, must be obtained from the Clerk, as no others will be received. The tenders will be opened on November 8.

NOVEMBER 12. — Aberdare. — OILS.—The Directors of the Powell Duffryn Steam Coal Company, Ltd., invite tenders for the supply of oils from January 1, 1907. Forms of tender and all particulars can be obtained, on application, at the Surveyor's Office, Aberdare Office, near Aberdare. Tenders to be addressed to the Directors of the Powell Duffryn Steam Coal Company, Ltd., 101, Lendall-street, London, E.C., and posted so as to be received not later than 10 a.m. on November 12.

NOVEMBER 12. — Birmingham. — STORES.—Birmingham Water Committee invite tenders for the supply of certain stores for one year from January 1, 1907, comprising the following:—Iron and steel files, oil cans, road picks, shovels, wrought-iron and gas pipes and fittings, Root's and Babcock and Wilcox's boiler tubes and fittings, nails, bolts, screws, etc., stop-taps, ferrules, and plugs, cast-iron stop-tap boxes with wrought-iron lids, gun-metal sluice valves, hydraulic stop valves and valves of couplings, light and power fittings, sand washer fittings, dry-salters, brooms and brushes, timber, bitumen, rubber, gutta-percha and asbestos goods, oil-dressed leather butts, etc., bricks, lime, cement, and other building materials, rope, flax, hemp and wire yarn, lead piping, and pig-lead. Patterns of some of the materials may be seen on application at the Foreman's Office, Branshous-bush, Broad-street, Birmingham, on November 6 and 7, between the hours of 11 a.m. and 4 p.m., and tenders must not be submitted until after November 12. Forms of tender and copies of conditions may be obtained on and after November 5, at the offices, 44, Broad-street, Birmingham, on payment of 1s. Persons who wish to inspect the forms of tender before paying the deposit may do so on personal application at offices of secretary. Tenders must be made out on the forms provided, and be delivered at offices of Mr. E. Antony Lees, Secretary, not later than 12 noon on November 12, addressed "Tenders for Stores, the Secretary, Water Department, 44, Broad-street, Birmingham."

NOVEMBER 19. — Dublin. — STORES.—The Dublin United Tramways Company (1896) Ltd., invite tenders for the supply of general stores, including car fittings, iron, steel, castings, oils, paints, glass, brushes, ironmongery, harness materials, electric supplies, timber, etc., for the year ending December 31, 1907. Forms of tender (price 2s. each), conditions, and all information can be obtained, and patterns seen, at the Secretary's Office, 9, Upper Sackville-street, from October 29 to November 12. Tenders, sealed, and marked on the outside "Tenders for Stores," and addressed to the Chairman, to be lodged with Mr. R. S. Tresilian, Secretary, on or before November 19.

NOVEMBER 22. — Cardiff. — STORES.—Cardiff Corporation invite tenders for:—(1) Stores.—Only persons having places of business in Cardiff, and who can quote for the whole of the requirements, are required to tender for stores for the twelve months ending December 31, 1907. (2) Lead service work in Cardiff and outside districts.—Only firms having places of business within the area of supply of the Cardiff Corporation Waterworks are requested to tender for plumbers' work (by competent plumbers) for the twelve months ending December 31, 1907. (3) Laying masons' work.—Masons and bricklayers' work required in the building of hydrant tanks, meter tanks, the relaying of paving, etc., during the twelve months ending December 31, 1907. (4) Street surface covers.—Various cast-iron street surface covers, stop-tap pipes, etc., that may be required for the twelve months ending December 31, 1907. Specifications may be seen, and forms of tender obtained, on application at the offices of Mr. C. H. Priestley, M.I.C.E., Waterworks Engineer, Town Hall, Cardiff, on and after November 3. Sealed tenders, endorsed "Stores," "Lead Service Work," "Masons' Work," "Street Surface Covers," "Cast-iron Scrap, etc.," as the case may be, to be delivered at office of Mr. J. L. Whitham, Town Clerk, Town Hall, Cardiff, on or before November 22.

Auction Sales.

Nature and Place of Sale.	By whom Offered.	Date of Sale.
*MACHINERY, TIMBER, BUILDING MATERIALS, FELTINGS.—At 103, Lavender Hill, S.W.	J. Hibbard & Sons	Nov. 5 & 6
*"BUTCHERS STOCK AND PLANT, PENNYTON.—On the Premises	H. W. Smith	Nov. 7
*"TIMBER, Etc., BRIMNAL GREEN.—Timber Yard, Bethnal Green Junction, E.	William F. Lang	Nov. 7
*"FREEHOLD BUILDING LAND, NEW SOUTHGATE.—Railway Hotel, New Southgate	Charles Stannard & Son	Nov. 13
*"TIMBER, Etc., HACKNEY ROAD.—On the Premises	Joseph Hibbard & Sons	Nov. 13
*"BUILDERS' BOARDS, Etc., STATION STREET, BIRMINGHAM.—On the Premises	Edwards, Son, & Bigwood	Nov. 13, etc.
*"FREEHOLD BUILDING LAND.—At the Torrington Hotel, North Finchley	C. Sparrow & Son	Nov. 26

SALES OF PROPERTY.—Continued from page 522.

By FISHER, STANHOPE, & DRAKE.	
Stoke Newington.—100, Evering-rd., u.t. 67 yrs., g.r. 81, e.r. 50.	£325
Stamford Hill.—102, Olinda-rd., u.t. 73 yrs., g.r. 81, e.r. 24, 12s.	130
By DRENNAN, TEWSON, & CO.	
Kingsland.—7, High-st. (s.), with warehouse, u.t. 55½ yrs., g.r. 35½, e.r. 275.	3,050
North Woolwich.—98 and 100, Albert-rd. (s.), y.r. 30½, 4s.	800
Great Missenden, Bucks.—Mowbray-ter., twelve freehold cottages, nos. 137, 138, 139.	1,800
By H. & R. L. CONN (at Chatham).	
Chatham, Kent.—The Brook, the "Duke of Cambridge" p.h., etc., f.g. 10s., reversion in three yrs.	2,500
The Brook, f.g. 10s. 17s., reversion in three yrs.	550
October 24.—By BEADEL, WOOD, & CO.	
West Tytherley, etc., Hants.—The Norman Court Estate, 9, 165 & 3, 4 p. f. (including the manors and advowsons)	200,000
By GRAVES & SON.	
Westbourne Park.—11, Cornwall-rd., u.t. 42½ yrs., g.r. 84, e.r. 62½.	350
By MAY & PHILLIPS.	
Streatham.—Tooting Bec-rd., "Bee Lawn," f. p.	1,300
Brixton.—55, Arlington-rd., u.t. 68 yrs., g.r. 81, 10s., e.r. 42.	265
By A. PIERCE & SONS.	
Brixton.—87, Upper Tulse-hill, u.t. 30 yrs., g.r. 16½, 10s. p.	1,375
By KITCHWORTH & STEVENS.	
Hyde Park.—Connaught-ter., etc., f.g. 49½, 8s., u.t. 10½ yrs., g.r. 22, 18s. y.r. 4.	325
Wandsworth-rd.—Hartington-rd., etc., i.g. rents 39½, u.t. 26½ yrs., g.r. 63½ (with reversion).	415
Hackney.—34 to 60 (even), Balcarnest, u.t. 33½ yrs., g.r. 104, 10s., w.r. 183½, 16s.	860
By TOWERS, ELLIS, & CO.	
Paddington.—152, Blomfield-rd., and 11 and 12, Blomfield-mews, u.t. 35 yrs., g.r. 20½, e.r. 91½.	510
By DOUGLAS YOUNG & CO.	
Tooting.—Lucien-rd., "Clarendon," f. e.r. 36½, Lucien-rd., "Frankston," "Silvermine," and "Harrington" u.t. 91½ yrs., g.r. 24½, e.r. and v.r. 116½.	1,005
October 25.—By J. H. BOLMER.	
Bermondsey.—24, Monnow-rd. (manufacturing premises), u.t. 36½ yrs., g.r. 20½ (including machinery).	830
15 and 16, Matson-st., u.t. 30 yrs., g.r. 31, 10s., e.r. 41½, 12s.	293
Upton Park.—59 and 52, Walton-rd., u.t. 31 yrs., g.r. 6½, 6s., w.r. 62½, 8s.	430
By CROFTS & CO.	
Tooting.—69 and 71, Graveney-rd., u.t. 76 yrs., g.r. 81, 8s., e.r. 92.	330
By DAVID BOKSALL & CO.	
Stoke Newington.—6, Vicarage-rd., u.t. 69½ yrs., g.r. 44, e.r. 38½.	345
7, Alcockbury-rd., u.t. 74 yrs., g.r. 7½, y.r. 10.	370
38, Bentham-rd., u.t. 69 yrs., g.r. 6½, e.r. 38½.	335
By P. J. DIXON & SON.	
Finsbury.—9 to 17 (odd), Clifton-st., and 24, Earl-st., f. y.r. 294.	4,800
St. Luke's.—29, Gresham-st., u.t. 35 yrs., g.r. 500.	500
Highbury.—25, 28, 32, and 34, Elwood-st., f. y.r. 54½.	1,150
30, Elwood-st. (s.), f. y.r. 24½.	320
City-rd.—No. 312 (business premises), u.t. 35½ yrs., g.r. 8½, y.r. 55½.	325
By FAREBROTHER, ELLIS, & CO.	
Bloomsbury.—6 and 7, Gloucester-st., f. y.r. 112½.	1,700
Fulham.—174, Eskourter-rd. (dile), area 15,000 ft. f.	1,950
Dulwich.—Derwent-ter., etc., f.g. rents 21. 6s., reversion in 10 yrs.	270
Fenwick-rd., etc., f.g. rents 11. 10s., reversion in 60 yrs.	200
By C. C. & T. MOORE.	
Limehouse.—61 to 67 (odd), Stalsby-rd. (s.), f. w.r. 130½, 10s.	1,230
Mile-end.—52, Lincoln-st., f. 34½, 4s.	800
Walthamston.—38, Canarvon-rd., f. w.r. 26½.	250
Victoria Park.—371 to 383 (odd), Wick-rd., u.t. 56½ and 58½ yrs., g.r. 85½, w.r. 266½, 10s.	1,020
383, 390, and 392, Wick-rd. (s.), u.t. 56½ yrs., g.r. 15½, w.r. 137½, 4s.	700
2 to 14 (even), Prince Edward-rd., u.t. 62½ yrs., g.r. 18½, w.r. 180½, 10s.	775
Teddington.—Adelaide-rd., f.g. 8½, 8s., reversion in 61 yrs.	215
By STIMSON & SONS.	
Baham.—27, 29, 35, 37, 45, 47, and 51, and 53, Laitwood-rd., u.t. 81½ and 77½ yrs., g.r. 56½, 16s., w.r. 448½, 2s.	2,030
Tooting.—15, Cowick-rd., u.t. 96 yrs., g.r. 64, w.r. 42½, 18s.	195
Brixton.—17, St. John's-rd., u.t. 55½ yrs., g.r. 8½, e.r. 65½.	350
Stockwell.—21 and 23, Willington-rd., u.t. 30 yrs., g.r. 10½, y.r. 58½.	425
Camberwell.—3, 5, 7, and 9, Cheam-pl., f. w.r. 98½, 10s.	900
Waltham.—44 to 54 (even), Friday-st., u.t. 45½ yrs., g.r. 84½, 10s., w.r. 304½, 8s.	1,570
By JOSEPH BROWN.	
Streatham.—Bycroft-rd., freehold building land, 0 a. 2 r. 30 p. p.	800
New Southgate.—3, Bellevue-rd., u.t. 30 yrs., g.r. 8½, 2s.	215
By DICKINSON, RIGGALL, & CO. (at Brigs).	
Messingham, Lincs.—"The Manor Farm," 143 a. 0 r. 21 p., y.r. 130½.	3,000
"The Bleach Yard Farm," 94 a. 1 r. 5 p. f., y.r. 30½.	875
Three freehold houses, 39 a. 2 r. 0 p., y.r. 15½.	410
Two freehold houses and 0 a. 2 r. 22 p., y.r. 17½.	440
Yaddethorpe, Lincs.—Two freehold cottages, y.r. 12½.	145

By BATCHELOR & SON (at Croydon).	
Croydon.—The Waltons, "Octagon Lodge," f. w.r. 156, 12s.	£305
Southbridge-pl., "The Lodge," f. r. 135.	185
Dupas Hill-la., f.g. 204, reversion in 68 yrs.	410
October 26.—By S. & E. BARKS.	
Stamford Hill.—41 and 43 Olinda-rd., u.t. 73½ yrs., g.r. 10, w.r. 6½, 2s.	345
By BROWNE & LAY.	
Orpington, Kent.—High-st., two freehold buildings sites	480
Catford.—78, Caverley-rd., u.t. 35 yrs., g.r. 74, 7s., e.r. 40½.	330
Kingsdon Hill Square.—280 and 281, King's-rd., f. w.r. 36½, 8s.	475
By GILBERT & HOV.	
Haringway.—115, Waltham-rd., u.t. 82 yrs., g.r. 71, 10s., e.r. 47½.	360
By ROBINS, GORE, & MERCER.	
Oxford Street.—1, Greave-st. (s.), u.t. 6 yrs., g.r. 60½, w.r. 145½, 12s.	150
By TYSER, GRAYWOOD, & CARR.	
Chiswick.—14 and 12, Cranbrook-rd., f. w.r. 72½.	750
Gunnery-rd., 13, Wellesley-rd., u.t. 70½ yrs., g.r. 17½, 6s., e.r. 52½, 10s.	550
Contractions used in these lists.—F.g. for freehold ground-rent; l.g. for leasehold ground-rent; l.g. for improved ground-rent; g.r. for ground-rent; r. for rent; f. for freehold; c. for copyhold; l. for leasehold; p. for possession; e.t. for estimated rental; y.r. for yearly rental; q.r. for quarterly rental; y.r. for yearly rental; u.t. for unexpired term; p.a. for per annum; yrs. for years; la. for lane; st. for street; rd. for road; sq. for square; pl. for place; ter. for terrace; cres. for crescent; av. for avenue; gds. for gardens; yd. for yard; gr. for grove; b.h. for barbon; p.h. for public-house; o. for office; s. for shops; ct. for court.	

TO CORRESPONDENTS.

NOTE.—The responsibility of signed articles, letters, and queries read at meetings rests, of course, with the authors.

We cannot undertake to return rejected communications; and the Editor cannot be responsible for drawings, photographs, manuscripts, or other documents, or for models or samples sent to or left at this office, unless he has specially asked for them.

Letters or communications (beyond news items) which have been duplicated for other journals are NOT DESIRED.

All communications must be authenticated by the name and address of the sender whether for publication or not. No notice can be taken of anonymous communications.

We are compelled to decline pointing out books and giving addresses.

Any communication to a contributor to write an article, or to execute or lend a drawing for publication, is given subject to the approval of the article or drawing, when required, by the Editor, who retains the right to reject it if unsatisfactory. The receipt by the author of a proof of an article in type does not necessarily imply its acceptance. The Editor does not undertake to read and consider articles offered for acceptance unless they are type-written.

All communications regarding literary and artistic matters should be addressed to THE EDITOR; those relating to advertisements and other exclusively business matters should be addressed to THE PUBLISHER, and not to the Editor.

MEETINGS.

FRIDAY, NOVEMBER 2.

Architectural Association.—Mr. Hugh Stanger on "The Corinthian Order." 7.30 p.m.

Royal Sanitary Institute (Lectures for Sanitary Officers).—Dr. A. Walsley Harris on "Water—Composition, Pollution, and Purification." 7 p.m.

The Junior Institution of Engineers (Westminster Palace Hotel).—Inaugural meeting. Address by the President Mr. William B. Bryan, M.I.A.S.C.E., on the subject of "Water supply." 8 p.m.

Southern Counties Federation Master Builders.—At the "Old Ship Hotel," Brighton, 3 p.m. and 4 p.m.

Glasgow Technical College (Great Architectural Society).—Professor Chas. Gourlay on "The Byzantine Churches of Constantinople." 8 p.m.

SATURDAY, NOVEMBER 3.

Incorporated British Institute of Certified Carpenters (Carpenters' Hall, London Wall, E.C.).—(1) Visit to the works in connexion with Victoria Station Extension, L.M. & S.C.Rly., at 10.30 a.m. (2) Visit to the Grosvenor Hotel Annex now in course of construction and adjoining Victoria Station. 2.30 p.m. (3) Monthly meeting and the election of new members. 6.30 p.m.

MONDAY, NOVEMBER 5.

Royal Institute of British Architects.—Presidential address by Mr. T. E. Colcutt. 8 p.m.

University of London (Imperial Institute-road).—Mr. Banister Fletcher on "The History of Architecture." An introductory lecture on "Greek Architecture." 8 p.m.

Royal Sanitary Institute (Lectures for Sanitary Officers).—Mr. J. E. Worth on "Sewerage." 7 p.m.

Liverpool Architectural Society.—Mr. Walter Cave on "Fenestration: or the Treatment of the Window Openings in Relation to the Structure." Illustrated by lantern slides. 8 p.m.

Society of Engineers.—Mr. Sherard Cowper-Coles on "Recent Storage Battery Improvements." 7.30 p.m.

TUESDAY, NOVEMBER 6.

Institution of Civil Engineers.—Inaugural address by the President, Sir Alexander B. W. Kennedy, LL.D. F.R.S.; presentation of the Council's awards, and reception in the Library. 8 p.m.

WEDNESDAY, NOVEMBER 7.

Royal Sanitary Institute (Lectures and Demonstrations for Sanitary Officers).—(1) Mr. J. E. Worth on "Sewage Disposal." 7 p.m. (2) Inspection at a factory building 3 p.m.

Builders' Foremen and Clerks of Works' Institution.—Ordinary meeting of the members. 8 p.m.

THURSDAY, NOVEMBER 8.

Institution of Electrical Engineers.—Inaugural address by the President, Dr. R. T. Glazebrook, F.R.S. 8 p.m.

Architectural Association.—Conversation, to be held at Tufnell-street, Westminster. 8 p.m.

FRIDAY, NOVEMBER 9.

Royal Sanitary Institute (Lectures for Sanitary Officers).—Mr. J. E. Worth on "Scavenging, Disposal of House Refuse." 7 p.m.

Eastern Counties Federation of Master Builders.—At the Shadwell Hotel, Culver-street, Colchester. Council meeting at 3 p.m., half-yearly general meeting at 4 p.m.

PRICES CURRENT OF MATERIALS.

*Our aim in this list is to give, as far as possible, the average prices of materials, not necessarily the lowest. Quality and quantity obviously affect prices—a fact which should be remembered by those who make use of this information.

	BRICKS, &c.
	s. d.
Hard Stocks.....	1 10 0 per 1000 alongside, in river.
Round Stocks and	
Gravelled Stocks for	
Picked Stocks for	
Facings.....	2 17 6 " delivered.
Flattens.....	1 8 0 " at railway depot.
Red Wire Cement	1 14 0
Best Fareham Red	3 12 0
Best Red Pressed	
Best Blue Pressed	5 0 0
Staffordshire.....	3 5 0
Do. Bulloose.....	4 0 0
Best Stourbridge	
Fire Bricks.....	3 14 0

GLAZED BRICKS.	
Best White and	
Every Glazed	
Stretchers.....	12 0 0
Headers.....	11 0 0
Quoins, Bullnose,	
and Flats.....	16 0 0
Double Stretchers	19 0 0
Double Headers.....	16 0 0
One Side and two	
Ends.....	19 0 0
Two Sides and one	
End.....	20 0 0
ferred, Squints.....	20 0 0
Best Dipped Salt	
Glazed Stretch-	
ers, and Headers	12 0 0
Quoins, Bullnose,	
and Flats.....	14 0 0
Double Stretchers	15 0 0
Double Headers.....	14 0 0
One Side and two	
Ends.....	15 0 0
Two Sides and one	
End.....	15 0 0
ferred, Squints.....	14 0 0
Second Quality	
White and	
Dipped Salt	
Glazed.....	2 0 0 " less than best.
Thames and Pitt Sand	7 0 per yard, delivered.
Thames Ballast.....	5 6
Best Portland Cement	27 0 per ton, "
Best Ground Blue Lias Lime	19 0 " "

NOTE.—The cement or lime is exclusive of the ordinary charge for sacks.

Grey Stone Lime..... 11s. 6d. per yard, delivered.

Stourbridge Fireclay in sacks 7d. 6d. per ton at rly. dpt.

STONE.

BATH STONE—delivered on road wag-	s. d.
gons, Paddington Depot.....	1 6½ per ft. cube.
Do. do. delivered on road wag-	
gons, Nine Elms Depot.....	1 8½ " "

PORTLAND STONE (20 ft. average).—

Brown Whitbed, delivered on road

wagons, Paddington Depot, Nine

Elms Depot, or Fimlico Wharf... 2 1 " "

White Banded, delivered on road

wagons, Paddington Depot, Nine

Elms Depot, or Fimlico Wharf... 2 2½ " "

Anconter in blocks..... s. d.

10 per ft. cube, delivered, rly. dpt.

Beor..... 1 6 " "

Greenshill..... 1 10 " "

Darley Dale in blocks..... 2 4 " "

Red Corshill..... 2 2 " "

Cloaburn Red Freestone 2 0 " "

Bed Mansfield..... 2 4 " "

YORK STONE—Robin Hood Quality.

Scalloped random blocks, 2 10 " "

6 in. sawn two sides land-

ings to sizes (under

40 ft. super.)..... 2 3 per ft. super. "

6 in. ditto, ditto..... 2 6 " "

3 in. sawn two sides slabs

(random sizes)..... 0 11½ " "

2 in. to 2½ in. sawn one

side slabs (random

sizes)..... 0 7½ " "

1½ in. to 2 in. ditto, ditto 0 6 " "

HARD YORK—

Scalloped random blocks, 3 0 per ft. cube, "

6 in. sawn two sides land-

ings to sizes (under

40 ft. super.)..... 2 8 per ft. super. "

6 in. rubbed two sides

ditto..... 3 0 " "

3 in. sawn two sides slabs

(random sizes)..... 1 2 " "

2 in. self-faced random

slabs..... 0 5 " "

STONE (continued).		
HARD YORK (continued) ..	s. d.	
option Wood (Hard Bed) in blocks 2 0 per ft. cube, deld.	ry. depôt.	
" " 6 in. sawn both		
" " sides random		
" " slabs	1 0	"
" " 2 in. do.	0 8	"

SLATES.		
n. In.	£ s. d.	
0x10 best blue Bangor	13 2 6	per 1000 of 1200 at r. d.
0x12	13 7	"
0x10 first quality ..	13 0 0	"
0x12	13 5 0	"
6x8	7 5 0	"
0x10 best blue Port		
madoc	12 12 6	"
6x8	6 12 6	"
0x10 best Eureka un-		
fining green	15 17 6	"
0x12	18 7 6	"
8x10	13 5 0	"
6x8	10 5 0	"
0x10 permanent green	11 12 6	"
8x10	9 12 6	"
6x8	6 12 6	"

TILES.		
	s. d.	
Best plain red roofing tiles ..	42 0	per 1000 at rly. depôt.
Best plain and Valley tiles ..	3 7	per doz.
Best Broadway tiles	50 0	per 1000
Do. Ornamental tiles	52 6	"
Hip and Valley tiles	4 0	per doz.
Best Bourbon red, brown, or		
brindled do. (Edwards) ..	57 6	"
Do. Ornamental do.	60 0	"
Hip tiles	4 0	per doz.
Valley tiles	3 0	"
Best Red or Mottled Stafford-		
shire do. (Peakes)	51 8	per 1000
Do. Ornamental do.	54 6	"
Hip tiles	4 1	per doz.
Valley tiles	3 8	"
Best "Rosemary" brand		
plain tiles	48 0	per 1000
Best Ornamental tiles ..	50 0	"
Hip tiles	4 0	per doz.
Valley tiles	3 8	"
Best "Harrell" brand		
plain tiles, sand-faced ..	53 0	per 1000
Do. pressed	47 6	"
Do. Ornamental do.	60 0	"
Hip tiles	4 0	per doz.
Valley tiles	3 8	"

WOOD.		
	At per standard.	
Deals: best 3 in. by 11 in. and 4 in.	£ s. d.	£ s. d.
by 9 in. and 11 in.	13 0 0	14 0 0
Deals: best 3 by 9 in. by 7 in. and		
8 in., and 3 by 7 in. and 5 in.	11 0 0	12 0 0
Battens: best 2 by 6 and 3 by 6 ..	0 10 0	less than 7 in. and 5 in.
Deals: seconds	1 0	0 less than best.
Battens: seconds	0 10 0	"
2 in. by 4 in. and 2 in. by 5 in.	8 10 0	0 10 0
Foreign Sawed Boards—		
1 in. and 1½ in. by 7 in.	0 10 0	more than battens.
2 in.	1 0 0	
At per load of 50 ft.		
Fir timber: best middling Danzig	4 10 0	5 0 0
or Memel (average specification)		
Seconds	4 0 0	4 10 0
Small timber (8 in. to 10 in.) ..	3 12 6	3 15 0
Swedish timber (6 in. to 8 in.) ..	2 0 0	3 10 0
Swedish balks	2 10 0	3 0 0
Pitch-pine timber (30 ft. average)	4 0 0	4 15 0

JOINERS' WOOD.		
	At per standard.	
White Sea: first yellow deals,		
3 in. by 9 in.	24 0 0	25 0 0
Battens, 2 in. and 3 in. by 7 in.	16 0 0	18 0 0
Second yellow deals, 3 in. by 11 in.	18 0 0	20 0 0
Battens, 2 in. and 3 in. by 7 in.	17 0 0	19 0 0
Third yellow deals, 3 in. by		
11 in. and 9 in.	13 0 0	15 0 0
Battens, 2 in. and 3 in. by 7 in.	11 0 0	12 0 0
Petersburg first yellow deals,		
3 in. by 11 in.	21 0 0	23 0 0
Do. 3 in. by 9 in.	18 0 0	20 0 0
Second yellow deals, 3 in. by 11 in.	16 0 0	17 0 0
Do. 3 in. by 9 in.	14 0 0	15 0 0
Third yellow deals, 3 in. by		
11 in.	13 0 0	14 0 0
Do. 3 in. by 9 in.	12 0 0	13 0 0
Battens, 2 in. and 3 in. by 7 in.	10 0 0	11 0 0

White Sea and Petersburg—		
First white deals, 3 in. by 11 in.	14 0 0	15 10 0
Battens, 2 in. by 9 in.	13 0 0	14 10 0
Second white deals, 3 in. by 11 in.	13 0 0	14 10 0
Battens, 2 in. by 9 in.	12 0 0	13 10 0
Pitch-pine: deals	10 0 0	11 0 0
Under 2 in. thick extra ..	0 10 0	1 0 0
Yellow Pine—First, regular sizes	44 0 0	upwards.
Odmonds	33 0 0	"
Second, regular sizes ..	28 0 0	"
Yellow Pine odmonds ..	28 0 0	"
Kauri Pine—Planks, per ft. cube.	0 3 6	0 5 0
Danzig and Steettin Oak Logs—		
Large, per ft. cube	0 3 0	0 3 6
Small	0 2 6	0 2 6
Waincoat Oak Logs, per ft. cube.	0 5 6	0 6 0
Dry Waincoat Oak, per ft. sup.		
1 in.	0 0 8	0 0 9
1 in. do. do.	0 0 7	"
Dry Mahogany—Honduras, 1 in.		
Large, per ft. sup. as inch	0 0 9	0 0 1 0
Selected, Figury, per ft. sup.		
as inch	0 1 6	0 2 6

WOOD (continued).		
	At per standard.	
JOINERS' WOOD (continued)—	£ s. d.	£ s. d.
Dry Walnut, American, per ft.	0 0	1 0
super, as inch	17 0 0	22 0 0
Teak, per load	0 4 0	0 5 0
American Whitewood Planks,		
per ft. cube	0 4 0	0 5 0
Prepared Flooring, etc.—		
1 in. by 7 in. yellow, planed and		
shot	0 13 6	0 17 6
1 in. by 7 in. yellow, planed and		
matched	0 14 0	0 18 0
1½ in. by 7 in. yellow, planed and		
matched	0 16 0	0 1 0
1 in. by 7 in. white, planed and		
shot	0 12 0	0 14 6
1 in. by 7 in. white, planed and		
matched	0 12 6	0 15 0
1½ in. by 7 in. white, planed and		
matched	0 15 0	0 16 6
and beaded or V-jointed brds.		
1 in. by 7 in.	0 11 0	0 13 6
1 in. by 7 in. white ..	0 14 0	0 18 0
1 in. by 7 in.	0 10 0	0 11 6
1 in. by 7 in.	0 12 9	0 15 0
6 in. at 6d. to 8d. per square less than 7 in.		

JOISTS, GIRDERS, &c.		
	In London, or delivered	
Rollad Steel Joists, ordinary	per ton.	£ s. d.
sections	7 5 0	7 15 0
Compound Girders, ordinary		
sections	9 10 0	10 10 0
Steel Compound Stanchions		
Angles, Tees, and Channels, ordi-		
nary sections	9 5 0	10 5 0
Fitch Planks	9 5 0	10 5 0
Cast Iron Columns and Stanchions		
including ordinary patterns ..	8 0 0	9 0 0

METALS.		
	Per ton, in London.	£ s. d.
Iron—	£ s. d.	£ s. d.
Common Bars	8 11 0	9 0 0
Staffordshire Crown Bars, good		
merchant quality	9 0 0	9 10 0
Staffordshire "Marked Bars" ..	11 0 0	"
Mild Steel Bars	9 5 0	9 10 0
Hoop Iron, best price	9 10 0	9 15 0
Galvanised	17 10 0	"
(And upwards, according to size and gauge.)		
Sheet Iron Black—		
Ordinary sizes to 20 g.	10 0 0	"
" " 24 g.	11 0 0	"
" " 28 g.	12 10 0	"
Sheet Iron, Galvanised, flat, ordinary quality—		
Ordinary sizes, 8 ft. by 2 ft. to		
3 ft. to 20 g.	14 10 0	"
Ordinary sizes to 22 g. and 24 g.	15 0 0	"
Sheet Iron, Galvanised, flat, best quality—		
Ordinary sizes to 20 g.	17 10 0	"
" " 22 g. and 24 g.	18 0 0	"
Galvanised Corrugated Sheets—		
Ordinary sizes 6 ft. to 8 ft. 20 g.	14 10 0	"
" " 22 g. and 24 g.	14 15 0	"
Best Soft Steel Sheets, 6 ft. by 2 ft.		
to 3 ft. by 20 g. and thicker ..	12 0 0	"
Best Soft Steel Sheets, 22 g. & 24 g.		
10 ft. by 10 ft.	15 0 0	"
Cut Nails, 3 in. to 6 in.	10 0 0	10 10 0
(Under 3 in., usual trade extras.)		

LEAD, &c.		
	Per ton, in London.	£ s. d.
LEAD—Sheet, English, 3lb. and up.	22 0 0	"
Pipe in coils	22 10 0	"
Soil pipe	23 0 0	"
Copper pipe	23 0 0	"
ZINC—Sheet—		
Vielleu Montagne	34 0 0	"
Silesian	33 15 0	"
COPPER—		
Strong Sheet	per lb.	0 1 4
Thin	"	0 1 5
Copper nails	"	0 1 4
BRASS—		
Strong Sheet	"	0 1 2
Thin	"	0 1 3
Tin—English Ingots	"	0 1 11
SOLDER—Plumbers'	"	0 0 9
Timmer's	"	0 0 11
Blowpipe	"	0 1 1

ENGLISH SHEET GLASS IN CRATES OF STOCK SIZES.		
15 oz. thirds	24d.	per ft. delivered.
" fourths	13d.	"
21 oz. thirds	24d.	"
" fourths	13d.	"
26 oz. thirds	24d.	"
" fourths	13d.	"
32 oz. thirds	24d.	"
" fourths	13d.	"
Plated Sheet, 15 oz.	34d.	"
" 21 oz.	44d.	"

ENGLISH ROLLED PLATE IN CRATES OF STOCK SIZES.		
Hartley's	24d.	per ft. delivered.
"	34d.	"
"	44d.	"
Figured and Oxford Rolled		
" Occasey" Glass, white ..	44d.	"
" " tinted ..	54d.	"

OILS, &c.		
	per gallon	£ s. d.
Raw Linseed Oil in pipes	0 1 10	"
" " in barrels	0 1 11	"
" " in drums	0 1 1	"
Bolled	0 2 1	"
" in pipes	0 2 3	"
" in barrels	0 2 4	"
" in drums	0 2 3	"
Turpentine in barrels	0 4 2	"
Genuine Ground English White Lead	per ton	25 0 0
Red Lead, Dry	24 0 0	"
Best Linseed Oil Putty	per cwt.	0 7 0
Stockholm Tar	per barrel	1 13 0

VARNISHES, &c.	
	Per gallon.
£ s. d.	
Fine Pale Oak Varnish	0 0 0
Fine Copal Oak	0 10 0
Superfine Pale Elastic Oak ..	0 12 6
Fine Extra Hard Church Oak ..	0 10 0
Superfine Hard-drying Oak, for seats of	
Churches	0 14 0
Fine Elastic Carriage	0 12 6
Superfine Pale Elastic Carriage ..	0 16 0
Fine Pale Maple	0 16 0
Fine Pale Durable Copal	0 18 0
Extra Pale French Oil	1 1 0
Eggshell Flatting Varnish	0 18 0
White Copal Enamel	1 4 0
Extra Pale Paper	0 12 0
Best Japan Gold Size	0 10 6
Best Black Japan	0 9 0
Oak and Mahogany Stain	0 8 8
Brunswick Black	0 16 0
Berlin Black	0 10 0
Knottling	0 10 0
French and Brush Polish	0 10 0

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 Remittances (payable to J. MORGAN) should be addressed to The Publisher of "THE BUILDER," 4, Catherine-street, W.C.
 SUBSCRIBERS IN LONDON and the SUBURBS, by preparing at the Publishing Office 19s. per annum (52 numbers) or 4s. 9d. per quarter (13 numbers), can ensure receiving "The Builder" by Friday Morning's Post.

TENDERS.
 Communications for insertion under this heading should be addressed to "The Editor," and must reach us not later than 10 a.m. on Thursday. [N.B.—We cannot publish tenders unless authenticated either by the architect or the building-owner; and we cannot publish announcements of tenders accepted unless the amount of the tender is stated, nor any list in which the lowest tender is under 100*l.*, unless in some exceptional cases and for special reasons.]
 * Denotes accepted. † Denotes provisionally accepted.

CHESTER.—For erecting enclosures and stands, etc., on new ground, for Chester Football Club. Messrs. Douglas & Minshall, architects, 6, Abbey-square, Chester:—
 J. Mayers & Son £900 W. Vernon & Son,
 W. Browne 949 Chester)..... £908
 [Accepted subject to modifications.]

CLETHORPES.—For erecting an elementary school in Ellistown-street, for Lindsey County Council Education Committee. Messrs. Scorer & Gamble, architects, Bank-street-chambers, Lincoln:—
 Spencer & P. McGinnis £10,681 12 2
 Santo & Co. £11,750 0 0 Gill & Son .. 10,067 0 0
 Sprakes & Sons .. 9,987 10 0
 Macpherson .. 11,115 10 0 Elmes .. 9,881 3 0
 R. Rhodes .. 10,997 0 0 Wilkinson & Parker & Son 10,835 0 0 Houghton
 Mawer Bros. 10,488 10 0 F. S. Scar
 W. Wilson .. 10,490 0 0 borough .. 7,768 9 6
 Hawtins & J. Guttridge .. 4,450 0 0
 Goodhand 10,315 0 0 G. Wright .. 2,290 0 0
 W. Gilbert .. 10,205 0 0 Moss & Sons
 J. E. Thompson .. 10,200 0 0 borough .. 9,275 0 0
 Holmes & Richardson 10,200 0 0

CORK.—For teacher's residence, Sunday's Well, Cork. Messrs. W. H. Hill & Son, architects, Cork:—
 F. Dolan, Queenstown? .. £375

CORK.—For building two houses at Strawberry-hill, Sunday's Well, for Mr. J. F. Keiller. Messrs. W. H. Hill & Son, architects, 28, South Mall, Cork:—
 J. Delaney & Co. Cork? .. £960

DARTFORD.—For dry-docking, painting internally and externally, and carrying out other works to the pontoon at Long Reach Hospital, Dartford, Kent, in accordance with specifications prepared by Mr. W. T. Hatch, M.Inst.C.E., M.I.Mech.E., Engineer-in-Chief, for the Metropolitan Asylums Board:—
 Lonsby & Salmon .. £1,230 W. C. Reeder & Co.,
 1, Railway-place,
 Fenchurch-street,
 Ltd. 620 E.C. £297

EAST SHEEN.—For constructing sewers and making up Ormonde and Carlton-roads. Mr. William H. Burt, surveyor, 14, Southampton-street, Strand:—
 W. Neave & Sons .. £1,615 J. Mowlem & Co., Ltd. £1,540
 C. Killinback & Co. 1,575 G. Wimpey & Co.* 1,497
 S. Kavanagh & Co. 1,549 (M. Thacker & Co., too late.)

FRIERN BARNET.—For new Council schools for the Middlesex County Council. Mr. H. G. Crothall, Architect to the Education Committee:—
 F. G. Minter .. £5,165 Nicholls & Son £1,678
 A. Porter .. 4,968 Mattock & Parsons .. 4,414
 W. Johnson & Co., 4,923 Fairhead & Son .. 4,621
 Ltd. 4,922 W. Lawrence & Son .. 4,572
 Mattock Bros. 4,818 Treasure & Son .. 4,400
 Gough & Co. 4,818 Knight & Son ..
 J. Stewart .. 4,788 Tottenham? .. 1,364
 W. J. Kershaw .. 4,757
 * Recommended for acceptance.

HADLEY WOOD.—For a residence to be erected on the Beech-hill Park Estate, Hadley Wood, for Dr. F. Pershouse. Mr. A. E. Kingwell, architect, London. Quantities by Mr. H. F. Williams:
 Spencer, Santos .. £2,860 0 0 8 3 1 1 1
 Parnell & Son .. 2,677 0 0 Washays .. £2,527 10
 Ringerlee & Son .. 2,667 0 0 Soole & Son .. 2,500 0
 J. Peattie .. 2,660 0 0 W. J. Richardson .. 2,490 0
 Foster & Dicksee .. 2,660 0 0 C. Gray Hill .. 2,470 0
 F. Newton .. 2,660 0 0 S. Dunn .. 2,337 0
 Leslie & Co. 2,677 0 0 Allan Fairhead & Son, Edele? .. 2,217 0

GILLABEY (Ireland).—For building two houses, Messrs. W. H. Bill & Son, architects, 28, South Mall, Cork.

W. J. O. Mahony, Magazine-road, Cork. £1,125

HAREFIELD.—For new Council schools and cookery centre, for the Middlesex County Council, Mr. H. G. Crothall, Architect to the Education Committee.

Bill Bros.	£5,992	C. F. Keadley	£4,877
Tribe & Co., Ltd.	5,627	Wisdom Bros.	4,875
Mattock Bros.	5,600	W. J. Dickens	4,865
J. Appleby & Son	5,577	W. Johnson & Co.,	
Spiers & Son	5,567	Ltd.	4,725
Leslie & Co., Ltd.	5,411	J. Barker & Co.,	
J. Dorey & Co., Ltd.	5,160	Ltd.	4,717
A. G. Wilson	5,007	Mattock & Parsons	4,681
G. R. Brown	4,990	Fassnidge & Son ..	4,606
Godson & Son	4,936	Knight & Son ..	
W. J. Page	4,976	Tottenham	4,280

† Recommended for acceptance.

HARMONDSWORTH.—For new Council schools, for the Middlesex County Council, Mr. H. G. Crothall, Architect to the Education Committee.

Leslie & Co., Ltd.	£4,258	W. Lacey	£2,554
F. G. Winter	3,316	J. Dorey & Co., Ltd.	3,810
Mattock & Parsons	3,250	W. Johnson & Co.,	3,416
J. Batchelor	3,125	Fassnidge & Son ..	2,743
Wisdom Bros.	2,965	A. & B. Hanson	2,730
C. F. Keadley	2,910	Ward & Son ..	
W. W. Belch	2,895	Usbridge	2,680
W. J. Renshaw	2,857		

† Recommended for acceptance.

ILFORD.—For making-up Glencoe-avenue, Oxford-road, Frances-avenue, Francis-road, Elizabeth-road, and parts of Park-road and Eton-road, for Ilford Urban District Council, Mr. H. Shaw, A.M.I.C.E., Surveyor to the Council, Town Hall, Ilford.

Parsons & Parsons, Ilford Wharf. £1,690 13 7

KILKEEL (Co. Down).—For erecting four dwelling-houses, for Mr. H. O'Neill, Mr. E. C. Page, architect, Kilkeel.

McAulran	£1,100 0 0	Lightbody	£923 0 0
O'Hare	1,015 18 4	Bingham & Shields ..	
Moore & Hamilton ..	935 0 0	Kilkeel	837 5 3

ILANARON.—For water supply works, for the parish of Ilanarun with, Llangrove, for Ross Rural District Council, Mr. H. T. Blake, Water Engineer, Ross.

Pinder & Son £1,293 12 2	Tooth Bros. & Pem-
Blake Bros.	859 10 0
	bridge, Ross.
	£780 0

LONDON.—For two detached houses, Thurlough-hill, S.W., Mr. H. Bignold, architect, 242, Lavender-hill, S.W., and Lowestoft.

Harbour	£3,350	Tucker	£2,169
Frost	2,280	Limpus & Son	2,050
J. Nels & Co.	2,216		

LONDON.—For the demolition of the keeper's lodge and the erection of a new one at Wormwood Scrubs, in connection with the widening of Scrubs-lane, for the London County Council.

J. J. Richards & Son	£725 0	Martin, Wells, & Co., Ltd.	£405 10
E. J. Clayton	690 0	J. Christie	388 5
W. & T. Bain	491 10	Albott & Charlton	354 10
K. & G. Foster	194 0	J. Barker & Co.,	
Colwell & Edgar	180 0	Ltd., High-street,	
R. Richardson	143 10	Kensington, W.	382 0

LONDON.—For erecting a gymnasium in connection with the Wood-street School, Woolwich, for the London County Council.

W. & B. H.	£1,044 2 5	J. Smith & Sons, Ltd.	£705 0 0
Stevens & Sons	823 0 0	Kirk & Radcliff ..	699 0 0
W. Harris	812 0 0	Thomas & Edges ..	683 0 0
G. E. Everitt	773 11 0	T. D. Leng	675 0 0
H. L. Holloway	759 0 0	J. & C. Bowyer,	
E. F. Bulled & Co.	746 3 2	Weston-street	
		Upper Nor-	
		wood	659 0 0

[The estimate of the architect (Education) comparable with the tenders is £768.]

NORTHOLT.—For new Council schools, for the Middlesex County Council, Mr. H. G. Crothall, Architect to the Education Committee.

M. Dymock	£2,697	W. J. Renshaw	£2,077
Tribe & Co., Ltd.	2,427	Godson & B.	2,076
J. Batchelor	2,285	Dorey & Co., Ltd.	2,074
W. J. Dickens	2,233	Wisdom Bros.	2,050
W. Brown	2,147	Fassnidge & Son ..	2,036
H. Haynes	2,099	A. & B. Hanson ..	1,997
C. F. Keadley	2,007	Southall	

† Recommended for acceptance.

NEATH. For erecting a congregational chapel at Skewen, Messrs. Lloyd & Marlyn, architects, Dynevor Post Office, Skewen.

D. Davies & Sons. £3,300 D. Ogley, Skewen, Price Bros. 2,861 Neath £2,446

* Accepted subject to modifications.

OSSETT.—For erecting a new Wesleyan church, Messrs. Garside & Pennington, architects, Pontefract and Castleford.

Brick and Stonework: J. Pickersgill & Sons, Ossett ..	£975 0 0
Joiners: S. Foster & Co., Keighley ..	623 14 0
Plumber and Glazier: J. H. Wilson, Outwood, Wakefield ..	100 0 0
Painter: H. Sanderson, Ossett ..	51 0 0
Sider: T. Brer & Son, Dewsbury ..	109 8 0
Painter: W. Carver, Wakefield ..	42 14 4

PONTEFRAC.—For alterations to property to convert it into three shops, Corn Market, Pontefract, for Mr. H. Hague, Messrs. Garside & Pennington, architects, Pontefract.

Alterations.

H. Gundry	£433 7 6	Walker & Ward, Pontefract ..	£411 0 5
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New Shop Fronts.

A. Reynolds & Co. £273 0 0	G. Blakey, Wake-
Hurst & Sons	263 17 0
S. Spink	248 0 0

field.

REDDITCH. For the erection of an engine-house, for the Royal Enfield Cycle Co., Ltd., at their new works, Hewell-road, Redditch, Mr. Bernard Perrins, C.E., architect.

F. Newbould	£1,149 0 0	C. G. Huins & Sons	£794 5 7
G. Huins & Son	929 15 0		

[All of Redditch.]

SHOEBURYNES. For making up of Trafalgar-road and West-road (Victoria Estate portion), for the Urban District Council, Mr. Harold Harris, surveyor, Clarence-chambers, Southend-on-Sea.

A. J. Harris, Shoeburyness ..	£364 2 5	Trafalgar-road, Southend-on-Sea ..	£193 8 9
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WESTON-SUPER-MARE.—For the erection of a bungalow at Uphill, Weston-super-Mare, for Mr. J. M. Newton, Messrs. T. Scammell, Son, & Perkins, architects, 10, John-street, Bristol.

J. Perkins & Son, Ltd. £855	A. J. Beaven
Stephens & Bastow ..	678
J. Hawkins & Son	605
C. Addicot	600
R. Ford & Sons	570

Shoeburyness.

WORTHING.—For detached residence at Heene, Worthing, Mr. T. R. Hyde, architect, Crescent-road, Worthing. Quantities by Mr. A. H. Tucker, 26, Chapel road, Worthing.

Sussex & Son ..	£2,966 0 0	J. Blaker & Son	£2,863 18 3
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NOVEMBER 10, 1906.

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Clifton Maubank }	Messrs. Wimperis & Best, Architects.
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Bangour Village Lunatic Asylum: Edinburgh District.....	Mr. Hippolyte J. Blanc, R.S.A., Architect.

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The Electricity Scheme of the London County Council.



T will be remembered that when the Select Committee of the House of Commons rejected the Electric Supply Bill of the London County Council last July, they stated

that they were unanimously of opinion that "the best means of providing for the supply of electrical energy in bulk, and for power and motive purposes, is by one large and inclusive scheme extending over not only the entire county of London, but also to adjoining boroughs and districts." They recommended that the County Council should be the Central Authority. In view also of the pressing importance of the provision of cheap electric power for London, they urged the Council to come to a decision quickly so that the Bill might be presented early in the Session of 1907. In accordance with this request the Highways Committee have outlined a scheme of electricity supply which was discussed at the meeting of the London County Council on Tuesday. It was decided to ask for Parliamentary powers to carry it out.

The project proves to be one which, if completed, will have far-reaching influences, and will specially affect the welfare of the citizens of London. Unfortunately many papers which have either an excessive political bias, or decline to recognise the rights of municipalities to act for the

common welfare, have attempted to make the question one of prejudice. We hope, however, that this scheme, like the corresponding schemes for the lighting of Paris, will be discussed on its merits, and not regarded merely as a counter in Party politics. In a project of this magnitude there are bound to be many difficulties, and destructive criticism is easy; but the evidence given before the Select Committee in July proves that on certain fundamental points experts are agreed, and so a working scheme for the supply of cheap electricity for lighting, heating, and more especially for power purposes, is by no means Utopian. So far as we can judge, if the project be carried out on the lines suggested in this report, then, by 1910, many householders, manufacturers, printers, shopkeepers, and even workmen—for it is proposed to hire out small motors to turn lathes, sewing machines, etc., will benefit largely. The financial risks involved are of the slightest, as the results of the working of similar schemes in this country and abroad amply prove. The following is a brief résumé of the proposals.

The area of supply in London is 117 square miles, and it is proposed to supply no less than 334 square miles of the surrounding districts. In order that the supply of electricity for power and motive purposes be as cheap as possible, it is necessary to have only one or two large power-stations, as otherwise the duplication of plant, buildings, staff, etc., will seriously increase the cost to the consumer. Hence the generating-stations which already exist in London and burn

thousands of tons of coal every day will ultimately have to be converted into distributing-stations. This itself will be no slight gain, as it will appreciably clear the atmosphere and lighten the heavy traffic in the roads and rails round London. For this reason powers are sought to enable the Council at a reasonably early date to purchase the existing undertakings on equitable terms. In the meantime the local authorities in the county are to be restrained from further expenditure on capital account without the consent of the Council. The magnitude of the undertakings of local authorities may be estimated from the fact that up to March 31 last they had expended no less than 5,450,000*l.* on them. There would be no immediate necessity, however, of raising capital for acquiring these stations, as most of the money has been advanced on loan by the Council.

The difficulty arises that it is proposed to treat all the undertakings in the same manner, irrespective of the financial results obtained, and this seems to us to be a very real difficulty. It has to be remembered, however, that, as with gas and water supply, the interests of the community as a whole have to be considered. If we assume that a cheap supply of electricity is a paramount necessity, and those who are familiar with the industrial revolution affected in certain districts of France by cheap power will readily grant this assumption, it ought to be possible to arrange a compromise.

With respect to the private supply companies in the County of London the local authorities have already powers

which enable them at certain dates to purchase them compulsorily. Hence by 1931 at the latest all the electrical undertakings in this area can be purchased. At the end of last year the capital expenditure of these companies was nearly 13,000,000*l.* It is not considered necessary to seek powers to purchase the systems of the supply companies outside the county area, but it is highly desirable to purchase them by agreement. Everyone will agree to the proposal of the Council to obtain powers to take over compulsorily from the present authorised distributors the provisional orders for those districts in their area where no supply is obtainable.

The suggestion is made that the maximum charges for energy should be governed by the amount and regularity of the demand of the consumer. It is only equitable that the consumer who merely increases the peak of the load on the power-station should have to pay more than the consumer who takes a steady supply, whether large or small, and so levels up the "load factor" on the value of which depends the rate at which the power must be charged. This method of charging, originally proposed by the late Professor John Hopkinson, has been introduced successfully at Brighton and other towns. The suggestion is also made that if a large consumer cannot obtain a supply from the local undertakers at a reasonable rate and within a reasonable time, he be empowered to demand a supply direct from the Central Authority. The necessity of this provision was proved by the working of the Welsh power schemes.

Two alternative sites are suggested for the huge power-station—one at Erith, and the other at Barking—and both seem admirably adapted for the purpose. As a greatly increased demand is anticipated in consequence of the much cheaper price of supply, the sites are sufficiently ample to provide for very large extensions. The County Council have already numerous existing tramway sub-stations which can be utilised as centres of distribution. This appreciably reduces the proposed capital expenditure which would have been otherwise necessary.

The cost of the first section of the station, including the site, is estimated at 1,600,000*l.*, and the cost of the mains, distributing systems, etc., will be 2,650,000*l.* The purchase of the motors, radiators, and other electric appliances which can be hired by the consumer is included under this item. The scheme provides that the first two sections of the supply will be working by 1910, and the energy will be supplied at a low rate, seeing that in all probability the demand will be very great.

The Finance Committee of the Council criticised last year's report adversely. This year they make hardly any criticism. They remind the Council that large sums will be required very shortly for the tramway extensions, and point out that as the present scheme contemplates distributing the energy as well as generating it "in bulk," the financial scope is much wider. They admit that the probable rapid development is the best justification for the establishment of the undertaking.

We think that the electrical advisers

of the Council have developed a good *prima facie* scheme; the broad lines are laid down, and questions of detail can be considered afterwards. If any person or company has an alternative scheme it will be duly considered by the Parliamentary Committee next Session, but we hope that there will be no further delay. The scheme proposed is of a very far-reaching nature, and it will ameliorate the conditions of life to many thousands of workers. It deserves, therefore, the careful consideration of all citizens.

WATER SUPPLY.

NO branch of engineering is of greater importance to the community than that coming within the province of the waterworks engineer, and, as shown in the instructive presidential address delivered by Mr. Bryan to the Junior Institution of Engineers on Friday last week, the problems connected with the subject of water supply in the present day are not essentially different from those existing in ancient times.

Except in the case of cities and towns able to draw upon rivers and streams, the earliest method of obtaining water was by digging wells, many of which are still in existence. One remarkable example cited by Mr. Bryan is "Joseph's Well," at Cairo, excavated in solid rock to the depth of 297 ft., and from which water was formerly raised in two lifts by buckets on endless chains, those for the lower level being operated by mules in a chamber to which access was given by a spiral pathway. Remains of numerous important wells of antiquate exist throughout the East, and it is interesting to recall the fact that the ancient Chinese, who were expert well-borers, frequently reached depths of 1,500 ft. and upwards, by practically the same methods that are in use at the present time.

One has only to look at the map of any country to realise the fact that in deciding upon the position of cities and towns an ample water supply has always been a primary consideration. Rivers were naturally indicated as the most convenient and economical sources of supply, sometimes supplemented by wells. Afterwards it became necessary to make arrangements to bring water from more distant sources, and for storing and distributing it very much as is done in London to-day. For instance, for nearly five centuries after its foundation Rome depended upon the waters of the Tiber and upon those derived from wells and springs. But these sources becoming much polluted, purer supplies were sought elsewhere, and aqueducts were constructed to bring them into the city. The ruins of these aqueducts existing to this day testify to the magnificent workmanship and skill of ancient Roman engineers. To show the magnitude of the Roman water supply system it may be mentioned that, according to the best modern authorities, when all the aqueducts were in operation some seventy million gallons were distributed daily.

Those who are interested in the aqueducts of ancient Rome will find full particulars in the works of Frontinus, from which various quotations were made by Mr. Bryan. The nine great aqueducts

which, in the year 97 A.D., conveyed water to Rome had been built at various times, and some of the older ones were constantly failing to deliver their due supply, owing in some measure to leakage, but still more to the fraudulent diversion of water.

The first permanent water commissioner in Rome was Marcus Agrippa, who determined the amount of water supply to the public buildings and basins and to private consumers respectively. It is recorded by Agrippa that the Emperor took great interest in the water question both as regarded the quantity and quality of the water supplied. Investigation about that time showed that there was much unnecessary waste due to the carelessness of the watermen, and that some of the purest waters were used for "baths, fulling mills, and other vile appointments." Consequently, it was decided to separate the various supplies according to their purity—water from the Marcian aqueduct being used wholly for drinking purposes, and that from the other aqueducts for watering gardens and the ordinary uses of the city. Deputy-commissioners appointed by the commissioner were instructed to employ levellers in the basins, to stamp the delivery tanks conforming with the supplies granted to private consumers, and to settle the sizes of the outlets and lead pipes attached to them. The deputy-commissioner detected many cases where the outlets on delivery tanks were of more than the authorised diameter, and some that had not even been stamped. Thus it is clear that the stamping and testing of fittings was a common practice in ancient times, and is not quite so modern an idea as some water officials believe.

The deputy-commissioners found also that in some cases pipes of excessive diameter had been attached to the outlets, with the object of obtaining more water than the quantity granted, and in others, where a water-rate had been transferred to a new owner, the watermen fixed a new outlet, and from the old one—left in the tank—they drew water and sold it for their own profit. The commissioner discovered that the watermen were in the habit of attaching unauthorised supply pipes, and, as the result of the measures adopted by him, very considerable savings were effected. Rates levied somewhat similarly to those obtaining in modern practice constituted the source of income for the maintenance of the water undertaking. Severe fines were inflicted on persons who transgressed the general rules for the preservation and due administration of the water system, and especially for causing pollution. From these and other details quoted by Mr. Bryan it is very clear that most of the difficulties and responsibilities connected with the management of waterworks systems in the present day were anticipated by the water authorities of ancient Rome.

Another interesting point is that the Roman laws connected with the acquisition of lands for aqueducts, the settlement of the amount of compensation by an arbitrator, and regulations for protecting waters from pollution and penalties for unlawfully taking water, were practically the same as those

prevailing to-day. In fact, many provisions similar to those in our Land Clauses and Land Waterworks Acts were in operation in ancient Rome, and have remained in force in Italy to the present day.

Having referred briefly to the development of waterworks systems in Great Britain, the Continent, and in America, Mr. Bryan gave some statistics relative to the present London water supply, with which he has been so intimately connected for many years past.

The area now under the control of the Metropolitan Water Board is 537 square miles, with a population of nearly 7 millions. The average daily supply for the year ending March 31 last was 218 million gallons, or 32.3 gallons per head per day for all purposes. As "millions of gallons" convey no definite impression to the average mind it may be pointed out that the water supplied in the month of July, 1904, would have filled a canal 40 ft. wide by 3 ft. deep, by 2,020 miles long. The average weight supplied was equal to 3½ cwt. per head per day, and the height to which the water was raised about 200 ft. The total revenue of the Water Board per ton is only about 1½d., and, considering that this rate includes transport for many miles in addition to impounding, filtration, and pumping, it will be realised how very cheap water really is.

For the storage of water to be delivered to London, reservoirs with the total capacity of 7,415 million gallons, and covering 1,309 acres, are in existence, in addition to seventy-eight covered reservoirs with the collective capacity of 78 million gallons, and the new covered reservoir at Honor Oak—with the capacity of 58 million gallons—the largest work of its kind hitherto built.

We referred a few weeks ago to the excellent quality of the Metropolitan water supply, a subject on which Mr. Bryan naturally entertained the same opinion, and in corroboration alluded to the fact that for many years past London has been the most healthy among the great cities of the world.

NOTES.

THE Trades Disputes Bill. The Trades Disputes Bill in the Report stage has been under the consideration of the House during the past week, and when the debate was concluded at the close of the week Clause 2 had been agreed to. This clause evoked much discussion, as it is that which relates to peaceful picketing. All the amendments moved by the Opposition were rejected with one small exception. The chief discussion was raised by the Government proposal to omit the words "peaceably and in a reasonable manner," as qualifying the attendance to persuade, etc.; but if the clause is to stand at all we cannot see that the alteration now effected at the instance of the Government renders it more objectionable. It stands thus:

"It shall be lawful for one or more persons acting on their own behalf or on behalf of a trade union or firm in contemplation or furtherance of a trade dispute to attend at or near a house or place where a person resides, or works, or carries on business, or happens to be if they so attend merely for the purpose of peacefully obtaining or communicating information, or of peacefully persuading any person to work or abstain from working."

The insertion of the word "peacefully" in connexion with the purpose was a distinct gain, although the elimination of "peaceably" before the attendance is a loss. As to the insertion of the word "firm," this has been improperly construed in some quarters as giving firms immunity from pecuniary responsibility for tortious acts; but so far it does nothing of the sort, it merely enables their representatives to "peacefully persuade" in the same manner as the unions. Although we do not consider that the amendments to this clause have made it more objectionable, we have already expressed our opinion on this measure as a whole as one entirely opposed to public policy. The intention of a Government should be to foster good relations between various classes in the State and encourage arbitration and conciliation, whereas the attitude of the present Government is like that of a person who, seeing two men fighting with their fists, promptly presents them with lethal weapons.

Housing Reform. A DEPUTATION from the National Housing Reform Council on Tuesday last to the President of the Local Government Board and the Prime Minister drew two interesting speeches from them. The gist of Mr. Burns's speech was that legislation cannot make local authorities perform their duties energetically, and that proper sanitary supervision and similar business must be made effective by individual pressure on local bodies. As we have more than once said in these columns, it is not so much further legislation which is required to produce better houses as good intentions carried out actively by those who already possess the necessary power. The Prime Minister's speech was much on the same lines, and was marked by the common-sense which has given the Prime Minister so considerable a place in the House of Commons. Thus he pitched upon and emphasised the point that it is absurd to make factories healthy and at the same time to neglect the home. It is clear from the two replies that, while some legislation will be carried out, the Government consider that the necessity of the time is the efficient performance of their duties by local authorities rather than the giving of more power to the central Government.

Engineering and Aesthetics. In his opening address on Tuesday as President of the Institution of Civil Engineers, Sir Alexander Kennedy gave expression to some opinions as to the vexed question of the opposition (as it often seems) of the artist and the engineer, which we were very glad to hear, especially as coming from such a source. He pointed out that as soon as engineering works were treated on their own merits and not as if they were mistaken imitations of other things, it would be found that they could possess even artistic as well as other merits. This is what we have been preaching for years, and now that the representative body of engineers have heard it from their own President, they will perhaps believe it, and give up assailing us with their bad and ill-designed ornament foisted on to engineering works with the vain idea of giving them "archi-

tectural interest." We quite agree with Sir Alexander that a ship like the *Dreadnought* is a grand object (though we cannot go so far as to prefer it to the old three-decker under sail); we will add that a locomotive is a grand production, and that it is even worth while for the poet or artist to stand on the platform at King's Cross and see one of the splendid "Atlantic type" locomotives sail majestically in at the head of its train. No attempt to "ornament" that engine would be likely to add to its effect. There is much truth in what the President also said as to the relation of the engineer to Nature, especially in connexion with water-power utilisation and mountain railways. "No apology was needed for undertakings which gave employment to hundreds of men in places where hitherto no one could maintain himself, or for substituting industrial villages for ruined huts," but we are glad to find him stigmatising the "mountain railways" of Switzerland and of Snowdon as merely a product of tourist madness, wholly unnecessary, serving no public benefit whatever, and in many cases likely to cause irreparable damage to natural beauty.

Bridge Design. A PAPER with this title cannot be expected to deal with more than an infinitesimal part of the comprehensive subject indicated, a fact that was clearly recognised in the paper read last week by Mr. P. J. Waldram before the Civil and Mechanical Engineers' Society. The contribution in question relates particularly to the design of steel girder bridges of moderate span, and includes an account of some unusual, if not altogether novel, methods of computation. Among these, we may mention an ingenious method of ascertaining the length of plates in girder flanges by finding points in a parabola. While favouring graphics for especially complicated cases, and for the purposes of checking, the author prefers mathematical calculations by the slide rule for general use. There is something to be said for this view, for, unless drawn to almost unwieldy scale, graphical diagrams are not very accurate, and on the other hand the results obtained by mathematics lend themselves readily to tabulation and comparison, thus rendering errors more easy of detection. Moreover, the sheets can be typed with a sufficient number of duplicates to enable each draughtsman working on the plans to be supplied with a facsimile copy. In cases where time is an important factor this is a great convenience. The main points touched upon by the author are collected under the headings of span, load, floor and girder design, estimate of weight, and methods of erection, and the paper is concluded by two series of calculations for plate girder bridges. The convenience of these examples would be greatly enhanced if they were accompanied by drawings showing the general design and the positions of the various members in the two bridges:

A Warning to Concrete Users.

VALUABLE as concrete undoubtedly is when properly used, it is a dangerous material in incompetent hands. The

average builder's man has got so into the way of considering concrete to be little better than a filling material that may be mixed blindfold and shovelled into a hole or into moulds as if it were mere earth, that he is certainly not fit to be trusted with its preparation for and application to important parts of buildings and especially in the form of concrete-steel. The report, published on another page, of some tests conducted by Mr. A. T. Walmisley, shows clearly how necessary it is that concrete employed in reinforced floor construction should be of correct proportions, carefully mixed, and applied under conditions favourable to hardening at the proper time. In the case of the floor to which we refer the mixture was not of the specified proportions, the aggregate was not properly graded, the finished product was full of voids, and although ample time was allowed for hardening, the concrete had not fully set when the tests were made. It is well known that if concrete is allowed to lie about until setting has commenced, and is then worked, its strength is very seriously affected, and the process of hardening is considerably delayed. Something of the kind probably occurred in connexion with the concrete for the floor tested by Mr. Walmisley. Civil engineers have bought their experience of concrete at a high price, and it is our hope that architects may not have to do the same in connexion with the many new applications of the material to building construction.

THE case of Greenwood v. Turner concerning estate agents' and auctioneers' rights to commission is interesting. The defendant had instructed the plaintiff to sell certain houses for her by auction, but at the auction the reserve was not bid, and no sale was effected. The defendant had instructed the plaintiff to communicate to her any offers that might be made for sale by private treaty. Subsequently, a Mr. Aldridge, having seen the plaintiff's name on the bill advertising the auction, offered over the telephone to the plaintiff a sum for the property which exceeded the price at which it had been reserved at the auction, but, owing to some misunderstanding over the telephone, the plaintiff had thought it a less figure and not accepted it. Mr. Aldridge then entered into negotiations with the solicitors of the defendant, whose names he had seen on the same bill, and a sale was effected slightly below the reserve price. The plaintiff claimed commission on the sale. The defendant had paid the plaintiff a sum agreed for out-of-pocket expenses, and in summing-up to the jury the learned judge intimated that the auctioneer's bill displayed on the premises would be included in those expenses, and left it to the jury to say whether the plaintiff had brought about the actual sale. The jury found for the defendant.

THE completion of the new tubular railway between Brompton, Piccadilly, and Finsbury Park, points to the early opening of a useful underground route placing residents in the west of London in direct communication with the Great Northern Railway and intermediate places. Connections with previously-existing lines

will afford equal facilities for inhabitants of the eastern and southern districts, and will constitute one more link between the north and south of London. A novel feature, installed as an experiment at Holloway-road station, is a moving spiral stairway by which passengers will be conveyed to and from the surface. The innovation will undoubtedly be popular with many persons who object on constitutional grounds to the slight jerk attending the starting and stopping of lifts, and who cannot forget that, in spite of the most approved safety devices, a lift may possibly fall to the bottom of the shaft in case of breakdown. Another reason in favour of the moving stairway is that it will obviate all waiting for lifts in draughty corridors and the annoyance experienced when the lift attendant cuts things too fine, and only just arrives at the bottom in time for his passengers to lose a train.

ACCORDING to the latest information available concerning the railway bridge accident near Atlantic City it seems that it was impossible for a train travelling at a high rate of speed to avoid jumping and the risk of derailment on entering the bridge. Experts are said to have stated that upon replacement of the draw-span after the passage of a vessel the connecting rails remained 6 in. above normal level. This is probably an exaggeration, but it is substantially correct, for on inspection of the track the coroner found the ends of the bridge rails to be considerably higher than those on the land track. That the wheels of the first car actually struck the rail ends with great force is evidenced by the battered condition of the metals. In this country no drawbridge would be permitted to be used unless provided with ready means of adjusting the levels, and with the guard rails which were absent in this bridge. Some day, perhaps, the American people will awaken to the fact that more efficient control over the construction and management of railways is not only desirable but imperative.

IN his Report upon Selby Selby Abbey, Mr. J. Oldrid Scott recommends "the general restoration of the choir with new roof and groining, following in all respects the original design." If adopted this advice will certainly give us a modern reproduction of the ancient roof as it existed until last month, but it is questionable whether the policy is a good one. The timber groining was never more than a cheap substitute for the stone vaulting originally contemplated, and that was abandoned simply because insufficient funds were available at the time of building. The tushes, or projecting stones, left for the addition of flying buttresses still remain on the outer walls except where improved away, and so far as we know there is no objection, on structural grounds, to the building of counter-fores for masonry groining. Since the ready destruction of the timber contributed so largely to the damage done in the Abbey choir it would be wise to employ stone for this portion of the restoration, and thus for the first time to realise the conception of the original designer.

WE have received litho-graphed sketches, which we believe have been scattered broadcast to the press, of the existing St. Paul's Church, Great Portland-street, and the Concert-Hall which it is proposed to build on the site. We have nothing particular to object to the exterior design, but we decline to publish or to have anything further to say to it until we have the plan and section and the arrangement of the orchestra—in other words, until we know that it is to be planned and constructed with a knowledge of what is really required for a concert-hall. The exterior design of a concert-hall is a very secondary matter compared with that; but it seems to be constantly supposed by architects that any one can arrange an orchestra and auditorium without special knowledge. One result of this ignorant confidence is seen in the orchestra of the Queen's Hall, which is cleverly arranged so as to be larger than necessary for a band only, and too small for a band and chorus, so that when there are choral performances there is never space for an adequate choir. We agree that a concert-hall of smaller size is very much wanted in London; but unless it is planned with a settled idea as to what class of concerts are to be given in it, and with a knowledge of what is required for that class of concert, it will only be another failure. Concert-halls cannot be carried out as mere commercial speculations; they require musical knowledge in the planning of them.

In the main street of Lewis-ham, near the church, stands a picturesque range of buildings which constitute the almshouses founded by Abraham Colfe, the vicar. By his will he devised, 1656, certain landed estates in trust to the Leathersellers' Company for the building and endowment of the charity, as well as of two schools for sons of parents living in Lewisham and Blackheath, to the number of thirty-one boys in each school. The Charity Commissioners have framed a scheme for the continuance of the charity in the existing almshouses, and for the structural and sanitary repair of the building. The Leathersellers' Company are charged, under the scheme, with providing rather more than one-half of the amount necessary for the repairs, and for satisfying a debt which has arisen; a fund has been opened for raising the remainder, 400l., of the sum required. Colfe's bequests were augmented in favour of annual gifts of money to the almswomen by a later benefactor, one Coverley, seventy years ago; in an official return subsequently made by the Company the income of the three endowments is set down as amounting to 650l. per annum.

The seventeenth exhibition of the Society of Portrait Painters, now open at the New Gallery, contains a good many interesting portraits, illustrating a variety of style and aim in portrait painting. There are a good many portraits which may be called studies in effect, such as Mr. Melton Fisher's "Mrs. Melton Fisher" (2), M. Lerolle's half-length of "Mademoiselle Escudier" singing (6); Mr. Sargent's

brilliant and effective sketch (for it is little more) of General Leonard Wood" (8), and Mr. Moust Loudan's "Mrs. David Limond" (38), a very harmonious colour study in which, however, the face suffers a slight eclipse in order to reduce it to the scheme of colour. In opposition to these are Mr. John Collier's stately and carefully composed full-length portraits of ladies, all of them dignified and effective though a little hard and not very harmonious in colour; they form, however, a protest against the sketchy treatment of portraiture. His "Dr. John Clifford" (28) is a very spirited and vigorous portrait of a man; so also is Fantin-Latour's realistic and highly characteristic portrait (16) of an odd-looking French gentleman with his hat held behind his back. In portraits of the large and sumptuous order, M. Besnard's of "Mme. Blanche Marchesi" (99) surpasses everything else of the kind; there is a kind of *bravura* about the exuberant draperies (very harmonious in colour effect) which almost provokes a smile; but if the lady was satisfied to be depicted in this heroic fashion the spectator can hardly complain. Mr. Collier's portrait of Mr. H. Richardson (58), painted for Marlborough College, is a good example of the class of portrait which is a simple and unaffected likeness of the subject in his habit as he lived, with no straining after effect. Among the best portraits in the West Gallery is Mr. R. Jack's bright life-size portrait (20) of a charming girl, treated in a style which shows a reminiscence of Gainsborough, and in which the costume is kept subordinate. There are others which we may call costume portraits, such as Mr. Henry's of "Miss Dorothea Landau" (39), a very pretty picture nevertheless; and there is Mr. von Glehn's "Alderman Davis" (69) with a powerful contrasted effect in the robes and no compensating force in the head; it is a wardrobe picture. Mr. J. E. Blanche's portraits of men have their admirers, no doubt; they are in the ultra-modern taste which seeks not for beauty in art, and regards coarse execution and taste as a proof of artistic power. The style of M. Mancini, who shows "The Marquis del Grillo" (76) let into a mosaic confusion of accessories all on one plane, will no doubt be lauded as an example of originality of style, whereas its defect is that it is totally destitute of pictorial quality. In the same room is Señor Ramon Casas' picture of the King of Spain on a rocking-horse, called an "equestrian portrait."

WHAT a relief to come from some of these violent experiments in portraiture to the calm and distinction of the Reynolds and Gainsborough portraits in Messrs. Agnew's small and choice collection. Some are finer than others, but there is not a portrait here that has not balance of style and distinction of character. Among them Reynolds's portrait group of two children, William and George Brummell, is remarkable not only for the usual Reynolds quality of colour, but for its beautiful composition of line, which is of the most studied and subtle character. In Gainsborough's portrait group of two boys, "Henry and Edward Tomkinson," for once he has not succeeded so well as usual in harmonising the figures

with the landscape; the colours of the costumes are rather strong, and the rest of the picture hardly seems to belong to them. Franz Hals is shown at his best in the two remarkable portraits of two exceedingly unattractive people, Herr Bodolphe and Vrouw Bodolphe; the finish and character of the hands in the portrait of the man are especially remarkable. Raeburn's old lady, Mrs. Colin Mackenzie, in a kind of hood, is delightful in every sense. Romney's "Lady Monson," well known from engravings, a little overdoes the statuesque, it is too manifestly a pose, but there is certainly a grandeur about it. Among other things in the collection is a small and exceptionally beautiful landscape of Crome's, "The Return of the Flock," which in composition suggests Richard Wilson rather than Crome, though it is much richer in colour than Wilson; a landscape by Morland, "The Fern Gatherers," which shows Morlands power in the treatment of a great tree which takes up most of the canvas, and which, but for a certain crudeness of colour, is worthy of Theodore Rousseau; a remarkable and unusual example of Van Dyck, "Children of the Balbi Family," in a style quite unlike his English pictures; and Lawrence's well-known "Elizabeth Farren," in which Lawrence for once reminds us of Reynolds.

Mr. Maclean's
Gallery.

THE most important things in the annual winter exhibition at Mr. Maclean's Gallery in the Haymarket (of which the private view was held on Thursday last week) are an exceedingly fine Corot and an example, equally fine in its different way, of Mauve. The Corot (18) is called merely by the prosaic title "Gathering Sticks"; it is we suppose practically necessary to have distinguishing titles for landscapes, in order to identify them, but it seems a pity to append such a title to what is in reality a grand and poetic landscape. It shows the edge of a wood of great trees, painted in a more solid manner than is usual with Corot (it probably belongs to what may be called his middle period), and looking outward from the wood the ground falling away forms a dark ridge against the sky. Mauve's picture, "Across the Common" (22), is unusual as showing no cattle; it is a waste moor with a very fine sky over it, and quite in the painter's best manner. There are a good many things in the room that we do not care much for, but these two landscapes are alone worth a visit. Among the remainder of the contents of the gallery is Mr. Orchardson's "Jessica" (33), a picture fine both in colour and character, and which is pretty well known. Among the less important landscapes W. Steelink's "Early Morning—Distributing the Flock" (32) is a bright and well-composed landscape; and a small one by James Maris "On the Zuyder Zee" (41) has a sky in the best Maris style. Pierre Billet's large picture, a group of fishermen lying about on the beach, "Avant la Pêche" (28) is well drawn and painted, but looks rather too much as if the figures were posed for composition.

Messrs.
Wisselingh's
Gallery.

AT Messrs. Wisselingh & Co.'s gallery in Grafton-street there is an exhibition of portraits, drawings, and etchings by

Professor Legros, Mr. Strang, and Miss Dorothea Landau. Mr. Legros' form the larger proportion of the collection, and consist of studies of heads and figures, and of some of his landscapes with figures, drawn in a somewhat archaic style, representing ideal scenes, sometimes with a kind of moral *motif*; "Après le Crime," for instance (29) which however is hardly as striking as the title would lead one to expect. There is plenty to look at in these drawings however. "Vieillesse de Robert Macaire" (19) is a very significant study of the head of a man grown old in chicanery; and "Projet d'un Monument à la Memoire d'Alfred Stevens" (5) is a fine sketch for a monument embodying two figures in the style of Stevens. Mr. Strang's study for his picture of "The Sea Pool" (29), and a figure study from the life (35), are fine drawings; his curious and stiff portrait of Professor Legros, compared with the Professor's own portrait of himself (or what we take to be such) on the adjoining wall, looks rather like a caricature. Miss Landau, whose name is new to us, exhibits a variety of studies of figures and heads in various media (oil, gold point, lithograph, etc.), which show considerable versatility of talent. The most important, "L'Avvelenatrice" ("The Poisoner"), a half-length of a woman holding up a cup, is a work of some power, as far as we could judge of it in a bad light.

The Cheyne
Art Club.

THE exhibition of the Cheyne Art Club, at the Baillie Gallery, contains a good deal of interesting work, though the largest picture there, Mr. Lobley's "Westminster Abbey" (9) is a bad representation of the west front of the Abbey, and under an aspect, in regard to light and colour, which is unreal. In his other two Westminster pictures, 15 and 33, the building fares better and the effect is less scenic; but his St. Mary-le-Strand (43) is again very bad, a mere travesty of the architecture. Mr. Blaylock shows a fine freedom and sense of light and air in "An Essex Farm" (4), "Tor Bay" (10), and "Brixton Trawlers" (19). A little coast sketch, "The Shell Gatherers" (28), by Mr. Pettinger, is a fine bit of landscape suggestion; and a forest picture by the late Frank Nowill, "Wet Trees" (29), is a very clever treatment of a very difficult subject. We noticed with pleasure also Mr. Pettinger's "A Rainy Day" (56), M. Wallace's "Evening on the Tweed" (49), and his "Breezy Day in North Holland" (12), with a Millet figure and a Maris sky.

MISSION CHURCH, LADY BAY, WEST BRIDGFORD.—That portion of the parish of West Bridgford known as Lady Bay has up to the present been inadequately served in the matter of church accommodation. Up to five years ago a small iron building was the only provision made for the needs of the parish. It was then decided to erect portion of a permanent building to serve the purpose of mission church and schools, pending the erection of a permanent church. This building was designed by Mr. William R. Gleave, and the eastern portion only then erected. The completion of this work has now been undertaken, extending it westwards, giving a hall 70 ft. by 28 ft., with classroom and vestries added, and heating apparatus installed. The front to the road is carried out in red sand bricks and Laynton stone dressings, the principal features being a large circular window and buttressed belfry, surmounted by a large Greek cross. The whole has been carried out from Mr. Gleave's designs (of Calvert & Gleave) by Mr. G. T. Lovett, builder.

NOTES ON MOSAIC AND MARBLE INLAY.—VIII.

At the Church of the Nativity, Bethlehem, shining whites, such as the ground of inscriptions, are rendered with mother-of-pearl. At Pompeii a sulphur yellow holds the place of gold, but Nero encrusted his "golden house" with gilded tesserae, which gave it its name. The early tesserae are on transparent glass, as at the Baths of Caracalla, the Palatine, and an inscription of the IVth century in the catacombs of S. Agnese. At Salonika they are composed of slightly yellow glass, which appears to have been fired again after the application of the gold leaf, about 5 millimetres thick. At S. Sophia the glass is transparent. Tournetfort, in his "Voyage du Levant," Vol. I., says that the gold of the tesserae is of different colours, covered with a thin coat of glass, which only comes off in boiling water. At Aix-la-Chapelle the ground is almost always green, sometimes bottle-green or red; these cubes have often lost their covering both of glass and gold; the gold is always yellow, never green. Colourless glass was used for this purpose, according to Theophilus, but there are existing tesserae of gold applied on vitreous pastes, such as those on grey or red of the Vth century from S. Maria Maggiore, and from the Baptistery of Ravenna of the same period. The substitution of the opaque ground (generally red) was made in the XIth or XIIth century, and is still used. Silver tesserae are very rare, examples are in S. Sophia, the Cathedral at Pisa, the Cappella Palatina at Palermo, and at Ravenna in S. Apollinare Nuovo. Mother-of-pearl is used with marble at Ravenna and Parenzo, and in the coptic churches of Egypt.

At S. Luke's, Styria in Phocis, Messrs. Schulz and Barnsley found both vitreous pastes and marbles were used on a gilded background. They observed signs of alterations after the commencement of the work, odd spaces between the first rows of gilded tesserae and the final outlines of the figures occurring in some places. The average size of the cubes was $\frac{3}{8}$ in., but they were larger in outlines of draperies, and smaller in the delicate gradations of faces and hands.

At Parenzo, on the triumphal arch, the gold tesserae are set at an angle, like steps, so as to make them glitter. Sig. Boni thinks that the setting of tesserae at different angles, the mixing transparent and opaque material, etc., shows a tendency similar to that which in modern times has produced impressionism. The gold tesserae were found by Sig. Natale Tommasi to be inclined about 30 per cent. from the vertical, so as to be exactly opposite the eye of the spectator, and at right angles to the visual ray. The rows radiate in fan-shape from the figures, and surround the outline; in other places they are grouped like scales overlapping.

External mosaics in a north aspect cannot be counted on to last more than fifty years. The façade at Orvieto may be cited as proof. The decoration was done in the time of Orcagna (1358-62). In 1402 some of it required restoration, and further restorations were made in 1423, 1485, 1506, 1552, 1558, 1573, etc. The colours used are stated in a contract made in 1359 by the "Opera" with a certain Donnino, of Florence, who was to go to Venice and buy there glass for the mosaic of the façade. The colours and quantities were as follows: Fine gold, 100 lb.; blue with its shades, 50 lb.—that is, 10 lb. of each shade; "Lacca" with its shades, 50 lb., 10 lb. of each shade; "Biffa," 50 lb.; green, the same; vermilion, the same; white, 50 lb.; yellow with its shades, 50 lb.; carnation, 50 lb., 16 lb. each shade; "Verduccio," 50 lb., 10 lb. each shade; black, 50 lb., 10 lb. each shade (? dark grey); fine silver, 30 lb. The glass was to be good and well annealed, and answer well to the hammer.

M. Gerspach, in his valuable book on mosaic, gives a very complete account of the processes of production, starting with the preparation of the wall. He advises that, if it be external, it should be well roughened, and even, in certain cases, that twisted brass wires should be inserted. It must then be well wetted, and a coat of lime cement spread over the surface, and when that is dry another coat of soft plaster of the thickness of the cubes which are to be used, and these two coats should exactly fill the space which

the mosaic is to occupy. The design is then to be traced on the plaster, and in the part which is to be first executed the plaster is to be cut away and the cement moistened, then a fresh coat of fine cement is to be laid, into which the tesserae are to be set. The composition of the lime-cement varies both with period and locality. In antiquity it was made of two parts of pounded marble, and one part of travertine lime; it was also sometimes two parts of pozzolana, and two of old hydraulic lime, and they appear to have mixed gum tragacanth with it to retard the setting. He gives as a good formula:—

First Coat.		Second Coat.	
Pozzolana	104	Pozzolana	54
Pounded brick	4	Pounded brick	5
Slaked lime	24	Lime	104
Water	12	Water	3

In the first coat three-fifths of the pozzolana and lime should be in lumps of 2 to 3 millimetres, and the rest in powder; in the second they are half as fine again.

They used to make the coats of cement very thick—in the apse of S. John Lateran, a work of the XIIIth century, they are nearly 6 centimetres. The object of this was to make the surface level. We are now content with 12 millimetres for the first, and 8 millimetres for the second. It is not indispensable, however, to put two coats; if the distance of the mosaic from the core of the wall is less than 15 millimetres, it is better to put only one. The mosaics of Andrea Tañi, in the Baptistery of Florence, fell down twice in one century; the "Avicella" of Giotto required restoration in twenty years, though on a perpendicular wall, and other examples of the same kind might be cited. The cause was generally the weight of the over-thick coats of cement, the bad quality of the materials, and the negligence of the mosaicist in not sufficiently damping the first coat before applying the second; this is proved by the pieces which fall out, often carrying with them the second coat, leaving the first uninjured.

Until the commencement of the decoration of the new basilica of S. Peter's, at Rome, with mosaic, lime-cement was used for both internal and external work. At this time Muziano, of Brescia, the friend of Michelangelo, invented the oil mastic, using it for the mosaics of the Gregorian chapel, the most ancient in S. Peter's. A useful receipt for this mastic is as follows:—

Travertine powder	60
White lime slaked coming from the same	60
Travertine	10
Raw linseed oil	10
Boiled linseed oil	10

These proportions can be varied, and the travertine can even be replaced by similar substances. The lime cement only remains soft enough to work for a few hours, while the oil mastic extends the time during which the mosaic can be worked to three or four days in summer and twice that time in winter. The mastic also adheres better than the cement, and holds perfectly on all sorts of grounds (stone, metal, wood, or vitrified substances) if the surface be roughened and then oiled. It is lighter, too, since only one coat is employed, and these advantages have made its use general for interior work and for portable mosaics. "The tesserae are arranged in a box in assorted tints, and marbles are still used sometimes instead of vitreous pastes in some parts of the mosaic. In S. Peter's a flesh coloured stone found at Cotanello, near Rome, is used. At Salerno pebbles from the shore are found among the low-toned whites of the half-length of S. Matthew; sometimes precious stones were used—mother-of-pearl and even eggshells. The cutting apparatus has been already described; M. Gerspach recommends a stone-hammer for marble or stone. If the tessera requires a slight alteration in shape the wheel is used. The cube should be always slightly tapered, and the mastic rises in the joints, which can be larger or smaller according to the will of the mosaicist. Sometimes the surface is washed with a coloured water to colour the mastic, which modifies the colour of the mosaic in proportion to the size of the joints. M. Gerspach describes the same process of executing work in the studio as that used at Venice, but gives the following extra details:—"A frame is made of slate or wood covered with zinc with borders screwed on." The plaster cut out is replaced with damp powdered pozzolana or some similar material: "When the piece is complete it is covered with a coat of paste of rye flour, or with a paper similarly pasted, and divided into manageable pieces; over all a coarse cloth is glued, and it is left to dry. Then the edges of the frame are unscrewed, the cloth cut, and,

turning it over, the pieces are taken up; the process is called 'musaco a rivoltatura,' from this turning over." "To work safely in this manner it is best to limit the size of the frame to about 7 ft. by 5 ft. 6 in. and the pieces to about 9 in. square." The process has only one advantage, that of cheapness; in other ways it is very inconvenient, and to it may partly be attributed the modern decadence of mosaic. "The workman cannot judge of the relative effect of the tesserae which he is using, because he does not see its real aspect. The operation becomes mechanical, it deprives the mosaicist of the faculty of interpreting his model, of disposing his values according to unforeseen necessities, it suppresses personality and character." It is only fair to add that the Salvati Company maintain that it is as easy to judge of the effect from the back as from the front as the tesserae are the same colour throughout.

The decline of mosaic proceeded from the attainment of a fair measure of success in the copying of pictures. This began in the XVIIth century, and was, of course, hailed as a wonderful improvement in art, as is generally the case with any achievement which is fatal to the progress of the particular form of art in which success in a doubtful aim has been attained. The object of the workman having become the accurate imitation of the effect of a picture, not the fitting decoration of a wall surface, it was only natural that the latter should be less and less successfully attained as time went on, the opinion of both painters and public as to what was fitting decoration for a wall, in whatever medium it was executed, becoming more and more degraded. The works produced in the mosaic factory in the Vatican show to what a low level the constant following of a false aim may reduce the endeavour of capable workmen—especially when joined to a commercial subdivision of labour. M. Gerspach says:—"The copying of pictures is generally confined to several hands, and the design cut up into pieces, care being, of course, taken that the cuts do not cross important parts. The mosaic may be placed on wood, marble, or metal; at the Vatican they use slabs of *peperino*. The process has been already described under oil mastic. When the mosaic is quite dry it is polished, but first it is coated with wax, so that the angles of the tesserae may not split off under the rubbing. The polishing is done with powdered gritstone used gradually finer; then with emery-powder, using a lead pad at first, and then one of pewter covered with linen. It is then washed with a great gush of water, rubbed with a clean rag and a little red earth of Naples, then a fine brush with spirits of wine is passed lightly over the surface to clear greasy matters off, and it is cleaned with soapy water. The mastic is then coloured with a wax medium mixed with colour, so as to make the picture as little like a mosaic as possible."

The Pontifical factory was founded in 1727 by P. P. Cristofari to decorate S. Peter's, the colours being produced by Mattioli, who made 17,000 different tints. It occupies the rooms which were used as the offices of the Inquisition. The cost of the large mosaics produced in this factory is enormous, and the time and labour spent are commensurate. For instance, a picture of Paestum, 8 ft. long and 20 in. broad, occupied four men for three years, and when completed its price was 1,000*l*. Twenty artists are regularly employed, half of whom are mosaicists. A similar official manufactory has been founded at St. Petersburg.

The ovens are like those of glassworks, and include both those for melting the first substances and annealing-ovens. The material is melted in crucibles of fire-clay, poured out upon a marble slab, and divided into cakes; these cakes are then put into the annealing-oven at a lower temperature. Then they are allowed to cool slowly and are stored. "As it is not possible to exactly calculate the amount required for a given work the stores increase rapidly, and in a few years the assortments become very varied. On the other hand, in a country like Italy, where there are many ancient mosaics, restorations are frequent, the original tesserae are used as much as possible, but some remain over, which are put away with the new ones, and

a mistake, and that they fail to secure the best possible designs. On the contrary, I believe that it is to the interest of the public that a competition should be instituted for every proposed public building of importance. I do not deny that there may be many exceptions to this rule. The new Scotland Yard is a notable instance of such an exception; but the architect of that noble work stands by himself, as is recognised, I think, both by the public and by the architectural profession. It is said that buildings erected from competition designs fail more or less in reaching a high standard of architecture. There is, of course, a good deal of truth in this criticism; but I think it cannot be said with any approach to truth that public buildings, where there has been no competition, reach a higher standard.

I think, in the interests of architecture, that every means should be taken to secure the best design possible, and, as a rule, this can be done by competition. Competition is also invaluable to the young architect for reasons beyond that of striving for a first prize: it gives him the opportunity of comparing his work with that of others and of taking home to himself, if he is modest, his weaknesses. Beyond this there is the chance of discovering genius which otherwise might strive in vain to make itself known.

I think it is a matter of congratulation that the London County Council have decided to institute a competition for the building of their proposed County Hall. But I learn with dismay that it is their intention to make it open to architects of all nations.

There is no precedent for such a course; and I think a vigorous protest should be made, in the interests of both the English public and the English architect, against a course which appears to be unnecessary and unjust, and one which no other nation would think of adopting. It is no question of dislike to meet our foreign brethren in competition that prompts this protest; it is that I feel that an international competition would be a direct slight to English art, and that it is to the English architect we must look for the production of a design that will illustrate the best traditions of English work.

I feel sure you will share my opinion that the results of recent competitions go to prove that the younger generation is fully qualified to continue that advancement in the art of architecture which we all so earnestly desire. May I none the less offer a word of advice to our younger students? All who have had experience in judging competitions must have been struck with the number of designs submitted by competitors who are evidently in the first stages of their studentship. Let me counsel such beginners to realise that the art of design must be carefully studied, and can be mastered only by continued practice. An important competition does not offer the requisite opportunities for the student to learn his craft.

The Institute has been actively engaged in the advancement of architecture during the last session. I refer particularly to its activities during July last when the International Congress assembled in London. Unfortunately for myself I was then absent from England, and therefore cannot speak from personal experience of the brilliant success which distinguished the various lectures, receptions, and excursions. It is evident that these periodical gatherings of our *confères* of all nations will have very happy results for architecture and for architects. The least that can be said is that we certainly acquire a closer insight into the aims and aspirations of our foreign brethren, who, we find, are in close sympathy with many highly important subjects now engaging the attention of the Institute.

During the assembly of the Congress every subject of interest, from the education of the public to reinforced concrete, seems to have been exhaustively considered. I think we may hope that such questions as the improvement of our thoroughfares, the execution of important municipal or Government work by salaried officials, the education of the public, and the status of the architect will not be allowed to pass into oblivion. I have a very strong conviction that there is sufficient energy and enthusiasm among the members of this Institute to keep alive an interest in these questions, all of which tend towards the advancement of our art.

That the Congress passed off so happily, and was such a complete success, was due to the courtesy and tact, and the other personal attributes of its President; to the unflagging energy and ability of the Committee; and to the zeal of our accomplished Secretary, whose services were indeed invaluable. It has been said in commendation of Count Moltke that he could be silent in several languages. I feel sure that many of our foreign brethren were thankful that Mr. Locke did not consider silence as always commendable.

I believe that not the least interesting of the papers read at the Congress were those on the question of the education of the public. Perhaps I may be permitted to add a few words on this subject. It is one of such importance that I venture to reiterate what others have said.

I remember a passage in Ruskin's "Stones of Venice" which bears very directly on this question. Although there is no doubt that in the present day Ruskin is not considered such an authority on artistic matters as he once was, he certainly spoke many words of wisdom. It has been said that there are two classes of admirers of Ruskin—first, those who believe in him as an art exponent, but who think him entirely ignorant of political economy; and, secondly, those who believe him to be a political economist, but who declare he knew nothing of art. However, the words that I will now quote may be put before you, I think, without being challenged in any way. He says: "Every man has at some time of his life personal interest in architecture. He has influence on the design of some public building; or he has to buy and build his own house. It signifies less whether the knowledge of other arts be general or not; men may live without buying pictures or statues; but in architecture all must in some way commit themselves; they must do mischief and waste their money if they do not know how to turn it to account. And it is assuredly intended that all of us should have knowledge, in matters with which we are daily concerned, and not be left to the caprice of architects or mercy of contractors."

I think it may be taken for granted that public taste in painting and sculpture has developed during the last generation; but, notwithstanding the advice of Ruskin, it does not seem that there has been such an awakening of public interest in architecture. It is certain that the average cultured Englishman of to-day shows no such appreciation of architecture as did his predecessors. Our ancestors sought culture in the Fine Arts largely through the study of literature, but more, I think, through home and foreign travel. Undoubtedly far greater numbers travel nowadays; but education in the arts is not really furthered by hurried visits to buildings and galleries, "Baedeker" and "Murray" in hand. In the olden times the Grand Tour was considered a necessity for every cultured gentleman. In Evelyn's Diary there is a most interesting account of the way in which the Grand Tour was undertaken by one who was *par excellence* the cultured traveller of the XVIIIth century. I may remind you that Evelyn spent some years in travelling on the Continent, his travels extending from Holland to as far south as Naples. He was always on the alert to obtain introductions to collectors of art objects and to those interested in architecture and the kindred arts, thus showing that he devoted a large part of his ample leisure during these travels to the study of architecture and the arts. He was undoubtedly more attracted by the Italian Renaissance and the French phase of that style than by medieval work. He speaks of the Farnese Palace as being built after "the ancient manner, and when architecture was but newly recovered from the Gothic barbarity." Nevertheless there is evidence in the Diary that the "Gothic barbarity" appealed to him in some degree, although he owned to a very decided preference for "the ancient manner." The Grand Tour, without which I believe it is impossible for the layman to make a serious study of architecture, has had a lasting influence on English style.

Evelyn was a man of cultivated taste and wide knowledge, and he undoubtedly possessed very great influence in the archi-

tectural world of his day. It is certain that his influence was a powerful factor in the decision that the new St. Paul's should be built (to quote his own words) "with a noble cupola, a form of church not as yet known in England, but of wonderful grace."

It would be interesting to inquire how far the taste of Charles II. was influenced by an enforced exile in foreign lands. He may have been surrounded by architectural enthusiasts; and his "Grand Tour" (though limited) must have had some influence on his knowledge and taste. One gathers from Evelyn and from other sources that Charles was really devoted to the arts, and this is shown by his interest in all that pertains to architecture and by his fine collection of pictures and other works of art. We have undoubtedly owed many dukedoms to his initiative; but I seriously think that his enthusiasm for architecture encouraged Evelyn and Wren in their determination to give us a "noble cupola" and a new form of church. I connect the names of Wren and Evelyn thus, not because the latter had any part in designing St. Paul's, but because he undoubtedly had some voice in the arrangement of the plan and the choice of a style. I have cited Evelyn's Diary because I think it is shown therein that a successful study and appreciation of architecture can be best obtained by intelligent travelling. But it must be leisured travel; it must not be for the purpose of counting steeples. I am sure that a contemplation of the actual monuments of architecture is always more valuable in the education of the lay public than any other method of study, just as it is in that of the architect himself.

No doubt much knowledge may be derived from the extensive writings on the Renaissance of art and literature given us during the last twenty-five or thirty years. But a discriminating taste in works of art cannot be obtained by reading only. Knowledge derived from books must be reinforced by an earnest study of the actual works of the masters. Unfortunately too many people are content to absorb the views of critics, while they neglect a personal study of the work itself.

A question of paramount interest, not only to this Institute, but to the public generally, relates to the control over architectural schemes in connexion with the laying-out of new streets and the erection of public buildings. This question has constantly been before this Institute, and a variety of suggestions have been made, some advocating a tribunal of art, others an advisory board, working in conjunction with H.M. Office of Works.

I believe the present First Commissioner has instituted some kind of advisory body for the purpose of dealing with the Government Offices now in progress of building; but this is only a temporary arrangement. The matter is of such universal importance, and the question of want of intelligent control over public undertakings so often arises, that one cannot but feel that this Institute should give special attention to the subject.

An architectural tribunal might become an influence in dealing with subjects not directly connected with street improvements or the erection of public buildings. For instance, there is one question suggested by our Arts Committee on which they have reported, viz., the possible substitution of stone for the present wooden pediment and dome crowning the river façade of Somerset House.

It is impossible to conceive that Sir William Chambers would have erected a wooden structure where stone was so obviously the material that should be employed, had not the exigencies of the plan precluded the use of the heavier material. But in this age of steel it would be a comparatively easy and inexpensive matter to add steel stanchions and girders to the interior of the building, and to erect thereon a stone dome. This would only involve trifling alterations to the rooms under the dome.

This suggestion may be criticised on the ground that it is not true construction to erect a stone dome on steel stanchions and girders. But I believe that in Sir William Chambers's time, and since, the present dome was painted to look like stone; and this was surely more in the nature of a sham than the proposal now laid before you.

That there is an interest arising in public

thought on such matters as the decoration of our public buildings is testified to by the munificence displayed by some of our citizens in providing the decorative panels to the Royal Exchange. I would, however, venture to say that had some competent authority—such as an art tribunal—been consulted, we should have had a more complete and harmonious scheme.

What an opportunity for fine decoration awaits fulfilment in the panels of the Central Hall of the Law Courts! These are really better suited to the purpose than those of the Royal Exchange; they are better lighted, and at a better altitude for effect; and, indeed, I believe they were designed by Mr. Street with the idea that they should ultimately be decorated by paintings. The ornamentation of these panels would be a fitting finish to one of the finest halls in Europe. But unless some public-spirited persons, stimulated and advised, shall we say, by our art tribunal, will come forward, this hall will remain, I fear, a monumental example of the want of thoroughness in completion and of the want of appreciation of art shown by our nation in general.

That they do these things better in France must be apparent to those who know Paris. Let us hope this was impressed on those of our municipal authorities who lately paid semi-official visits to Paris. It was evident to them, no doubt, that the Parisians complete what they set out to do; that they recognise the importance of placing their buildings in an ample space, and arrange that the surroundings shall be in perfect harmony with the buildings. A false economy of space is not the dominant idea when considering the question of improvements to Paris.

The municipal visitors from London probably realised that the French people would not have allowed generation after generation to pass, and still leave St. Paul's crowded in by monstrous warehouses, as we have done.

To illustrate how we conduct matters of this kind I need only mention the work now in progress in St. James's Park. We began well: a design was selected which met with general approval. It was masterly in its conception, and we congratulated ourselves that at last we were in the right direction. We were to have a fitting memorial of our great Queen, the surroundings to which would be treated in a monumental spirit. But what is likely to happen? I am afraid the usual mutilation that ensues from the lack of funds, and I fear it is possible that a feature in Sir Aston Webb's design will be eliminated—the stone arcade, a feature which of all others was the one necessary to complete and give full effect to a work worthy of the nation. It is futile to appeal to any Government; but cannot a strong appeal be made, in the interests of art, to a generous English public, to assist in completing what is well begun?

The new building for the "Hearts of Oak Benefit Society" is a fine object lesson to some of our public bodies in well completing what is well begun. The Hearts of Oak Society, composed, as you know, wholly of working-men, has shown a very broad and public spirit in the way it has completed, to the smallest detail, what it set out to accomplish. Let us hope this spirit will be maintained, and that it will not succumb to the modern curse—advertisement—and so allow the building to be defaced by monstrous gilded letters.

I hope it may not be out of place if I take this opportunity of referring to the Report of the Royal Commission on the Traffic of London Streets. This Report, issued in June, 1905, called forth much criticism and much valuable suggestion from many quarters, but none more interesting to ourselves than the paper read in this room by Mr. Paul Waterhouse. It seems unaccountable that no one fully qualified to approach the subject from an architectural point of view was selected to act on the Commission; at any rate, no qualified architect was consulted. Careful readers of Mr. Waterhouse's able paper must come to the conclusion that any inquiry such as the Commission were instructed to make should take into consideration the general architectural effect of all proposed new thoroughfares. I think that this Institute should endeavour to make itself distinctly audible

when any scheme which deals with London streets is being considered. The papers bearing on this subject which have been read here show that many architects have made a study of this question. But the general public seems to regard it with indifference, and the constitution of the London County Council does not always enable it to take the broadest and most statesmanlike view of such matters. For instance, in laying out the Aldwych site the London County Council has certainly failed to procure the finest view of those great features, the churches of St. Mary and St. Clement Danes, although, at the instance of this Institute, some improvements were made to the original plans.

In the present construction of the County Council expert qualification is not a necessary factor. Councillors and aldermen are not elected in virtue of any special knowledge, although undoubtedly there are many amongst them who take an interest in such questions as the present, and who conscientiously study them.

In connexion with this question of improvement in our thoroughfares I may refer to the collapse of the Charing Cross Station roof. When this deplorable disaster took place, necessitating as it did the reconstruction of nearly the whole roof and of a portion of the station, it was immediately suggested that a new terminus might be erected on the south of the river. A site on the south side amply sufficient for a much larger station and offices, and also for a new hotel, could have been obtained. The present space occupied by the station and hotel is of such enormous value that the railway company, had they adopted the scheme, would have been but little out of pocket. The gain to the public would have been a new bridge for foot passengers and for wheeled traffic. There can be no doubt that a bridge at this point is much needed. Waterloo Bridge being about 700 yds. to the east and Westminster about 1,200 yds. to the south.

I believe the directors of the company fully recognised the fact that a terminus on the south side would have been a great improvement from the point of view of the railway requirements. The vast amount of traffic could have been dealt with more easily. The chief argument that could be urged against the removal of the station was the serious objection that the public would certainly make to crossing the river by an open bridge, exposed to all weathers, instead of entering the station by its present easy access. This objection, in addition to the greater distance of the terminus from the City and West End, might have materially affected the suburban traffic, and it probably decided the directors of the company to remodel their terminus on the original site. But it is quite possible that an opposite decision might have been arrived at could it have been shown that a bridge is not necessarily an open structure.

Would it not have been worth while to consider the possibility of erecting a structure on the principle of some of the mediæval bridges? An obvious suggestion would be a bridge of the type of old London Bridge, the great national wonder of the Middle Ages, and, even as late as the XVIIth century, the only bridge of the capital. Expense, of course, would be a serious objection; but when one considers that old London Bridge was erected by contribution in the reign of John Lackland, one wonders whether it would not be possible to achieve a similar masterpiece in the XXth century, and by the same means. In the XVIIth century Lyly the Euphuist wrote from London—"Of all the strange and beautiful shows me thinketh there is none so notable as the Bridge which crosseth the Thames, which is in manner of a continual street, well replenished with large and stately houses on both sides."

Another point greatly in favour of London Bridge in mediæval times was the connexion it made with the suburbs south of the water. In those days Southwark formed comparatively an integral part of London. Shakespeare would hardly have built the Globe Theatre in Southwark if his patrons had had to face the discomforts of an open bridge. It is the present want of easy and convenient communication between the north and south of the river that prevents the

improvement of Southwark and Lambeth. In these localities there is a large area of very inferior property; but if they were more pleasantly accessible from the City and Westminster the congested areas on the north side of the river might be relieved by extension on the south side. In fact, with a street-bridge communication, Southwark might easily become a real part of the City and a more important business centre.

Other fine and still existent examples of street bridges are the Ponte Vecchio in Florence, the Rialto in Venice, and the comparatively modern bridge over the Avon at Bath. This last example is, of course, quite a small work; but it serves to connect, as by a street, two parts of Bath that would assuredly have had a different history had the bridge been merely an open one. It may also be instanced as a successful architectural treatment, especially as seen from the river.

Of course, it might be objected that a street bridge or bridges over the Thames would detract from or even destroy the architectural beauty of the Embankment; and, indeed, any scheme that might endanger the grand effect of this noble work must be approached with the greatest caution. It would never do to imperil the beauty of the only noble engineering work of the last century, nor to spoil the many picturesque views from our London bridges. But, bearing in mind the examples already referred to, I contend that the Thames might be spanned by street bridges which would not in any way detract from its present beauties. The existing bridges of Blackfriars and Southwark might be metamorphosed into stately erections, and a fine site for another "national wonder" could start from the end of Northumberland-avenue.

At the risk of being thought tedious I have alluded to subjects which have been more comprehensively dealt with before, but which, I think, are of sufficient importance to bear constant reiteration.

It is to be hoped that such questions as the education of the public and the appointment of an art tribunal are within the range of practical politics.

We may, I think, assume that the important question of the higher education in architecture which will be open to the student is attracting the attention it deserves. We may anticipate that in the near future a complete scheme will be developed.

The course of study will probably cover a wider range than it has hitherto done. We may hope that it will be more thorough and more complete, and that it will, to a large extent, ensure that all those proposing to practice as architects shall have studied the various periods of architecture and have gained some knowledge of the principles underlying style. Even if education goes no further than this, it will possibly spare us many of the efforts of those who show in their buildings that they have not been taught the first elements of their art. It will save us from the conceited ignorance which thrusts upon us so many vain attempts at originality.

At the same time, it is devoutly to be hoped that education will not make us too academic, and that it will not enslave those who feel that they have a message to deliver and an individuality which they must express. Finally, it is to be hoped that it will not result in a dead level of uniformity in our streets, wearisome through too much repetition; for what is good for 100 ft. may become weak if continued for an indefinite length.

The education of the architect should tend to bring us into closer relations with the sculptor and the decorative painter. The architect should study the sister arts sufficiently to gain some knowledge of the aims of the artists with whom he may have to collaborate.

Of quite recent years an appreciative sympathy seems to be growing up between the various arts, but in spite of this we still see instances of a want of harmony between architect and decorator, or between architect and employer. An example of this is found at the Old Bailey Sessions House; at one end of the hall is a mural painting which is monumental in character, on a fitting and grand scale, and in perfect harmony with its surroundings. At the other end is a decoration

which, however admirable in itself, does not accord well either with the architecture or with the other paintings. This incongruity must surely be attributed to the influence of the employers.

It is impossible to foresee what the future will bring forth; but so much of the work of to-day is of the very highest order, and worthy to be compared with the best that has been done before, that we may look forward to the future in a spirit of optimism.

I think that we are all confident that there is still enthusiasm in our ranks, and that our younger men are inspired by a vital desire to improve and ennoble their art."

Sir H. Trueman Wood said he understood it was the practice of the Institute to invite an outsider to undertake the task, which could really be very much better fulfilled by one of the members, of proposing a vote of thanks to the President. And when the compliment was paid him of asking him to propose the vote of thanks, he was not deterred by his incompetence from accepting. It was within a few days or weeks of twenty-seven years since it was his pleasing duty to intimate to Mr. Colcutt the fact that he had been awarded at the Paris Exhibition of 1889 the Grand Prix for his design for the Imperial Institute, which award was a much greater compliment than that it would be now, for our French friends, however well-intentioned they were to ourselves, had by no means arrived at the present condition of the *entente cordiale*, and, while they were perfectly ready to admit our merits in matters of machinery and manufacture, they were not ready to acknowledge the supremacy of Englishmen in anything relating to art and architecture, and for that reason, he believed, the award to Mr. Colcutt at that time was very much appreciated by English architects. On the various topics on which the President had touched, there were many about which a layman had better hold his tongue, but there were one or two on which even a layman might have opinions, which he might take such an opportunity of expressing. One of these was that of the education of the public. As a member of the public he thought that in matters artistic what the British public wanted was to be made to realise its own incompetence to have any opinion at all. There were really very few of them who, at all events before they had read the morning paper, were capable of forming any opinion on matters outside their own ordinary work, and he was quite sure that artistic matters would be better dealt with in this country if those competent to deal with them were left to do so, and were not interfered with by the incompetent criticism. Another question was that of the traffic of London, and he should like to endorse, from the point of view of the outsider, the original and valuable suggestion by the President for what he called street bridges between the south and north of the Thames. It was for the architects to consider whether they could construct such bridges without offending the amenities of the situation; but they would be hard put to to produce anything more abominable than two of the bridges which already crossed the river. He had always wondered why it was that the south part of London was in such an unfortunate condition as it is, and why it was not used for the erection of important buildings in the same way as the north side of the Thames. But the President had explained that—i.e., the inconvenience and difficulty of getting across the river. If the President's suggestion could be realised, he thought that future generations would look back upon the President's year of office with gratitude. He thought that architects and the Institute should insist even more than they do upon having sufficient area in the streets for the lofty buildings which they were obliged to erect, for it was not only a question of appearance, of architecture, but it was a question of convenience that there should be wider streets which did not render insignificant the enormous buildings which it was necessary to put up on the sites available. He should like to say that, in his opinion, the engineer would be all the better if he had a little more of the architect in him, and he was sure they would all agree with that; and would they bear with

him if he said that the architect had something to learn from the engineer? From the outside point of view it was a hopeful sign that the profession was showing a readiness to avail itself of the resources of materials which modern science was putting in their hands, and that architects no longer sneered so much at steel and concrete buildings, and that they were adopting these materials to buildings of a magnificent, imposing, and satisfactory nature. He believed that there was a great deal in the future of the profession in this direction. The Institute was to be congratulated at this particular period of its history in that, when London was being rebuilt, they should have at their head one who had taken an important part in that rebuilding, and future generations would look back to this time and would realise, as architects now realised, that the Institute, which directed architecture in this country, was fortunate in having at its head one so thoroughly competent to deal with such important questions. He was sure that they would desire to pass a very hearty vote of thanks to the President for his valuable and most illuminating address.

Sir Aston Webb, R.A., who seconded the vote of thanks, said he did so with the greatest pleasure, partly because it gave him the opportunity of congratulating an old friend on the position that he now so worthily occupied as President of the Institute, and also because they all recognised the high artistic ideal that Mr. Colcutt had always set before himself in his work, and also the very high level of integrity in professional conduct he had always maintained. He had touched upon a great many points on which the members were greatly interested. One of the first topics—and one of the first topics of all Presidential addresses which he could remember, and he remembered about thirty—was that of competitions. He and the President used to meet in a little room near Victoria-street, and, with others, try to get together a memorial in which they pledged themselves not to enter into any competition in which a professional assessor was not appointed. After a great deal of labour and a good deal of smoke, they managed to get a large number of architects to sign that memorial, and he thought it was through the President's influence that Mr. Street was induced to present the memorial to the Institute, and it certainly resulted in a great number of architects declining to compete unless an assessor was appointed, and it was very interesting to hear the President say, after a lapse of thirty years, that he was of the same opinion still, and that he thought that one assessor, and only one, was the right practice. He (the speaker) was of the same opinion, too. He thought that, on the whole—although there might be reasons for having more—that justice was better done by one man than by three. One man felt the full responsibility, and he alone was responsible to the competitors. Of course, all were not satisfied; that never would be the case. One was satisfied, and the rest were more or less dissatisfied, and that was one of the inevitable consequences of competition. Another matter dealt with was the London County Hall. He thought they must all congratulate the County Council on having selected and obtained such a magnificent site. One extraordinary fact about it was that no one thought of the site before. Probably all would agree that nothing better could be obtained. He was in agreement with the President in what he said about not throwing the competition open to foreign architects, but he supposed the matter was settled, and it could not be reopened; but a London County Hall should be designed by an Englishman. He disliked the idea that when they had the building they might have to label it "made in Germany," or some other country. Of course, he hoped it would be made in England. Then the President touched on a more serious topic, and there again he (the speaker) was in agreement—i.e., the Architects' Benevolent Society. There was no sadder occupation than to sit on the Council of the Architects' Benevolent Society and hear of so many who went under in the struggle for a living in architecture. He hoped that the President's appeal would be handsomely responded to. He would have the greatest pleasure in doubling his subscription, and he hoped that

others would do the same. As to the proposed Advisory Committee on streets and public buildings, when he (the speaker) had the honour of being President he brought forward the same question, and the first Commissioner, Lord Windsor, who was present, said that if the Council would memorialise him he would do what he could. The Council did memorialise him, and he no doubt laid the matter before the Government. If the Institute were to continue their action something of the sort might in due course be done. It had struck him once or twice that the suggestion which Mr. Bryan, of America, had made as to arbitration between foreign countries might be adopted in regard to art and architectural matters. That was to say, one could hardly expect public authorities to hand over the right of decision on these matters to other bodies, but if it were necessary that, before these public authorities could carry out works, their proposals should be laid before some body who would point out where improvements might be made, he thought that a great deal of good would be done. As a rule, public bodies wished to do the right thing, but did not know what was the right thing, and he thought they would adopt suggestions made if they were not expected to delegate their powers. He did not altogether agree with the President that St. Paul's would be improved if the surrounding buildings were removed. He thought that one of the finest sights was to see St. Paul's as one came out of Cheapside with all the buildings about it, for he thought its size seemed to be increased, and the views to be had of it now were exceedingly beautiful. There were public buildings which were improved by the removal of the buildings close to them, but he did not think that St. Paul's was one of them. He thought they could congratulate Mr. Macartney—and also St. Paul's—upon his appointment as the keeper of that noble building, but Mr. Macartney would have a very difficult task, for he understood that there were sewers and tubes suggested all round it. Although they might do without tubes, they could not do without sewers, and they must not do without St. Paul's, and, if there was any necessity, no doubt the Institute would call up the public to the rescue of that building. Westminster Abbey was also looking out for someone to take charge of it, and he hoped that the selection would be as fortunate and as good as it had been in the case of St. Paul's. As to the work being done in St. James's Park, of course, it was in an unfinished state, although little paragraphs appeared in the papers from time to time in which it was said that the work was now quite complete except for the statuary. That was not so, of course; only the first washes, as one might say, had so far been put in, and what would be the final form of the work he was not in a position to say. But he could say that those who had this great work in hand were determined to bring it to a worthy completion. Mr. Brock was now at work fixing the marble work to his basins and steps, and it was quite hoped that in the spring or early summer that the unsightly hoarding might be removed, and the fountains and some of Mr. Brock's beautiful sculpture be disclosed. It was also hoped that the present detached piers will also be completed with their sculptural groups, but that by no means completed what it was hoped finally to do. As to architectural education, an attempt had been made to bring various educational bodies somewhat into line. The Institute had never considered itself exactly an educational body, but they could do a very great deal in the matter by recognising the work done by the various schools, and by relaxing to some extent the work asked for in the testimonies of study, and also by exempting, in some cases, students from the Intermediate examination when they had shown that they had gone through a recognised course at a proper school. He hoped that the Institute would continue in that course, and extend the practice as occasion required. As to improvements in London and in cities throughout the country, he agreed with Sir H. Trueman Wood that architects had something to learn from engineers, but Sir Henry also said that engineers had something to learn from architects. At the present time the lay-outs

of our great cities and of our streets and buildings was too much in the hands of engineers and borough surveyors—excellent people, with whom no one wished to dispense; in such matters as traffic, paving, drains, etc., we could not do without them, but they were, however, not the people to lay-out or settle the lay-out of streets, etc.; beauty should be considered, and have a place found for it, and the people to introduce that element in our buildings and streets were men who had been trained, and all their life spent in trying to find out what the effect of certain work would be from an architectural point of view, and the only persons who were competent were architects who had spent their life in studying such matters. Architects with this knowledge were seldom selected, and they were not consulted until everything was cut and dried. In the case of important public buildings money should be spent on the sites so as to prepare them carefully to receive the buildings; there should be almost as much money spent on preparing a site as on the building itself, and it was getting to be recognised in the case of private houses that the architect had the direction in the arrangement of the garden and the grounds. We knew how different our buildings looked if attention was paid to the garden and terraces which surround it. But at present, as regarded great buildings in our towns, that was absolutely ignored, and nothing was spent in the way of improving the site, so that a great deal of the money spent on these costly buildings was thrown away because the work could not be seen, and because it could not be appreciated on account of slovenly and badly-conceived arrangements of the approach of the buildings. It was of great importance that money should not be wasted for want of some forethought. What was wanted was to rouse the public so that they could be got to see that their cities could be made beautiful—for London was a beautiful place with great opportunities, as Mr. Paul Waterhouse had pointed out in his recent paper; and Mr. Norman Shaw had done the same, showing how it could be done. What was required was that these and similar opinions should be brought together, and put into general shape, so that, as alterations took place in London, these opportunities would not be missed, and in time, while we could not get what Wren wanted and intended, we might have London beautiful—a city of which people might be proud, and in which they might be happy to dwell.

The President briefly replied, and the meeting terminated.

The next meeting will be held on November 19, when Mr. A. E. Henderson will read a paper on "The Crosses (Vith Century A.C.) Temple of Artemis at Ephesus."

THE ARCHITECTURAL ASSOCIATION.

An ordinary fortnightly meeting of the Architectural Association was held on Friday last week at Tufton-street, Westminster, S.W. Mr. R. S. Balfour, President, in the chair.

The minutes having been read by Mr. C. Wontner Smith, Hon. Secretary, and confirmed, and some nominations having been read, the following gentlemen were elected as members:—

L. Brunati, Campden-hill.	W. Reid, Johannesburg.
J. Page, Stockwell.	A. Womersley, Kensington.
A. D. Robinson, Camden-road.	H. H. Hill, Queens-square.
C. W. Clark, Norbury.	L. J. Hicks, Weybridge.
R. H. Wheeler, Montagu-square.	F. O. Marchant, Kent.
A. R. Allen Lodge, Stratford.	L. A. Colclifford, West Drayton.

The Chairman announced that the presentation to Mr. W. G. B. Lewis will take place at the next ordinary general meeting on November 30.

Mr. Tanner, Hon. Secretary, announced the following meetings:—Discussion Section meeting on November 22; paper by Mr. H. G. Iberson on "Do Architects Justify Their Existence?" at 7.30 p.m. Camera and Cycling Club meeting on December 4; paper by Mr. J. D. Crace on "Purpose in Colour Decoration," at 8 p.m.

The Corinthian Order.

Mr. Hugh Stannus then delivered a lecture on "The Corinthian Order."

The lecturer said his subject was the

"Corinthian Capital." He apologised for the change of subject from the one given in the Brown Book, and explained that pressure of work had precluded the possibility of completing proper diagrams for the other subject in time for the date he had agreed to take. He had been occupied for some years in thinking about the present subject during such leisure as a busy man has, and in preparing notes; and he proposed, firstly, to show the evolution, as Mr. Schuitz had similarly done in an admirable article on the Ionic capital in the *Builder* fifteen years ago, and, secondly, to go critically through the various elements which may be said to constitute the Corinthian capital, with some consideration about their possibilities.

The paper was fully illustrated with diagrams and lantern-slides, without which we regret it is impossible to give an adequate report, but the following is an abstract:—

The lecturer commenced by admitting that the Corinthian capital was one of the small things of architecture; but often the hand of the artist is seen by his attention to such small things. He defined the capital, and showed its constructive function and its aesthetic value. In Corinthian examples the essential elements were—the calyx, i.e., the leaf-band at the starting; and the major caliculus, i.e., corner-scroll under the abacus at the top. Without these a capital might be Corinthianesque or semi-Corinthian; but it could not be considered as a complete or perfect example of the style.

He explained the origin of the name, it having been adopted because the ornamental parts of the early capitals were made of bronze from the ancient city of Corinth, repeating the remarks on this subject which he had made in a discussion following a paper by Mr. Lethaby at the Society of Arts on February 11, 1890. He showed views of Roman remains in which the capital was bare, the ornamental leaves having been removed, and directed attention to the holes of the rivets with which they had been originally fixed, and said that this example, though late, was evidence of the practice.

He traced the evolution from the Egyptian papyrus-flower capitals to a (theoretical) early example. Then, explaining his reasons for believing that the capital which is figured in Professor Cockerell's book on Bassae was not a portion of the architecture of the temple, but only the capital of a statue-pedestal, he suggested the date of it as about 380 B.C., judging by the details shown in Cockerell's drawing. He demonstrated the gradual building up of this capital with bronze scrolls and leafage ornaments, thus proving that it is the simplest and therefore the earliest example of which there was any pictorial record; and, further, that it was undoubtedly derived from a bronze original. The date of the succeeding type, from Epidaurus, he accepted as 374 B.C.; and, from internal evidence, he showed that it was later than the Bassae type, though containing equally strong evidence of a bronze original and also traces of Ionian influence. The Miletus type he placed at about 360 B.C., and he explained the design. He then mentioned the Choric column type, which shows traces of Phœnician influence, and, further, he proceeded to explain and criticise the Lysicrates type of 335 B.C. There must have been intermediate steps between this date and the time of Antiochus IV., but he did not know of any existing examples. The Olumpeion type of 174 B.C. shows a severe and orderly arrangement of the leaves, and it was probably from some of these capitals, which were a part of the loot taken by Sulla to Rome, that the Romans derived their normal type as seen at Mars-Ultor and in the Pantheon. The Tivoli type he considered, for historic reasons, to be about 75 A.C., and, showing slides of several examples, he suggested that some of them were intentionally Archaistic; and that there has not been any further development from that time, the Classic and Renaissance architects basing their further variations on the canonical Mars-Ultor type.

The lecturer then proceeded to enunciate the principles which govern the design. Firstly, he showed from nature the radiation in growth, the gradation in richness, the alternation in position, the redundancy in foliage, the variety in leaf-edge, and the economy in effort; and, secondly, he applied

these to the capital. He concluded by pointing out the moral of it all was that the canon is not closed, and he indicated various directions in which a healthy evolution might travel, and referred students to Mr. Spiers's book on Grecian and Roman architecture.

In the discussion which followed,

Mr. R. Phœnix Spiers, in proposing a vote of thanks to Mr. Stannus, said that the climate of Egypt appeared to have had a different effect upon Mr. Stannus from what it had upon him. He (the speaker) went with an open mind, though he was well acquainted with Fergusson's theories, and he was bound to say that, as regards the origin of various capitals from an Egyptian source, his experience in Egypt led him to an opposite view. Mr. Stannus pointed out that the very essence of the Corinthian cap was the angle spiral, which started from the bell and rose to support the abacus. Everything depended upon that, but there was no projecting abacus in Egyptian columns. The abacus of the Egyptian cap was set back behind the bell, so that it did not serve the purpose of the Greek abacus. The Egyptians never recognised the important value which the abacus should have. There were the two classes of capitals, the concave and the convex; the Doric cap was the convex, and the Corinthian the concave, and the idea might occur to any one of them to invent a bell shape without going to Egypt. If the Greeks had copied the Egyptians, the first thing they would have done would have been to copy the papyrus plant on which the Egyptian capital was based, but there was not a single Greek example in which the series of lines representing the stems or stamens of the flower in Egyptian work was carried round the bell. He could not see any reasons, therefore, for accepting Mr. Stannus's conclusions. He was not in agreement with Mr. Stannus as to some of his dates, and he should like to know his authority for those given in his abstract. If the Corinthian capital of Bassae crowned the column of which Cockerell shows the base and part of the shaft *in situ*, its date would be nearer to 450 B.C. than 380 B.C. (Mr. Stannus's suggestion). According to Pausanias the tholos at Epidaurus was built by Polycleitos the younger, which would bring the date of the capital therein to 500 B.C., ten years more or less, instead of 374 B.C. (Mr. Stannus's acceptance). The Miletus capital was carved about 327 B.C., instead of Mr. Stannus's date, 360 B.C., as, according to Messrs. Rayet and Thomas, the temple of Apollo, near Miletus, was built by Poonios, of Ephesus, and Daphne, of Miletus, 334-320 B.C. As to the column of the temple of Jupiter Olympus, the one blown down in 1852, he was very much interested to see the slide of it on a large scale. He examined it in 1866, and he came to the conclusion that it was too debased an example to be one of the earlier ones. [Mr. Stannus: Probably of Hadrian's time.] Yes. It was no doubt only a copy of an earlier cap. He had much pleasure in proposing a vote of thanks to Mr. Stannus for an admirable lecture, and for the immense trouble he had taken in preparing the slides and in making so many original diagrams.

Dr. Clay briefly seconded.

Mr. Davies also supported the vote of thanks. As an old student of Mr. Stannus, he was very glad to be present that evening.

The Chairman then briefly put the vote of thanks to the meeting, and it was heartily carried.

Mr. Stannus, in reply, said he knew he should catch it from Mr. Spiers, who had a great knowledge of archaeological matters and was very severe in his methods, and would not allow what had been called "the scientific use of the imagination." But a man had to imagine in these matters—to imagine the way in which one should look for things; and that scientific use of imagination really led to finding out things. Mr. Spiers went to Egypt with an open mind, so did he (the speaker); and Mr. Spiers went at the age of twenty, and he (Mr. Stannus) went there when he was over fifty years of age, and after he had been accumulating knowledge on Egyptian matters for twenty years, and he went prepared to see things

and understand the relation they bore to each other. Mr. Spiers said there was no abacus in the Egyptian capital beyond the little block which he (the speaker) should call a scamillus rather than an abacus; but the reason of the construction in the two countries quite accounted for that. In Egypt, if they desired to put a beam on the top of a column, all they had to do was to make a mountain of sand and then to roll the beam up until they got it on to the top of the column; there was no necessity to have any projections in Egyptian capitals, but there was such a necessity in Greece. It was the difference of construction which necessitated the projecting capital in Greece, while it did not in Egypt. Mr. Spiers said we could all design concave capitals. He (the speaker) wished we could. With our present knowledge and with all the textbooks before us we could do a very passable Corinthian one, but in those past days the designers could not, and we must bear that in mind. Just as our architectural students who had rich fathers who could afford it could make the grand tour to France and Italy, in those days there was no France and Italy for the Greek students, and they went to Egypt for their grand tour, and there was no doubt that they picked up wrinkles in Egypt which they could not have picked up elsewhere. A great deal came to them from the Phœnician traders, perhaps through the Ægean isles. Corinth itself was a Phœnician settlement, and this was where they got their bronze casting from. He knew he was trailing his coat on the ground when he spoke about dates; but there were two kinds of evidence about the date of any building or about the date of any solitary odd capital one found in a building. There was, first of all, the external evidence—the evidence of some traveller who was not an expert; Pausanias, Pliny, and Vitruvius were not experts—and, secondly, the capitals he had shown were capitals found in the bulk, and there were sufficient of them to go down one side of the temple. There were odd ones, but there was only one odd one found at Bassæ, for example; and, with all reverence to Professor Cockrell's memory—he was a great man—he ventured to think that he erred in putting every column in the middle. Just think of it! The Greeks were careful to avoid anything like a column in the middle; they always put the void in the axial lines and the columns in the unaxial points! It was a solution which he could not persuade himself the Greeks would be capable of. Dr. Dörpfeld believed that there were two such columns, but the whole of the temple at Bassæ was a little toy of a thing, and the exact distance that the beam would have crossed was 14 ft. 2½ in., and the Greeks, who were accustomed to large blocks of marble, and who had blocks 27 ft. long in some of their temples, could easily bridge over 14 ft. 2½ in. without the necessity of a central column. He was sorry he did not make himself clear about plaster for Corinthian columns. He meant that if they made a Corinthian capital with a bell that it was suitable for plaster; but if they made it with the nobler material, stone, he should disestablish the bell and have done with it.

The Chairman announced that the next meeting will be held on the 30th inst., when Mr. William W. and will read a paper on "The Difficulties Which Beset an Architect in London, wit". Special Regard to Existing Legislation and Other Controlling Authorities."

The meeting then terminated.

THE ARCHITECTURAL ASSOCIATION DISCUSSION SECTION.

THE second meeting of this Section was held on Wednesday evening, October 31 last, at No. 18, Tufton-street, S.W., with Mr. Frank Lishman in the chair. When Mr. Guy M. Nicholson read a paper entitled "Quantities and Cost," of which the following is a summary:—

When builders were comparatively few in number in each town, and the means of communication were not so good as they are at present, builders did not find it any great burden to take their own quantities. As numbers increased, however, and it became the general rule for about twelve builders to compete, it became obvious waste of time for

twelve builders to each take out their own quantities while only one could get the work, the remaining eleven having all the trouble and expense for nothing. It therefore became the custom for the builders to employ one man to take out the quantities for all of them, and to include his charges in their estimate, so that the one who was successful in obtaining the work was responsible for paying the charges, and the remainder only had the trouble of pricing the bills. From the builders' point of view this arrangement was better than the present system, where the surveyor is appointed by the architect for the employer. From the employers' point of view, however, the disadvantages were obvious. Being employed by the builder the tendency was for the quantities to be full, and the client had no check on them.

The next step, therefore, was that in works of any size two surveyors were appointed, one to represent the employer and one to represent the builder, and this still happens on Government contracts of very considerable size, and is, of course, a strictly fair arrangement. More generally, however, it became the practice for the architect to employ a surveyor who prepared the quantities for all his work, and where firms of good reputation are employed, the builders, as a rule, find no reason to grumble with this arrangement. The surveyor has no motive for endeavouring to get the work done at less than its real value, and, therefore, a firm of surveyors with a reputation to lose will always see that the work is fairly represented in the quantities, both as to amount and description and the circumstances under which it will have to be carried out.

The method which seems to work most satisfactorily, on the whole, is that followed by the leading architects, like Sir Aston Webb, Mr. Norman Shaw, and others. Having once tested a firm and found their work to be accurate and reliable, they continue to employ the same firm throughout. The surveyors therefore get a thorough knowledge of their methods and intentions, and the result is satisfactory to the client, the architect, the builder, and everyone concerned.

In the case of very large works intended to spread over a number of years, such as some of the Government contracts for docks, and very large buildings, such as Liverpool Cathedral, it is found more satisfactory to let the work on a schedule of prices, and to have it measured as it is done. Approximate quantities are furnished from the original design, and the contractors tender on this basis, and the prices in the approximate quantities afterwards form the schedule on which the work is measured and valued as it proceeds. In the case of very large work this system works extremely well, and is economical owing to the absence of variations, as the work is only done once, instead of twice, as in the case of extras and omissions. It is a very useful method in Scotland, even for buildings of a moderate size.

The settlement of variations or prices is, of course, one of the most important branches of the work. It is this part of the work which, in my opinion, renders it undesirable that architects should prepare their own quantities. In the case of a small country practice, where the buildings are of small size, and the architect has plenty of spare time, only rough quantities are required, and it may not injure anybody for the architect to prepare them. In the case of a practice of any size, however, it is practically impossible to combine the two. A surveyor who does that work only has the experience gained by dealing with the work of several architects, and being perpetually in touch with the current prices. An architect who only occasionally does any work to quantities, and who does not keep a staff of assistants who are accustomed to the work, cannot of necessity give the client such satisfactory results, and it is very frequently found to be a risky proceeding for a builder to tender on his quantities.

It is generally fair to assume that the methods adopted by the best men in the profession are those which are safest to follow, and one does not find the leading architects endeavouring to combine surveying with their own business, which is a practical proof that they have found it better

not to do so. I think that most firms of architects who have employed surveyors of reputation for any length of time will be quite willing to own that they have received considerable assistance in their work from so doing.

In the case of work done for public bodies it is specially important that the final accounts should be quite clear. Very frequently these have to be again roughly checked by the auditor of the Local Government Board, and if the final accounts are at all roughly prepared, or are so prepared that it is difficult to trace the various items, it gives rise to endless difficulties with the architect, and in some cases leads to his losing his appointment. There is nothing that is of greater importance to an architect's reputation with his clients than the absolute clearness of the final accounts for the buildings.

Mr. N. D. Sheffield opened the discussion by stating that the public do not know what quantity surveyors are, and architects have to explain matters. On the question, "Do quantities increase the cost?" which Mr. Nicholson had said was not so, except in a few isolated cases, he had a case once in which builders were asked to tender upon quantities; the cost came out more than the client would expend, and the work was kept in abeyance. Then the client opened the matter again and asked for fresh tenders upon the drawings, and the tenders were lower. He was bound to say, however, that the builders in the second case were not of the same class as in the first.

Mr. F. Buss disagreed with the idea that quantities increase the cost of building, and said every builder, London or country, naturally never does anything for nothing, and when he has drawings and specification given him, and is expected to give an estimate from those, he invariably charges. Then there was the question where the builder takes on a contract at too low a figure. If he does, he almost always makes this up somewhere afterwards. As to architects preparing their own quantities, many young architects think all they have to do is to go to Batsford and buy a book on quantities, take it home and work it out, and they are then perfectly prepared to take off quantities. The last speaker referred to specifications which quantity surveyors are always delighted to have, but do not always get. What Mr. Buss preferred to do was to go and see the architect and find out what he wants, prepare the quantities, and write the specification from the quantities.

Mr. Jacob spoke of some architects who charged full fees and obtained tenders from surveyors for preparing the quantities, and took the lowest. If they only pay poor fees they are apt to get poor work. And now it is becoming the custom for public bodies to obtain tenders from surveyors and take the lowest.

Mr. S. W. Neighbour referred to the question whether quantities increased the cost of building, and he knew of a case in London where tenders were first invited from drawings and specification, and then, as the price came out rather high, fresh tenders from quantities, and, fortunately, these came out lower. Where the client does get the advantage is in country work, say, from 1,000l. to 1,500l. Country builders are used to that class of work, and their tenders come out low without quantities. In fact, some country builders are not well acquainted with quantities, and if they tender from them their price is often high. For London, to supply quantities to builders is only fair, as many have a great number of buildings to tender for, and even pricing for these costs a considerable sum, and when done they often only get one job in ten that they tender for.

Mr. Dale referred to the quantity surveyor advising the architect as to the specification, and rather demurred to it.

Mr. Jenkins said that when builders take out rough quantities themselves from drawings they object to these being used except as a schedule to price from. He also said they sometimes make a mistake in pricing quantities in moving them out; the question then comes, Should variations be priced at the same price as that in the schedule?

Mr. Hamo thought Mr. Nicholson had looked at the question from the quantity surveyor's point of view. Architects do

think quantities are necessary, and he thought they should have a knowledge of quantities—*not* take out quantities themselves, but know about them. He thought quantities should form part of the contract.

Mr. G. Stephenson pointed out one thing that is often forgotten, viz., that a quantity surveyor has to put in a vast amount of labour, which takes about fifteen years to become acquainted with, and he then becomes a responsible man. Builders themselves look to the surveyor, between the architect and themselves, and therefore a trustworthy man is essential; and surveyors must remember that it is their bounden duty to take their quantities in the best way, and, too, should architects give thoroughly good $\frac{1}{4}$ -in. scale drawings and $\frac{1}{2}$ -in. details. As to the specification, he thought the surveyor should write this in conjunction with the architect.

Mr. Wonnacott said the gist of Mr. Nicholson's argument seemed to be that quantities should be taken out by the quantity surveyor. He thought architects might take out their own quantities, as if they did they knew, if variations are required, where to save cost.

Mr. Turner thought surveyors should write the specification, as architects cannot if they are busy, and architects should tell their clients there is the quantity surveyor, and they must pay his fees.

Mr. Lishman (the Chairman) considered that in many provincial towns where there is not a quantity surveyor the architect is obliged to take out his own quantities.

Mr. R. C. Glead, in summing up the discussion, said that, as a general rule, he did not think an architect should take out his own quantities. As had been said, it takes years to learn. The principles are simple, the practice is difficult, and each single case is different. Quantities must be written in order to be priced. Specifications it would be better for the architect to write himself. As to the question of tendering for public bodies, this is being considered by the Surveyors' Association; it is not the way to treat professional men to ask them to tender one against another. There are many bodies who are pleased to let the architect have the appointment of his own surveyor; others, again, do not like putting all their eggs in one basket, and these put one professional man against another. The main point really is whether quantities increase the cost of building. There is no doubt that architects in the end are for quantities, and this he had found from experience. The preparation of quantities is, as Mr. Nicholson said, counting the cost before you start. If you keep on altering the work you have a schedule, but if you have no schedule he defied anyone to say what could be charged. So that quantities do not increase the fair cost of a building. Where quantities are a disadvantage is for country houses coming to about 1,500l. Many builders know how much they can build per room, and also how much next-door cost, and they can build like next door, and they can follow those lines better than understand quantities.

Mr. Nicholson then replied to various questions asked, and the meeting terminated.

LOAD AND IMPACT TESTS OF A "KLEINE" FLOOR.

On Wednesday, October 31, some tests upon two "Kleine" floors were conducted under the direction of Mr. A. T. Walmisley, M.Inst.C.E., at Irongate Wharf-road, Paddington. Both floors were of similar construction with the exception of the differences stated below.

Floor (A), with the clear span of 13 ft. 1½ in. between supports and the width of 5 ft. 3 in., was built of hollow bricks, measuring 10 in. by 4 in., in a single course, the bricks being laid flat and on edge alternately with the object of forming a satisfactory bond between the brickwork and the layer of concrete constituting the upper portion of the floor. The bricks were laid in 1 : 3 Portland cement mortar, in which were embedded tension bars of steel, about 1½ in. deep by 0·17 in. wide, the joints being transverse to the supporting joists. The sides of the panel were not supported in any way, as the object was that the floor should be tested as a beam, and not as a slab

supported all round. The concrete laid over the bricks to the mean depth of 7 in. was composed of Portland cement, 1 part to 6 parts of Thames ballast.

For the purposes of the tests a layer of sand, 7 in. thick, was spread over the surface of the floor, and upon this timber baulks and rolled-steel joists were laid for carrying the load, which consisted of pig-iron.

At 2·27 p.m. the load of 5 cwt. per square foot was applied, the deflection then being nil; at 2·43 p.m., with the load of 5·96 cwt. per square foot, there was still no deflection. Gradual increase of the load up to 7·4 cwt. per square foot occasioned the deflection of 3/20 in., and at 3·50 p.m., when the load of 7·95 cwt. per square foot had been applied, the floor suddenly collapsed. It was then observed that the hollow bricks had failed, and that the tension bars had been pulled out from one end, but were not broken.

In one respect this test must be regarded as satisfactory, for the floor was designed to withstand the load of 2 cwt. per square foot, with a factor of safety of 4, a condition that was practically complied with. The unsatisfactory point is one that in no way reflects upon the merits of the system. It is that the concrete was mixed in poorer proportions than those specified by the patentees, that it was badly made, and had not properly set at the time of the test. Consequently, it is a fair inference that under more favourable circumstances the floor would have carried a much greater load per square foot.

Floor (B), on which the impact tests were conducted by Mr. Walmisley, had the clear span of 8 ft. 6 in. and the width of 4 ft. It was built of hollow bricks laid as described above with tension bars in the joints, but was not covered with concrete. A layer of sand, 3 in. thick, was spread over the surface, and the load of 4 cwt. per square foot was applied on timber baulks and rolled-steel joists, as before described. The load was next removed, and a stone, weighing 84 lb., was allowed to fall upon the centre of the floor from the height of 8 ft. The weight displaced the sand to the depth of 2 in., but produced no apparent effect upon the floor itself.

The sand was then removed, and the stone was dropped from the height of 9 ft., with the result that the surface of the brickwork was slightly chipped.

On being allowed to fall from the same height and upon the same place for the third time the lower half of two bricks for a length of 1½ in. fell from the under-side of the floor. A fourth fall of the stone caused some of the bricks to be displaced, making a hole in the floor about 8 in. square.

A final impact test was conducted at one end of the same floor, the stone being dropped from the height of 9 ft., with the result that the bottom of one brick fell out and two bricks were loosened, leaving a small aperture of about 2 in. square. In the case of this and the other impact tests, there were no adverse conditions to interfere with interpretation of the results, which must be regarded as distinctly satisfactory.

In commenting upon the inconclusive character of the tests of "Kleine" flooring at the Imperial Hotel in June last, we suggested that future trials ought to be conducted on a more scientific basis. We are glad to observe, therefore, that the patentees have accepted the hint by engaging the services of an experienced engineer to conduct the tests here described.

THE LONDON COUNTY COUNCIL.

The usual weekly meeting of the London County Council was held on Tuesday in the County Hall, Spring-gardens, S.W., Alderman Spicer, Chairman, presiding.

Loans.—On the recommendation of the Finance Committee, it was agreed to lend Battersea Borough Council 10,763l. for electric lighting; and to sanction the borrowing by Islington Borough Council of 3,475l. for a street improvement.

White Hart-lane Estate: Sale of Land.—The Housing of the Working Classes Committee reported that an offer had been received from the Home Workers' Aid Association to

purchase about 11½ acres of land forming the eastern end of the northern portion of the White Hart-lane estate, the price offered being at the rate of 450l. an acre, or about 5,287l. in all. It is understood that the land is required for the purpose of carrying into effect a scheme for the housing in cottages or cottage flats of home-workers who at present reside in rooms in crowded parts of London, the scheme also providing for the conveyance of the work between the workers and their employers. The White Hart-lane estate is about 225 acres in extent, and consists of two detached sections. The northern part contains about 46 acres, and is about 440 yds. distant from the boundary of the southern portion, which is now in course of development. The Committee recommended:—

"That land forming part of the northern portion of the White Hart-lane estate, having an area of about 11½ acres, as shown by red colour on the plan submitted to the Housing of the Working Classes Committee on July 19, 1905, can be disposed of without detriment to the utilisation of the remainder of the estate for the purposes of Part III. of the Housing of the Working Classes Act, 1890, and that the resolution of April 2, 1901, be rescinded in far as it relates to the utilisation of such land for the purposes of Part III. of the said Act."

After discussion, the Chairman of the Committee agreed to take back the report. Several speakers expressed the opinion that the Council would not be making a good bargain, and that the land was worth more per acre.

Suggested Footway Tunnel under the Thames to connect North and South Woolwich.—The Improvements Committee reported as follows:—

"The late Bridges Committee on June 6, 1905, recommended the Council to apply to Parliament in the session of 1906 for power to construct, at an estimated cost of 145,000l., a footway tunnel under the Thames to connect North and South Woolwich. Consideration of the recommendation was adjourned until July 25, when the matter was referred back to the Committee with instructions to report upon the question in twelve months' time. The only present means of crossing the river at Woolwich for either vehicular or passenger traffic is the Council's ferry, and there is no other access between the north and south sides of the river nearer than the Blackwall Tunnel, about three miles westward. It is not possible to increase the frequency of the ferry services, and these under normal conditions are scarcely sufficient to deal adequately with the traffic proceeding across the river at this point. Moreover, in bad weather and during the prevalence of fog the ferry service has at times to be entirely suspended, and on such occasions inconvenience is caused to the public. Apart from the occasions on which the ferry service has to be suspended, the service is necessarily irregular, owing to its being affected by the large amount of shipping passing up and down the river to and from the numerous large docks which are situated to the west of Woolwich. Very many persons of the working class have to cross the river from one side to the other to proceed to their work, and we feel that the hardship entailed upon them at such times is particularly serious. The Bridges Committee suggested that a footway tunnel, about 500 yds. long and about 10 ft. in diameter, similar in design to the Greenwich Tunnel, should be constructed under the river at the point where the free ferry crosses. It would probably not be necessary to acquire any land in connexion with the construction of the tunnel, as the shafts on either side of the river could be sunk under land belonging to the Council, and we have reason to believe that the local authority, the Woolwich Metropolitan Borough Council, would be prepared to consider favourably the question of giving the necessary facilities therefor. We are advised that, in view of contingencies, it would be desirable to increase from 145,000l. to 150,000l. the estimate of the cost of the tunnel. A deputation from the Borough Council has attended before us and strongly urged that the Council may be recommended to apply at once for the necessary powers. There is no doubt that better means of communication across the river at Woolwich would be of great public benefit, but we feel that, in view of the Council's present heavy financial commitments, it would not be justified in applying for power to execute the work at an early date, and we therefore recommend that no action be taken for obtaining in the session of Parliament of 1907 power to enable the Council to construct a footway tunnel under the Thames to connect North and South Woolwich; and that the Woolwich Metropolitan Borough Council be informed of this decision."

An amendment to refer the matter back was lost, and the recommendation was then carried.

London Building Acts Amendment.—The following adjourned Report of the Building Act Committee was then considered:—

"The Council will remember that on the second reading of the London Building Acts (Amendment) Bill, 1905, all parts of the Bill with the exception of Part VIII, relating to the means of escape in case of fire and the reduction of the risk of fire in buildings, were withdrawn by arrangement between the members of Parliament in charge of the Bill and of the City of London (Escape from Fire) Bill, and that on April 4, 1905, the Council ordered copies of a document showing the effect of the Bill on the existing Acts to be sent to the City Corporation, the metropolitan borough councils, and other authorities and associations interested, for their observations

with a view to an amended Bill being introduced as soon as possible. We have for some time past had under consideration the observations received in response to the Council's invitation, but, owing to the magnitude of the work, we have not been able to report to the Council in time for a Bill dealing with all the amendments required in the London Building Acts (Amendment) Act, 1905, shows conclusively that it would be very difficult, if not impossible, to pass in one session of Parliament a Bill dealing with the whole of the amendments required in the London Building Acts. There were, however, in the parts of the Bill which were withdrawn provision dealing with two matters with regard to which we think that an amendment of the law should be sought without further delay. These are the constitution of the Tribunal of Appeal and the method of remuneration of District Surveyors. As regards the first of these matters, the Council on November 25, 1904, resolved that in the Bill to be introduced in the next session of Parliament provision should be made for increasing the number of members of the Tribunal of Appeal from three to five, for one member to be appointed by the Council, but not to be a member of the Council, and for the fifth, to be a barrister of not less than ten years' standing, to be chosen by the other four, and to act as chairman of the Tribunal; also that no architect or surveyor practising in London shall be eligible for membership of the Tribunal, and that the powers of the Tribunal shall be restricted to the limitations of the section under which the appeal is made. The Parliamentary Committee subsequently recommended that that provision should be rescinded, and that a provision should be inserted in the Bill requiring the Tribunal to state their reasons when giving a decision. The Council, however, on December 15, 1904, declined to approve the recommendation of the Parliamentary Committee, and the necessary provisions were inserted in the Bill to give effect to the above-mentioned resolution of November 5, 1904.

The decision of the Tribunal on an appeal from the certificate of the Superintending Architect with regard to the general line of buildings may have a far-reaching effect, and result in a very serious loss to the public of light and air space. Dealing with the Tribunal does with matters of great consequence to the well-being of the general public, it is of the highest importance that its constitution should be such as to inspire absolute confidence in the impartiality of its decisions. As the Council is aware, sect. 175 of the London Building Act, 1894, prescribes that the Tribunal shall be constituted as follows:—One member appointed by the Secretary of State for the Home Department, one by the Council of the Royal Institute of British Architects, and one by the Surveyors' Institution. It appears to us that the interests of the general public cannot be considered to be sufficiently safeguarded by a Tribunal consisting of three members, two of whom are appointed by the professional bodies whose interests are closely connected with those of the owners of land and property, and this objection is intensified when, as is now the case, the persons appointed by the professional bodies are architects and surveyors in active practice.

We have under consideration several alternative proposals for providing an appeal from the Council's decisions, amongst others, that all appeals should go to a County Court judge or judge of the High Court, sitting with two professional assessors or arbitrators, or should be settled by arbitration. The form of Tribunal is one of considerable difficulty, but we are convinced that the Tribunal of Appeal should be such as to be acknowledged by everybody to be the most fitting for the duties which it has to perform, and we therefore hope that the Council will deal with the matter without delay.

With reference to the question of paying District Surveyors by salaries, the London Building Acts (Amendment) Bill of 1905 contained provisions to enable the Council to do this more easily and satisfactorily than can be done under the existing law. As these provisions were contained in the parts of the Bill which were withdrawn, and we thought the matter one of great urgency, we considered whether a satisfactory scheme of payment by salaries could not be established at once. With this object, we submitted a scheme to the Council on January 30, 1906, and February 27, 1906, but our recommendations were referred back for further consideration. It seemed clear from the debate on these occasions that the Council was opposed to the payment by salaries unless and until some amendment of the existing law was obtained, and we therefore think that legislation on the subject should be sought without delay. An additional reason for urgency exists in the fact that a considerable number of District Surveyors' districts are vacant at the present time, and it is desirable that the temporary arrangements made for the supervision of these districts in view of the possibility of securing at an early date legislation with regard to the mode of payment of District Surveyors should be terminated as soon as possible.

These two matters of the Tribunal of Appeal and the payment of District Surveyors by salaries can be conveniently dealt with apart from the others which require attention, and if a satisfactory amendment of the law in these two respects can be secured it will greatly facilitate the work of formulating proposals with regard to the other necessary amendments. In the circumstances we think that a Bill introduced in the next session of Parliament, and which we have informed the Parliamentary Committee, in accordance with standing order No. A. 161 (2), of our intention to recommend the Council to this effect. We recommend (a) that standing orders Nos. A. 161 and 162 relating to applications to Parliament be suspended so far as may be necessary to enable the following recommendation to be considered; (b) that application be made in the next session of Parliament of 1907 for the amendment of the London Building Acts so far as may be necessary to alter the constitution and duties of the Tribunal of Appeal and to enable the Council to establish a

satisfactory system of payment of District Surveyors by salaries.

Mr. Stuart Sankey said there were no satisfactory reasons given for these proposals, and no reasons were given why the changes should be made. If the Tribunal were abolished, what was to be substituted for it? What necessity was there for an Act of Parliament in order to deal with the salaries of district surveyors? These matters had been discussed two or three times this year, and now they were brought up again, and no reasons were given for doing so. The Building Act Committee submitted proposals earlier in the year which set London in a ferment, and all but part 8 had to be withdrawn. The cost of getting that part through was 60,500*l.*, and the cost of opposing the Bill must have been very large. No one had accused the Tribunal of Appeal with incompetence or want of ability, and yet there was this suggestion that they were not impartial, and that they did not possess the confidence of London. He had never before heard such an attack on a judicial body.

Sir Melvil Beachcroft said it would be little short of a scandal to discuss the matter at that hour, and he would move the adjournment of the discussion.

Sir T. Brook Hitchcock seconded, and the Chairman of the Committee agreed to an adjournment.

Electricity in Bulk.—After a long discussion, the Council decided to proceed with the scheme for supplying electricity in bulk, referred to on another page.

Tramways, etc.—On the recommendation of the Highways Committee, it was agreed:—

"That application be made to Parliament in the session of 1907 for the undermentioned purposes, namely:—

(i.) To amend sect. 12 of the London County Council (Tramways and Improvement) Act, 1901, so as to make the provision relating to the obtaining of the consent of frontagers to the alteration or doubling of tramways inapplicable to lengths of line not exceeding 30 ft. each.

(ii.) To amend sect. 12 of the London County Council (Tramways and Improvement) Act, 1901, relating to the removal of sludge, etc., from the Council's tramways.

(iii.) To extend and amend the provisions of the London County Council (Tramways and Improvement) Act, 1896, which relate to the making of by-laws.

That expenditure, on capital account, not exceeding 20,000*l.*, be sanctioned for the provision of special trackwork in connexion with the reconstruction or construction for electric traction, on the centre-sideline system of certain existing or authorised tramways proposed to be undertaken in the near future.

That the offer of the Hadfield Steel Foundry Company, Ltd., of Sheffield, to supply for a sum not exceeding 20,000*l.*, the special trackwork referred to in the foregoing paragraph be accepted."

Sites for Educational Purposes.—On the recommendation of the Education Committee it was agreed:—

"That the necessary steps be taken with a view of obtaining during the session of Parliament, 1907, compulsory powers of purchase over a site in Talbot-grove (Kensington, N.), having an area of about 33,000 sq. ft., as an alternative to the site proposed to be situated in Lancaster-road for the purpose of the provision of a new primary elementary school."

That in connexion with the site mentioned in the foregoing resolution steps be taken to secure the insertion in the Bill of a clause to provide that improvements made in lands or premises after the date on which the Council determines upon the site shall not be taken into account when assessing compensation if such improvements be made with a view of obtaining or increasing compensation payable by the Council, and of the insertion of any other clauses which are usually inserted in improvement Bills or which are necessary to protect the interests of the Council."

"That the necessary steps be taken with a view of obtaining during the session of Parliament, 1907, compulsory powers of purchase over the undermentioned sites, which are required for the purpose of the provision of new primary elementary schools:—

(i.) Paddington, N.—Site of the St. Vincent's Home, Harrow-road, and adjoining house in that road, area about 32,000 sq. ft.

(ii.) Holborn and St. Pancras.—Site in Herbrand-street, having an area of about 27,500 sq. ft."

Repairs to Schools on Schedule of Prices.—The Education Committee reported as follows, the recommendation being agreed to:—

"Tenders have been invited from fourteen contractors whose names are on the selected list for executing repairs to school buildings on the printed schedule of prices in the Greenwich, Lewisham, and Woolwich county electoral areas. Six firms submitted tenders, which were referred to us on October 16, 1906. We recommend that the services of the undermentioned contractors be accepted for carrying out repairs to schools, so far as the buildings only are concerned, in the county electoral areas specified below, on the printed schedule of prices, with percentages added thereto as respectively stated; that each contract be for a period of one year in the first instance, and do remain in force thereafter until determined by the Council; that previous written notice by either party, such notice to expire at any time; that the Solicitor do prepare,

and obtain execution of, the necessary contracts; and that the seal of the Council be affixed thereto, when ready:—

Greenwich—H. Line, 81, Peckham-rye. For repairs measured work, 10 per cent. For sanitary work, 10 per cent. For day work generally, i.e., wages and materials, 15 per cent. Lewisham, Groups I. and II.—H. Line, 81, Peckham-rye.—For repairs measured work, 7½ per cent. For sanitary measured work, 15 per cent. For day work generally, i.e., wages and materials, 7½ per cent.

Woolwich, Groups I. and II.—E. B. Tucker, 82, Lavender-hill.—For repairs measured work, 15 per cent. For sanitary measured work, 15 per cent. For day work generally, i.e., wages and materials, 15 per cent."

Mosaic Panel, Horniman Museum.—The Local Government, Records, and Museums Committee recommended:—

(a) That the special estimate of expenditure on maintenance account, of 135*l.*, recommended by the Finance Committee, in respect of repairs to the mosaic panel on the front of the Horniman Museum, be approved.

(b) That expenditure not exceeding 135*l.* be sanctioned for repairs to the mosaic panel on the front of the Horniman Museum; that the offer by Messrs. Green and Co. to carry out the work for a sum of 110*l.*, and to guarantee its permanence, be accepted; that the Clerk of the Council and the Solicitor do prepare and obtain the execution of a contract to give effect to the offer, and that the seal of the Council be affixed to the contract when ready; and that a fee of 25*l.* be paid to Mr. Anning Bell for supervising the work."

Sir Melvil Beachcroft moved, and Mr. Collins seconded, that the proposal be not agreed to, but the amendment was rejected, and the Committee's recommendations were agreed to.

Piccadilly, near the Circus.—The Improvements Committee reported as follows, the recommendation being agreed to:—

The agreement between the Crown, the P. and R. Syndicate, and the Council with regard to the widening of Piccadilly at the Piccadilly Hotel—namely, between Piccadilly-place and Air-street, provides, *inter alia*, that land shall be added to the public way so as to enable the frontage at the junction of Piccadilly with Air-street and Piccadilly-place to be rounded off instead of the frontages of the buildings in these thoroughfares meeting at right angles. In order that the hotel may be erected to the line provided in the agreement the corners on the Piccadilly frontage of the hotel will have to be cantoned. Mr. R. Norman Shaw, R.A., who has prepared the design of the elevation of the building, has written pointing out that if the corners of the hotel be cantoned, as suggested, the dignity and proportion of the public way will be seriously impaired, and that several architects whom he has consulted concur in this view. He therefore urges that the Council will allow the building to be erected with square angles to the public way. This will necessitate the retention for building purposes of two pieces of land, of an area of about 14 sq. ft. each, which it has been agreed to add, but which has not yet been added to the public way. The Council answers to be one of architectural design, as the retention of these small pieces of land will not interfere in any way with the convenience of the public. It has been agreed that if the Council consents to the retention of this land, the compensation payable by the Council will be proportionately reduced. The Council will remember that Mr. Norman Shaw, who is the senior architect of the Royal Academy, and is one of the assessors in the case of the designs, prepared by selected architects, for the suggested buildings which might be erected in Aldwych and on the present site between Strand and Aldwych, and that he has also agreed to act as an assessor in connexion with the designs for the proposed hotel. The Council is sure that the Council will wish to endorse the opinion of so eminent an authority as Mr. Norman Shaw, when this can be done, as in the present case, without prejudice to the public interest, and we therefore recommend that the proposal to erect the Piccadilly Hotel with square, instead of cantoned, angles at the junctions of Piccadilly with Air-street and Piccadilly-place be agreed to subject to a reduction, proportionate to the area of the land retained for building purposes, being made in the compensation payable by the Council; that the Solicitor do complete the matter; and that the seal of the Council be affixed to any necessary documents."

Retention Money.—The Main Drainage Committee recommended, and it was agreed:—

"That a sum of 1,500*l.* be allowed to W. Kennedy Ltd., out of the balance of the retention money under their contract with the Council for the construction of sect. 1 of the northern low-level sewer No. 2.

"That a sum of 4,064*l.* be allowed to the Westminster Construction Company, Ltd., out of the retention money under their contract with the Council, for the construction of sect. "C" of the southern outfall sewer enlargement.

"That the expiration of six months after the completion of the work, a sum of 1,200*l.* be allowed to Mr. James Smith in respect of the balance of the retention money under his contract with the Council for the construction of the Strand (Green and Hornsey relief sewer)."

Theatre, etc., Works.—The following works were agreed to on the recommendation of the Theatres and Music-halls Committee:—

"Pass staircase from the grand circle to the balcony of the Alhambra Palace, off St. James's-square, and fixing an iron door (Mr. W. M. Brown)."

Electrical installation at the Playhouse, Northumberland-avenue (Mr. E. Wingfield-Bowie).

Fire-resisting curtain, Putney Hippodrome, Felsham-road (Messrs. Vaughan, Brown, & Cook).
Conservatory adjoining the Sportsbank Hall, Sportsbank-street, Catford (Messrs. H. & G. Taylor).
On the walls of the pit lavatory at the Tivoli Music Hall, Strand (Mr. G. H. Dyball).—

Sky Sign, Sloane-square.—The Building Act Committee recommended:—

"That, having regard to the default of the Chelsea Metropolitan Borough Council to take proceedings under the London Building Act, 1894, as empowered by the London Government Act, 1899, to secure the removal of a sky sign on the 'King's Arms' public-house, Sloane-square, Chelsea, the Council, pursuant to the provisions of the London Government Act, 1899, and the Public Health Act, 1891, do determine to institute proceedings in default of such borough council."

The recommendation was agreed to.
Displacements of Persons of the Working Class.—The Housing of the Working Classes Committee reported as follows:—

"In continuation of previous reports on the subject of the displacement of persons of the working class in connexion with the development of private property, we desire to draw attention to clearances effected in the metropolitan boroughs of Lambeth and Stepney and the City of Westminster. As regards Lambeth, seventeen houses containing 116 rooms in Fitzalan-street, Gundulf-street, and Distin-street, have been demolished. The site is being used for a public house, and it is estimated that nearly 200 persons of the working class will be displaced. Four other minor displacements have taken place in the borough, eleven houses in Montpelier, eight in Loughborough-street, six in Walnut Tree-walk, and nine in Penny-street and Mart-street having been demolished. These houses contained 144 rooms, and were occupied by about 250 persons of the working class. Three of the sites are being utilised for the erection of factories and business premises, whilst the last-named is at present vacant. Stepney has also had a considerable displacement of working-class population has been taking place during the past few years from an area about 3 acres in extent adjacent to the Shadwell Fish Market, and belonging to the Corporation of the City of London. The houses on the area, which originally numbered about 150, have been either demolished or allowed to fall into ruin, and as a result only thirty-five are now inhabited. It is estimated that 475 rooms have been destroyed or are unfit for habitation, and that at least 800 persons of the working class have been compelled to remove. In the City of Westminster twenty-nine houses have been either demolished or allowed to fall into ruin, and ten more will probably shortly be demolished in Willow-street and a small thoroughfare known as Buckingham-cottages. Eventually 151 rooms will have been destroyed, involving the displacement of about 200 persons of the working class, and we are informed that the site is being offered for letting on a building lease. On the opposite side of Willow-street an area about 1½ acres, including twenty-seven cottages, occupied by 260 persons of the working class, is being offered for sale, and it is probable that when the property is sold the houses will be demolished. In Chapters-street, and Frederick-street twelve houses, containing seventy-five rooms, with a working-class population of about 110 persons, have been demolished, and on the site are erecting upon the site six houses, each containing six working-class tenements, the total number of new rooms being 126, or fifty-one in excess of the number destroyed."

The Council adjourned soon after eight o'clock.

APPLICATIONS UNDER THE 1894 BUILDING ACT.

The London County Council at their meeting on Tuesday dealt with the following applications under the London Building Act, 1894. The names of applicants are given between parentheses:—

Lines of Frontage and Projections.

Clapham.—The extension of a porch and the erection of two porches in front of houses on the northern side of Larkhall-rise, Clapham, between No. 68 and the London, Brighton, and South Coast Railway (Mr. J. Mayo).—Consent.

Dulwich.—A one-story addition in front of a motor house at "Baldorran," on the western side of College-road, Dulwich (Mr. W. Griffiths for Messrs. B. & J. Co.).—Consent.

Hammer-smith.—The retention of buildings on the eastern side of Pennard-road, Hammer-smith, abutting upon the northern side of Goldhawk-road (Mr. A. W. Hudson for Messrs. Grantwick & Morton).—Consent.

Hammer-smith.—A two-story building at "The White," Wythe-road, Willesden Junction (Mr. A. W. Collins).—Consent.

Kennington, South.—Three wooden oriel windows at the second floor level, and a one-story bay window and porch at the ground floor level in front of No. 52, Cromwell-road, Kennington, and two wooden oriel windows at the eastern front of such building (Messrs. Hampton & Sons).—Consent.

Paddington, South.—Retention of an oriel window at the rear of No. 11, Sussex-square, Paddington, abutting upon Bathurst-mews (Messrs. Hoare & Wheeler).—Consent.

Paddington, South.—Permission to retain an iron and canvas roof over the northern end of

Inverness - mews, Queen's - road, Bayswater (Messrs. Harvey & Potter).—Consent.

St. George, Hanover-square.—Refacing of the front and part of the flank of Bute House, No. 75, South Audley-street, St. George, Hanover-square (Mr. R. Philip for Mr. H. L. Buchoffsheim).—Consent.

Strand.—A projecting oriel window at the second and third floor levels, and three projecting balconies at the second floor level on the Cockspur-street frontage of a building to be erected on the site of Nos. 14, 15, and 16, Cockspur-street, and Nos. 8, 10, 12 and 14, Warwick-house-street, Strand (Messrs. Stock, Page, & Stock for the Direction der Disconto-Gesellschaft).—Consent.

City of London.—An oriel window in front of Nos. 50 and 51, Fetter-lane, City (Mr. W. E. Hazell for Mr. R. Melhuish).—Refused.

Dulwich.—A motor-car shed at No. 206, Upland-road, East Dulwich, to abut upon Crebort-street (Mr. E. G. Young).—Refused.

Kennington, South.—Additions at No. 50, Addison-road, Kennington, to abut upon Napier-road (Mr. E. H. Sim for Mr. G. E. Baker).—Refused.

Lewisham.—The retention of an open shed on the southern side of Loampit-vale, Lewisham, adjoining No. 83 (Mr. G. Attwater).—Refused.

Wandsworth.—A projecting shop at No. 132, Penwith-road, Earlsfield (Mr. T. Aldred for Mr. Andrews).—Refused.

Wandsworth.—Buildings on the eastern and western sides of Harborough-road, Streatham (Mr. C. M. Quilter for Messrs. F. T. Wooding & Son).—Refused.

Width of Way.

City of London.—Buildings on the northern side of Little Somerset-street, City, to abut also upon the eastern side of Harrow-alley (Mr. W. Stewart for Messrs. Millner & Juteau).—Consent.

Camden, North.—A building on the western side of Stupen-street, Camden, to abut upon the southern side of Depot-street (Mr. A. C. Remnant for Mr. S. Lamb).—Refused.

Width of Way and Line of Frontage.

Hammer-smith.—A building on the western side of Willow Way, Uxbridge-road, Hammer-smith (Mr. L. J. Williams for Mr. W. I. Friend).—Consent.

Deviation From Certified Plans.

Hackney, South.—Buildings on the south-eastern side of Cassland-road, Victoria-park, Hackney, westward of Brookfield-road (Mr. G. H. Lovegrove for Mr. G. S. Shaw).—Refused.

Formation of Streets.

Paddington.—The retention of wooden fences or barriers across Biddulph-road and Ashworth-road, on the Paddington estate, Sutherland-avenue, Paddington (Mr. H. T. Steward).—Consent.

Wandsworth.—That an order be issued to Messrs. Taylor & Kensett, sanctioning the formation or laying out of a new street for carriage traffic to lead out of the south side of Blackshaw-road, Tooting, and in connexion therewith the widening of a portion of Tooting High-street and two existing ways out of the south side of Blackshaw-road.—Consent.

Hammer-smith.—That an order be issued to Mr. J. E. Watts, refusing to sanction the formation or laying out of a street for carriage traffic on a site on the northern side of the Mitre-bridge loop line of the London and North-Western Railway, Hythe-road, Willesden (Mr. E. Collins).—Refused.

Space at Rear.

Hammer-smith and Kennington, North.—A modification of the provisions of sect. 41 with regard to open spaces about buildings, so far as relates to the proposed erection of ten houses on the eastern side of Latimer-road, Hammer-smith (Mr. M. Minkler).—Consent.

Kennington.—A modification of the provisions of sect. 41 with regard to open spaces about buildings, so far as relates to the proposed erection of an additional story over the one-story rear portion of the "Derby Arms" public-house, No. 45, Vauxhall-street, Kennington (Mr. W. M. Proudfoot for the Forest-hill Brewery Company, Limited).—Consent.

Strand.—A modification of the provisions of sect. 41 of the Act with regard to the proposed erection of an addition at the first floor level at the rear of No. 161, Regent-street, Strand (Messrs. Bywaters & Sons, Ltd., for Messrs. Edwards & Sons).—Consent.

Deviation From Certified Plans.

St. George, Hanover-square.—A deviation from the plan in connexion with the erection upon the site of Nos. 23 and 24, Bolton-street, an additional story to such addition (Messrs. D. Cubitt, Nichols, Sons, & Chuter).—Consent.

The recommendations marked † are contrary to the views of the local authorities.

Architectural Societies.

MANCHESTER SOCIETY OF ARCHITECTS.—The Annual Report of the Manchester Society of Architects shows that the number of members is now 223 (ninety-eight Fellows, seventy Associates, and fifty-five Students), as against 219 at the date of the last Report. The Society commenced its career with thirteen members, of whom the late Mr. Alfred Waterhouse, then a Manchester architect, was one. How active the Society now is in promoting architectural study is shown by the list of subjects for students' competitions during the ensuing year, which is as follows:—

1. Mr. Beaumont's Prize for the best selection of Measured Drawings and Sketches, drawn in pen and ink, suitable for publication in the Society's Sketch-book. (Due November 1, 1906.)

2 and 3. The best set of Architectural Sketches of places visited by the Society during the session. (Due November 1, 1906.)

4 and 5. The best set of Measured Drawings of old work done during the session. Sketch-book to be produced. (Due November 1, 1906.)

6. Mr. Holden's Prize for a Group of Three Tombs in a Public Cemetery.—It is proposed to place a group of three tombs in an important central position in the cemetery attached to a crematorium; an area of some 650 sq. ft. is reserved for this, suitable approaches will be arranged leading up to it. The tombs are to be to three brothers, eminent respectively as sculptor, soldier, and scientist, and may take the form of small memorial chambers, in which the ashes of the members of their families may be deposited. The Holden Prize is for the encouragement of classical study. (Due February 28, 1907.)

7. The President's Prize.—Mr. J. H. Woodhouse claims this prize for the best set of architectural notes, on matter interesting and useful to an architect. These notes should be as far as possible notes from actual buildings, old and new, illustrating matters of construction and design. (Due March 1, 1907.)

8 and 9. The Entrance to a Formal Garden from a Park.—The garden is enclosed by a terrace wall, bounded by low ornamental wall and balustrade, so that views over the park are obtained by those walking on the terrace. The park is at a somewhat lower level, the carriage-drive being 6 ft. below the terrace. A design is required for the entrance piers and gateway, to combine a carriage-way, 12 ft. 6 in. wide, and steps up to the terrace on either side. The main portion of the design is the gate piers.

10 and 11. The Facade of a Theatre.—In few buildings is the difference between English and Continental architectural methods more conspicuously shown than in the external treatment of the theatre. In a Continental city of any size the theatre, usually subsidised by the Municipality, if not by the State, is one of the most monumental of municipal buildings, recognised as important for the embellishment of the city, and usually set off by adequate space in which it can be seen. In the present design a theatre front after the Continental type is asked for. The ground floor will be devoted to entrances, with vestibule, ticket-offices, and staircases beyond, while the principal floor will be occupied for the whole width of the frontage by the foyer (crush-room) and its adjuncts. The present design is confined to the principal front.

12 and 13. A Club-house for a Society of Architects.—On a site with a frontage of 55 ft. to an important street, with party walls on either side and a narrow street in rear, is to be built a club-house for a society of architects, in which, besides meetings for business and discussion, members can enjoy social intercourse and informal reunions (requirements follow).

14 and 15. A Mural Monument.—The subject of the present design is a memorial to be placed against a wall of a large medieval parish church, and to commemorate one who was especially identified with the study of Gothic architecture.

16 and 17. A Tramway Shelter.—At the suburban terminus of a line of tramway, close to a public park, a shelter is required to afford accommodation for the tramway employees and for cabmen (requirements follow). The building will not be entered from the park, but will be so close to the entrance to the park that its external appearance must be designed to be in some sort accessory to the entrance.

18 and 19. Design for a Market Hall.—Particulars of this competition will be furnished to students attending the School of Architecture Constructive Design Class.

We have quoted some of the principal remarks on the subjects given, to show in what spirit the Society is working. It is to be hoped there will be a good response in all these interesting competitions.

BUILDERS' MEMORIAL TO THE LATE COL. STANLEY G. BIRD, C.B.—A meeting of the subscribers to this memorial was held on Wednesday at the Builders' Institute, 31-32, Bedford-street, Mr. T. F. Rider, Chairman of the Builders' Accident Insurance, Ltd., presiding, at which it was decided, on the motion of Mr. H. H. Bartlett, of London, seconded by Mr. W. Sapcote, of Birmingham, that the money subscribed should be invested in some trustee security, to be called "The Stanley G. Bird Memorial Fund," and be handed over to the Builders' Benevolent Institution, so that the annual proceeds of the fund might be applied in any way which the trustee of that charity might consider most fitting.

Fifty Years Ago.

FROM THE *Builder* OF NOVEMBER 8, 1856.

METROPOLITAN BOARD OF WORKS DEPUTATION TO SIR BENJAMIN HALL.

ON Wednesday last a deputation from the Metropolitan Board of Works waited on Sir Benjamin Hall, at the office of Public Works, with the amended drainage scheme, lately adopted by the Board, and plans of other improvements, for Sir Benjamin's approval.

The engineer, Mr. Bazalgette, was required by Sir Benjamin to enter at great length into the details of his plan, and to explain how it was that a scheme (plan B) already to some extent condemned by the Board (if the reports in the daily press were correct), was now presented for his approval. The subject, he at length said, should have his best and most speedy attention.

The plan for improvements at Covent garden was then submitted by Mr. Marrable to Sir Benjamin, who said he had very serious complaints to make against the Board for not having much sooner given their attention to these improvements, and for now bringing before him plans as to which he was called upon to decide at once, that notices might issue by the 15th instant: it was really too bad, he declared; and indeed, on the whole, it would appear that the deputation was considerably snubbed. The Southwark improvements were another subject, Sir Benjamin said, on which he felt it his duty to talk to the deputation most seriously, and he then recapitulated what he had done, and what the Board had not done, and reiterated his opinion that it was really "too bad." Finally, Sir Benjamin said that if the plans were sent to him on Monday, he would put aside other business and attend to the subject, but hoped such delays would never again recur.

Illustrations.

MONUMENT TO CHOPIN.

THE monument here illustrated has recently been erected in the Parc Monceau, at Paris, to the memory of Chopin, as the result of a subscription opened by a committee of admirers of the eminent composer and pianist, presided over by the former Director of the Conservatoire de Music, M. Theodore Dubois. The monument, which is in white marble, is in the portion of the park near the Boulevard de Courcelles, and almost in the midst of a mass of foliage, which has rather hindered the effect of the photograph. It is the work of M. J. Froment Meurice, one of the best of the pupils of Chappu. The figures—the winged genius of music above and the disconsolate figure in grief below—sufficiently explain themselves.

Whether a representation of the realistic figure of Chopin, in the everyday costume of his period, grouped with these two idealised figures, is a happy inspiration may be a question; but there is a fine and what may be called a Chopinesque feeling in the work as a whole.

NEW CHURCH, BOURNEMOUTH.

The illustration is reproduced from a drawing which was hung at the last Royal Academy.

The plan shows that it is planned on the system of having narrow aisles for passage only. The original and picturesque treatment of the tower and of the square mass at the east end, rising high above the nave, with its belfry, will strike every one.

Mr. Gilbert Scott is the architect. We presume, from the presence of confessionals in the plan, that this is a Roman Catholic church, though it is not so stated in the title.

CLIFTON MAUBANK.

SKETCHES or photographs of this fine old XVIth century manor-house, once the seat of the Horsey family, have several times appeared in the *Builder*. The remaining habitable portion of the old house formed a nearly square block, the west and south fronts of which were illustrated in your issue of August 27, 1904. South east of this lies another building, partly ruined, apparently of a slightly earlier date.

The excavations made in connexion with the additions to the house now in progress have thrown no light upon the subject, but it appears probable that these two portions were connected by the great hall and other buildings. This connecting link apparently became ruinous under the thriftless guardianship of the later Horseys, and, when the property at last fell into other hands, its state became still worse, since they saw no value in the beautiful stonework except its market value as building materials, to which end they pulled down this part.

The main front of the great hall was bought by the Philips family, and re-erected at Montacute, where it has grown into its surroundings, and forms not the least charming portion of a fine old house. This also was illustrated on August 27, 1904, and the delicately beautiful carving is worth careful study.

There is so little record or tradition that the evidence of the house itself has chiefly to be relied upon in forming any conclusions as to its history.

Somewhere about the end of the XVIIth century Clifton Maubank evidently underwent a very drastic alteration. Whether from the diminishing fortunes of its original owners or some other reason, it appears as though the possibility of forming a smaller self contained home out of the western portion of the house had occurred to the owner. At all events, this part was "modernised," and the mullioned windows mostly done away with, and large wide-barred sash windows substituted; whilst, to prevent any restorer from recurring to the original form, one room was finely panelled in bold oak work, and others in tamer and probably later deal.

Perhaps then the disused portion fell into decay, a possible reason, but no excuse, for the actions of the succeeding owners. Not content with mutilating the house, they also sold the gatehouse, ascribed to Inigo Jones, which now stands in the park at Hinton St. George. The chapel, of which the only traces now existing are slight markings in the grass, near the road gate, apparently existed, although in a ruined state, until the last century.

The north and east fronts of the present house possess no special features. It is therefore here that the additions are being built: the only parts pulled down being some last century kitchen offices. Certain carved stone doorways in this portion have to be moved into other positions, but with these few exceptions the old house is not altered. In the south front of the additions it has been decided to use sash windows, preserving unity with the existing house; on the north and east fronts, however, the few old windows are mullioned, and advantage of this is taken in the new work.

The illustration shows the original design for the work, which has had to be materially modified in carrying out. The detached and

ruinous building will be repaired. This will entail the removal of some of the ivy, now so picturesque though destructive a feature, but within bounds it will be permitted to remain. At the further corner of the fine grass court, which lies west of the house, is a little Georgian garden house, long abandoned to the use of numerous geese and hens; its sash windows and plaster panelling are much damaged, but sufficiently existent to need repair only. A bleached and weathered oak Jacobean arched head, with daintily-carved satyrs, has formed a portion of the door, and under better conditions will probably fulfil the same purpose again.

In order to avoid harsh contrasts to the old works, the stonework, tiling, etc., for the new buildings will, as far as possible, be obtained from the walls and buildings around.

The contractors for the alterations are Messrs. Henry Martin & Sons, of Northampton.

EDMUND WIMPERIS & BEST.

BEACHAMWELL HALL.

This house is in course of erection to replace the old hall, burnt down in 1902.

It has been rebuilt nearly upon the former site, and, owing to the fact that the original stabling, which stands close to the house, is faced with white brick, the same material has perforce been adopted for the new house, but when weathered and with ruddy Broseley tiling for the roofs, and with painted wood cornice, outside window frames and sun shutters, the general effect should not be unpleasant.

The contractors are Messrs. Martin, of Northampton, and the architects are Messrs. Edmund Wimperis & Best.

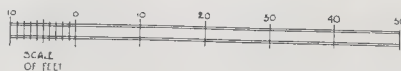
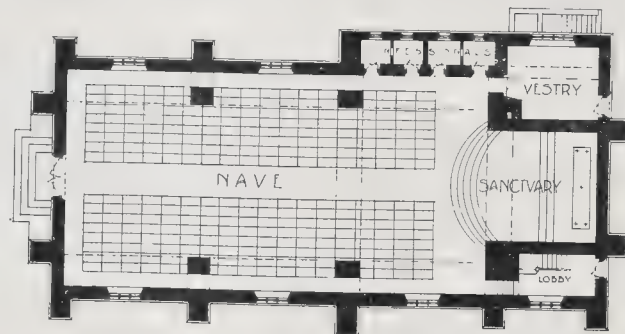
BANGOUR VILLAGE LUNATIC ASYLUM.

In 1898 the Act regulating the provisions to be made for the insane poor was acknowledged by the Edinburgh Lunacy Board, who framed (under the advice of Commissioner the late Sir John Sibbald) a series of instructions, and invited competitive plans for an asylum, to be built on the "segregate" system. An excellent and open estate was acquired near Uphall.

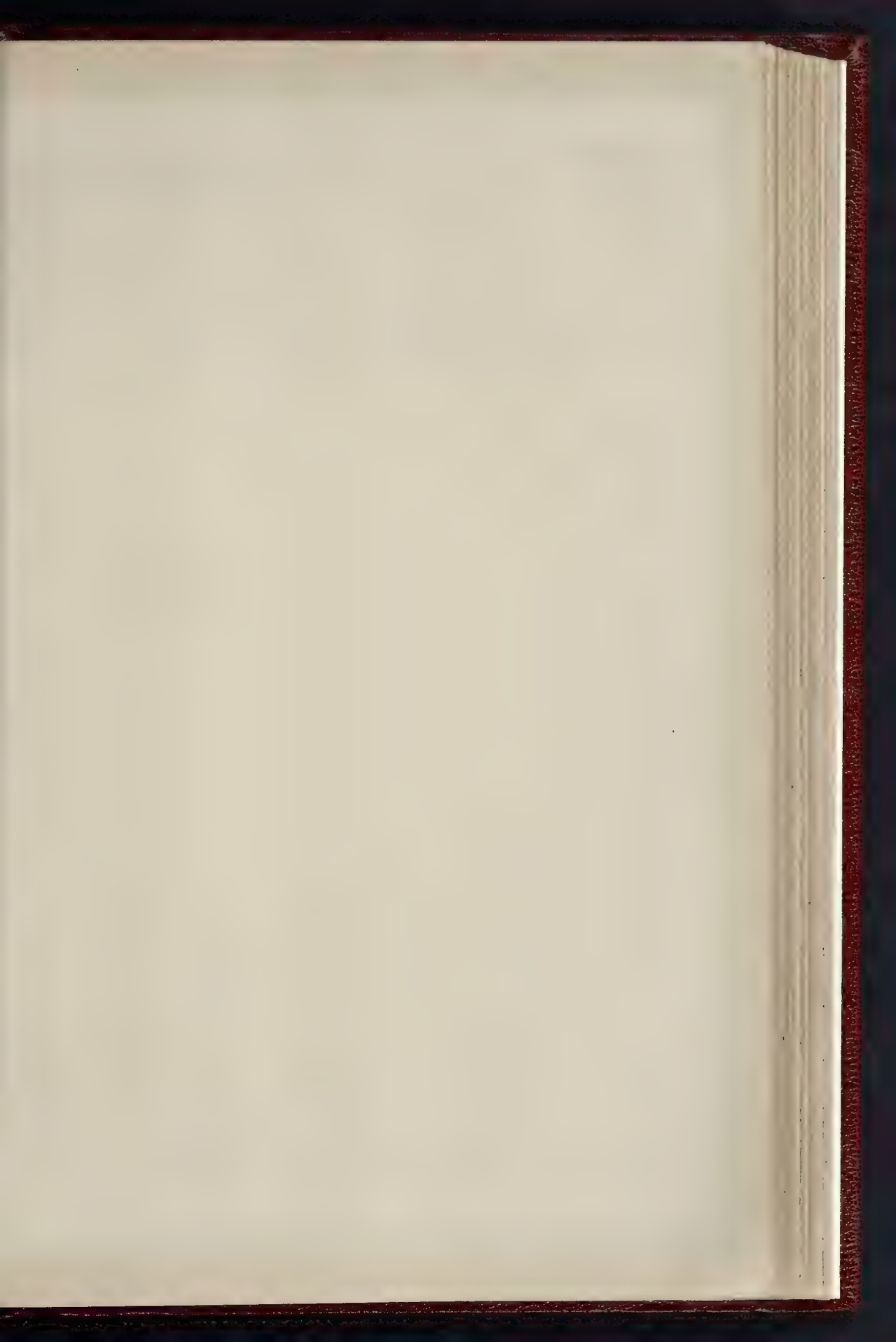
About thirty competitors entered, and upon a report by an architectural and a medical expert, the scheme submitted by Mr. Hippolyte J. Blanc, R.S.A., was recommended and adopted.

Differing from the manner of arrangement of existing asylums, which is that known as the "pavilion or block and corridor system," the arrangement of this asylum follows the suggestions offered by that of Alt-Scherbitz, in Saxony, which is composed of a series of detached buildings, distributed without formality or attempt at regularity. This is termed the "villa or segregate system."

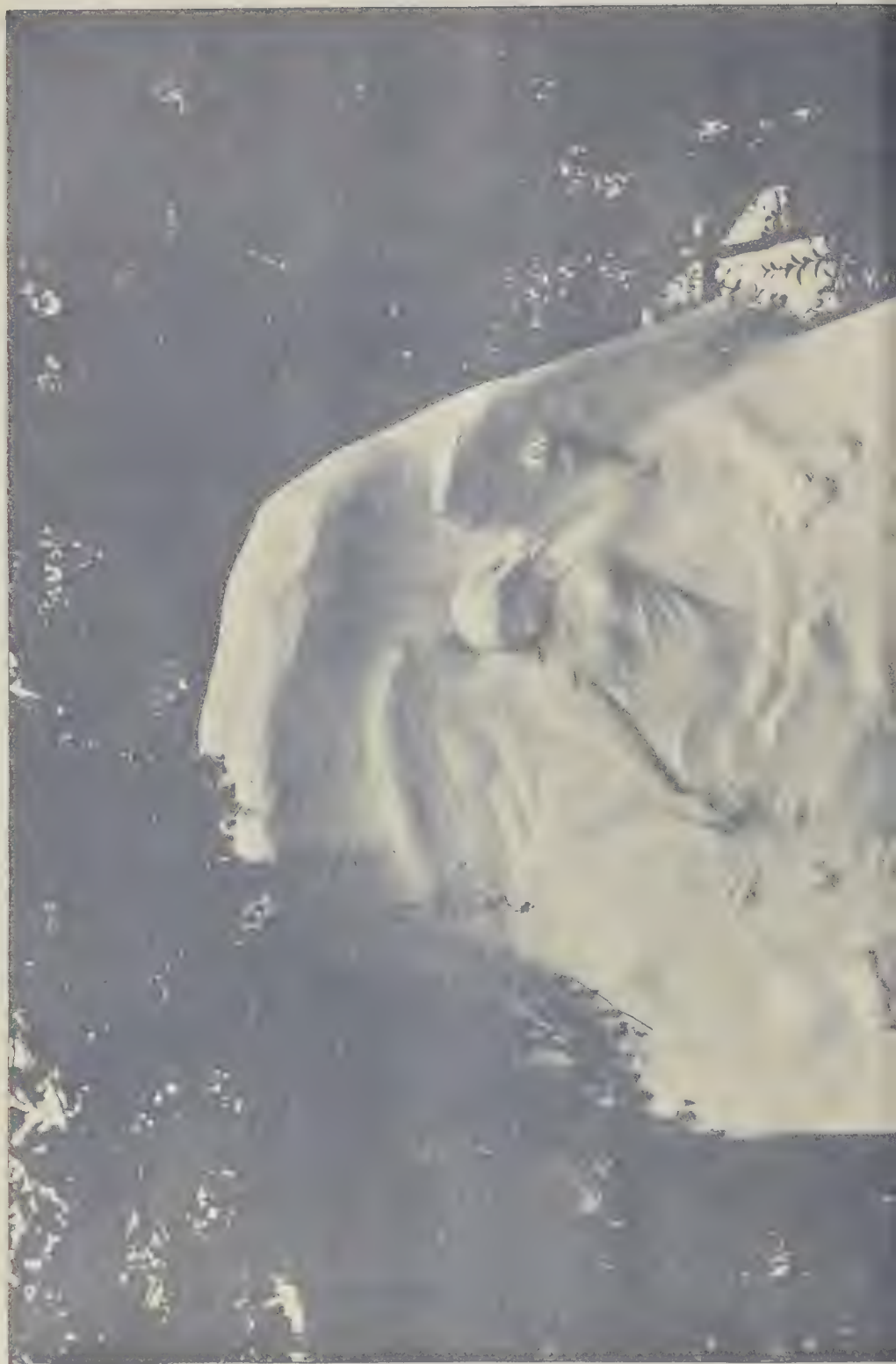
A chief feature in the scheme is the avoidance of everything suggestive of restraint,



New Church, Bournemouth. Plan.



THE BUILDER NOVEMBER 1912





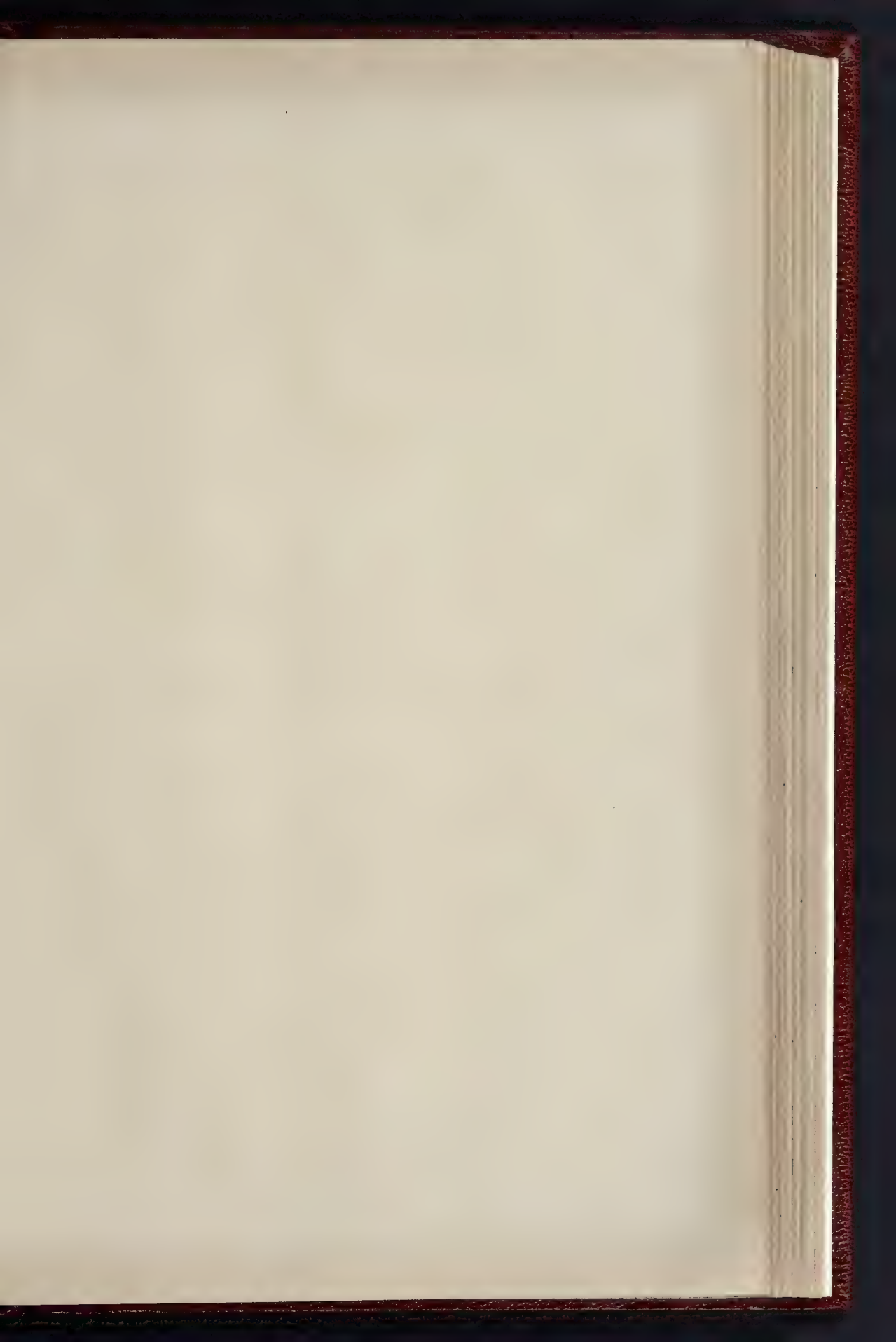
MONUMENT TO CHOPIN, IN THE PARC MONCEAU, PARIS - M. J. FRÉMY, MUSEUM, N. 111



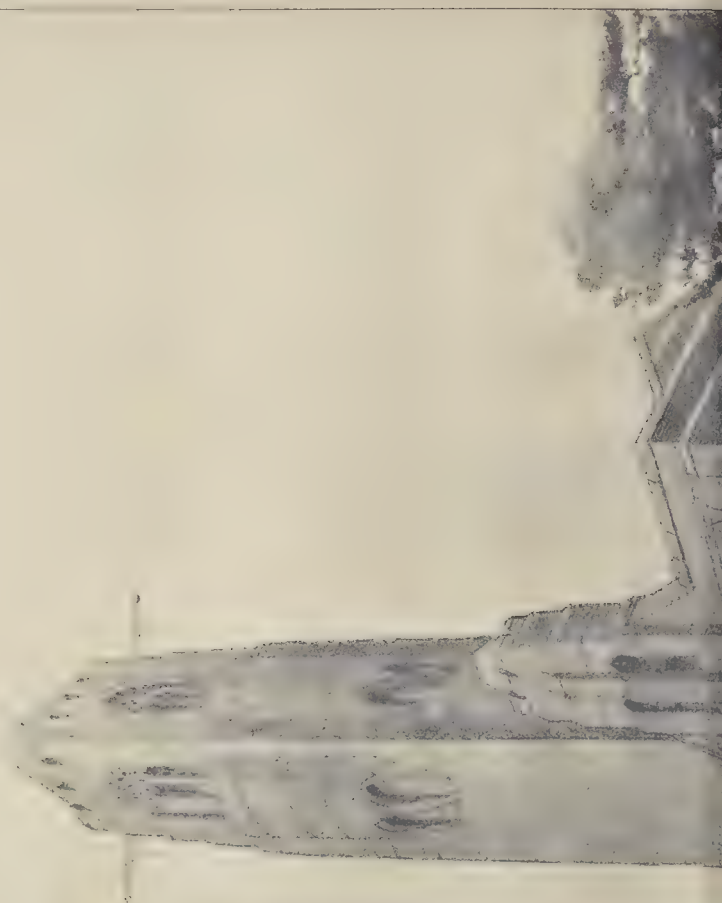
THE BUILDER, NOVEMBER 10, 1906.



UNIVERSITY OF MICHIGAN

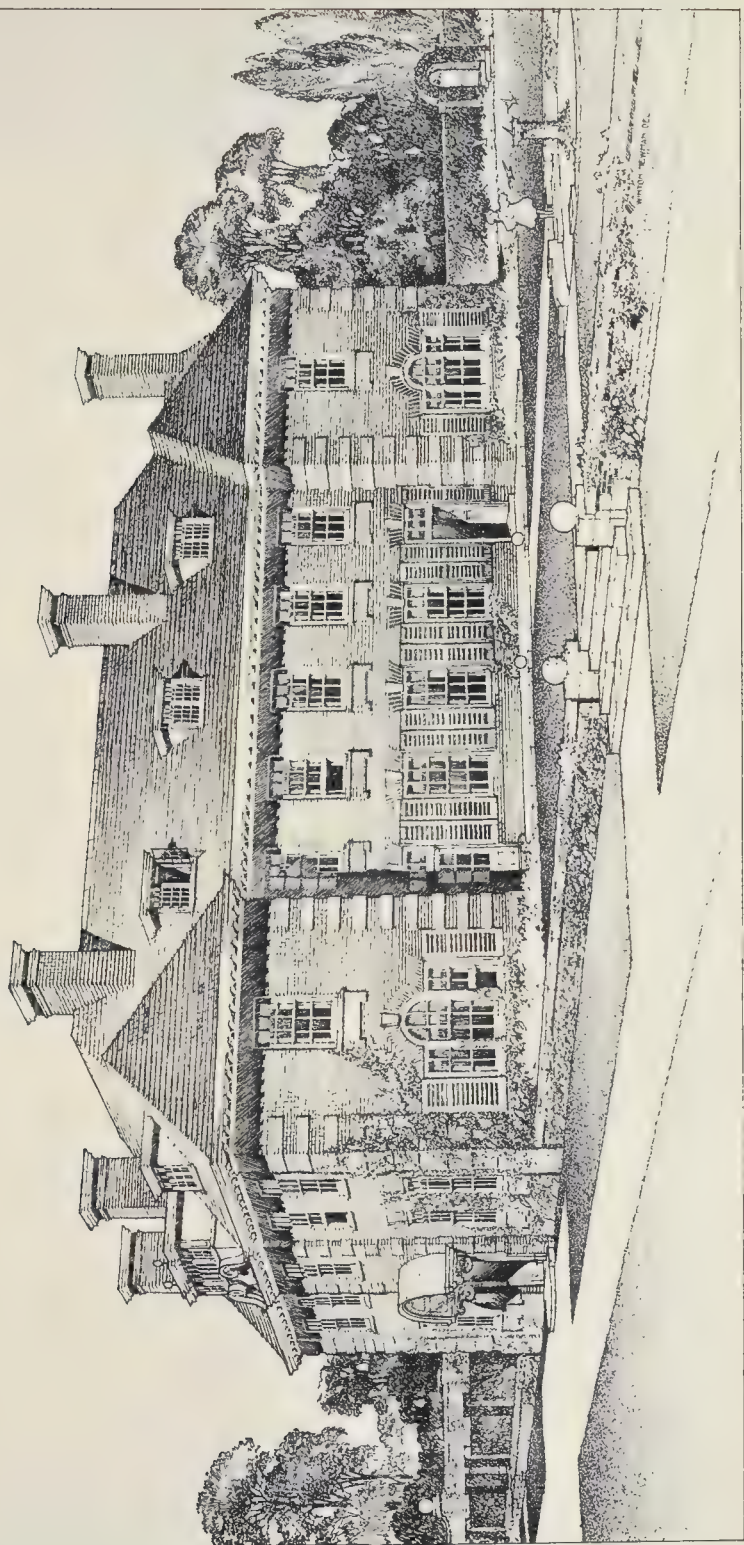


THE CHURCH, NOVEMBER 10, 1901.





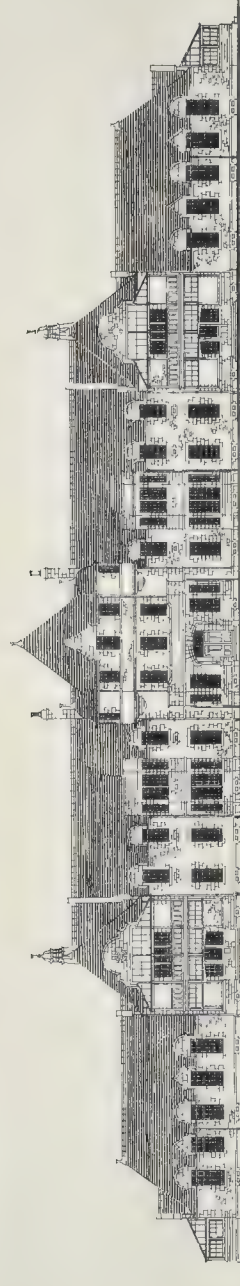
NEW CHURCH, BOURNEMOUTH.—MR. G. GILBERT SCOTT, ARCHITECT.



BEACHAMWELL HALL.—MESSRS. WIMPERIS & BEST, ARCHITECTS.

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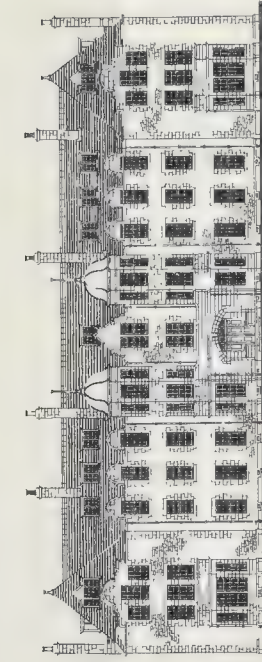
HOSPITAL BLOCK.



HOSPITAL BLOCK.



NURSES' HOME.



NURSES' HOME.



such as enclosing yards. The buildings are of comparatively small accommodation, and with their surroundings are treated with such variety of form and environment as to destroy all appearance of official residence.

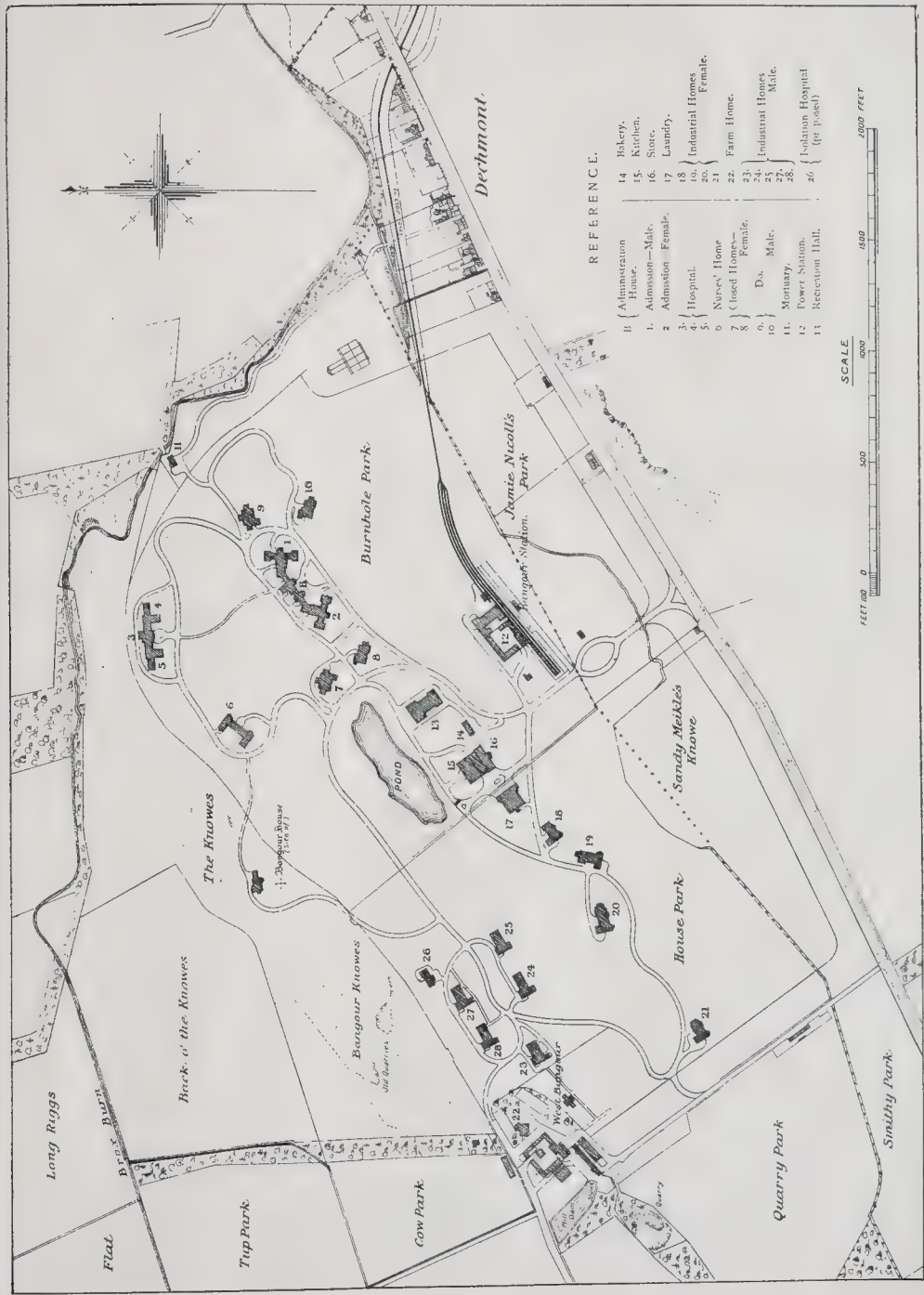
The buildings are of simple, natural design, in strict adherence to the internal arrangement of the plans. Interest is imparted by variety of external treatment in exposed

stone, harling, tiled and green slated roofs. A fair architectural effect is obtained by simple variations in form, without superimposed decorative details.

The main divisions of the whole groups are the "medical section," on one (the east) end of the estate, and the "industrial section," on the west. Between the two sections are (in separate buildings) the washing-house and

laundry, the kitchen, and stores, and the bakery. Adjoining these there is a large group of buildings, providing accommodation for boilers, coal stores, engine, dynamos, and accumulators, together with a series of workshops for the male patients practising their respective trades.

On the eastern section of the estate is the administration house, and, connected to it,



REFERENCE.

- 14 Bakery.
- 15 Kitchen.
- 16 Store.
- 17 Laundry.
- 18 Industrial Homes Female.
- 19 Industrial Homes Male.
- 20 Farm Home.
- 21 Industrial Homes Male.
- 22 Industrial Hospital (for post).
- 23 Reception Hall.
- 24 Power Station.
- 25 Mortuary.
- 26 Dr. Male.
- 27 Closed Homes—Female.
- 28 Nurses' Home.
- 29 Hospital.
- 30 Admission—Female.
- 31 Admission—Male.
- 32 Administration House.
- 33 { Administration House.

Bangour Village Lunatic Asylum : Edinburgh District. General Plan.

THE WHITWORTH ART GALLERY, MANCHESTER.—New buildings are being added to this institution. The three galleries, which were built in 1894 and 1897 at the back of Grove House, are already, according to the *Manchester Guardian*, too small to house the collection of the Institute. During the last year three rooms, each about 80 ft. by 30 ft., have been built on the west side of the central gallery, from which they will be entered. All these rooms have circular ceilings and roof principals designed so that nothing appears below the line of the ceiling, and are lighted from skylights on each side of the roof. When Grove House and the front corridors have been pulled down there will be erected in their place a large range of buildings to complete the façade on the east front. The new façade will be built of thin red bricks and terra-cotta to correspond with the present galleries. The entrance hall will be only one story in height, with a flat roof, so as to admit the light freely to the sculpture hall, which will be behind it. The two bays (over the staircases) will be carried up as square towers. The internal arrangements are as follows—Inside the porch there will be a vestibule leading into an entrance hall, 33 ft. 4 in. by 33 ft. 4 in., the ceiling of which will be divided into panels by beams carried on polished grey granite columns, and in the square central panel will be a glass dome to the entrance hall. On each side of the hall will be cloak-rooms. A doorway from the entrance hall will give access to a sculpture hall, 102 ft. 6 in. by 33 ft. by 20 ft., high-lighted from high windows along each side of the whole length; the two end walls are arched with three arches carried on polished granite columns, giving access to the present north and south galleries and to two staircases leading up to the upper floors; beyond the staircase hall, at each end, is a square pavilion, 33 ft. by 33 ft., the one to the south on the ground floor to be used for official rooms, and the one to the north for exhibition purposes. From the sculpture hall, in a line central with the front entrance, a doorway will lead into a corridor giving access to the present central gallery, and on each side of this corridor will be a top-lighted gallery for exhibition of textiles, etc. The upper floor will contain library, council chamber, and exhibition-rooms. Each of the two staircases gives access to the basement, which will contain, in addition to the present galleries, rooms for the staff, a strong room, and storage for chairs, etc., and a connecting corridor between the north and south basement galleries. The architects are Messrs. J. W. Beaumont & Son, of Manchester.

PROPOSED PUBLIC IMPROVEMENTS, MANSFIELD.—On the 1st inst. Mr. H. R. Hooper, an inspector of the Local Government Board, held an inquiry at the Mansfield Town Hall relative to the application of the Town Council to borrow the following sums: 15,000*l.* capital for the gas undertaking; 8,000*l.* for the electricity undertaking, partly in connexion with the provision of current for the Light Railway Company; 480*l.* for the completion of the Rosemary-street improvement; and 2,870*l.* to meet expenditure on the baths in excess of the original loan. The Rosemary-street improvement was first dealt with. With regard to the 2,870*l.* required for the baths, the Town Clerk explained how the old baths came into the possession of the Corporation, and then the Borough Surveyor explained some of the items of additional expenditure. Regarding the sum of 8,000*l.* for the electricity department, the Town Clerk stated that under the order of the Mansfield and District Light Railway Company the company had to take from the Corporation the current required for their system. The company opened their lines during the middle of last year, and since then the demand for current had very largely increased. The various items of expenditure were gone through by Mr. R. W. Hammond, one of the consulting engineers.

PROPOSED POLICE STATION, TEIGNMOUTH.—On the 31st ult., at the Town Hall, Teignmouth, Mr. W. O. E. Meade King, Local Government Board Inspector, opened an inquiry into the application of the County Council to borrow 4,000*l.* for the erection of a police station. In the course of the inquiry Mr. Harbottle, the architect, stated that the plans for the building provided for three cells, a sergeant's residence, and rooms for two constables.

PROPOSED EXTENSION OF EDINBURGH COURT OF SESSION.—So far as is known in the Parliament House, a final decision on the part of the Government authorities with regard to the proposed extension of the Court of Session has not been arrived at, but tentative plans, prepared by Mr. Oldrieve, of the Board of Works, and showing improvements in the Outer House, are under consideration. It is understood that the proposals embrace the erection of two new Courts, in substitution of two of the present Outer House Courts. These new Courts will, it is believed, be erected on the vacant ground between the present building and the Cowgate. It is projected that they will be large and spacious, and suitable for jury trials and other judicial inquiries involving the necessity for larger accommodation than the existing Courts afford.

Underneath it is proposed to arrange rooms for witnesses and for restaurant purposes, and the suggestion has been made that the communicating stair should be so placed that witnesses will reach the Courts with the least possible delay. The construction of the access to the new building will necessitate the removal of the two centre Courts of the Outer House, and the space not required for the corridor will be available for apartments which may be used by officials. —*Scotsman.*

PUBLIC HALL, SUNDERLAND.—The work of enlarging and improving the Victoria Hall at Sunderland, which has been carried out by the Corporation, has now been completed. The alteration to the large hall consists of a new platform end, the old north wall having been taken down and rebuilt 6 ft. further back. A curved wing is built on each side of the platform, united at the top by an enriched beam. The organ is carried on girders across the back. The ceiling is panelled and enriched with raised plaster panels. The whole of the walls, curved wings, ceilings, coves, and pilasters are coloured and decorated. Cloak, retiring, and smoke rooms are attached to each part of the hall, and on the basement floor are retiring-rooms for the male and female chorus. An octagonal tower has been erected at the north end of the building, and contains the emergency stair to the small hall and banqueting hall. The ground floor is taken up by the banqueting hall, 54 ft. by 33 ft., and capable of seating 220 people. Kitchen, scullery, and pantry accommodation is provided. The small hall covers the first floor, and is 66 ft. by 33 ft. It is fitted with a gallery, and has seating room for 700. There are cloak and retiring rooms attached to this hall also. The hall is built of special red brick, with all the dressings of stone, and the roof is covered with green Westmorland slates. The architect was Mr. John Eltringham, Sunderland.

ASSURANCE OFFICES, NEWCASTLE.—New offices, designed by Mr. F. T. Walker, architect, of Newcastle, will shortly be erected on a site in Mosley-street for the Edinburgh Life Assurance Company. The building will be 94 ft. high, and will have a frontage of 47 ft. 6 in. The front will be of polished red Peterhead granite up to the first floor; and, above, of Fordingham freestone from the Fourstones quarries. On the basement there is to be a restaurant 60 ft. by 40 ft., and 29 ft. high, with an entrance from Grey-street. On the ground and remaining floor the offices will be placed.

Sanitary and Engineering News.

MANCHESTER WATER SUPPLY.—During the last fortnight the stock of water in the Manchester Corporation reservoirs at Longdendale has increased from 2,565 million gallons to 3,489 million gallons. The Engineer of the Manchester Waterworks (Mr. G. H. Hill, C.E.) is engaged on the preparation of plans for the reservoir to be constructed at Heaton Park, and it is expected that within a short time the Waterworks Committee will be in a position to advertise for tenders for the work. The reservoir is not expected to be completed for five or six years. It is a work altogether apart from the laying of the third Thirlmere pipe which has already been decided on. It will be fed, in fact, by the two Thirlmere pipes already in use. These now discharge at Prestwich, not far from Heaton Park. The third will branch off from the existing Thirlmere pipe track at Little Hulton, and be brought to Audenshaw, which is on the south-east of the city, while Heaton Park is at the northern extremity. The Heaton Park reservoir will hold 500 million gallons, which is equivalent to about one-twelfth of the total capacity of the existing reservoirs at Longdendale in the gathering grounds, and the storage reservoirs at Godley, Denton, Audenshaw, Gorton, and Prestwich.

BRIDGE, THORNABY.—Mr. W. J. Cudworth, Chief Engineer of the southern division of the North-Eastern railway system, has supervised the plans for a new bridge to carry the passenger lines across the Tees near Thornaby. The bridge, to be built by the Tees-side Bridge and Engineering Works, Ltd., of Middlesbrough, is after the three-girder type, having rolled steel joists and heavy sectional steel-work, manufactured in the Cleveland district. For the construction will be utilised the masonry piers of the existing bridge, which was built sixty-five years ago by the Stockton and Darlington Company, with timber flooring laid upon four cast-iron girders over each span, the three river spans being 89 ft., and the two shore spans 31 ft. The continuous girders are strapped and bolted over the piers, and are strengthened with tension straps of wrought-iron.

SEWAGE WORKS, ILFORD.—An inquiry has been opened by Mr. A. A. G. Malet, at Ilford Town Hall, on behalf of the Local Government Board, into

the application of the Urban Council to borrow 25,000*l.* to meet the cost of sewage disposal works. Mr. Shaw, Surveyor to the Ilford Council, gave evidence, and stated that the proposed covering works would probably remove the nuisance which, it is alleged, is occasioned to residents in Barking by the existing sewage works.

Foreign.

FRANCE.—The Conseil d'Etat has refused to sanction the loan of 32 million francs required for the formation, at Bordeaux, of a large street between the Gare du Midi and the Place de la Comédie. The Municipality of Bordeaux will therefore be prevented from realising a scheme which has in fact given rise to strong protests, and which would have had the effect of practically destroying the most ancient and interesting portions of the city.—An exhibition of decorative art, which will include a section of "Art Rustique" (whatever that may mean), is to be held in the Pavillon Marston at the Exposition of the Union Centrale des Arts Decoratifs, from November 16 to December 31.—A monument to the memory of those who fell in the war of 1870 has just been erected at Neuilly. The design shows the figure of a young woman, symbolising *La Patrie*, seated on a cannon and looking into the distance with an air of anxiety, while she supports a dying soldier shrouded by the national flag. The arms of Neuilly are sculptured on the pedestal. M. Verlet is the sculptor, and M. Achille Colle the architect.—The jury concerned with the competition for the construction of artisans' houses has awarded the first prize to M. Boudinaud, architect, of Marseilles. The Municipality of Tarare are having a steel bridge built over the Rhone, at an estimated cost of 106,300 francs.—The Municipality of Saint-Germain are having a Salle des Fêtes built, at an estimated cost of 261,000 francs.—A new college for girls, to cost a million francs, is to be built at Orléans, in the faubourg de Bourgogne.—A sum of 700,000 francs has been voted for a barrage across the Touques, at Deauville, with the establishment of a foot bridge.—A marble statue of Hercules has been discovered on a private property in the neighbourhood of Pertuis, which is attributed to the monument to the memory of the Republic of Revolt, the architect is to be inaugurated shortly at Nîmes.—The President of the Republic recently laid the first stone of the works for carrying out the canal from Marseilles to the Rhone. The total cost of the canal is reckoned at about 70 million francs.—The railway company of the Midi has been commissioned to construct the three lines to be carried out across the Pyrenees, between France and Spain.—The death is announced of M. Basinet, Engineer-in-Chief of the Department of Ponts et Chaussées. He had been commissioned to prepare a scheme for the proposed sea-to-sea canal ("canal des deux Mers"). The death is also announced, at the age of 70, of Jean Benoit, the painter, a pupil of Eck and of Pils. He made his debut at the Salon in 1859 as a flower-painter, but subsequently devoted himself to portraits and to genre pictures. He exhibited every year at the Old Salon. Among his works may be mentioned "Après une Tempête à Gênes", "Ateliers de Sculpteurs", "Les Pêcheurs", "L'Alsace", "Jeune Fille à la Fontaine"; portraits of M. Siegfried and of Bartholdi, the sculptor; and (in this year's Salon) "Roses Blanches à Taormina." He had received medals at the Salons of 1872, 1889 and 1900, and a decoration in 1894.

GERMANY.—The Third Art Exhibition held in Dresden shows many interesting examples of internal architecture and decoration. In fact, the watchword of this exhibition may be styled German "Raumkunst," or internal decorative art. The word "Raumkunst" is new, but the spirit of the style is only a revival of the ancient spirit, when three considerations ruled the design, i.e., the want to be supplied, the nature of the material used, and the personality of the artist. The art is, however, international rather than German, and impartial critics must allow that the most successful examples recall involuntarily that English work which a couple of decades ago gave universal delight by its originality and unusual charm. The exhibits include ecclesiastical interiors—Roman Catholic, Protestant and Jewish, the different treatment being, however, hardly characteristic of the various beliefs, besides fitted-up private apartments and public halls. Professor Henry van de Velde's octagonal hall for a museum is, perhaps, the finest piece of decoration exhibited, if technical errors be overlooked, such as carrying mighty marble pillars on wooden plinths, and so forth.

ITALY.—The old Guildhall, Bologna, a Gothic building with an open loggia dating from 1422, has been purchased by the city, and is to be restored. The whitewash has already been removed from the ceiling of the great hall and

brought to light Bartolomeo da Rimini's paintings.—Professor Giacomo Boni has just completed the restoration of Trajan's column. Fifteen pieces of marble had to be replaced, as an angle of the pedestal had been damaged by the fall of the bronze statue of the Emperor from the top of the column. The foundations were also strengthened by filling up a large cavity or grotto which had been dug out in the Middle Ages and used as the graveyard of the Church of St. Nicholas under the column.—The bronze doors to the central portal of Milan Cathedral were recently unveiled and consecrated. They are the design of Professor Ludwig Pogliaghi, who won the work in competition. The panels depict scenes from the life of the Virgin. The doors weigh 17.75 tons.

GREECE.—The Greek Government is about to undertake important works with regard to the water supply of Athens, which at present is brought 16 km. and is deficient in quantity and quality. It is proposed to bring the water 160 km. from Lake Styμφalia, in which case the supply would be sufficient for the towns of Athens and Piræus, and also for the waterless plain of Attica. Three societies are trying to secure the contract; one composed of French capitalists, one of English financiers, and the third of French and English bankers.

Miscellaneous.

NEW CLOCK, HIGH CROSS CHURCH, HERTS.—A fine eight-day hour-striking clock, showing the time upon a 5-ft. dial, has just been erected at this church by Messrs. Wm. Potts & Sons, of Leeds and Newcastle-on-Tyne. All the wheels are of gun-metal cut on engine from the solid, and solid steel cut on the lathe, and are hardened and tempered. The clock has Lord Grimthorpe's double three-legged gravity escapement and compensation pendulum, with a 2-ewt. cylindrical shaped bob and other improvements inserted.

FURTHER STRAND IMPROVEMENT.—A meeting of the Further Strand Improvement Committee was held on Saturday last at 1, Pall Mall East, Lord Kinnaird in the chair, when a letter, dated November 2, was read from the Clerk of the London County Council as follows:—"I have to inform you that the Council has come to no recent decision with regard to the frontage of the Strand at the south-eastern corner of the crescent site. The Improvement Committee in July last submitted a report advising the Council to confirm its decision of October 20, 1903, to the effect that no alterations be made in the frontage. This report was, however, withdrawn, and the matter is being further considered by the committee. Any decision which the Council may pass will be at once communicated to the Further Strand Improvement Committee." Mr. Mark H. Judge, honorary secretary, proposed the following resolution:—"That, as the whole of the middle and eastern sites between Aldwych and the Strand are still in the market, this committee hereby resolves to make an offer to the London Council for the purchase of 300 ft. of the frontage at the present site, next the Strand, for the erection of a building 30 ft. high in order to demonstrate how buildings on the present line of frontage would mar what might otherwise become the noblest thoroughfare in the metropolis, leading to and from Buckingham Palace, the Houses of Parliament, Westminster Abbey, the National Galleries, the Royal Courts of Justice, and St. Paul's Cathedral; that the offer be a sum of 50l. for the use of the frontage for three months, and for such further period the County Council may be willing for the hoarding to remain, a rental at the rate of 600l. per annum." Mr. Hutchinson Harris seconded the resolution, and, after discussion, it was adopted unanimously.

THE FIRE AT SELBY ABBEY.—According to the *Yorkshire Post*, an official inquiry was to be held on Friday this week into the cause of the fire at Selby Abbey. The inquiry will be held in the Sacristy of the abbey, and the Bishop will be assisted by Lord Wenlock and Mr. E. C. Brooke, who are acting as assessors. As the accommodation at the Selby Abbey is very limited, it is not intended to throw the proceedings open to the public, but representatives of the Press will be admitted. In connexion with this inquiry experts representing the fire insurance companies, the Kinetic Company, and the organ builders will be present, and evidence will be taken.

EXCAVATIONS.—Excavations have been begun within the area enclosed by the Roman walls at Pevensey, which is supposed to be the site of the Roman-British city of Andredeaster. The committee who are undertaking the work include Mr. W. Page, F.S.A., and Mr. C. R. Peers, F.S.A., Mr. H. Sands, F.S.A., Mr. L. F. Salzman, F.S.A., Mr. E. Ray (members of the Sussex Archaeological Society), with the assistance of Dr. Haverfield and Mr. Fox. Mr. Salzman is superintending the work, with the assistance of Mr. Ray. Seven trial shafts were sunk, and the ancient pathway from the north postern gate was disclosed at a distance

from the walls. From the result of these trials the committee have laid plans of excavation, which should disclose the foundations of Roman buildings. They also intend to obtain a ground plan of the Decuman gate and of the Norman castle. Excavations were first made at Pevensey in 1852, but nothing of importance was unearthed. The property belongs to the Duke of Devonshire, and he and the tenant have given permission to excavate.

ROMAN VILLA DISCOVERED.—An interesting discovery has been made by Dr. Henry Laver at the village of Grimston, near King's Lynn. In a piece of pasture the site of a Roman villa has been unearthed about 12 in. to 18 in. below the surface, and, by permission of the Marquess of Cholmondeley, excavations have just been carried out by members of the Norfolk Archaeological Society. The villa apparently runs north to south, and at the north-east corner the hypocaust, or heating-chamber, has been located. The fine tiles for the hot air were found *in situ* in some instances. Amongst the debris in the hypocaust were found many fragments of mosaic pavement, with portions of designs, but, for the most part, they were broken up. Some fragments of window glass of Roman origin were also discovered, as well as oyster shells and the bones of sheep, pigs, and ducks in an ashpit which adjoins the hypocaust. To the west of this chamber is another large chamber paved with red tesserae, and running southward from it is a long corridor, also paved with red tesserae. Large quantities of wall plaster, richly painted in red and blue colours, were also found in one of the other three chambers excavated.—*Standard*.

GREEK ARCHITECTURE.—In his lecture on Doric architecture at the Manchester University on the 30th ult. Professor Capper threw some doubts on the common theory that all the temples of the Greeks and Romans are built on the same plan and according to well-ascertained rule. He took as examples four or five of the finest Doric buildings of the Vth century B.C., and showed, with the help of a series of beautiful slides, that there are many interesting differences in the planning and construction, the arrangement of the sculptures, and so on. Of the difficulty in the way of such inquiries was the small amount that was definitely known; for instance, of the three most perfect examples of Greek Doric in existence—the so-called Temple of Concord in Sicily, that of Neptune at Paestum, in Italy, and the Theæseum at Athens—the dates were unknown. It could be imagined that there were only three or four specimens of XIIIth-century Gothic architecture remaining, and those in ruins, to a Greek of the age of Pericles it might well seem that all Gothic cathedrals were built on the same plan. In the same way we, in studying the scanty remains of the great Greek temples, might hastily conclude that there was very little variety in plan. Incidentally Mr. Capper brought out the point that the temples were designed not as places of worship, but as places for the reception of statues of the gods—abodes in which the gods might dwell. The conversion of some of the temples in later times into Christian churches, while it did not deprive them of their structures, often wrought havoc with the architecture and the internal arrangements. It is largely to its conversion into a church that the Theæseum owes its wonderful preservation.—*Manchester Guardian*.

OLD "A. A." DAY STUDENTS' CLUB.—The Club which is called the "Old Architectural Association Day Students' Club," but which is not, we understand, connected with the Association, held its annual meeting on Monday last, at the Café Florence, when the Report for the year and the balance-sheet were formally passed. The room was hung round with a good many very interesting sketches by members; among them were a good pencil drawing of the lion gate pier at Hampton Court, and an interior of Peterborough Cathedral, besides others, by Mr. Travers; some measured drawings of the fine panelled room at the Queen's Hotel, York, by Mr. H. H. Fraser; a drawing of the interior of Cawston Church, by Mr. C. S. Milham; pencil sketches of old work by Mr. J. G. Allen and Mr. J. W. Jones; and water-colours of intended buildings by Mr. C. Williams-Ellis.

Capital and Labour.

PLUMBING TRADE, MANCHESTER.—A dispute, which has resulted in the locking-out of a number of men, has occurred in the plumbing trade of Manchester and Salford. Its origin is the attempt on the part of several employers to alter the working hours during the winter months—an alteration which, if enforced, would, it is stated, have the effect of reducing wages by two shillings a week. A meeting attended by 270 operatives was held in the Caxton Hall, and the chairman (Mr. H. Hamilton) afterwards informed a reporter that the number of men who had been

locked out as a result of refusing to accept the employers' arrangements as to working hours was eighty, and that it had been decided to grant them strike pay. The other firms had withdrawn the proposed alterations.—*Manchester Dispatch*.

Legal.

THE STRAND BUILDING DISPUTE: MOTION TO COMMIT MR. LORDEN FOR ALLEGED CONTEMPT.

In the Chancery Division, on Friday, the 2nd inst., the case of Draper v. Lorden was heard before Mr. Justice Warrington, on a motion on behalf of the plaintiff for leave to issue a writ of attachment against the defendant for alleged breach of an undertaking contained in an order dated August 10, 1906.

Mr. H. Terrell, K.C., in opening the motion on behalf of the plaintiff, said that what defendant had done was to break the undertaking he had given by diminishing the support enjoyed by the plaintiff's premises by excavating on his own premises within 2 ft. of plaintiff's easterly wall, and in one place actually underneath the plaintiff's wall. The plaintiff's premises were No. 422, Strand, which was the house on the easterly side of Bedford-street—the corner house. The plaintiff was also the lessee of No. 51, Bedford-street, which was the house immediately adjoining No. 422, Strand. Defendant was the owner of the four houses adjoining on the eastern side of No. 422, viz., Nos. 418, 419, 420, and 421, Strand. Defendant had proceeded to pull down some of his houses, and shortly after he commenced to pull down Nos. 418 and 419, which were old houses, the local authorities served dangerous structure notices both on the plaintiff and the defendant. The notice on the defendant was to pull down, repair, or renew such part of his front wall as was dangerous, and the dangerous structure notice against the plaintiff was to pull down or renew such part of his easterly wall as was dangerous. The ordinary order was made by the magistrate against each of the parties, and the defendant proceeded not to pull down his wall, but all his houses. What the defendant had done was to clear the site of the four houses, and, in order to protect the plaintiff's easterly wall from falling in, he had put some struts. Defendant was now getting ready to rebuild on the site and had dug out his foundations within 2 ft. of the plaintiff's wall. That was admitted. At one point the defendant had actually had a trench dug immediately underneath the plaintiff's wall. It was clear that the defendant had not acted under any notice under the London Building Act. By serving a notice under the Act the parties serving acquired certain liabilities, and on the other hand certain rights. Defendant, however, had not chosen to do that, but he had chosen to pull down his houses, and now wanted to rebuild on the site. What the plaintiff said was that in digging out foundations like the defendant had done must diminish the support of the wall. The defendant's undertaking was that he was not to do anything to diminish the support. The notice of motion also asked his lordship to extend the *interim* injunction already granted. The learned counsel then read an affidavit made by Mr. Percy Leeds, an architect, filed in support of the motion, to the effect that the defendant's building operations had undoubtedly weakened the strength of the wall, and it continued it would probably result in the plaintiff's building collapsing.

Mr. Roskill, K.C. (with him Mr. Cozens-Hardy), on behalf of the defendant, then read the affidavit of Mr. Tanson, architect, filed in opposition to the motion. He said he had inspected the premises of the plaintiff and defendant, and especially the wall in question, and in his opinion the wall was not fit to remain up and should be pulled down at once. He further said that in his opinion the way the defendant had conducted his building operations was perfectly proper, and that the defendant had done nothing to increase the danger of collapse of the wall. He thought the defendant's operations were done to strengthen the plaintiff's building.

His Lordship: No doubt, when he has completed his building.

Mr. Roskill also read an affidavit made by Mr. Gruning on behalf of the defendant. The deponent stated that he had been consulted from time to time by Mr. Crickmay (defendant's architect), and in his opinion, owing to the condition of the wall, it was necessary that it should be rebuilt throughout. The defendant had not pulled down otherwise than by shoring the wall, which was a party structure. Rubbish had been removed, and some excavations had been made, but not so far as to decrease the stability of the party wall. The learned counsel said that both Mr. Tanson and Mr. Gruning were gentlemen of the highest standing in the profession, and Mr. Crickmay, another eminent architect, had also made an affidavit on behalf of the defendant.

His Lordship: Defendant did not consult his neighbour before commencing these excavations. Mr. Roskill: He could not.

His Lordship: You were under an undertaking, you know. You form an opinion that you will make the excavation and go and do it.

Mr. Roskill then read the affidavit of Mr. Crickmay, who stated that in his opinion the defendant's operations had in no way weakened the structure. He said that the way to prevent a collapse would be to pull down the wall and rebuild it. In his opinion no part of the defendant's operations would tend to weaken the plaintiff's premises. He thought that what the defendant was proposing to do would tend to strengthen them.

Mr. Terrell then read affidavits made by Mr. Leeds and Mr. Streeter in reply, traversing the statements in the affidavits filed on behalf of the defendant. Mr. Leeds said there could be no doubt whatever that the defendant's operations had seriously affected the plaintiff's premises. In his view the wall in question was not a party wall, but an external wall. The learned counsel said that it was all very well for the defendant to say that he had strengthened the wall by filling up with concrete, but there was no doubt that defendant had done that which he was not entitled to do.

Mr. Roskill urged that the defendant had acted quite *bona fide* in the matter. What the defendant had done was in consequence of the compulsory order made by the London County Council.

His Lordship: That is the dispute for the trial. Mr. Roskill agreed. What defendant said was that under a compulsory order made on the plaintiff certain things had to be done to an alleged party wall, and the plaintiff had not done that which he ought to have done. A difficult question might or might not be raised at the trial whether the plaintiff in the circumstances had not cast on the defendant a greater burden of lateral support than he ought to rest upon the defendant. With that difficult question undecided, the plaintiff came there and said the defendant ought to be committed.

His Lordship said the defendant undertook that he would not, except by complying with a dangerous structure motion, diminish the support of the wall. Defendant really could not say that he was justified in what he did.

Mr. Roskill said his case was that what the defendant had done had not diminished the lateral support. What the defendant had done was at his own risk.

His Lordship: Yes, and at somebody else's risk too. What appears to me is that the object of the undertaking was to prevent the defendant doing anything which could diminish the support of the wall. It seems to me that it was put like that in order to get rid of all difficulty.

Mr. Roskill said it was not suggested that the defendant was not to proceed with his building. It was admitted that the party wall was bad, but what the other side suggested was that defendant had diminished the stability of the wall. In answer to that the defendant brought in the best expert evidence to show that he was not doing so. The plaintiff himself was diminishing the support by holding the defendant up and preventing him going on building. He submitted that on an interlocutory application of that kind it would be a great hardship to continue the *interim* injunction.

His Lordship: What about the motion to commit?

Mr. Roskill said that Mr. Lorden was present in Court, and would tell his lordship that in his view he had done nothing which the Court ordered him not to do. Mr. Lorden was present to answer any questions put to him.

His Lordship: I do not know what I can ask Mr. Lorden; but if he apologises, through you, for what he has done, it might influence me in what I should do.

Mr. Terrell said he was not anxious to have Mr. Lorden committed, but he must undertake not to interfere with the plaintiff's wall.

Mr. Roskill replied that if the wall fell down the defendant would be able to prove at the trial that it did not fall in consequence of anything he had done. All his learned friend Mr. Terrell had done was to bring the defendant there, and on the evidence of his experts, say that what the defendant had done had diminished the support. It seemed to him that the defendant ought not to have been brought there on such evidence as that.

Mr. Terrell: If you want to underpin our wall, or to go under it, you must serve us with the proper notice.

Mr. Roskill: We cannot underpin a condemned wall. This is a very technical matter, and I ask your lordship to allow it to stand over until the trial, and then you can deal with it. Would your lordship think it right to refer it to a quite independent surveyor and have a report on it?

His Lordship: When is the action coming on for trial?

Mr. Terrell: It is not set down yet.

Mr. Roskill: I think the simplest thing to do

would be for me to agree to the *interim* injunction standing until the trial, and giving an undertaking until the trial. What I feel is that when you have heard the evidence your lordship will take a different view of the case.

Mr. Terrell: I should be satisfied with an order that defendant should not excavate within 10 ft. of our wall.

Mr. Roskill said that if the trial was ordered to come on quickly, he would give an undertaking not to excavate within 7 ft. of the base of the wall and not more than 3 ft. deep.

Mr. Terrell said he thought he could accept that.

His Lordship: Not to make any excavation lower than 3 ft. from the base of the wall and no nearer to the wall than 7 ft.?

Mr. Terrell said he would accept an undertaking in that form.

Mr. Roskill asked his lordship to reserve the question of the costs of the present application until the trial of the action.

His Lordship, in giving judgment, said the motion was one to commit the defendant for breach of an undertaking contained in an order of the Court, dated August 10, 1906. The plaintiff and defendant were the owners of neighbouring and adjoining houses, the plaintiff's being No. 422, Strand, and No. 51, Bedford-street, and the defendant's being Nos. 418, 419, 420, and 421, Strand. The defendant was carrying on certain building operations on his site, and the plaintiff commenced the action, stating that the operations of the defendant were in some way tending to damage his houses, and he moved for an *interim* injunction. On that motion the undertaking which defendant was said to have broken was given. It appeared that certain walls of defendant's old houses, and the eastern wall between Nos. 421 and 422, Strand, were condemned as dangerous structures by the local authority. On the motion the defendant by his counsel undertook, without prejudice to any steps taken under the dangerous structure notices of July 21, 1906, not to do any act whereby the support of the wall in question was diminished. After that undertaking the defendant pulled down the whole of his houses and shored up the eastern wall in question. A motion was made to commit him for contempt for doing that, but with that he had nothing to do, then, as that matter was ordered to stand till the trial of the action. Subsequently to that, some time the previous week, the defendant proceeded to excavate the ground on which his houses had stood. He excavated it in one case within 2 ft. of the plaintiff's wall, and at other places at varying distances—3 ft. or something more. Plaintiff thereupon served him with the present notice of motion to commit him for breach of the undertaking and for an injunction to restrain him in terms from excavating so as to diminish the support. The defendant, in answer to that application to commit him, had filed certain affidavits by distinguished architects, which showed that in their opinion there was no danger of collapse. That might very well be, but it was not the point. The point was whether there had been any breach by the defendant of his undertaking whereby the support was diminished. How could it be, as the defendant said, a matter of opinion that when a man took away the soil within that distance of a wall it did not diminish the support? He thought there could be only one answer to that, and that the support of the wall had been diminished by what the defendant had done. If it had been diminished, then there had been a breach of the undertaking. He thought the defendant had broken his undertaking. He was willing to believe that the defendant did not do the act with any idea that he had broken the undertaking, but he was of opinion that he had broken it. Although he did not propose to make an order committing the defendant to prison, he must order him to pay the costs of the motion. The terms of the undertaking had been already agreed.

Liberty was given either party to apply to expedite the trial, but his lordship stated that he could not possibly hear the case during the present sittings, his work being already fixed.

CASE UNDER THE METROPOLIS MANAGEMENT ACT.

THE case of Couchman and another v. the Mayor, etc., of Lewisham, came before a Divisional Court of King's Bench, consisting of the Lord Chief Justice and Justices Ridley and Darling, last week, on appeal, by way of a case stated, from the decision of the magistrate sitting at the Greenwich Police Court, on a point arising under the Metropolis Management Act, 1855.

Mr. J. B. Matthews, in opening the case, said the complaint against the appellants was to recover 137*l.*, the proportional sum in respect of the estimated expense of the making-up a new street called Littlewood. His first objection to the order appealed from was that the condition precedent imposed by the County Council, when it sanctioned the laying-out of the road had not been complied with, and therefore no valid sanction was in existence. His second objection was

that the only available space for laying out the road that was sanctioned as a 40 ft. road turned out to be only 35 or 36 ft. The third objection was that, if such a road as sanctioned could for any other reason be laid out, it could only be laid out by overlapping the appellants' land, and therefore there could not be any dedication of the road as a highway by the man who laid it out.

The Lord Chief Justice asked if the road had in fact been made up.

Mr. Matthews replied that it had not.

Mr. Macmorran, K.C., said he appeared for the respondents, the Borough Council of Lewisham, who were charged with the duty of making up streets which were said to be new streets, and the Council had to deal with the streets as they found them. The question of dedication had nothing whatever to do with the present point.

The Lord Chief Justice asked who were going to do the proposed work.

Mr. Macmorran said that the Borough Council had to do it. The Borough Council had to deal with the street as they found it. They did not lay it out, it being already laid out. The right of the Borough Council to make up the street in no way depended on the right of anybody to the soil of the street.

At the conclusion of the arguments of counsel, the Lord Chief Justice, in giving judgment, said he was by no means satisfied that the street which the respondents had to deal with might not be made 40 ft. wide. That would, however, be a matter which would have to be considered after the Council had done the work, and if it was not 40 ft. wide proper proceedings might then be instituted. He thought that at the present stage the apportionment could not be questioned, and that the decision of the magistrate must be affirmed.

Justices Ridley and Darling concurred, and the appeal was accordingly dismissed with costs.

CASE UNDER THE LIVERPOOL IMPROVEMENT ACT.

THE case of Goldstraw v. Jones came before a Divisional Court of King's Bench, composed of the Lord Chief Justice and Justices Ridley and Darling, on the 5th inst., on the appeal of Mr. William Goldstraw, a surveyor of buildings, in the service of the Liverpool Corporation, from a decision of Mr. Kinghorn, the deputy-stipendiary magistrate of Liverpool, who dismissed an information by appellant against James Jones, a shopkeeper, of 100, Aigburth-road, Liverpool, charging him with a breach of the Liverpool Improvement Act, 1882, by hanging out a flag or sign attached to an iron pole projecting 6 ft. over the pavement, and with neglecting to remove the same on receiving notice from the appellant. It was proved that the pole, which projected from a window slightly opened, was fastened by a screw bolt to a main part of the building, and that it could be removed by unscrewing the bolt, and was in fact so removed from time to time by respondent. The magistrate was of opinion that the pole and flag were not a sign within the meaning of the section of the Act under which the prosecution proceeded, that the projection was not of a fixed or permanent character, but only a temporary erection, and he accordingly dismissed the information.

Mr. Macmorran, K.C. (with him Mr. F. E. Smith, M.P.) appeared for the appellant. The respondent was not represented.

The Court, having heard the arguments of Mr. Macmorran, sent the case back to the deputy-stipendiary for further consideration.

Patents of the Week.

APPLICATIONS PUBLISHED*.

22,278 of 1905.—J. C. ROCK: *Adjustable Clamp Brackets, Combining Hanger and Rail Holder for Mantel-shelves and the like.*

This relates to an adjustable clamp bracket combining hanger and rail holder for mantel-shelves and the like, and consists in the combination of a slotted arm or bracket carried on the clamp screw constituting a clamp bracket, hooks or horns formed at the head of the clamp screw constituting the hanger, and an eye bolt with clutch constituting the rail holder.

23,312 of 1905.—E. RANSON: *Method of Ventilation.*

This relates to a method of ventilation, and consists in combining a short down shaft or tube with a long up shaft, which for convenience may take the form of an existing chimney, the upper end of the down shaft being open to the room and placed near the ceiling or in any other suitable position. This combination takes the form of a ϕ upon, of which the longer arm is the up shaft.

* All these applications are in the stage in which opposition to the grant of Patents upon them can be made.

PATENTS.—Continued on page 554.

List of Competitions, Contracts, etc.

For some Contracts still open, but not included in this List, see previous issues. Those with an asterisk (*) are advertised in this Number: Competitions, iv.; Contracts, iv. vi. viii. x.; Public Appointments, —; Auction Sales, xxx. Certain conditions, beyond those given in the following information, are imposed in some cases, such as: the advertisers do not bind themselves to accept the lowest or any tender; that a fair wages clause shall be observed; that no allowance will be made for tenders; and that deposits are returned on receipt of a bonâ-fide tender unless stated to the contrary.

Competitions.

* **NOVEMBER 20.—Slough.—SCHOOL.**—The Bucks County Education Committee invite architects practising in the neighbourhood of Slough to offer their services in connexion with the erection of a new elementary school at Slough to accommodate about 600 children. Applications to be sent in on or before November 30, on forms obtainable from Mr. C. G. Watkins, Education Secretary, Aylesbury.

NO DATE.—Dunfermline.—LIBRARY.—Architects are invited to furnish competitive designs for the erection of a branch library in Dunfermline. For conditions of competition and other particulars apply to the Secretary of the Carnegie Dunfermline Trust, St. Margaret's Hall, Dunfermline.

Contracts.

BUILDING.

NOVEMBER 12.—Eiland.—MANSION.—For the erection of a Wesleyan manse at Victoria-road, Eiland. Plans and specifications may be seen, and bills of quantities obtained, at offices of Messrs. Joseph F. Waish & Graham Nicholas, architects, Museum-chambers, Halifax, from November 12 to 19.

NOVEMBER 12.—Embsay.—DISPENSARY HOUSE.—Monaghan Guardians will, on November 12, at 10 o'clock, receive and consider tenders for making improvements at the above dispensary house. Copy of specification of work to be done can be seen at the Board-room, Workhouse, any day (except Board day) up to the above date. Mr. Samuel Mitchell, Clerk of Union, Board-room, Workhouse, Monaghan.

NOVEMBER 12.—Huddersfield.—HOUSES.—For the erection of twenty dwelling-houses in Pim-plan, Close Hill. Plans may be seen, and bills of quantities obtained, at office of Mr. J. Berry, architect, surveyor, and valuer, 4, Market-place, Huddersfield. Tenders, free of charge, to be forwarded to the Secretary of the Close Hill Industrial Society, Newsome, not later than November 12.

NOVEMBER 12.—Westham.—NEW SCHOOL.—The East Sussex Local Education Authority invite tenders for new public elementary school for infants (ages 4 to 7) at Westham, near Lewes. Plans and specifications may be seen at the office of the Surveyor of East Sussex, Mr. F. J. Wood, County Hall, Lewes, on or before November 12, from whom full particulars can be obtained.

NOVEMBER 13.—Biggleswade.—COTTAGE.—The Ardee No. 2 R.D.C. invite tenders for building a labourer's cottage at Biggleswade in accordance with plan and specification to be seen at the office of Mr. R. L. Curtis, C.E., Leatdown-place, Dundalk, or at the board-room of the Ardee Workhouse. Tenders to be sent in before 11 a.m. on November 13. Mr. James E. Dwyer, Clerk of the Ardee Workhouse.

NOVEMBER 13.—North Frambridge.—ALTERATIONS TO SCHOOL.—Essex Education Committee (Maldon Local Advisory Sub-committee) invite tenders for alterations to North Frambridge School. Plan and specification may be seen at the office of Mr. F. H. Bright, Clerk to the Maldon Local Advisory Sub-committee, 53, High-street, Maldon, between the hours of 10 and 4 any working day except Saturday. Sealed tenders, endorsed "Alterations to North Frambridge School," to be delivered to the Clerk not later than November 13.

NOVEMBER 14.—Clydach.—SUNDAY SCHOOL.—For erection of a Sunday-school at Clydach. Drawings and specification at Hill's Dock, Clydach, any weekday, excepting Saturday, from 9 to 3 up to November 14. Mr. John H. Morewood, architect, Welwyn Lodge, St. Thomas, Swansea.

NOVEMBER 15.—Blairmuir.—SCHOOL.—The School Board of Blairmuir invite tenders for the mason, carpenter, slater, plasterer, plumber, painter and glazier, and iron work for new school to be erected at Blairmuir. Plans and specifications to be seen with the Clerk, Mr. John McCulloch, Birchwood, Boyndie, with whom offers must be lodged on or before November 15.

NOVEMBER 15.—Grimsall.—ALTERATIONS.—Prestwich Guardians invite tenders for the necessary alterations of a part of their workhouse, Delaunay-road, Grimsall, in connexion with the provision of new rooms. Specifications may be obtained at the Workhouse, between the hours of 10 and 12 noon, on application to the Workhouse Master, Mr. Jones. Tenders, endorsed "Alterations to Grimsall Workhouse," to be delivered to Mr. Edward W. Ogden, Clerk to the Guardians, Union Offices, Cheetham Hill-road, Manchester, and delivered by 10 a.m. on November 15.

NOVEMBER 16.—Brighton.—GREENHOUSE.—Brighton Corporation invite tenders for the erection of a greenhouse at the Corporation Waterworks, Lewes-road, Brighton. The specification and form of tender may be obtained on application at the office of the Borough Surveyor, Mr. A. Weller, at the Town Hall, Brighton. Sealed tenders, addressed to Mr. Hugo Talbot, Town Clerk, Town Hall, Brighton, and

endorsed "Tender for Greenhouse," must be left at office at the Town Hall before 10 o'clock in the forenoon on November 17.

NOVEMBER 19.—Cardiff.—SCHOOL.—For the erection of new schools for 20 children, Clarence-road, Cardiff, for the Rev. Gilbert Heaton, M.A., and the managers of S. Mary's National Schools, Cardiff. Plans and specifications may be seen, and quantities obtained, at office of architects, Messrs. Veall & Sant, Cardiff, to whom sealed and endorsed tenders are to be sent not later than November 19.

NOVEMBER 19.—Fagham.—POST OFFICE AND PREMISES.—For the erection of post office and business premises at Fagham for the Rev. L. Jenkins. Plans and specification may be seen, and bills of quantities obtained, at the office of Mr. Geo. Kenhole, architect and surveyor, Station-road, Bargoed, on payment of 2l. 2s. Sealed and endorsed tenders to be sent to architect not later than November 19.

NOVEMBER 20.—Barton.—COTTAGE.—The R.D.C. of Lynton invite tenders for carrying out the necessary works required in the provision of a cottage for the Manager of the Sewage Disposal Works at Barton, in the Parish of Milton, in the County of Hants, including the laying of drains, water supply, &c. Copies of the specification of work to be done and plans seen, at the offices of the Clerk to the R.D.C., Lynton, Hants, or at the offices of the engineer, Mr. E. H. Shenton, The firm of Messrs. Anson & Shenton, 22, Victoria-street, Westminster, S.W., on payment of a cheque for 5l. Tenders must be received by Mr. J. Davis Rawlins, Clerk to the Committee, 10, County Buildings, Lynton, Hants, before 11 o'clock a.m. on November 20.

NOVEMBER 20.—North Woolwich.—SCHOOL.—The East Ham Education Committee invite tenders for the erection of school buildings, to accommodate 852 children, at Storey-street, North Woolwich, and for the construction of deep foundations. Each contractor must deposit a 50l. Bank of England note, or crossed cheque of equal value, with his tender. Plans and specification may be seen, and forms of tender and any other information obtained, at the office of the Committee's Architect, Mr. E. L. Curtis, 11 and 12, Finsbury-square, London, E.C., on any weekday except Saturday between the hours of 10 and 4. Tenders on the printed form, must be delivered to Mr. H. C. Padgett, Secretary, Education Office, East Ham, E., not later than 4 o'clock in the afternoon of November 20.

NOVEMBER 20.—Severn Tunnel.—ENGINE SHED, &c.—The Great Western Railway Company invite tenders for the construction of an engine shed, &c., at Severn Tunnel Junction. Plans and specification may be seen, and forms of tender and bills of quantities obtained, at the office of the engineer at Newport Station between 10 and 4. Tenders, addressed to Mr. G. R. Mills, Secretary, Paddington Station, W., and marked outside "Tender for Engine Shed, Severn Tunnel Junction," will be received on or before November 20.

NOVEMBER 20.—Severn Tunnel.—SCHOOL BUILDINGS.—The East Ham Education Committee invite tenders for erection of school buildings at Storey-street, North Woolwich, and for the construction of deep foundations. Each contractor must deposit 50l. with his tender. Plans and specification may be seen, and forms of tenders and any other information obtained, at the office of the Committee's Architect, Mr. E. L. Curtis, 11 and 12, Finsbury-square, E.C. Tenders, on the printed form, must be delivered to Mr. H. C. Padgett, Secretary, Education Office, East Ham, E., before 4 p.m., November 20.

NOVEMBER 21.—Liskeard.—SCHOOL.—Cornwall Education Committee invite tenders for the erection of a new secondary school at Liskeard, according to plans and specifications, which may be seen at the office of Mr. John Sansom, Architect to the Committee, Liskeard, from whom all particulars relating to the work may be obtained. Sealed, endorsed tenders, on official forms, which may be had from the Architect, are to be sent to Mr. F. R. Pascoe, Secretary, Education Office, Truro, on or before November 21.

NOVEMBER 21.—Skewen.—ALTERATIONS AND EXTENSIONS TO CHAPEL.—For alterations to Gorphwysfa Chapel, erection of new school, &c., at Skewen for the Building Committee. Plans and specifications may be seen, and bills of quantities obtained, at the offices of Mr. J. C. Lloyd Davies, 10, Belhellem-road, Skewen, on or before November 21, endorsed "Tender for Alterations and Extensions to Skewen Chapel."

NOVEMBER 21.—Thirsk.—INFANTS' SCHOOL.—The North Riding of Yorkshire C.C. Education Committee invite tenders for the whole of the several works in connexion with the proposed alterations and additions to Thirsk Infants' Council School. Forms of tender, &c., at the offices of Mr. C. Moore Milgate, Thirsk, or at the County Hall, Northallerton. Tenders to be delivered to Mr. Douglas Smith, Secretary, County Hall, Northallerton, not later than November 21, sealed, and endorsed "Tender for alterations Thirsk Infants' School."

NOVEMBER 21.—Tralee.—POST OFFICE.—The Board of Public Works (Ireland) invite tenders for the erection and completion of a new post-office at Tralee, Co. Kerry. Tenders will be received up to, but not later than, 10 a.m. on November 21. The plans and specifications can be seen at the District Office of Public Works, Tralee. Forms of tender and bills of quantities will be supplied on deposit of

1l. The separate envelopes containing the tender and the bill of quantities must be endorsed, Mr. H. Williams, Secretary, Office of Public Works, Dublin.

NOVEMBER 22.—Ackworth.—CLUB, INSTITUTE, &c.—The erection of working-men's club, institute, and baths at Ackworth. Plans and specification can be inspected, all information obtained, and assistance rendered at office of Mr. James Heseline, architect and surveyor, Pontefract. Sealed tenders delivered to architect not later than on November 22.

NOVEMBER 24.—Battarm.—SCHOOL.—Leicestershire C.C. Education Committee invite tenders for the erection of a council school at Battarm, in the parish of Ibsack, together with out-offices, drainage, and other works connected therewith. Conditions of contract, quantities, and form of tender may be obtained from the architects, Messrs. Goddard & Wain, Station-chambers, Coalville, on payment of a sum of 2l. 2s. Sealed tenders, upon the forms supplied, to be sent in the envelopes provided to the office of Mr. W. A. Brockington, Director of Education, County Education Office, 33, Bowling-green-street, Leicester, not later than 10 a.m. on November 24, addressed to "The Chairman of the Buildings and Sites Committee."

* **NOVEMBER 24.—Gloucester.—NEW BLOCK TO ASYLUM.**—The Committee of Governors of Gloucester Second County Asylum invite tenders for a new block, to accommodate about 170 female patients, at the Second County Asylum, Barnwood, near Gloucester. Bills of quantities and forms of tender can be obtained from Messrs. Giles, Gough, & Trollope, architects, 28, Craven-street, Charing Cross, W.C., on payment of 3s. 3d. Plans and specifications can be seen at the architects' office aforesaid, and at Wolton Asylum, Gloucester. Sealed tenders, on forms supplied, are to be delivered to Mr. J. W. Lloyd, Town Clerk, Municipal Buildings, Gloucester, on or before November 24.

NOVEMBER 27.—Fulwood.—SCHOOL.—Lancashire Education Committee invite tenders for the erection of a new public elementary school, to accommodate 162 children, at Fulwood, near Preston. The plans may be seen, and bills of quantities obtained, at the office of the County Architect, Mr. Henry Lither, 16, Ribblesdale-place, Preston, by payment of a deposit of 2l. Tenders must be delivered before 12 o'clock noon on November 27, sealed and endorsed, to Mr. W. W. Lloyd, Town Clerk, Municipal Buildings, Preston.

* **NOVEMBER 29.—Holborn.—UNDERGROUND CONVENIENCES.**—The Holborn B.C. invite tenders for construction of an underground convenience in Theobald's-road, and addition to the existing one in Shaftesbury-avenue, in accordance with drawings, &c., by the Borough Surveyor, at whose office the drawing and specification may be seen between 11 and 1 o'clock after November 15. Tenders to be delivered to the Town Clerk, 197, High Holborn, W.C., not later than 10 a.m. November 29.

DECEMBER 3.—Boston.—LAVATORY, &c.—Boston Corporation invite tenders for converting part of the Fish Market into a lavatory, &c., and converting part of the Police-station into a lavatory, &c. Plans and specifications can be seen at the office of the Borough Surveyor, Mr. G. E. Clarke, A.M. Inst. C.E., where forms of tender can be obtained. Tenders to be sent to Mr. M. Staniland, Town Clerk, Municipal Buildings, Boston, on or before December 3, marked "Tender for Lavatories and Shop."

* **DECEMBER 12.—Leigh-on-Sea.—SCHOOL.**—The Essex Education Committee invite tenders for new school at Leigh-on-Sea. Contractors desirous of tendering are required to communicate with Mr. S. J. Adams, Architect, Weston-road, Southend-on-Sea, before noon, November 15, and enclose 2l. 2s. Plans, &c., may be seen at the offices of the architect. Tenders, sealed, and endorsed "Tender for Leigh School," to be delivered to Mr. J. F. Ingram, Secretary, Bank-chambers, Weston-road, Southend-on-Sea, by noon, December 12.

DECEMBER 15.—Woodford.—SCHOOL.—The Woodford Local Advisory Committee of the Essex Educational Committee invite tenders for the erection and completion of a new boys school for about 500, and for sundry alterations to the girls' and infants' schools, at Churchfields, Woodford, Essex. Plans, specification, and form of contract may be inspected at the office of the architect, Mr. Frank W. Moore, Chelmsford, and Mr. Arthur Hogwood, 33, Great Tower-street, E.C. Builders desirous of tendering must send in their names and addresses on or before November 26 to Mr. Ernest J. Bond, Clerk, 95, Leadenhall-street, E.C., with a deposit of 5l. Sealed tenders, endorsed "Tenders for Woodford Churchfields Council School," to Mr. E. J. Bond, Clerk, Woodford Green, Essex, not later than December 15.

* **DECEMBER 22.—Burnley.—TECHNICAL SCHOOL.**—Burnley Education Committee is prepared to receive tenders for the erection of a technical school in Ormerod-road, Burnley. Drawings may be seen, and specifications, bills of quantities, and forms of tender obtained, from the Borough Engineer. Tenders, endorsed "Tender for Technical School," and addressed to the Chairman of the Education Committee, to be delivered at the Town Clerk's Office, Town Hall, Burnley, not later than 9 a.m., December 22.

NO DATE.—Ballygowan.—HALL.—For the erection of a band hall at Ballygowan for the Committee of the Ballygowan Band. Plans and specification may be seen at the office of Mr. Walter K. Wheeler, C.E., architect 142, Upper Newtownards-road, Belfast.

No DATE.—**Downpatrick.**—HOUSE.—For the erection of a dwelling-house on Circular-road, Downpatrick, for 3 months. Tenders to be lodged with Mr. E. T. Nolan, Quailie Downpatrick, with whom plans and specifications may be seen.

No DATE.—**Ferryhill.**—REBUILDING PREMISES.—The rebuilding of business premises at Ferryhill, for Messrs. Murray, Names to Mr. T. H. Murray, architect and surveyor, Consett.

No DATE.—**Great Houghton.**—WESLEYAN CHURCH.—New Wesleyan church and schools at Great Houghton, near Barnsley, Names to Messrs. Garfield and Pennington, architects, Pontefract and Castleford, when bills of quantities and other particulars will be forwarded.

No DATE.—**Hull.**—OFFICES AND STORE.—For offices and store, St. Andrew's Dock. Apply to Messrs. Freeman, Son, & Gaskell, architects, Carr-lane, Hull.

No DATE.—**Seaton Carew.**—BUILDINGS FOR SMELTING WORKS.—The Central Zinc Company, Ltd., invite tenders for erection of buildings, etc., and for supply of materials in connexion with new smelting works near Seaton Carew. Particulars will be furnished on or by written application to Mr. H. M. Ridge, General Manager, Seaton Carew.

ENGINEERING, IRON, AND STEEL.

NOVEMBER 12.—**Belfast.**—IRON AND TIMBER.—The Belfast Harbour Commissioners invite tenders for the supply of a quantity of rolled steel joists, sawn pitch pine timber, spruce planks, and Baltic flooring. Form of tender may be obtained from the Harbour Engineer, Mr. W. Redfern Kelly, M.Inst.C.E. Separate sealed tenders for steel and timber respectively, on the special terms provided for the purpose, to be addressed to Mr. W. A. Currie, Secretary, Harbour Office, Belfast, endorsed "Tender for —," and sent in on or before November 12.

NOVEMBER 12.—**London.**—RAILS AND PLATES.—The Bengal and North-Western Railway Company Directors invite tenders for the supply and delivery of 2,750 tons steel rails, 50 lb. per yard, and 10 tons of half-plates for ditto, as per specification, to be seen at the Company's offices. Tenders, addressed to Mr. Alexander Izat, Managing Director, 237, Gresham House, Old Broad-street, London, E.C., and marked "Tenders for Rails and Fish-plates," are to be lodged not later than noon on November 12. For each specification a fee of 10s. will be charged, which cannot, under any circumstances, be returned.

NOVEMBER 13.—**Hitchin.**—IRON FENCE.—The Hitchin U.D.C. invite tenders for the supply and fixing of a wrought-iron unclimbable fence with cast-iron pillars at the reservoir site on Windmill Hill in accordance with the drawings and specifications (showing probable length required) to be seen at the Clerk's office, Town Hall, Hitchin, during office hours. Tenders at the yard and per pillar to be sent to Mr. William Onslow Times, Clerk to the Council, Clerk's Office, Town Hall, Hitchin, endorsed "Fence," not later than 12 at noon on November 13.

NOVEMBER 13.—**London.**—RAILS, ETC.—The Secretary of State for India in Council invites tenders for the supply of rails, 50 lb. per yard, and dog spikes, for rails. The conditions of contract may be obtained on application to the Director-General of Stores, India Office, Whitehall, S.W., and tenders are to be delivered at that office by 2 o'clock p.m. on November 13.

NOVEMBER 13.—**Long Ditton.**—FILTER BEDS, ETC.—Metropolitan Water Board invite tenders for the construction of six filter beds, a service reservoir, and other contingent works at Long Ditton. Forms of tender and contract, with specification, etc., may be obtained on application to the Engineer, Brixton Hill, S.W., on production of an official receipt for the sum of 5s., which sum must first be deposited with the Comptroller, at the Board's Central Offices, Savoy-court, Strand, W.C. Such payments and applications must be made between the hours of 10 and 4 (except on Thursdays and Saturdays). Tenders, enclosed in sealed envelopes addressed to the Clerk of the Board, Metropolitan Water Board, Savoy-court, Strand, W.C., and endorsed "Tender for Filter Beds and Reservoir, Long Ditton," must be delivered at the office of the Board not later than 10 a.m. on November 13.

NOVEMBER 13.—**Manchester.**—SCRAP IRON.—Manchester Corporation Tramways Committee invite offers for a quantity of scrap iron, steel, etc. Forms of tender may be obtained on application to Mr. J. M. M'Elroy, General Manager, Tramways Department, 55, Piccadilly, Manchester. Offers are to be addressed to the Chairman of the Tramways Committee, 55, Piccadilly, Manchester, endorsed "Offer for Scrap Iron, etc.," and must be received not later than 10 a.m. on November 13.

NOVEMBER 15.—**Sheringham.**—GROYNES.—Sheringham U.D.C. invite tenders for the extension of two timber groynes on the foreshore at Sheringham, in the county of Norfolk. Contract drawings, terms and conditions of contract, and specification may be seen on application to Mr. Edgar C. Rouse, Clerk, Church-street-chambers, Sheringham, or at the office of the Consulting Engineers to the Council, Messrs. Douglass & Arnott, 15, Victoria-street, Westminster, London, S.W. Copies of the form of tender, and bills of quantities, and bills of quantities may be obtained on application to the Engineers upon payment of a deposit of 1s. Copies of contract and plans may be obtained from the Engineers on payment of 2s. 6d., which sum is non-refundable. Sealed tenders, which will only be received on the form supplied, endorsed "Tender for Groyne Extension, Sheringham," to be delivered to the Clerk before 10 a.m. on November 15.

NOVEMBER 16.—**Rotherham.**—HEATING.—Rotherham Corporation invite schemes and tenders for heating the wards and supplying domestic hot water to the wards at the new Isolation Hospital, Budsley Moor-lane, Rotherham; and also for an extension of the heating apparatus at the administrative block at such hospital. Further particulars and information can be obtained on application at the office of the Corporation Architect, Mr. J. Platts, High-street, Rotherham. Tenders, endorsed "Heating Isolation Hospital," to be sent to Mr. W. J. Board, Town Clerk, Town Hall, Rotherham, not later than November 16.

★ NOVEMBER 17.—**Tottenham.**—HEATING.—The Tottenham Education Committee invite tenders for heating the Parkhurst-road and Belmont-road schools with low-pressure hot water, boiler and pump, and of specifications and quantities to be made to the architect, Mr. G. E. T. Lawrence, 22 Buckingham-street, Adelphi, W.C., before November 17, with deposit of 2s. 6d. in respect of each school.

NOVEMBER 19.—**Bailborough.**—PUMP.—Bailborough R.D.C. will, on the 19th inst., call sealed tenders for supplying at Shercock one deep well pump, with 4-in. Banged valve worked, 2-in. lead suction pipe, rose, retaining valve, deep well chamber, wrought-iron rods, indiarubber washers, and bolt complete. Mr. Hugh Clarke, Executive Sanitary Officer, Board-room, Bailborough.

NOVEMBER 19.—**Basford.**—BOILER.—Basford Guardians invite tenders for making, delivering, and fixing a Lancashire boiler, 24 ft. long and 7 ft. diameter, together with injector, valves, etc., at the Basford Workhouse. Engineers desirous of tendering should apply to the architect, Mr. W. V. Betts, Bank-offices, O.D. Basford, Nottingham, on or before November 19, when specifications will be supplied to them.

NOVEMBER 20.—**London.**—STEEL MATERIAL.—The Bombay, Baroda, and Central India Railway Directors invite, up to noon on November 20, tenders for the supply of steel material, which may be made on forms, copies of which, with specification, can be obtained at offices of Mr. W. V. Constable, Secretary, Gloucester House, 2, 3, and 4, Bishopsgate-street Without, London, E.C., on payment of 1s. (which will not be returned).

NOVEMBER 21.—**Hartlepool.**—STEEL GIRDER WORK.—The Directors of North-Eastern Railway Company invite tenders for the steel girder work required for the new coaling staiths at Victoria Dock, Hartlepool. Plans may be seen, and specification obtained by personal application to Mr. T. M. Newell, Dock Engineer's Office, Hull, on and after 10 o'clock on November 7. Sealed tenders, endorsed "Tender for Steel Girder Work, Hartlepool," to be delivered at the office of the Engineer, York, not later than 12 noon on November 21.

NOVEMBER 21.—**Lossiemouth.**—FOOTBRIDGE.—For supplying and erecting over the River Lossie at Lossiemouth, 10 ft. long, containing 4 girders, timber gangways and piers, and steel girders over three spans of 34 ft., the west span having a tilting bascule, plans and specification to be seen with authorities of quantities obtained from Messrs. George Gordon & Co., civil engineers, Inverness. Tenders to be lodged on or before November 21 with whom copies of the plans and specification may also be seen.

NOVEMBER 21.—**Southampton.**—MACHINE.—The Director-General, Ordnance Survey, invites tenders for the supply and erection of a plan or paper-rolling machine. Applications for forms of tender and specification should be made to the Officer in Charge of Stores, Ordnance Survey, Southampton. All tenders must be submitted before noon on November 21.

NOVEMBER 21.—**Bury.**—PIPES.—The Bury and District Joint Water Board invite tenders for the following:—(a) The manufacture and supply of 1,150 tons of 15-in. diameter cast-iron pipes; (b) the manufacture and laying of iron pipes; (c) the manufacture and supply of sluice and air valves, etc.; (d) the supply and erection of steel river crossings. Copies of the several specifications, bills of quantities, with forms of tender, may be obtained, on application to the Engineer, Mr. J. Cartwright, 21, Parson's-lane, Bury, upon deposit of 2s. for each contract. Tenders, endorsed "Bury Waterworks," to be delivered to Mr. John Haslam, Clerk to the Board, Bank-street, Bury, on or before November 24.

NOVEMBER 21.—**Dorking.**—REFUSE DESTROYER.—Dorking U.D.C. invite tenders for the supply and details for providing and erecting a house refuse destructor capable of dealing with 60 tons weekly. Particulars are desired for (1) machinery, including steam-raising plant, (2) building, and (3) building and roadway. Particulars as to site, etc., can be obtained on application to the Engineer, Mr. J. Cartwright, 21, Parson's-lane, Bury, upon deposit of 2s. for each contract. Tenders, endorsed "Dorking Refuse Destroyer," to be delivered to Mr. John Haslam, Clerk to the Board, Bank-street, Bury, on or before November 24.

NOVEMBER 21.—**Rome.**—ELECTRIC STREET RAILWAY.—The Municipal Council of Rome invite tenders for the construction and operation of the new street railways at Rome. For further particulars apply to the Sindaco di Roma. Tenders to be delivered not later than December 31.

MISCELLANEOUS.

NOVEMBER 12.—**Gravelly Hill.**—TABLES AND FORMS.—Aston Guardians invite tenders to supply thirteen tables and twenty-four forms, of varying sizes, for the Workhouse at Gravelly Hill. Samples may be seen at the Works, and tenders, upon forms to be obtained at offices of Mr. John North, Clerk to the Guardians, Union Offices, Vauxhall road, Birmingham, endorsed "Furniture," must be received not later than November 12.

NOVEMBER 13.—**Epsom.**—TIMBER.—The Guardians of the Epsom Union invite tenders for the supply of 20 to 30 fathoms of yellow batten ends and yellow batten ends, in lengths of 2 ft. 6 in. suitable for splitting up for firewood, to be delivered by the contractor, free of expense, at the Union Workhouse, Epsom. Tenders, stating price per fathom, must be delivered at the office of the Reader, Clerk, Lonsdale, Epsom, before 7 o'clock p.m. on November 13, marked outside "Tender for Firewood."

NOVEMBER 14.—**Earlshateon, Dewsbury.**—FENCE.—The Dewsbury Joint Hospital Board invite tenders for the erection of a cross-stood wooden fence along the Fens, Hospital, Earlshateon. Specification and form of tender can be obtained on application to the architects, Messrs. Ho-ton & Fox, Corporation-street, Dewsbury. Tenders, under sealed cover, endorsed "Tender for Fencing," to be sent to Mr. H. Ellis, Clerk to the Board, Town Hall, Dewsbury, not later than 12 o'clock noon on November 14.

NOVEMBER 16.—**Carmaney.**—BURIAL-GROUND, ETC.

—Belfast R.D.C. invite proposals for the following:—Fencing: To provide and erect additional fencing at Carmaney new burial-ground. Screening: To supply from time to time, until January 1, 1907, 50 tons of screenings to be delivered at Carmaney new burial-ground. Cinders: To supply from time to time, until March 1, 1907, 100 loads of cinders to be delivered at Carmaney burial-ground. Separate sealed tenders for the foregoing to be lodged with Mr. Joseph W. Robb, Clerk to the Belfast R.D.C., Clerk's Office, Union Workhouse, not later than 12 o'clock noon on November 16.

NOVEMBER 17.—**Maldstone.**—TEAM LABOUR.—Maldstone R.D.C. invite tenders for team labour (day work) and for stone carting and road watering up on roads in each parish within their district. Particulars, terms of contract, and forms of tender may be obtained of Mr. M. C. Warne, Surveyor, Barming, Maldstone. Tenders to be sent to the Surveyor, endorsed "Tender for Team Labour," on or before 10 a.m., November 17.

NOVEMBER 18.—**Dowla.**—LIBRARY FURNITURE AND FITTINGS.—Merthyr Tydfil Corporation invite tenders for the supply of furniture and fittings for the Dowla Free Library. Copies of the specification and schedule may be obtained, and drawings inspected, upon application to Mr. E. A. Johnson, F.R.I.B.A., architect, Merthyr Tydfil. Tenders, marked "Dowla Library," stating the date by which the person tendering would guarantee the completion of the contract, must be delivered to Mr. T. Anynryd Rees, Town Clerk, Town Hall, Merthyr Tydfil, not later than November 18.

NOVEMBER 19.—**Bailborough.**—WELL.—Bailborough R.D.C. will, on the 19th inst., consider tenders for cleaning-out well, and for the laying, pairing lining, and staying same where necessary, and erecting a new pump, which will be supplied by the Council. The work to be done according to a specification to be sent to Mr. Hugh Clarke, Executive Sanitary Officer, Board-room, Bailborough, a copy of which can be obtained from L. O'Brien, A.I.C.E., Stradone, on payment of 1s.

NOVEMBER 19.—**London.**—BINS.—Metropolitan Borough of Islington invite tenders for the supply and delivery of galvanised cast-iron or wrought-iron bins and cast-iron orderly bins. Drawing of the shingle bins and a specification and sample of the orderly bins may be seen, and a form of tender obtained, upon application to the Borough Engineer, Mr. J. Patten Barber, at the Town Hall, Upper-street, N., and payment of 1s. 1s. Sealed tenders, endorsed "Tenders for Bins," must be received by Mr. William F. Dewey, Town Clerk, Town Hall, Upper-street, N., not later than 4 p.m. on November 19.

NOVEMBER 19.—**Sandgate.**—SCAVENGING.—Sandgate U.D.C. invite tenders for the scavenging of house refuse within their district (including a portion of Shorecliffe Camp) for the year commencing January 1, 1907. Particulars of the work to be done and of the conditions to be complied with may be had at the office of the Council's Surveyor, Sandgate. Tenders, endorsed "Scavenging," must reach Mr. Shera Atkinson, Clerk to the Council, Council Offices, Sandgate, Kent, not later than November 19.

NOVEMBER 21.—**Hastings.**—TIMBER.—Hastings Education Committee invite tenders for the supply of timber to erect school schools for the year 1907. Form of tender (which must be returned to Mr. Philip O. Buswell, Clerk of the Committee, Offices, 8, Welington-square, Hastings, endorsed "Timber," not later than noon on November 21), giving particulars of quantities required, may be obtained at the offices of the Committee.

NOVEMBER 26.—**Sandgate.**—SCAVENGING.—Sandgate U.D.C. invite tenders for the scavenging of house refuse within their district (including a portion of Shorecliffe Camp) for the year commencing January 1, 1907. Particulars of the work to be done, and of the conditions to be complied with, can be had at the office of the Council's Surveyor, Sandgate. Tenders, endorsed "Scavenging," must reach Mr. J. Shera Atkinson, Clerk to the Council, Council Offices, Sandgate, Kent, not later than November 26.

DECEMBER 1.—**Brussels.**—METERS.—The Town Council of Brussels will receive, up to December 1, tenders from manufacturers of volume meters, in connection with the existing supply of such apparatus for the service of water distribution. For conditions apply to the Secretariat, à l'Hôtel de Ville.

NOVEMBER 1.—**Dublin.**—SHOP FITTINGS.—For extensive shop fittings in No. 39, Lower Camden-street, for Alderman Delahunt. Plans can be seen at office of George T. Moore, civil engineer and architect, 1 and 2 Foster-place, College-green, Dublin.

No DATE.—**East Wemyss.**—SINKING PIT.—The Wemyss Coal Company, Ltd., East Wemyss, Fife, invite tenders for sinking the Denbeath Pit, Methil, from the Chemist to the Parrot Seam.

No DATE.—**Johnstone.**—TAKING DOWN AND RE-ERECTING CRANE.—For taking down 20-ton travelling crane, 65 ft. span, and erecting same in adjoining bay. The work to be done by the contractor. Apply Messrs. Thomas Shanks & Co., Union Iron Works, Johnstone.

No DATE.—**Johnstone.**—WHITEWASHING.—Offers wished to whitewash inside buildings and extension now going up. The work to be done by the contractor. Apply Messrs. Thomas Shanks & Co., Union Iron Works, Johnstone.

No DATE.—**Leeds.**—BOWING GREEN.—Forming a bowling green in Leeds, about 1,200 yds. super, in extent, the estimate to include levelling the site, providing and laying of grass sods, etc. Plan and full particulars to be sent to Messrs. Thomas Winn & Sons, architects, 84, Albion-street, Leeds.

PAINTING, ETC.

NOVEMBER 10-19.—**West Ham.**—CLEANSING, PAINTING, ETC.—The Education Committee of West Ham invite tenders from contractors having their place of business in the borough for the cleansing, repair, and painting of two schools, to be executed during the Christmas vacation. Contractors to make written application to Mr. William Jacques, A.R.I.B.A., Architect to the Education Committee, 4, Fenchurch-lane, London, E.C., for copy of specification and form of tender on or before November 12, when application must be accompanied by a deposit of 5s.

NOVEMBER 14.—**LONDON.**—STORES, ETC.—The East Indian Railway Company invite tenders for the supply and delivery of (1) colliery tubs, (2) wheels and axles for colliery trucks, (3) miscellaneous carriage fittings, (4) india-rubber fittings, (5) panel plates, (6) steel crank and straight axles for locomotives, (7) cast-iron wheels and axle pins, (8) cotters and split pins, as per specifications to be seen at the Company's offices. Tenders are to be sent to Mr. C. W. Young, Secretary, Nicholas-lane, London, E.C., marked "Tender for Colliery Tubs."

or, as the case may be, not later than 12 o'clock noon on November 14. Fees, which cannot under any circumstances be returned, are charged for the specifications as under, viz., for Nos. 1 to 9, 11, 12, 13, 14, and for No. 9, 10, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 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800, 801, 802, 803, 804, 805, 806, 807, 808, 809, 810, 811, 812, 813, 814, 815, 816, 817, 818, 819, 820, 821, 822, 823, 824, 825, 826, 827, 828, 829, 830, 831, 832, 833, 834, 835, 836, 837, 838, 839, 840, 841, 842, 843, 844, 845, 846, 847, 848, 849, 850, 851, 852, 853, 854, 855, 856, 857, 858, 859, 860, 861, 862, 863, 864, 865, 866, 867, 868, 869, 870, 871, 872, 873, 874, 875, 876, 877, 878, 879, 880, 881, 882, 883, 884, 885, 886, 887, 888, 889, 890, 891, 892, 893, 894, 895, 896, 897, 898, 899, 900, 901, 902, 903, 904, 905, 906, 907, 908, 909, 910, 911, 912, 913, 914, 915, 916, 917, 918, 919, 920, 921, 922, 923, 924, 925, 926, 927, 928, 929, 930, 931, 932, 933, 934, 935, 936, 937, 938, 939, 940, 941, 942, 943, 944, 945, 946, 947, 948, 949, 950, 951, 952, 953, 954, 955, 956, 957, 958, 959, 960, 961, 962, 963, 964, 965, 966, 967, 968, 969, 970, 971, 972, 973, 974, 975, 976, 977, 978, 979, 980, 981, 982, 983, 984, 985, 986, 987, 988, 989, 990, 991, 992, 993, 994, 995, 996, 997, 998, 999, 1000.

NOVEMBER 14.—**Stifford.**—**MATERIALS.**—Orsett R.D.C. invite tenders for the supply and delivery of materials as undermentioned:—400 cubic yds. wash-mill stones, delivered to Clockhouse-lane, parish of Stifford; 400 cubic yds. chalk flints, delivered to Clockhouse-lane, parish of Stifford. Tenders, sealed and endorsed "Tender for Flints," to be sent to office of Mr. James Beck, Clerk to the Council, Council Offices, 2, Orsett-road, Grays, not later than November 14.

NOVEMBER 15.—**Bexhill.**—**ROAD MATERIAL.**—Bexhill Corporation invite tenders for the supply of 412 tons of the best imperial blue quartzite macadam. Forms of tender may be obtained on application to Mr. George Ball, Assoc. M.Inst.C.E., Borough Surveyor, Town Hall. Tenders to be sent in to Mr. T. E. Rodgers, Town Clerk, Town Hall, Bexhill, not later than November 16.

NOVEMBER 17.—**Broomhill.**—**MATERIALS AND STORES.**—Broomhill Collieries, Ltd., invite tenders for the supply of general colliery materials and stores (Norway timber and drops excepted) during the twelve months ending December 31, 1907. Forms of tender may be obtained on applicants stating the description of goods to be tendered for, from the Broomhill Collieries, Ltd., Broomhill, Aklington, to whom tenders must be sent on or before November 17.

NOVEMBER 17.—**London.**—**THE CONSERVATORS OF THE RIVER THAMES** invite tenders for the supply of materials and stores, including ropes, lines, etc.; wrought-iron and steel; rivets, bolts, nuts, etc.; nails, spikes, and ironmongery; brooms, brushes, etc.; paints and varnishes; oils, etc.; asbestos, packing, and india-rubber; Portland cement. To be delivered as required at the Conservancy Works, Port of London Wharf, Millwall, Strand-on-the-Green, Chiswick; Shepperton Lock, Shepperton, Middlesex; Caversham Yard, Reading; or Osney Yard Oxford. Specification and forms of tender may be obtained at the Conservators' Offices in London, E.C., to Mr. Robert Phillips, Secretary, Thames Conservancy Offices Victoria-embankment, London, E.C., not later than 10 a.m. on November 17.

NOVEMBER 17.—**Millwall.**—**MATERIALS AND STORES.**—The Conservators of the River Thames invite tenders for supply of materials, etc., as follows:—Ropes, lines, etc.; wrought-iron and steel; rivets, bolts, nuts, etc.; nails, spikes, and ironmongery; paints and varnishes; oils, etc.; asbestos, packing, and india-rubber; Portland cement; to be delivered as required at the various Conservancy Works. Specification and form of tender may be obtained at the Conservators' Offices, Victoria-embankment, E.C., after November 7. Tenders, addressed to the Secretary as above, to be delivered not later than 10 a.m. on November 17.

NOVEMBER 17.—**Northumberland.**—**STONE.**—Northumberland C.C. invite tenders for the supply of stone to railway stations during the year ending March 31, 1908, for the maintenance of main roads. Forms of tender, specifications, and conditions can be obtained on application to the County Surveyor, Moot Hall, Newcastle-upon-Tyne. Tenders to be delivered at the address of Mr. J. A. Dean, County Surveyor, County Surveyor's Office, The Moot Hall, Newcastle-upon-Tyne, not later than noon on November 17.

NOVEMBER 19.—**Bristol.**—**STORES.**—Bristol Sanitary and Improvement Committee invite tenders for the supply, during the year 1907, of the following tools and stores:—viz., "Cordlines," "Ironmongery," "cements," "drain-pipes," "pots," "candles," "saddles," "sundries," "canvases," "varn," and "twine." Forms of tender may be obtained at the offices of the Engineer, Mr. T. H. Yabbroon, M.Inst.C.E., 63 Queen-square, on payment of 10s. Local tenders only will be accepted for those marked "Local." Tenders must be sent in the envelopes provided to 63 Queen-square, not later than 1 p.m. on November 19.

NOVEMBER 21.—**Dublin.**—**STORES.**—The Directors of the Great Southern and Western Railway Company invite tenders for the supply of the undermentioned stores for twelve months to December 31, 1907:—Brooms and brushes (No. of form 13); brass fittings for carriages (18); do. do. for lamps (35a); do. do. for water (26a); do. do. for gas (26b); castings, malleable iron (11); cement (34); coach screws and washers (15); colours (2); cotton waste (54); files and tool steel (20); fire bricks and clay (33); fish bolts (steel) (16a); galvanised roof-sheets, buckets, etc. (25); grates, stoves, and fenders (24); grindstones (35b); railway fastenings (iron) (16); rain-water pipes and gutters (25); ropes, twine, and flax (4); sewer pipes, plaster of Paris, etc. (32); shovels, spades, etc. (21a); signal wire pulleys (11); screws and split pins (14); stakes (fencing) (35); tin-plates (22); varnishes (11); wire, fence and signal (30a); wirework (30b). Forms of tender can be obtained on payment of 6d. each from the Company's storekeeper and the General Stores, Inchicore, Dublin. Patterns may be inspected at the same place between the hours of 10 a.m. and 4 p.m. on November 21. The tenders to be sent in, endorsed "Tender for Stores," and addressed to Mr. Fras. B. Ormsby Secretary, Kingsbridge Terminus, Dublin so as to be with him before 10 o'clock a.m. on November 21.

NOVEMBER 23.—**Barry.**—**STORES.**—The Barry Railway Company invite tenders for the supply, during the twelve months ending December 31, 1907, of the undermentioned stores and materials, viz.:—(1) Bolts, nuts, and ironmongery; (2) bolts and nuts (fish and fane) and spikes; (3) brass boiler tubes; (4) brass: sheet, plate, bar, etc.; (5) brushes, brooms, etc.; (6) cabinet furniture, builders' and general stores; (7) cast-iron chairs; (8) cement (Portland); (9) cement for boilers and steam pipes (non-conducting); (10) chains; (11) copper sheet, plate, bar, etc.; (12) electrical insulating materials; (13) electrical wires; (14) electrical sundries; (15) fencing and gate posts; (16) ferrules, for boiler tubes; (17) fishplates; (18) fire bricks and fire clay; (19) fishplates; (20) foundry requisites; (21) galvanised and lead-coated sheets, roofing, etc.; (22) gas and sanitary fittings (brass and iron); (23) glass: plate, sheet, lenses, chimneys, etc.; (24) hammer handles, coupling poles, sprays, etc.; (25) hollow-ware; (26) indiarubber and asbestos goods; (27) ironmongery and sundries; (28) iron-plate, bar, angle, tee, channel, etc. (Staffordshire); (29) iron plates, bars, angles, etc. (Yorkshire); (30) keys and key packings; (31) lamps and fittings; (32) lead, zinc, tin, etc.; (40) lime; (41) locks, etc.; (42) nails, screws, collar and taper pins; (43) oil, tallow, grease, soap, etc.; (46) packings, hydraulic and steam; (47) paints and colours; (48) pig-iron; (49) playboys' tools; (50) rain-water goods; (51) ropes, cables, lines, twines, etc.; (52) stone, slates; (53) springs; steel (dominated); (55) springs steel spiral, conical, and volute; (56) springs and rollers; (57) steel ball, bearing and buffer; (58) spring steel; (59) steel bars, angles, tee, channel, etc.; (59) steel castings; (60) steel plates and sheets; (61) steel for tools; (62) stoneware pipes etc.; (63) timber; (64) tubs and fittings (zinc, steam and hydraulic); (65) varnishes; (66) various sheet canvases, etc.; (69) waste; (70) wires (iron and steel); (71) wire ropes. After forms have been obtained same may be inspected at the offices of the Engineer, Mr. W. B. Ormsby, Barry Docks, on payment of 10s. Forms of tender may be obtained from Mr. W. B. Ormsby, Secretary, Barry Docks, on payment of 10s. Tenders, endorsed "Tender for Stores," to be sent to the Engineer, Mr. W. B. Ormsby, Barry Docks, not later than 10 a.m. on November 23.

NOVEMBER 23.—**Warrington.**—**STORES.**—The Cheshire Lines Committee invite tenders for the supply, during the year 1907, of the undermentioned

stores and materials, viz.:—General stores: (1) Fencing, sprays, scotches, etc.; (2) oils, white lead, soap, etc.; (3) glass; (4) waste, sponge cloths, scouring flannel, etc.; (5) iron bars, sheets and plates, spike iron, etc.; (6) telegraph materials; (7) wrought-iron tubing, point rodding, point rollers and standards, lead piping, and sheet lead; (8) nails, screws, files, uncoupling hooks, door furniture, burners, etc.; (9) wrought-iron bolts, turned pins, screw-springs, wrought-iron fencing, chain, etc.; (10) galvanised and tinned sheets, signal wire pulleys, stay rods, zinc sheets, tin plates, etc.; (11) leather, rubber, packings, etc.; (12) drain-pipes, cement, bricks, etc.; (13) for-signals; (14) brushes, mats, etc.; (15) rope, twine, sheet cord, spun yarn, etc.; (16) black lead, coal-dust, pins, etc.; (17) roofing slates. Permanent way materials: (18) steel fish-plates; (19) oak keys. Specifications, with forms of tender, can be obtained upon application to Mr. S. Saxton Barton, Stores Superintendent, Cheshire Lines, Warrington, and intending contractors are requested to particularise the stores for which they wish to tender. Patterns will be on view from November 12 to November 22 at the Committee's General Stores, Battersley-lane, Warrington. Sealed tenders, endorsed "Tenders for —," must be sent, addressed to Mr. Glegg Thomas, Secretary, Central Station, Liverpool. Cheshire Lines Stores Department, Warrington, will be received not later than 10 a.m. on November 23.

NOVEMBER 24.—**Swansea.**—**STORES.**—Swansea Harbour Trust invite tenders, up to noon on November 24, for the supply of iron, castings, chains, timber, bolts, ironmongery, ship chandlery, and general stores for twelve months from January 1, 1907. Forms of tenders and full particulars may be obtained on application to the Engineer at the Harbour Office.

NOVEMBER 28.—**Burton.**—**FIRE-CLAY GOODS.**—Burton-upon-Trent Gas and Electricity Committee invite tenders for the supply of the fire-clay retorts, bricks, and clay required at the Gasworks during the year 1907. Full particulars of the specification and conditions with form of tender, may be obtained on application to Mr. L. Ramsden, Manager and Engineer, The Gasworks, Burton-upon-Trent, to whom sealed tenders, endorsed "Fire-Clay Goods," must be delivered on or before November 28.

DECEMBER 15.—**Maldstone.**—**ROAD MATERIAL.**—The Bridges and Roads Committee of Kent C.C. invite tenders for the supply of the undermentioned materials, to be delivered between April 1, 1907, and March 31, 1908, as follows:—72,000 tons (more or less) of broken stone and chippings, such as (1) Rhenish basalt (2) Guernsey granite, (3) Cleve Hill basalt, (4) Leicestershire granites, (5) Penlee, St. Keverne, or other Cornish granites, (6) Penmaen-tyr granite, (7) Welsh granite, (8) Welsh slate, (9) Norway granite (9) quartzite, (10) or other equally durable material. Also the following local materials:—3,000 yds. (more or less) of Sevenoaks stone, unbroken (16) yds. (more or less) of surface, picked or grubbed flints, 2,500 yds. of Kent rag. Specification and forms of tender can be obtained upon application to the County Surveyor, Maldstone. Sealed tenders, endorsed "Tender for Road Material," must be sent to Mr. W. B. Prosser, Clerk to the Council, Sessions House, Maldstone (upon the prescribed form), not later than 12 noon on December 15.

NO DATE.—**Lurganbo.**—**STORES.**—The Directors of the Sligo, Leitrim, and Northern Counties Railway Company invite tenders for the supply of stores during the year 1907. List of goods and materials required and forms of tender can be had on application to Mr. R. E. Davis, Secretary, Lurganbo, Manohall.

NO DATE.—**Southend.**—**ROAD MATERIAL.**—Southend Corporation contract, Wanted, 1,000 yds. of Kentish Flint, 7,000 yds. of 2-in. slab paving, 12,500 of 12 by 6 Norway flat kerb and channel, 200 tons of 10 by 10 granite, 70 tons of cement, 100 tons of grey stone lime, 330 yds. of Thames ballast, 2,000 yds. of hardcore. Apply, stating prices, delivered Southend, to Mr. C. A. Zadig & Co., 73, Queen Victoria-street, E.C.

Auction Sales.

Nature and Place of Sale.	By whom Offered.	Date of Sale.
*FREEHOLD BUILDING LAND, NEW SOUTHGATE.—Railway Hotel, New Southgate	Charles Sparrow & Son	Nov. 12
*BUILDERS (IRONMONGERY, ETC.) STATION STREET, BIRMINGHAM.—On the Premises	Edwards, Son, & Bigwood	Nov. 13, etc.
*BUILDERS, CONTRACTOR, AND DECORATOR'S SHOP, ETC.—At 73, Harlesden-rd., N.W.	H. W. Smith	Nov. 14
*DEALS, BATTENS, ETC.—Great Hall, Winchester House, Old Broad-street, E.C.	Churchill & Sims	Nov. 14
*STOCKS OF WALL-PAPER MERCHANTS, COW CROSS-ST., E.C.—On the Premises	J. T. Skelding	Nov. 15
*BUILDERS' PLASTER AND MATERIAL, BETHNAL GREEN.—On the Premises	George Billings	Nov. 19
*FREEHOLD BUILDING LAND, CHISWICK.—At the Mart	W. B. Ormsby	Nov. 20
*FREEHOLD BUILDING LAND.—At the Torrington Hotel, North Finchley	C. Sparrow & Son	Nov. 26
*BUILDING SITE, GILTSBUR-STREET, NEWGATE-STREET.—At the Mart	Jones, Lang, & Co.	do.

PATENTS.—Continued from page 550.

and through which there is a constant current of air down the shorter and up the larger arm.

25,472 of 1905.—G. BAKER: *Sliding Sash Windows.*

This consists in the combination with a window frame of pulleys mounted on pins which are inserted at one end in the pulley stiles close to the upper end thereof, and are supported at the other end in brackets secured to said pulley stiles and to the head of the frame.

3,538 of 1906.—R. M. SOMERS: *Domestic Fire-places.*

This relates to a domestic fire-place having a hearth above the floor level, and formed with a

tunnel for the passage of an ash-pan to or from the ash-pit beneath the fire-grate, and consists in constructing the said tunnel with an upward inclination from the ash-pit, the base or floor of the tunnel forming a continuous inclined plane extending to the front of the hearth where the tunnel opens out above the floor level, whereby the ash-pan can be inserted or withdrawn into or from the opening of the tunnel at a higher level than the floor of the room or place.

4,193 of 1906.—W. R. BRIGGS: *Means for Securing Sash Lines to Sashes.*

This relates to the method of holding the ends of a sash line by pinching and bolting it between the ends of two pieces of flat metal sunk in a groove in the outer face of the sash stile,

the upper ends of the said pieces being attached to the top of the stile.

4,648 of 1906.—C. HOLZHAUER: *Closet Drainage Trap.*

This relates to a closet trap consisting of a reservoir built in the pit in such a manner that its bottom lies higher than the bottom of the pit, and filled with water into which the drainage pipe projects from 2 to 4 in.

6,832 of 1906.—E. BOMMER: *Spring Hinges.*

This relates to a fitting for doors, comprising in combination two co-operating hinges, one of which is adapted to be turned upon a ball or the like antifrictional bearing in opposition to the resistance of a spring, while the other is adapted

to turn about a pivot pin which is held in place in its socket by a spring arm or the like.

3,318 of 1906.—G. KRAHMER: *Brackets for Shelves, Tables, Scaffolding, and the like.*

This consists in the combination of a supporting bracket, an arm, a pivot pin, or bolt, carried by the arm and having its bearing in the bracket, said arm normally resting on the bracket and said pivot pin or bolt being removable upwardly from the bracket, and a brace having one end engaging with the arm and its other end forked to receive the pivot pin or bolt and engaging the bracket.

9,702 of 1906.—F. REYNOLDS: *Window Sashes.*

This relates to a window sash comprising slotted plates provided at the middle points and near the ends of the sash stiles, the slots in the middle plates being arranged to face in opposite directions relatively to one another, in combination with sliding stiles furnished centrally with pivots on which the sash is adapted to be hung, and carrying also near their ends stops which are adapted to take into the slotted end plates provided on the sash stiles.

13,952 of 1906.—A. DU MONTIER: *Metallic Tiles.*

This relates to a metallic tile provided at one edge with a projection, said projection being bent upon itself and provided with cement-receiving spaces, and at the opposite edge with a lip of less width than said projection, whereby the cement is received in the spaces between the outer edge of the projection and the lip enclosed by said projection.

16,043 of 1906.—W. SIMPKIN: *Briquetting Machines.*

This relates to a briquetting machine having an intermittently rotating mould wheel fitted with a radially movable ejecting cup in each of its moulds, and consists in the combination with an eccentrically within it and adapted to move the ejecting cups outwards. The invention also consists in the combination of a spring blank adapted to operate a press plunger, a guide bar fast to the spring block at a distance therefrom and adapted to guide the said plunger, means for reciprocating the block and guide bar relatively to the mould wheel, and a spring interposed between the plunger and the spring block.

14,312 of 1906.—L. H. RANSOME: *Combined Saw and Moulding Machines.*

This relates to a combined saw and moulding machine, and consists of a saw-bench with three spindles mounted in a rotating framework, one of which is specially made and speeded up for planing, beading, rebating, or moulding, and so arranged that any one of the spindles may be brought into use as wanted.

20,616 of 1905.—S. L. SMITH and T. HARDEN: *Jointing of Cables, Pipes, Rods, and the like, and in a Flux therefor.*

This relates to the jointing of cables, pipes, rods, and the like, and in a flux therefor. The flux is composed of stearine, vaseline, tin foil, and methylated spirit. The whole of the above composition is melted together by heat in any suitable vessel, and is stirred by means of a spoon for any other tool until the whole mass is thoroughly amalgamated together. The composition is then placed between two sheets of tin foil, and is then placed or folded round the joint of a lead cable in order to receive the molten lead in a mould to complete the joint and to join the lead cable together when necessary.

24,108 of 1905.—J. WEBSTER: *Stone-cutting Machines.*

This relates to a stone-cutting machine and consists in the combination of a pivoted and weighted tool box adjustable to angle and position of its tools and having its cutting edges in line with its pivots, a pair of swinging quadrant-shaped weights pivoted at a point above the aforesaid pivots and supporting stops on the faces of the said quadrant weights.

SOME RECENT SALES OF PROPERTY:

ESTATE EXCHANGE REPORT.

October 20.—By MESSRS. CHALK (at Cambridge).

Ashdon, Essex.—The Hill Farm, 155 a. 0 r. 29 p. 0 f. and c., yr. 100. £2,400

Hadstock, Essex.—Four freehold fields, 7 a. 1 r. 9 p. 800

Low Sutton Crosses, Lind.—Four freehold fields, 4 a. 1 r. 3 p. 105

October 23, 24, and 25.—By CHINOOK, GALS-WORTHY & CO. (at Swansea).

Swansea, Glamorgan.—Brynsi-ter, etc., f.g. rents 383l. 0s. 6d., reversions varying from 254 to 864 yrs. (in numerous lots) 14,007

October 25.—By PROUTHER & MORRIS (at New Malden, Surrey).

21, Albemarle-gdns., n. 96 yrs., gr. 6l., w.r. 32l. 10s. 210

Freebury-rd., a freehold-gdn. with greenhouse and other erections thereon, p. 1,250

Westbury-rd., etc., four freehold building sites. 720

By SEDGWICK, SOTT & WEAL (at Harrow).

Harrow Weald, Midd.—College-rd., "Glen-garry Villa," and 2 a. 3 r. 7 p. f. p. 51,725

College-rd., an enclosure of land, 1 a. 3 r. 10 p. f. 560

October 27.—By PEARCE, LLOYD & SONS (at Chester).

Shotwick Park, etc., Cheshire.—The Shotwick Park Estate, 1,600 acres, f. including the Manor of Shotwick Park and Great and Little Saughall (in numerous lots) 94,639

October 29.—By ELLIOTT, SONS & BOYTON.

Oxford-street—No. 396; also 63, Duke-st., 44, yr. 27. 21,000

25, Duke-st., f. 1, yr. 1004. 3,150

Marylebone.—11, Langham-st., ut. 28 yrs., g.r. 50l., e.r. 390l. 1,750

By PERCIVAL HOBSON.

Kingland.—45, Balme-rd., ut. 23½ yrs., g.r. 4l., yr. 32l. 220

New Cross.—108, Malpas-rd., ut. 58½ yrs., g.r. 4l., yr. 27. 220

Holloway.—101, Campl-rd. (s.), ut. 61 yrs., g.r. 5l., w.r. 48l. 2s. 140

By REYNOLDS & EASON.

Hoxton.—31 and 46, Buckland-st., n. 28 yrs., gr. 10l. 4s., yr. 70l. 525

Hackney.—152, Amburst-rd., ut. 61½ yrs., g.r. 1d., e.r. 60l. 650

Stanford Hill.—2, Oldbille-st., n. 77½ yrs., g.r. 6l. 10s., e.r. 40l. 295

By SASSERATH, MASSEY & CO.

Bromesbury.—35, Cavendish-rd., ut. 71 yrs., gr. 12l. 12s., e.r. 70l. 505

By F. V. VANCE.

Islington.—30, Parkfield-st., ut. 28 yrs., g.r. 2l., w.r. 57l. 4s. 180

Hoxton.—28, Venlock-st., ut. 36 yrs., g.r. 5l. 6s., w.r. 53l. 10s. 225

Hornerton.—12 and 14, Templar-rd., ut. 40 yrs., gr. 7l. 10s., w.r. 67l. 12s. 240

Finchley Park.—61 and 63, Wilberforce-rd., ut. 61 yrs., gr. 10l. 4s. 80

Bowes Park.—73 and 75, Russell-rd., ut. 72 yrs., gr. 11l., w.r. 58l. 10s. 350

By H. Y. FEAVER & SONS.

Ilford.—13, 15, 17, 19, 23, 25, and 27, Clements-rd., f. 1, yr. 179l. 1,895

October 30.—By HIBBARD & WHITTINGHAM.

Walthamstow.—214 to 232 (even), St. John's-st., ut. 99 yrs., g.r. 1s. 2d., e.r. 28l. 780

Streatham.—21, Marlborough-st., ut. 42 yrs., g.r. 3l. 2s. 6d., e.r. 30l. 255

By MATTHEW MILES, SONS & DEPPER.

Kenilworth Town.—Mansfield-rd., "The Mansfield Hotel," ut. 34 yrs., g.r. 15l. 15s., yr. 120l. 3,000

Islington.—13, White Conduit-st.; also the "Spanish Patriot," p.h., ut. 15½ yrs., g.r. 75l., yr. 112l. 505

By RUTLEY, SON & VINN.

St. Pancras.—35, 44, and 46, Drummond-cres., ut. 11½ yrs., gr. 18l., yr. 134l. 275

Kenilworth Town.—7, Gaisford-st., ut. 41 yrs., g.r. 9l. 8s., yr. 42l. 400

Camden Town.—116, Camden-st., ut. 33 yrs., gr. 6l., yr. 60l. 155

Marylebone.—12, Marylebone-rd., ut. 14½ yrs., gr. 40l., p. 1. 610

Hampstead-road.—17, Amphill-sq., ut. 86½ yrs., gr. 10l. 10s., p. 1. 235

Kenilworth Town.—1, Wadsworth-rd., ut. 59 yrs., gr. 6l. 10s., yr. 70l. 235

By C. SPARROW & SON.

Finchley.—Fallow Corner, "Fallow Cottage," and 1 acre, f. p. 1,325

7 and 9, Melrose-villas, ut. 63 yrs., g.r. 18l., yr. 84l. 630

Marylebone.—69 and 70, W. 1st-st. (s.), ut. 1. 1,040

Margate.—1, ut. 17½ yrs., g.r. 80l., yr. 102l. 1,040

By FREDERICK WARREN.

Highgate.—12, Whitehall-pk., ut. 82 yrs., g.r. 7l. 10s., yr. 49l. 530

Calendon Road.—1, 3, and 5, Bryan-st., with factory, ut. 35 yrs., gr. 17l., w.r. 117l. 6s. 495

Barnsbury.—20, 22, and 24, Connel-st., ut. 1. 215

Holloway.—37, St. John's-pk., e.r. 40l.; also 8, Wedmore-gdns., ut. 73½ yrs., g.r. 6l., e.r. 35l. 250

Canonbury.—60, 78, and 80, Canonbury-rd., ut. 22 yrs., g.r. 17l., yr. 110l. 355

By DOLMAN & PEARCE (at Watford).

Watford, Herts.—44 to 50 (even), York-rd., f. 1, yr. 67l. 4s. 475

By G. HABLETT (at Masons' Hall Tavern).

Poplar.—Crisp-st., "Guy Earl of Warwick" p.h., ut. 29 yrs., yr. 123l. (with goodwill) 8,550

By BORTON, SON & CO. (at Fulham).

Fulham.—50, Chessell-rd., ut. 73½ yrs., g.r. 8l., e.r. 40l. 340

October 31.—By E. H. HENRY.

Wandsworth Common.—Bolingbroke-gr., a freehold building site 350

By RAMSAY, WAINWRIGHT & CO.

Holloway.—80, Andover-rd., and 1, 2, and 3, Andover-cottages, with stable, etc., ut. 47 yrs., g.r. 12l., yr. 78l. 140

By WILCOUGHBY, SON & CALLOW.

Norwood.—136, 150, 162, and 166, Beulah-hill, ut. 99½ yrs., g.r. 32l., yr. 165l. 1,750

1, Preston-rd., ut. 99½ yrs., g.r. 7l. 2s., yr. 32l. 400

13, 15, 17, and 19, Preston-rd., ut. 99½ yrs., g.r. 22l., yr. 138l. 4s. 1,200

November 1.—By A. & G. GUYVER.

Edmonton.—1 to 10 (odd), 29, 31, 33, 35 (even), Rayburn-rd., f. g.r. 412l. 2s. 2,660

Bayham-rd., f.g. rents 38l. 15s., reversion in 87 yrs. 760

By MARK GILBERT.

Freezywater, Midd.—1 to 5, Goff's-ter., f. 1, yr. 128l. 1,600

Cheshunt, Herts.—135, Crossbrook-st. (1 share), 1, f. 20l. 205

Freezywater, Midd.—Barnard-rd., two freehold building sites 400

By HUNTER & HUNTER.

Paddington.—49, Barnsdale-rd., ut. 28 yrs., g.r. 7l., p. 1,380

By C. C. & T. MOORE.

Camberwell.—106 to 116 (odd), New Church-rd., f. w.r. 25d. 1,780

35 to 45 (odd), Waterloo-st., f. w.r. 158l. 12s. 1,080

Bethnal Green.—49, 61, 67 to 68 (odd), Mape-sq., f. w.r. 171l. 12s. 1,965

Poplar.—34 to 42, Ashford-st., f.w. 201l. 10s. 1,590

By H. E. TRAFFORD & CARTER.

Stratford.—69 to 97 (odd), Gibbins-rd., ut. 51 yrs., gr. 67l. 10s., w.r. 410l. 18s. 2,150

By SIMMONS & SONS.

Gray's Inn-road—Acton-st., the "Queen's Head," p.h., f. yr. 75l. 1,800

Aldersgate.—22, Glasshouse-ya., f. w.r. 36l. 8s. 425

Bermansley.—29 and 31, Farbrook-st., f. w.r. 12l. 8s. 760

King's Cross.—Field-st., a freehold building, p. Southwark.—30 and 32, Hayes-st., ut. 11½ yrs., gr. 10l. 300

Streatham.—14 and 16, Eastwood-st., ut. 95 yrs., g.r. 11l. 300

Old Kent-rd.—102 and 104, Mina-rd., ut. 141 yrs., gr. 7l. 245

Walthamstow.—25, Blackhorse-rd., ut. 72½ yrs., g.r. 5l. 6s. 160

By WAGSTAFF & SONS.

Kenilworth Town.—1 and 2, Willingham-ter., ut. 58 yrs., gr. 15l., yr. 50l. 8s. 395

By S. WOLLAUCH.

Aldersgate.—5, Fann-st., ut. 61 yrs., g.r. 90l., e.r. 180l. 385

Bromley.—Devon-rd., 1st fl. 7s. reversion in 89 yrs. 135

November 2.—By BARNARD & CO.

Nottingham.—38, Wheelstone-rd., ut. 60 yrs., g.r. 7l., w.r. 68l. 5s. 320

By SELFE & CO.

Clapham.—61, Rectory-gr., ut. 52 yrs., g.r. 4l. 10s., e.r. 35l. 290

Contractions used in these lists.—F.g.t. for freehold ground-rd.; l.g.t. for leasehold ground-rd.; l.g.t. for improved ground-rd.; p. for ground-rent; r. for rent; f. for freehold; c. for copyhold; l. for leasehold; p. for possession; e.r. for estimated rental; w.r. for weekly rental; q.t. for quarterly rental; y.r. for yearly rental; u.t. for unexpired term; p.a. for per annum; yrs. for years; l.a. for lane; st. for street; rd. for road; sq. for square; p.l. for place; t. for terrace; c.r. for crescent; a.v. for avenue; g.d.s. for gardens; y.d. for yard; g. for gate; b.h. for beerhouse; p.h. for public-house; o. for office; s. for shops; ct. for court.

MEETINGS.

FRIDAY, NOVEMBER 9.

Royal Sanitary Institute (Lectures for Sanitary Officers).—Mr. J. E. Worth on "Scavenging, Disposal of House Refuse." 7 p.m.

Eastern Counties Federation of Master Builders.—At the Shaftesbury Hotel, Colver-street, Colchester. Council meeting at 8 p.m., half-yearly general meeting at 4 p.m.

Monday, November 12.

University of London (Imperial Institute-road).—Mr. Banister Fletcher on "Greek Temples of the Doric Order." 8 p.m.

Surveyors' Institution.—First ordinary general meeting of the session. Opening address by the President, Mr. Langridge. 8 p.m. Previous to the reading of the address, the portrait of Mr. Julian C. Rogers, late secretary, will be unveiled.

Royal Sanitary Institute (Lectures for Sanitary Officers).—Dr. W. Hunting on "Signs of Health and Disease in Animals Destined for Food." 7 p.m.

TUESDAY, NOVEMBER 13.

Institution of Civil Engineers.—Mr. Charles Frewen Jenkins, B.A., on "Single-Phase Electric Traction." 8 p.m.

WEDNESDAY, NOVEMBER 14.

Royal Sanitary Institute (Lectures for Sanitary Officers).—Dr. W. Hunting on "The Names and Situations of the Organs of the Body in Animals." 7 p.m.

THURSDAY, NOVEMBER 15.

London Institution.—Professor H. Von Heikoner, C.V.O., B.A., on "Artistic Possibilities of the Machine." 6 p.m.

Royal Sanitary Institute (Lectures for Sanitary Officers).—Dr. J. King on "Dressed Meat, with a Demonstration of Morbid Specimens Collected from Meat Markets." 7 p.m.

London Master Builders' Association.—Council meeting at 31 and 33, Bedford-street, Strand, W.C., at 4 p.m. Conference Re Working Rules between the Council and the Mill Sawyers' Society, at 3.30 p.m.

FRIDAY, NOVEMBER 16.

Glasgow Technical College (Architectural Craftsmen's Society).—Discussion on "Ideal Specification" (Painter, Painter, and Plumber Work) by Messrs. Alex. W. R. Bell, W. G. Peddie, and Isaac Low. 8 p.m.

Institution of Mechanical Engineers.—Mr. T. Clarkson on "Steam as a Motive Power for Public Service Vehicles." 8 p.m.

Royal Sanitary Institute (Lectures for Sanitary Officers).—Dr. W. Hunting on "Fractional Methods of Stalling and Slaughtering Animals." 7 p.m.

Incorporated Association of Municipal and County Engineers.—Metropolitan District Meeting to be held at Westminster, at the Institution of Civil Engineers, Great George-street, Westminster. Address by Mr. T. C. Horsfall, illustrated by lantern slides, on "The Planning and Control of Town Extensions in Germany." 7 p.m.

TERMS OF SUBSCRIPTION.

"THE BUILDER" (Published Weekly) is supplied DIRECT from the Office to residents in any part of the United Kingdom at the rate of 10s. per annum (6 numbers) PRE-PAYD. To all parts of Europe, America, Australia, New Zealand, India, China, Ceylon, etc., 26s. per annum.

Subscriptions payable to J. MORGAN should be addressed to the Publisher of "THE BUILDER," 4, Catherine-street, W.C.

SUBSCRIBERS IN LONDON and the SUBURBS by prepaying at the Publishing Office 10s. per annum (32 numbers) or 4s. 9d. per quarter (13 numbers), can ensure receiving "The Builder" by Friday Morning's Post.

SEYSSSEL ASPHALTE (*Direct from the Mines*).

The Builder.

VOL. XC1.—No. 3825.

NOVEMBER 1, 1906.

ILLUSTRATIONS.

King Edward VII. Grammar School, King's Lynn.....Mr. Basil Champneys, Architect.

1. General View.
2. Entrance Front.
3. Headmaster's House and Dormitory Building.
4. Interior of Great Hall.
5. Plans of Ground Floor and First Floor.

Illustration in Text.

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Some Fatal Fires in London: A Study in Municipal Progression.



THE loss of six lives in the course of a many weeks through the apparent neglect of an administrative authority to perform its statutory

duty would seem to be a matter calling for inquiry.

The object of this article is to draw public attention to the manner in which the London County Council is exercising its powers under the recent London Building Acts (Amendment) Act, 1905, which deals with the provision of proper means of escape from buildings in case of fire. Under that Act certain functions, both administrative and judicial, are assigned to the Council. In its administrative capacity the Council's function is to call upon the owners of buildings to provide such proper means of escape as are required under the Act, whilst in its judicial capacity the Council has power to grant to the owners indulgence or relief from the specific performance of all or any of the requirements of the statute if the owner can show a reasonable case for the exercise of exemption.

Up to the commencement of the present year it was the duty of the District Surveyor—an independent official—to see that the rules of the Building Act, particularly in regard to construction, were carried out. In case of infraction of

the statute the District Surveyor took summary proceedings against the delinquent. At the present time, in case of a building being found to be not in conformity with the rules of the Act of 1905, the District Surveyor's function is not to serve a "notice of irregularity" on the owner; he has instead to notify the breach of the regulations—a breach possibly involving imminent risk of loss of life in the event of fire—to the Council, who are thenceforward responsible for the enforcement of the law, and who can proceed against a defaulting owner. The Council's responsibility dates from January 1, 1906.

What is the account which the Council itself gives of its stewardship?

According to the reports of the Building Act Committee, which were laid before the Council at its meeting on the 9th ultimo, there have happened in June and July last three fatal fires, two at least of which—as the Building Act Committee admits—would probably not have involved any loss of life had the requirements of the statute been attended to in time. There had been six months in which the necessary works might have been done; for five months in one case the Council had been aware of the peril hanging over the heads of these poor people, and "a warning letter" (about which we shall have something to say later on) had been sent to the owner, and in the other cases "No notice had been served on the owner of the premises."

In the two cases where five lives were lost the Committee says:

"In the circumstances of these cases we have decided not to take proceedings for the recovery

of penalties under sect. 24 of the London Building Acts (Amendment) Act, 1905."

No doubt the Building Act Committee and the Council have their reasons for this remarkable decision, but the matter will probably not be allowed to rest there.

The following is the text of the reports:

"FATAL FIRES AT NO. 210, MILE END-ROAD, AND NO. 14, TOWER-STREET, ST. GILES.

1. On June 24 and July 28, 1906, fires, which resulted in the loss of five lives, occurred at No. 210, Mile End-road, and No. 14, Tower-street, St. Giles, respectively.

The former premises, consisting of a basement, ground floor, with shop and two upper stories, were used as a dwelling and also for the manufacture and sale of hats. The fire originated in the shop on the ground floor at about 9.50 p.m., during the absence of the occupier. His wife and child, who had retired to the bedroom on the first floor, being unable to escape through the shop, ascended the stairs to the front room on the second floor, where they were seen at the window. The firemen at first found it impossible to reach them on account of the fierceness of the flames, which burst from the shop windows, but at the second attempt the body of the woman was brought down, and subsequently the child was found, still living, but so burnt that it succumbed the following day. It had been reported to us in February, 1906, that though there was a trap door 2 ft. by 2 ft. through the roof over the top landing, there was no ladder giving access thereto, and a warning letter was accordingly addressed to the 'owner' of the premises. After the fire an inspection was made of the premises, which were then unoccupied, and it was found that no attention had been given to the warning. Little or no damage had been caused to the roof, and it is, therefore, probable that had proper means of access been provided to the roof, in accordance with the requirements of sect. 12 of the London Building Acts (Amendment) Act, 1905, no lives would have been lost.* We have ascertained that the delay in attending to the warning letter was due to the serious illness of the owner of the premises.

In the latter case the building, which was occupied by a marine-store dealer, consisted of a basement, which was used as a rag-store, the

* The Rules in every case are ours.

ground floor with a shop, and three upper floors which were used for domestic purposes. There was a staircase, which was approached direct from the street from the ground to the top floor, and this staircase communicated by a soft wood door with the shop and basement. In the flat roof over the staircase was a hinged skylight, but although there is reason to believe that a ladder existed, it is not known whether it was available. The partitions, ceilings generally, and soffits of the stairs were of lath and plaster, but the ceilings to the shop and basement were of match-boarding, and the partition between the shop and the staircase was partly of deal. The fire appears to have originated in the basement, and to have spread rapidly to the staircase. The shop and first floor were only slightly injured, but the staircase from the first floor to the roof, and the second and third floors, were destroyed. At the time of the outbreak there were sleeping on the premises a girl aged fourteen years and an infant on the third floor, a girl, aged eighteen years, on the second floor, and the occupier and his wife on the first floor. The two last-mentioned persons escaped by the first floor windows, but the other inmates perished in their bedrooms. No notice had been served on the owner of the premises.

In the circumstances of these cases we have decided not to take proceedings for the recovery of penalties under sect. 24 of the London Building Acts (Amendment) Act, 1905.

"FATAL FIRE AT NO. 339, KENTISH TOWN-ROAD."

1. On July 1, 1906, a fatal fire took place at No. 339, Kentish Town-road. The premises consisted of a basement ground floor, with projecting shop, and three floors over. There were two trap-doors through the roof, access to which was provided by a movable step ladder. On discovering the fire one of the occupiers, with his wife and child, ascended to the third floor. Some delay occurred in opening the trap-door, but eventually the child was placed in safety on the roof, and the man returned to assist his wife. He was, however, unable to reach her, and she was overcome by the smoke and suffocated. There is little doubt that had it not been for the delay, slight though it may have been, in opening the trap-door, the woman would have been saved. The premises had not been notified to the Council by the District Surveyor under the London Building Acts (Amendment) Act, 1905, and consequently no notice under sect. 10 and 12 of that Act had been served upon the owner of the premises, and we do not, therefore, intend to take proceedings in this case.

The following questions arise on these reports:—

I. What interval elapsed between the receipt by the Council in February, 1906, of the report that the building was irregular and the issue of the so-called "warning letter" to the owner?

II. Did the warning letter contain any invitation to make an application to the Council for exemption from any of the provisions of the Act?

III. If not, what were the terms of the "warning letter"?

IV. Excluding all letters or communications which would come under the head of "warning letters," how many notices has the Council issued since January 1, 1906, requiring owners to comply with the above-named Act?

Our readers need hardly be reminded that the London County Council is a body elected every three years by a minority of the ratepayers of London to perform all the duties and take upon itself all the responsibilities of a great municipal corporation, and furthermore, a considerable number of members of the London County Council are also the representatives in Parliament of London constituencies. Now, so far as they are "owners" under the Act of 1905, these electors are liable, if the Council does its duty, to expend considerable sums of money to fulfil the obligations of "owners" under the Act, whilst these same electors will, in March, 1907, have an opportunity, if they choose, to dispense with the services, so far as the chief Municipal Corporation is concerned, of all or any of the present Councillors. The steward then is, if not under actual

notice to quit, constrained to bear in mind the possibility of dismissal from his master's service. We seem to recall the story of another steward:—

"How much owest thou unto my Lord?"

"An hundred measures of oil."

"Take thy bill and sit down quickly and write fifty."

This, however, is a digression. We are not here dealing with hundreds or fifties of measures of oil, rather are we considering risks and responsibilities in regard to hundreds and fifties of "human creatures' lives."

Take the case of a projecting shop, where the Act requires a proper means of access to the roof of the main building by means of a ladder and trap-door, so arranged as to open automatically if needed, and also that the roof of the one-story projection in front of the main building shall be made fire-resisting, so that inmates can either escape by the trap-door over the main building or can be reached by firemen using short ladders from the roof to the projecting shop.

The terrible consequences of the neglect to make such a shop comply with the Act are exemplified in the case of the fire at No. 339, Kentish Town-road (*vide supra*). What is the London County Council doing where the District Surveyors notify the Council of cases of non-compliance with the Act? The Council is sending to "owners" the following printed form:

"LONDON COUNTY COUNCIL."

Superintending Architect's Department,
County Hall, Spring Gardens, S.W.
The London Building Acts (Amendment) Act,
1905, Sect. 10.

Re Projecting shop at

Sir,--

Mr. _____ of the District Surveyor for the District of _____ has notified the London County Council that the above premises are not in conformity with the provisions of sect. 10 of the London Building Acts (Amendment) Act, 1905.

This section requires that where any part of a building, which is used or adapted to be used as a shop, projects for a distance of 7 ft. or more beyond the main front of any building of which it forms part and in which any persons are employed or sleep, the projecting portion of such shop shall be provided by the owner with a roof constructed of fire-resisting materials not less than 5 in. thick, but makes provision for allowing certain lantern lights or ventilating cowls in the roof of the projecting shop, provided they are constructed as required by the section. The Council is empowered in reasonable cases to exempt any building from the provisions of this section, and there is an appeal to the Tribunal of Appeal. The Council is anxious, as far as possible, to meet the views of owners in the matter, and I am accordingly desirous to inform you that if you consider you have a reasonable case for asking for exemption from any of the provisions of this section in respect of your building, you should make an application to the Council accordingly.

I am, Sir,

Your obedient servant,

W. E. RILEY,
Superintending Architect.

Note. Before work is begun two clear days' notice should be given to the District Surveyor under sect. 145 of the London Building Act, 1894.

We invite our readers to compare the concluding paragraph of this letter with Mr. Riley's words of June 2, 1905: "I think the great responsibility that is resting on some persons or somebody in regard to means of escape from fire requires immediate action" (*vide p. 58, Minutes of Evidence before Select Committee on London Building Acts (Amendment) Bill*). Then the "Ides of March" were further off, but now it is, "Take thy bill and sit down quickly and write fifty."

On reference to the Act we find, as might be expected, nothing whatever to justify this form of invitation. There is no mandate to the Council in dealing with the owner, who is not the occupier, to "as far as possible meet the views of owners" in a matter which may be of vital consequence to others, notably for example, to the "occupier who is not the owner," to whom, by the way, another polite letter form is sent, informing him, among other things, that the duty of complying with the provisions of the section "rests with the owner of the premises, whose attention has been drawn to the matter," and that "the Council is desirous that the Act should be worked with as little inconvenience as possible to everyone concerned." Again the opportunity to "meet the views of owners" and to consider the "convenience of everyone concerned" has now passed; the Council should have done that when drafting their Bill which was before Parliament in the summer of 1905. Now that the Bill has become an Act, now that ratepayers are beginning to find out the hardships and inconveniences involved in carrying out the requirements of that ill-considered measure, now that owners and others, by means of deputations and otherwise, are bringing pressure to bear on the Councillors, now that the District Surveyors in pursuance of their duties are notifying the Council of the large number of dangerous houses in the county (*i.e.*, dangerous from a fire escape point of view), now indeed is it not too late for the London County Council to send to the "owners" of London these invitations to delay? The Council appear to think otherwise. Then when owners do delay, and when occupiers are burnt, is the Council to say: "We do not intend to take proceedings in this case"?

Mischievous and deplorable as the effect of such tactics has been in the administrative area, the evil is increased tenfold by the uncertainties and delays which attend the judicial decisions of the Council.

When the Council's Bill was before Parliament a Report of the Home Secretary was read which contained a warning as to the inconvenience and undesirability of such legislation as would give the Council power to dispense in particular cases from requirements which, in the case of buildings where special danger exists, should rather be absolute and not left to the discretion of the Council. Unfortunately, sufficient heed was not given to that warning, and the consequence is that the Council, themselves the promoters of this particular piece of legislation, have been made both the administrators of the Act and the judges to interpret its provisions.

At the outset the Council appears to have delegated its judicial functions to its Building Act Committee, who sit in private, whose proceedings are not published and whose decisions are forwarded through the post to applicants without stating the grounds of such decisions. There is consequently not a surveyor in London who can say by what standard or in accordance with what principle any given application for exemption in regard to an existing building will be judged. Indeed, there is evidence that the standard of the Committee varies, and that the

ruling principle which guides them is one of expediency. Take the case of the projecting shops. Following a public meeting held at the St. Pancras Town Hall on June 11, under the Chairmanship of Sir William Job Collins, M.P., L.C.C., a deputation from the Association for the Amendment of the Projecting Shop Clauses waited upon the Building Act Committee. The following extracts are taken from the Building Act Committee's Report, July 9, 1906:—

"We have recently had before us a deputation from the Association for the Amendment of the Projecting Shop Clauses. The sections of the London Building Acts (Amendment) Act, 1905, which deal with projecting shops, are sects. 10 and 12."

After stating the requirements of sects. 10 and 12 the Committee proceeds:

"On behalf of the deputation it was urged that in addition to the actual cost of carrying out the requirements of sect. 10, the alterations inevitably involved considerable interruption of business and damage to stock, and that the requirement of the section, that lantern lights should not be less than six feet from the main front of the buildings, rendered the lighting of the back portion of shops almost impossible without recourse to artificial means. The deputation also claimed that the number of lives lost or endangered in the past through projecting shops, was not such as to justify the placing of so heavy a burden on the owners of existing shops, and asked that the Council should endeavour to secure the repeal of sub-sect. 3 of the section, which sub-section enacts that the Council should take advantage of the power given to it in sub-sect. 4 of the section to grant complete or partial exemption wherever possible."

The matter was one of the earliest to engage our attention when we were considering the course to be adopted in carrying out the provisions of the Act, and we have always been of opinion that, provided reasonable means of escape could be otherwise secured, the Council should take advantage of the power given to it in sub-sect. 4 of the section to grant complete or partial exemption wherever possible."

It will be seen that although in the Bill as printed on May 12, 1905, the requirements were more stringent, and the fire-resisting roof was indispensable, nevertheless the Committee here commit themselves to the opinion that "provided reasonable means of escape could be otherwise secured, the Council should take advantage of the power given to it . . . to grant complete or partial exemption wherever possible."

Here, then, in July, 1906, is a standard indicated which is appreciably lower than the standard of the Act of August 11, 1905, which in its turn was considerably lower than the standard laid down by the Council itself in their Bill as printed on May 12, 1905. By the same method of progression it may be supposed that by the time the elections come on next March, the requirements of the Act of Parliament as interpreted by the London County Council will have been so whittled down that "no inconvenience will be caused to anyone concerned," and if occupiers and their wives and children are burnt to death, to "meet the views of owners" it will be decided "not to take proceedings for the recovery of penalties under sect. 24 of the London Building Acts (Amendment) Act, 1905."

THE TRADES DISPUTES BILL.

THE Trades Disputes Bill on the 9th inst. passed the third reading in the House of Commons. We have commented on this measure from time to time, and have discussed the amendments introduced at the instance of the supporters of the Government. During the debates it has been attempted to justify the Bill on the ground that it does not alter the

law as it was understood to be until the decision of the House of Lords in the Taff Vale case; but this statement cannot be substantiated. Until the year 1901, when a decision was given by the House of Lords in a case in no way connected with trade unions, there was a technical difficulty in procedure in representative actions which was considered to render it impossible to bring trade unions as such before the Courts in actions for tort. After the decision in this case it was possible to sue the trade unions, and in the Taff Vale case an action was brought against a trade union and the trade union was held liable. The Trade Union Act of 1871 was very specific in its terms as to what were the matters connected with trade unions which should not be brought before the Courts, whereas Clause 4 of the present Bill is drawn in the widest possible terms, and, unlike all other clauses in the Bill, omits even a reference to "trades disputes." It runs, "An action against a trade union, whether of workmen or masters, or against any members or officials thereof on behalf of themselves and all other members of the trade union in respect of any tortious act alleged to have been committed by or on behalf of the trade union shall not be entertained by any Court." That is to say, absolute immunity for any tortious act, whether connected with a trade dispute or not, is given to trade unions—not only can they not be made liable in damages, but apparently they cannot even be restrained by injunction. It is obvious that this is not only a change in the existing law, but an absolutely new departure in any law except that which grants immunity from process to sovereigns, and to ambassadors as their representatives.

Added to this, Clause 3 enacts that a single individual is not to be made liable for acts done in furtherance or even in contemplation of a trade dispute, "on the ground only" that it "induces some other person to break a contract of employment or that it is an interference with the trade, business, or employment of some other person, or with the right of some other person to dispose of his capital or his labour as he will." This clause, should it ever become law, will have to be the subject of litigation to enable persons to ascertain their rights in disposing of their capital or their labour as they will. This is an entirely new departure in legislation; hitherto our laws have been connected with order and with the protection of the rights and property of the individual.

NOTES.

The
Coast Erosion
Commission.

FURTHER evidence before the Royal Commission on Coast Erosion confirms the opinion of Colonel Holland, mentioned in our "Note" of October 20, to the effect that the area of England is not being decreased by coast erosion. For instance, Mr. Clement Reid, F.R.S., of the Geological Survey, thought that during two centuries past the gain of land was greater than the loss, and Mr. A. Strahan, F.R.S., also of the Geological Survey, considered erosion to be more than compensated

for by accretion. It is worthy of note, however, that the former authority believes coast protection works should be controlled by some central body, and that Mr. Strahan recognises fully the serious erosion going on in the Isle of Wight and elsewhere on the South Coast. Evidence concerning the sliding down of cliffs as the result of springs points to the desirability of drainage systems as a preventative in places so affected, and the remarks of Professor Lebour concerning the slight sinking of the surface in portions of Northumberland and Durham indicate the importance of observations such as are made in other countries as to gradual changes of level. Mr. W. H. Wheeler, who has studied the question for many years past from a practical standpoint, brought forward a complete scheme for controlling the whole coastline. While recognising the fact that protective measures might be too expensive for some lands, he recommended that the coast should be divided up into sections placed under the supervision of wardens reporting to a central body, such as the Board of Trade. This idea is a good one, and worthy of adoption, for whether there is a general loss or not individuals will always want assistance and advice.

River
Purification.

SOME months ago we commented on the pollution of the Thames by the discharge of sewage from various forts into the lower reaches of the river. It is satisfactory to learn from the report received at a recent meeting of the Thames Conservancy Board that septic tanks and clinker filters have been completed by the Army Council at Coalhouse and Tilbury Forts, and should be in full operation in about a month from this date, and that plans have been prepared for a similar installation at Shornmead Fort, where construction will be commenced without delay. It seems, however, that nothing has yet been done to deal effectively with the effluent from Cliffe Fort, but now that the Army Council are convinced that the subject is one of real importance we have no doubt that this fort also will receive proper attention. Meanwhile, the Conservancy Board are by no means relaxing their vigilance, a fact demonstrated by the announcement that the Rivers Purification Committee are taking steps with the object of testing the efficiency of the installations at the two first-mentioned forts, and will shortly submit a further report as to the condition of the effluent from the other two establishments.

The Fire at
Selby Abbey.

AS A result of the official inquiry by the Bishop of Beverley, Lord Wenlock, and Mr. Brooksbank into the cause of the recent fire, it is made clear that the disaster was not due, as previously announced in the daily Press, to the blowing apparatus of the organ, but arose from the use of a paraffin lamp inside the instrument by the organ builders who had been sent to execute some repairs. Only those who have explored the interior recesses of a large organ can realise the bewildering array of trackers and other thin strips of wood that run in every direction, communicating motion from the keys to the wind-chest, and the profusion of

inflammable material disposed as if to invite ignition. Yet, as stated in the report of the committee, organ builders habitually use unprotected candles, and sometimes, as shown by the recent inquiry, paraffin lamps. In organs where wooden tracker-work is replaced by pneumatic or electric transmission, the risk of fire is somewhat, but only slightly, reduced, for fire-resisting construction cannot be applied to organs any more than to violins. The mellow tone of an organ depends very much upon indispensable wooden pipes, aided by the resonance of timber used in the construction of the case, the swell-box, and other parts of the instrument. This being so, it is imperative that greater precautions should be taken against fire. In many church organs gas-brackets are fixed in the interior, and where properly protected these may be employed without serious risk. But the tuner or repairer cannot always bring the light to bear upon desired points. Hence the familiar candle-end. Wherever electric light is available it is perfectly easy to fix sockets, into any one of which can be inserted the plug at the end of the flexible wire attached to a portable lamp, and then the lamp can be moved to any desired place without the slightest risk. We may draw attention again to the great importance, both in an architectural and practical sense, of building the originally intended stone vault over the choir, instead of merely restoring the timber roof; a matter to which Mr. St. John Hope also had already called attention in the *Times*.

THE Insurance of Ecclesiastical Buildings. CONSIDERABLE comment has been made on the fact that Selby Abbey was only insured for 10,000*l.*, and in the church publications it is asked, Are other ecclesiastical buildings also under-insured? Our answer would be that they certainly are. The insurance of a church or a parsonage house is made at the mere will and pleasure of the ecclesiastical officials who are interested in it. No technical valuation of a church by a respectable architect or surveyor is made before it is insured. In a good many cases churches are probably not insured at all, or, if they are, not on the best terms. In these days of increased heating and lighting the dangers of fire in church buildings of all kinds are increased. But we should be surprised to learn that the fact has made a difference, in most cases, in the amount of the insurance, if any. We have only to note the extraordinary variations of stipends in the Established Church to be aware of the absence of business capacity among church officials. It is, therefore, not in the least surprising if English churches, mission homes, and other buildings are not insured or are under-insured. Every ecclesiastical edifice should be valued for insurance by a technical adviser, and should be insured by those who are responsible for its care for a sum not less than this valuation.

The Peace Palace at The Hague. It appears that the Dutch architects who took part in the competition for the Peace Palace of Peace have protested formally against the selection of M. Cordonnier's design, on the acknowledged ground that it must cost more than the amount

available and named in the instructions, and that the choice may therefore render Mr. Carnegie's gift the subject of litigation. This is a good technical reason against the adoption of a design against which there are equally good architectural reasons. Only, if the Dutch architects mean to suggest that one of them should come in instead, there was no design by a Dutch architect equal to some by English and Americans, and there was not the slightest reason for selecting a design by a Dutch architect because the Palace was to be erected on Dutch ground. The Hague was selected as a central place, but the Peace Palace scheme was a cosmopolitan one, and had no essential relation with Holland.

Disputes between Adjoining Householders. THE case of Draper v. Lorden, reported at length in our columns last week, illustrates the drawbacks attendant on giving undertakings in Court in too vague a form. The plaintiff was the lessee of a corner house situated in the Strand and Bedford-street, and the defendant was the owner of four houses adjoining the plaintiff's house on the eastern side in the Strand. The plaintiff had commenced to pull down his houses, and dangerous structure notices had been served on both plaintiff and defendant in respect of certain portions of the houses. The action against the defendant had afterwards been commenced and an interim injunction applied for to restrain the defendant from damaging the plaintiff's house. On the motion for this injunction the defendant had given an undertaking not to do any act which would diminish the support of the eastern wall of the plaintiff's house. The defendant subsequently pulled down his houses, and excavated the ground at some places within 2 ft. of the plaintiff's wall. The proceedings reported last week were a motion to attach the defendant for a breach of this undertaking. There was much contradictory expert evidence as to whether the operations carried out by the defendant had diminished the support to the wall, but the Court found that there had been a breach of the undertaking, and the defendant was condemned in the costs of the motion, though not committed to prison, and a fresh undertaking was given. This fresh undertaking was in clear terms not to excavate lower than 3 ft. from the base of the wall, or nearer than 7 ft. from the wall. Now, had the original undertaking been given in explicit terms all this litigation would have been avoided; it was solely caused by an undertaking so vague in its terms that expert opinion varied on what would or would not constitute a breach of it.

Water for Building Operations. THE case of Payne v. Metropolitan Water Board, commented upon by us May 26 last, has been carried to the Divisional Court. The respondent was a builder who was carrying out building operations on a site where formerly a dwelling-house and its garden had been situated, and he had laid an information against the water company for having neglected to supply him with a certain quantity of water by measure, he having tendered the cost of making the connexions, and the maximum rate for the water, as

fixed by the East London Waterworks Act, 1853. The word "premises" occurs in the Act, and the magistrate had held that the building site was within the terms of the Act. The Divisional Court have reversed this finding on the ground that the respondent was not the owner or occupier of "premises" entitled to the supply of water he asked for. The Court construed the word "premises" in this connexion as meaning existing premises to which water could be supplied either for domestic purposes or trade purposes, and not to include land. The conviction was, therefore, quashed.

"STANDARDISATION" was the Standardisation subject of the Presidential address by Dr. Glazebrook at the Institution of Electrical Engineers last week. He confined himself mainly to those aspects of it which concern the electrical engineer, and gave a most interesting historical account of the progress of the standardisation of the electrical units. The first important advance was made by Professors Thomson (Lord Kelvin) and Wheatstone in the Report issued by the British Association in October, 1862, and it is interesting to notice how rapid has been the progress made on the lines they laid down. At the meeting of the representatives of various National Standardising Laboratories at Charlottenburg last year it was agreed that a Conference should be held with the object of bringing into agreement the laws of different countries with regard to electrical units. It is satisfactory to learn that the Foreign Office have already issued invitations to an International Conference to be held in London in 1907. We shall be very surprised if a complete settlement be not made of the few difficulties still outstanding. Electrical science has no nationality, and British, German, and French scientists are equally outspoken in their criticisms of the "Pentane lamp," the "Hefner" and the "Carcel" lamp, the national standards in their respective countries. When Dr. Glazebrook touched on the work of the "Standards" Committee he took up a more debatable subject. Engineers will readily admit that much of the work done is excellent, but there is a growing opinion that many things have been standardised in accordance with the wishes of certain manufacturers rather than in the interests of the industry. Take, for instance, the "British Standard Tables of Copper Conductors and Thicknesses of Dielectric." It is notorious that the thicknesses of the jute and paper dielectric are not determined in accordance with scientific principles, and yet these thicknesses are used by the Cable Makers' Association in this country. It is simply a case of "standardising ignorance." An excellent case, however, was made out for some of the work that has been done, and, in our opinion, if we had more scientists like Dr. Glazebrook and fewer official representatives on the Committees, still better results would be obtained.

Tension Tests of Steel Angles. IN a paper on this subject, read before the American Society for Testing Materials, Mr. Frank P. McKibben gives some useful

results obtained by tests conducted at the Massachusetts Institute of Technology. The objects were to ascertain—(1) The ultimate strength of the angles in tension; (2) the value of an angle-bracket in transmitting stress from the upstanding leg of the angle into the hitch-plate; (3) the relative strength of angles where the gauge line for rivets and the centre of gravity line respectively passed through the centre of tension; and (4) the relative strength of single angles and of angles riveted together to form pairs. Briefly summarised the results indicate that the ultimate strength of angles, where the rivet gauge line passes through the centre of tension, is from 74 per cent. to 87 per cent. of the resistance of the metal; that for angles riveted together in pairs the ultimate strength is from 77 per cent. to 86 per cent. of the strength of the metal; that the addition of an angle-bracket to the joint gives an increased resistance of from 4.7 to 8.7 per cent.; that in joints where the centre of gravity line coincides with the centre of tension, instead of with the rivet gauge line, there is an increased resistance of about 8 per cent.; and that the riveted pair of 3 in. by 3 in. by $\frac{5}{16}$ in. angles is stronger than a single 6 in. by 4 in. by $\frac{3}{8}$ in. angle. Mr. McKibben says that this is notwithstanding the fact that the sectional area of the former is less than that of the latter, but we must point out that by the Pencoed handbook the relative sectional areas are 3.58 sq. in. for two 3-in. equal angles $\frac{5}{16}$ in. thick, and 3.59 sq. in. for one 6 in. by 4 in. by $\frac{3}{8}$ in. angle. Still, the fact remains that the riveted pair appears to be stronger than the single bar.

It is stated that the First Commissioner of Works has resolved to effect a restoration of the pictures on the ceiling of the Royal United Service Museum, formerly the Banqueting House. The pictures, painted for King Charles I. by Rubens, depict the apotheosis of King James I. Charles I. paid Rubens 3,000*l.* out of his own purse for the paintings, which were fitted in the ceiling shortly before the outbreak of the Civil War. Cipriani was paid 2,000*l.* for restoring them. Kneller says that Jordaens helped Rubens in the work. Walpole mentions that it was originally intended to employ Van Dyck upon a series of paintings for the interior of the hall to illustrate the history and a procession of the Order of the Garter.

OUR attention has recently been directed to the vexed question of what are the origin and meaning of this place-name, of which there are so many instances, in two or three of its forms, in both London and the provinces. In London the most familiar example is, or rather was, the Cold Harbour, with its lane and wharf, on the south-side of Upper Thames-street, near the site of the Church of All Hallows the Great (or More) and the Less which was pulled down in 1894. Stow records that the steeple and choir of the adjacent Church of All Hallows the Less, which was not rebuilt after the Great Fire, stood over a vaulted gateway, which

was the entrance to "a right fair and stately house"—the Cold Harbour. The site, in part, of the church was afterwards occupied by Calvert's, since the City of London, Brewery. That Cold Harbour had been a block of tenements, latterly used as the Watermen's Hall, built by George, sixth Earl of Shrewsbury (obit 1590), upon the site of Poultny's Inn, bought by Alderman Sir John Poultny in 8 Edward III. The name in that street appears as "Cole Harbour," in J. Lockie's "Topography of London," 1810 and 1813, which cites also Cole Harbour-street in Hackney-road, as being "opposite Cole Harbour lately called Bath-street"; Cole Harbour and the lane between Dock-basin and the Marsh-wall, Blackwall (where was a half-timbered house, the Gild house, temp. Elizabeth, of the pilots of the port of London); and Cole Harbour-place, White Bear-yard, Kent-street, in the Borough. Those places are named, but with "Cold" for "Cole," in Baldwin's "New Complete Guide," 14th edition, 1774-5. Cold Harbour road and lane extend from Brixton-rise to the foot of Denmark-hill, Camberwell. Some privileges of refuge or sanctuary seem to have belonged to the Cold Harbour by the Thames side. "Harborough" remains as the late Middle English form of the affix, "harbour" for a place-name, as e.g., Market Harborough. "Coaled arberye" was an old English name for charcoal, and "cold harbour" might have denoted a charcoal store or wharf. But perhaps the most likely explanation is that given in the Oxford Dictionary: Dr. Murray says that "harbour" is an obsolete term except in its dialectical use, signifying a place of shelter or sojourn; lodgings, quarters, resting-place; place of entertainment, inn; place of refuge, or asylum. He cites Cold Harbour, a place of shelter from the weather for wayfarers constructed by the wayside; hence a frequent name of a locality, and in combination Cold Harbour-lane. That explanation of the term appears, we may point out, to be corroborated by the French word "*abri*," a refuge or shelter, akin in both its form and meaning to "harbour" with the same signification. "Cole Harbour" is clearly depicted in C. J. Visscher's drawing, first edition, 1616, of the riverside along Upper and Lower Thames streets, and there is a good drawing of it in the Soane Museum. In *Notes and Queries*, October 29, 1904, Colonel Pridesaux observes that in Sir John Poultny's will the name is spelt Le Coldherberuy and Le Choldherberue; in his executors' declaration as Le Coldherbergh.

THE Architectural Association Conversatione held at Tufton-street on Thursday, November 8, was a distinct social success. The attendance was excellent in spite of unpleasant weather, and the rearranged premises proved admirably suited to gatherings of this kind. The president, Mr. R. S. Balfour, received the guests on the first gallery, not, as has hitherto been the custom, on the ground floor—an improvement in every way. A large and instructive series of exhibits was arranged with more than usual success, both in placing and selection. The principal section was that of

sculpture, chiefly architectural, consisting of scale models of groups or figures forming important features of modern buildings. Amongst the many well-known sculptors contributing to this show were Mr. Goscombe John, A.R.A., Mr. Alfred Drury, A.R.A., Professors Lanteri and Moira, Messrs. Derwent-Wood and Hodge. The last-named submitted a large model of a corner tower of the Hull Town Hall. In the same gallery a large show of pencil sketches by prominent architects and a particularly attractive exhibit of Japanese objects, comprising elaborately-wrought swords, daggers, fans, etc., lent by Mr. Matt Garbutt, formed a valuable addition to the general exhibits. Stained glass silver work, and enamels were also to be found—all admirably arranged. Actual work of the Association was seen in the Day and Evening School work; here the largest section comprised some remarkable holiday work, in which that of Messrs. Farey, Hake, and Barry was prominent. A varied musical entertainment was provided wherein the musical society of the Association took vigorous part.

NEW WAR OFFICE BUILDINGS, WHITEHALL.

At the invitation of H.M. Office of Works we were on Tuesday afforded the opportunity of privately viewing the interior of the new War Office buildings in Whitehall; these have now been taken possession of by the War Office authorities, who are rapidly moving in the several departments which are in future to be housed there.

This huge block, one of the largest of single buildings that has been added to London for some years, has already become pretty well known to the public so far as its exterior is concerned, for the low boarding which surrounded the building was removed about three months ago, while the scaffolding was struck in the autumn of last year. As regards the interior, one is struck somewhat by the lavish and elaborate treatment of the entrance-hall, grand staircase, and the rooms allotted to the Army Council and chief officers, as compared with the uniformly economical finish of the rest of the building. As it is understood that levees will not be held in the new building, the apartments referred to and their approaches seem unduly ornate. These principal rooms are placed upon the *piano nobile*, and the grand staircase serves them only, the mezzanine and other floors being reached by subsidiary stairs, of which there are several.

The whole of the entrance-hall from Whitehall and the grand staircase are faced with Painswick stone rubbed to a smooth face; these wall surfaces are very little cut up, and give a feeling of breadth and simplicity which some of the details lack. The floor is laid with black and white marble squares, and the treads and risers of the stairs are of Piastraccia marble, while the balusters are of alabaster. The stairs start with a central flight, turning to right and left, and eventually landing immediately above the start, the last two flights being carried on a fine segmental arched bridge spanning the whole width of the well-hole. The corridor of the mezzanine is cleverly schemed to cross the hall just above the start of the stairs, but entirely disconnected from them; the general grouping of this with the rest of the stairs is successful and well thought out. Two fine columns of Brescia marble are features of the hall, and the same marble is used for the handrails.

On the level of the *piano nobile* the whole of the well-hole of the stairs is surrounded by an arched screen masking the corridors. This screen has an order of Corinthian pilasters in Painswick stone, with arched openings between; the impostes of these arches are of alabaster, with stone caps of Ionic order. The caps look a little too large for the rather short and stumpy impostes, but otherwise the screen is effective. At the head of the stairs is the Secretary of State's room; this is a fine apartment overlooking

Whitehall. The walls are panelled in oak with panelled Corinthian pilasters on pedestals, the panelling being only carried up to two-thirds the height of the columns, and the intervening space up to the entablature being plastered; the reason for this is not quite obvious, as there can have been little or no saving of cost, and the effect is a little spoilt. The chimney-pieces in this room, as is the case in most of the principal rooms on this floor, are old ones removed from Pall Mall, and the splendid brass chandeliers, adapted for electric light, are replicas of the old ones at Hampton Court. The Army Council chamber and committee-rooms, three very fine rooms forming a suite, are elaborately treated; they are panelled in oak throughout, with Ionic columns and pilasters, and have very good barrel ceilings heavily ornamented; the little cross barrels over the windows are charmingly dealt with, and the corresponding lunettes on the inside wall panelled in oak with good effect. The chimney-piece in the Council Chamber is a beautiful old one of carved statuary inlaid with verde antico marble.

There are other rooms on this floor allotted to the use of head officials, such as the Chief of the General Staff, the Adjutant-General, and the Permanent Secretary, which are all more or less elaborately finished in the same way as are the rooms already described. The oak panelling is merely oiled, producing a not very pleasant red tone, and the details are a curious mixture of Italian and English forms, not always satisfactory.

The general treatment elsewhere is very simple indeed, plain-panelled dadoes and plastered walls coloured green being considered sufficient in the clerks' offices, which occupy most of the ground, mezzanine, second, and third floors. The sub-basement is utilised for stores, boilers, and other apparatus; the basement for the resident officers, the resident engineer, and the resident clerk and their staffs, as well as for the library of nearly 80,000 volumes. On the fourth floor are dining-rooms capable of seating 600, and above are the most up-to-date and complete kitchen premises fitted for serving from 1,000 to 1,700 meals. The whole of the roofs are flat and covered with asphalt. The corridors everywhere seem light and spacious; those on the principal floors have oak dadoes and mosaic flooring. The sanitary arrangements are also excellent, with lavatory blocks cut off from the main building and separately ventilated.

No special method of ventilation has been adopted in the rooms beyond the provision of a deep draught board to the windows and a ventilator over the doors. A complete system of telephones has been installed throughout the building. Provision against fire is made in the shape of 108 hydrants on a special fire service, and in the event of a breakdown arrangements have been made by means of which the hydraulic power supply could be used. There are no less than twenty-one lifts in the building, those for goods being worked by hydraulic power; the passenger lifts are electric. The whole of the drainage works by natural gravitation in cast-iron pipes suspended from the ceiling of the basement, the floor of which is below the level of the sewer; a tank is also provided to take storm water in case of the flooding of the sewer. The principal materials used are: Bricks, ordinary and glazed; Portland stone; Portland cement; and York stone.

The building thus completed for occupation was designed by the late Mr. William Young, who was commissioned to prepare plans for the work in 1898. The foundations were begun in 1899, the entire site being excavated and a huge tank of concrete formed in which the buildings were to stand; the bottom of this tank is 6 ft. thick, and the sides vary from 7 ft. to 3 ft. thick. It would hold about thirteen million gallons.

Since Mr. Young's death the works have been carried out by Mr. Clyde Young in conjunction with Sir John Taylor, of H.M. Office of Works. The whole of the stone came from quarries at Portland owned by the Bath Stone Firms, and was worked at the contractor's yard at Chelsea. The glazed brickwork was supplied by Messrs. Brook & Son, of Halifax.

The eight sculptures at the corners of the top of the building were designed and executed by Mr. Alfred Drury, A.R.A., who was a pupil of M. Delon. They represent

Peace, War, Truth and Justice, Fame and Victory; but, with the exception of these figures, there is no carving symbolical of war to be found in the building. The external architectural carving was done by Mr. C. H. Maber, and the internal wood and stone carving and the marble work by Messrs. Farmer & Brindley.

The works generally have been carried out by the following firms:—The foundations—Messrs. J. Mowlem & Co.; the superstructure—Messrs. Foster & Dicksee (Rugby); plasterers' work—Mr. James Annan; sanitary plumbers' work—Messrs. Matthew Hall & Co.; mosaic pavements—the Art Pavements Company; wood block flooring—Mr. Burgess (Liverpool); stoves, chimney-pieces, etc.—Messrs. Yates, Haywood, & Co.; artistic grates in principal rooms—Messrs. M. Feetham and Co. and Messrs. Elsiey; electric cables—Messrs. Siemens Brothers & Co.; electric wiring—Messrs. F. A. Glover & Co.; electric and hydraulic lifts—Messrs. Waygood & Co.; heating apparatus—the Brightside Foundry and Engineering Company (Sheffield); boilers—Messrs. Beeley & Sons (Hyde, Manchester).

THE SOCIETY OF PAINTERS IN WATER-COLOURS.

The present exhibition of the Society is fully up to its usual high level of interest and excellence. If we select first some of the most remarkable and complete works in the room, we should begin by noticing Miss Fortescue-Brickdale's beautiful and essentially new treatment of the old subject of the "Madonna and Child" (68); new in spirit rather than in the design. The Virgin sits, as she does in so many "old masters' pictures, in front of a shrine or niche, on each side of which are seen, on a more removed plane, two small paintings, one of the sin of Eve, the other of the Annunciation. But the face of the Virgin is quite unusual; there is read into it a gentleness and tenderness of expression which belongs to modern feeling; and the child is one of the most bright and charming figures of the kind ever seen. The robes of the Virgin are grand in their amplitude of fold and richness of colour. Not far from this hangs an almost equally fine painting by the same artist of a modern subject, "The Shower" (84), a young lady seated under a verandah waiting for the weather to clear; the interest of the subject is of course very slight compared with that of the Madonna picture, but the painting of the head is beautiful. In the centre of the end wall is worthily hung Mr. Rooke's grand architectural drawing of the "Apse of St. Julian's Church, Erioude, before Restoration" (92); not only is the drawing of the architecture so good, but the texture of the masonry is represented with such force and truth.

Mr. E. R. Hughes has produced a perfectly exquisite figure and head under the title "The Nymph Callisto" (111), a figure in a wood, with a laughing face and half-draped in some kind of green streamers; one cannot but be vexed to find a work like this placed close to the floor, while a piece of sheer vulgarity flaunts on the line immediately above it. Mr. Hughes's "The Mantilla" (113), a lady in a rich black dress and crowned with the head-dress which gives the name to the work, is a very fine painting a little spoiled by the disproportionate size of the head. Mr. Colin B. Phillip has seldom produced anything so fine and striking as his large picture of "A Mountain Ravine" (132). Mr. Walter West has a very successful embodiment of Beatrix Esmond coming down an old Renaissance staircase with a candle in her hand, as described in Thackeray's story; perhaps his sweet figure in "Quaker Grey" (341) is more attractive though not so numerous drawings of cities that of "Assisi" (239), recumbent on its hill, is perhaps the best, and is one of the most beautiful and visionary views one could see; if it is not real, it is something, in a sense, better than the reality. Miss Mildred Butler again shows her new combination of peacocks and a meadow, "Where the Grass Grows Green" (138), a splendid piece of colour. And we may chronicle that Mr. Reginald Barratt, who has been for so long painting scenes in Venice admirably, has surpassed himself this year; he has a larger number of drawings than usual, and for purity of colour and clear and

precise representation of the architecture they seem quite perfect; if there are any that we could select as the best they would perhaps be "Under the Library, Venice" (80), and "View on Grand Canal" (131). It is a pleasure to see architecture represented in this way, with entire precision and exactness and yet with pictorial effect. Between these and Mr. Rooke's drawing, architectural subjects are well represented in this year's exhibition.

Looking round the rest of the exhibition in consecutive order, we find Mr. Hemy heading the list with an excellent seapiece "The Head of the Reef" (1). Mrs. Stanhope Forbes, in No. 4, with a quotation from Herrick as title, as well as in other works nominally based on Herrick's poems, shows that she has no faculty for understanding their spirit; and though her drawings are original and fine in colour (except the absurdly pronounced dabs of sunlight in No. 86, which look as if something had been spilt on the canvas), the personages she represents are as opposite as possible from the whole ideal of Herrick, who wrote of ladies and not of bronzed country lasses. No. 86, by the way, is not Herrick, but Longfellow, but the figure is equally out of sentiment with the poem. Herr Vosper's "Quiet Pipe" (18) is a good piece of colour bestowed on an ugly subject. Something pleasanter meets us in Mr. Lionel Smythe's "A Summer Memory" (24), a group no doubt on the sunny Wimerex shore, coming up from bathing; a sweet, healthful-looking girl and a little child, painted in a broad free style and with excellent drawing. Mr. Weguelin's "Sea Maidens" (33), otherwise mermaids, are very cleverly imagined and drawn, though we cannot like his *clungant* tone and colour in this, and still less in "Iris and Honey-suckle" (117). Mr. Rackham's picture from "Puck of Pook's Hill"—"There's where you meet hunters and trappers for the Cirluses," etc. (37), is a really brilliant piece of realistic conception of the past, carried out with great vigour (all but the mechanical clouds); so is "The Flight of the Fairies from England" (115), suggested by the same delightful book, and "The Angling Club" (145) is a delightful bit of satire though a little out of place here. But Mr. Rackham ought to do much when he once begins to take himself seriously. Mr. Sullivan's "Clytie of the Sixties" (69), like others of his, is what we call experimental art; it is the fashion of the critics now to praise this, but it is doubtful work; the young woman in a space spotted with discs of sunflowers as large as half-crowns, somehow suggests a wall paper. Like some others of the new school, Mr. Sullivan seems unable to paint beauty even where the subject demands it; he illustrates by a figure (159) Browning's poem "A Pretty Woman"—

"So we leave the sweet face fondly there"—

but the face is not "sweet" at all; it is commonplace and red, "Roses and Old Blue" (99) is a bold design with fine colour.

We passed over Mr. Anning Bell's "The Pool" (41), ladies of some mystic period in front of a hedge and by the brink of a pool, two of them undressing; every figure is good in itself, but there is no composition, the whole thing is ragged. Mr. Hughes's "Dick the Shepherd" (141), a portrait of a little boy dressed as a shepherd and "blowing his nail" in a snow landscape, is as good in its way as his other contributions, though not so important. Mr. Tuke has taken to painting ships—"Calm Day" (142) is a good ship picture; and Mr. Eyre Walker's "Near Bideford" (143), with the long sand-grass blown into curves in the foreground, an excellent coast picture; also the same artist's "Below Barnstable" (152), remarkably true to the character of the district; and Mr. Rigby's "A Westmoreland Cottage" (151) is a good bit of English road landscape treated in a true and unaffected style. Sir F. Powell's "The Whelk Gatherer" (150) we took at first for Mr. Albert Goodwin's work; there is a poetry in this lurid evening scene with the solitary figure just seen in the middle of the dim shore.

Two drawings that hang just over each other are good examples respectively of the rose and the poetry of water-colour style. Mr. Pillsbury's "Duckpond" (157) is a capital piece of highly-finished and conscientious work of its kind, but one only says "how clever," or at the best "how pretty"; what is done is all plain to the eye and on the

surface of things. Mr. Goodwin's "The Right from Lucerne" (156) is not only a fine and impressive subject, but there is something that appeals to the imagination even in the handling and execution, which is a matter of study, and produces an effect without, so to speak, showing the machinery by which it is done. So with "Innsbruck" (164) and "The Gorge of the Teign" (285) by the same artist.

Among works worth special mention is Mr. Cowper's finely studied half-length "The Love Potion" (180), only failing a little in the want of expression in the face. Mr. Crockett's "Summer Smocks" (182), a fresh landscape with two young girls in white dresses, owes a little to Mr. Wetherbee, but is a very pleasing work. Mr. Paterson's "Barbue Bridge" (197) is a curious effort at giving the colour of a scene while avoiding all definition of detail, and Mr. Cameron's "Evening Mists on the Meuse" (230) is a translation of landscape into the author's special programme of effect, rather than a representation of nature. Among others we noted are Mr. Dollman's two clever animal pictures, "The Hunter" and a bear (329) and elephants "By Night" (225); Mr. Gregory's "The Avon near Salisbury" (167); Mr. Tom Lloyd's "A Spring Evening" (168); Mr. Thorne Waite's "The Sussex Downs" (160), an admirably composed landscape; Mr. Hopwood's "A Street in Staithes" (206), with a fine effect of broad sunlight; Mr. R. W. Allan's "Cairo" (244); some interesting sketches on a tidal river, by Mr. Walter Crane; Miss Rose Barton's "Interior of St. Bartholomew the Great" (202), with figures of a woman and child; and some of Mr. Calverley's probably early landscape studies, which bring back pleasant recollections of an older school of water-colour.

MAGAZINES AND REVIEWS.

THE *Quarterly Review* contains an article on "The Cheap Cottage" with the signature "Home Counties"; a signature which we fear does not carry much weight with us. It is an advocacy of the position taken up by those who scoffed at Rural By-laws and believed in all the promises of cheap cottages as illustrated at Letchworth; in regard to which the bankruptcy of one of their builders, noted in our pages a week or two back, came as a significant criticism. We are glad to see, however, that the writer gives a warning against the idea that concrete building can be a really economical method except in special circumstances (the presence of the necessary materials on or near the site, etc.), and that he quotes with approbation an opinion that 9-in. brick is a better wall than 9-in. concrete, always supposing (in both cases) an exterior weather-defence of rough-cast or cement. A great deal is made of Mr. A. H. Clough's well-intended efforts at the provision of cheap cottages; but the one shown by him at Letchworth, almost a mass of wood boarding, we did not like. Many of these cottages, too, as we remarked at the time, might be excellent as "week-end" cottages in summer or autumn, but would not be pleasant to winter in. The same number contains an appreciative article on "The Art-work of Lady Dilke," which is not exactly a correct title, for what Lady Dilke produced was not art-work, but works on art. Her books, as far as we know them, are most interesting as well as instructive reading; and the article gives a better idea than many of us had of Lady Dilke's extraordinary industry and capacity for hard work, and the great total amount of her literary work of this class, much of which we believe will have a permanent value.

The *Art Journal* devotes an article to the City of Londonderry, which derives a value from Mr. W. Monk's admirable illustrations. An illustrated article by Mr. Sketchley on "Haslemere Arts and Crafts" shows what excellent work is getting done there. Among the illustrations we may mention especially the hanging in tapestry designed by Mr. Godfrey Blount, and Mr. Romney Green's dining table and chair; in reference to his panelled chest we should remark that we think chamfering is a device which has had its day. Mrs. Arthur Bell writes an article on Carrière, whom we think she over-ates; he was a painter of some genius but would have been less remarked but for the singular mannerism he had adopted and made his own, of painting every-

thing as if seen through a mist. His is not a robust or wholesome art, and we expect that it will meet the fate shadowed forth in Johnson's aphorism—"Nothing odd will do for long." The frontispiece to the number is formed by a very clever and effective etching of "St. Katharine's Wharf" seen from the empty basin, with the ships and boats in it lying dry, by Mr. Harold A. Rigby.

The Christmas number of the *Art Journal*, already out, is devoted to the life and works of Sir E. Waterlow. The numerous illustrations from his landscapes show, among other qualities, his care in composition, in which his works contrast favourably with many of the ragged and uncomposed landscapes produced in the present day.

In the *Burlington Magazine* the editor continues his article on the subject of English Provincial Museums, and sketches out in general terms the principle on which a local museum might be started, commencing with the works of men who were natives of the district, and devoting a section to local antiquities. In the course of the article he deprecates the loan system of South Kensington, against which we have spoken before. A central and metropolitan museum should be complete, and a serious student of a subject has a right to complain when he comes to such a museum and finds that objects he wanted most to study are represented by a card saying that they are on loan to the corporation of Little Puddington. In an article on "The Future Housing of our National Collections" the editor makes a strong protest, and we entirely agree with him, against the proposal to build a new stationery office on the ground in the rear of the National Gallery, which will certainly be wanted eventually for the extension of the Tate Gallery. Mr. Laurence Weaver commences an essay on the exceedingly interesting subject of London leaded steeples, beginning with Wren's, which number no less than nineteen. Mr. Weaver does full justice to Wren's genius as exhibited in the variety with which he treated his lead spires and lanterns, though to say that Wren "created within the square mile of the City more forms than all the architects of the Middle Ages" is stretching it a little too far; and there is the question, too, are they all good forms? We always feel drawn to those who appreciate and praise Wren, but it is no use to exaggerate. We agree with Mr. Weaver in thinking that the lead spire of St. Margaret Patten is essentially Gothic in character, and therefore does not harmonise with or sit well on the completely Renaissance tower.

Nearly the whole of the illustrations of the *Berliner-Architekturwelt* are occupied with one building, the "Haus Kempinski," of which Herr A. J. Balcke is the architect. It is a wild affair, a thing of shreds and patches, with a great deal of cleverness and originality in detail; but the architect has not been able to make a consistent whole out of it—or has not tried to do so.

The high standard of excellence set by the earlier numbers of *Public Works* is amply maintained in the present issue, where the articles more especially interesting to architects and civil engineers are an account of "Belfast's New City Hall," built from the designs of Mr. (now Sir) Brunswell Thomas, and a description of "The Great Charles River Dam," by Mr. Edward S. Sears, of Boston, U.S.A. The first of these articles is very completely illustrated by photographic views of the exterior and interior, and by two plans of the ground and first floors respectively. The new building, standing in the centre of Donegall square, is in the style of the Classic Renaissance, and the main facade is 300 ft. long; the crowning feature being the peristylar dome reaching the height of 173 ft. above ground level. A very fine effect is obtained in the entrance-hall, which is approached by way of a stone porte cochère and an octagon vestibule. The principal landing under the dome, the staircase to the great hall, and the great hall itself—120 ft. long by 57 ft. wide, with a vaulted ceiling rising to the height of about 40 ft.—are portions of this building to which attention may be specially directed.

Acetylene contains an article describing the work which has been done by the Phos Company in lighting railway carriages with acetylene. A generator and purifier are fixed on the roof or at one end of a railway coach, from which the acetylene gas is conveyed by

a pipe carried along the roof of the coach and connected to the lamps by T-pieces at the necessary intervals. A charge of 3½ lb. of calcium carbide is sufficient to run a five-light installation for seven hours, and the complete installation for a five-compartment carriage is supplied for 15½ 10s. This system of lighting is used on the London and South-Western Railway and on a considerable number of railways of less importance, both in the United Kingdom and abroad. Another purpose for which acetylene is applied, and for which it is eminently suitable, is to serve as a head-light on engines which travel over tracks liable to be obstructed by cattle or by poles torn down by hurricanes. For the Buenos Ayres and Rosario Railway the Phos Company have supplied a number of head-lamps, each of 2,500 candle-power. They are, it is stated, able to illuminate the track for half a mile ahead, and the flames have been found to remain steady when the lamps have been subjected to a wind pressure of 100 miles an hour.

Harper contains an article on "Macbeth," by Mr. Theodore Watts-Dunton, which is worth reading in itself, but only comes into our province here in respect of the illustrations by Mr. Abbey which accompany it. In the coloured plate which forms a frontispiece, Mr. Abbey is more successful with Lady Macbeth than with Macbeth, who is too common and pitiful a figure—he was not quite such a poor creature as that; the line drawing of Lady Macbeth holding out a goblet, with the words "A kind good-night to all," is very successful. The witches are poor, and raise no sense of the uncanny. In the supper scene where the murderers come "to the door" Mr. Abbey takes the licence to treat the place as a tent, and shows the "first murderer" lying flat and pushing up his face under the fold of the tent; it is an ingenious way of giving a little more probability or possibility to the appearance of the murderer unnoticed by the guests. Mr. W. D. Howell's pleasant article, "By Way of Southampton to London," is another of the series in which he has been giving the impressions of a cultivated American in England; impressions generally very sympathetic and very complimentary to the old country which America has, in some senses, left so far behind now.

In the *Century* "Whistler's Academy of Painting" (at Paris) is the subject of an article by Mr. Cyrus Cuncio (surely not a genuine name), illustrated by some capital sketches by the author, and giving an interesting sketch of Whistler's character and manner as teacher in an atelier, and his mystifications and his not unkindly eccentricities of behaviour towards his students. A colour print as frontispiece exhibits a conception of Becky Sharpe by an artist with a Polish name, Sigismund de Ivanowski, who has made a remarkably good realisation of Thackeray's creation; it is the very woman, and those who want to know what "Becky" would like had better turn to it.

In *Scribner*, under "The Field of Art," are some remarks on mural painting in America since 1898. There seems to have been a great deal of work of this kind done in the States of late years—far more, it is needless to say, than has even been thought of in this benighted country. It seems that there has been an outcry in some quarters against allegory, with the idea that mural painting must "record" something; on which head some good remarks are quoted, apparently from correspondents of the magazine:—

"Mr. Joseph Lauber says: 'There is no objection to a historical painting on the walls provided it can be made to fulfil the first condition, namely, to decorate: to have that balance in composition, scale, and colour that will make it a part of the building. Otherwise it should be an enclaved picture.' Mr. Low says: 'It behoves us all in these cases, if we wish to make the decoration of public monuments general, to avoid the obvious and the commonplace. It is evident that to be duly covered by the architectural style in which a room is conceived we cannot all go back to our meagre history; for one I own I am almost as tired of the "early settlers" as I am of "Justice," "Science," and "Art," but there is a rich field in the myths and history which we have inherited in common with all the modern world."

This is good sense and good art-criticism. An article by Mr. Christian Brinton gives some account, with illustrations, of the work of Ilya Répin, whom he calls "Russia's greatest painter"; but we are rather accustomed to find each Russian painter, musician, or writer who is mentioned in literature put forward as "the greatest." From the

illustrations, Répin seems to be a powerful and dramatic realistic painter of scenes of his own day, without much sense of beauty—a sense, by the way, which seems equally wanting in Russian music. His scene entitled "The Duel" has much tragic pathos.

Among the contents of the *Antiquary* is an article by Mr. Hubert J. Darnell on some "West Berks Brasses," with small cuts of the figures.

The *Church Builder* (quarterly) contains a number of illustrations of the church of Wymondham, a name dear and familiar to many of us in the old days when Brandon's "Open Timber Roofs of the Middle Ages" was a book devoutly studied. But there is more in Wymondham than the open timber roof with its angels; it is a grand church in every way, and we are glad to learn that a good deal has been done to it lately in the way of judicious and apparently very necessary repair, though more remains to be done.

In the *Fortnightly* is an article by E. March Phillips on "Bernini and the Baroque Style," intended as a kind of whitewashing of that master of the tawdry and exaggerated in art. It is curious to find such a protest being made at the present day, just when everyone is talking about the value of simplicity and sincerity in art; and we do not think it will do. Bernini's one really satisfactory piece of work was his double colonnade in front of St. Peter's—that we quite agree in admiring; but it is rather too late in the day to try to resuscitate admiration for the Trevi fountain. Bernini was a genius of a sort, no doubt; but he was a genius of the wrong sort and of a bad period, and an artist who placed his own glorification above the true and sincere love of art; and it is no use trying to put him again on a pedestal from which the best and sanest opinion on art has rightly handed him down.

EGYPT EXPLORATION FUND.

Mr. F. G. HILTON PRICE presided on Tuesday at the Rooms of the Royal Society, Burlington House, over the 20th ordinary general meeting of the Egypt Exploration Fund.

On the proposition of Mr. Berridge, the Officers and Committee were re-elected, and Sir John Evans was elected a Vice-President.

Mr. H. A. Grueber (Hon. Treasurer) read his financial report, which stated that the restriction of the Fund's Work to Deir-el-Bahari this year had enabled the Committee to keep well within the income at their disposal, and for the first time for many years he could show a balance on the right side. The general balance-sheet showed that the assets of the Fund and its branches amounted on July 31 to 3,691l. 16s. 6d., as against 2,388l. 19s. 7d. last year.

Mr. John Ward proposed the adoption of the Treasurer's report, which was carried.

The Chairman, in reviewing the work of the last season, said the principal undertaking was the continuation of the excavations of the XIIIth Dynasty Temple at Deir-el-Bahari, carried out by Messrs. Naville and Hall, assisted by Mr. Currelly. With regard to the works of other explorers independent of the Fund, Professor Petrie, who represented the British School of Archaeology in Egypt, had been carrying out work in the Eastern Delta, and he reported that at Tell el Yahudieh the walling of the town was found to have been at first an enormous bank of earth with sloping face, which later had a great stone wall built around it. There was no gateway, the entrance being by a long sloping roadway leading over the bank, which was more than 40 ft. high. The objects found show that this was a great camp of the Hyksos, and it agrees both with the description and position of Avaris. It indicates that the Hyksos were archers and a nomadic people coming from an open country without timber. The graves of Hyksos age had shown that they imported the black incised pottery and buff-painted pottery from Syria, and that there was a continual degradation during the period. A reconstruction of the lists of the Hyksos kings thus became possible from details of style and design. This site was ascertained to have been occupied as early as the XIIIth Dynasty. Professor Petrie considered that the whole outline of the fortifications, together with the plan of the Temple on the top of the mound, agreed with the accounts

of the City of Onias, and the topographical position accorded with it. At Tell el Retabeh remains were found dating from the XIIIth Dynasty onwards, and some monuments of Rameses II.; the Israelites were mentioned here as "foreigners of Syria." This probably represented the treasure city of Raameses. Mr. Garstang, in company with Mr. H. Jones, worked under the auspices of the Liverpool Institute of Archaeology, and completed the excavations at Esneh. The cemetery yielded a series of antiquities from about the XIIIth to the XVIIIth Dynasties. They also made excavations at Kubban and at Dakkeh, and in an undisturbed necropolis at Kostanneh were revealed some interesting interments having a close analogy to those of predynastic and early dynastic peoples of Upper Egypt. Mr. Legrain had continued his important work at the Temple of Karnak. During the season he had recovered 29 statues and nearly 1,000 bronzes. The total number of statues and stela found in this "cachette" up to date was 721, and about 17,000 bronze figures. Mr. Weigall gave a satisfactory report of his work in Upper Egypt and Nubia. Amongst other things he had discovered the name of a new King, perhaps of the XIIIth Dynasty, which was cut into a rock in large size—either Ka-Ka-Ra or Ha-Ka-Ra. He had also investigated the "Pan Greaves," the results of which he said were startling. The President after touched briefly on the work of Mr. J. E. Quibell at Sakkara, Mr. Edgar in the Delta, and Professor Breasted in Nubia.

Mr. R. H. Hall read a paper contributed by Professor E. Naville, in the course of which he said that the campaigns of excavation of the three last winters had led to results of the greatest importance; and because the third campaign had been more sensational than the first and second, and has brought to light a discovery which was at present unique in Egypt, a shrine containing its goddess, it should not throw into the shade the two former ones. They had unearthed the oldest temple at Thebes. It had been most wantonly destroyed; already, in old times, during the reigns of the Rameses, the fine material out of which it was built was carried away for other constructions. Of the delicate sculpture which revealed to them an art very little known before, only fragments had been collected; nevertheless they could still trace the architectural structure of the building, and recognise in it a form of sanctuary of which there was no other specimen in Egypt. In one way, perhaps, they had derived advantage from the fact that these remarkable sculptures of the XIIIth Dynasty were so fragmentary, since, had it been otherwise, they would never have seen any specimens of this peculiar style of art in England, or had any to distribute to museums; had the sculptures been perfect and in place, they would have had to have remained at Deir-el-Bahari.

The temple is the funerary temple of King Mentuhotep Neb hepet-Ra, of the XIIIth Dynasty. In the old empire the funerary monument of the king was a pyramid; an artificial mound, sometimes of huge proportions, which concealed the mummy, and near which was the temple where the king instituted his own worship, which was to be continued after his death. In the new empire the mummy did not rest under a pyramid; it was hidden in a chamber cut in the rock, sometimes at the end of a long passage, on the walls of which were depicted the scenes of the other world in a manner such as would only be conceived by the wildest imagination. As for the funerary temple it was a long way distant from the tomb, on the verge of the desert, where it was easily accessible. There the king established his own worship when he was still alive, in conjunction with that of the gods, and used also the walls of the building as a book on which he related the chief events of his life. The first in date of these was that of the Queen Hatshepsut, at Deir-el-Bahari, a large temple built in terraces, which was long thought to have no parallel in Egypt, and the clearing of which, except one-third done by Mariette, was the work of the Egypt Exploration Fund. Now they had a building of a new style which participated of both the older and the younger types. They find what they supposed to be the remains of a pyramid, but it was not isolated, did not stand by itself, and did not conceal a

mummy. It rose on a platform, out of a colonnaded hall, which surrounded it on all sides; and as yet they had not discovered the tomb for which it was built, and which it seemed to indicate. The access to the platform on which the pyramid stands was as in the temple of the XVIIIth Dynasty by a ramp, on both sides of which were colonnades protecting the sculptures of the supporting walls. These sculptures, like those of the later temples, described the wars of the king, his festivals, probably also his way of living, as they might judge from the hunting scenes. Everything was in pieces, only one single column had its original height, the side-walls of the platform and of the upper chamber, which were covered with the most elaborate carvings brilliantly painted, had nearly disappeared. But the pavements, especially in the north colonnade, were singularly well preserved. They could trace the original plan of the temple in its entirety, and see that it was something quite different from anything they knew. It was a new phenomenon in Egyptian architecture. They stopped the work of last season, at the entrance of a sloping passage going down into the rock, and they were most impatient to see where it led to. Was it the tomb of the King Mentuhotep, whom he called the second, or was it what a stela of the XIIIth Dynasty called the cave at Mentuhotep, a subterranean sanctuary? It was important to notice that the funerary temple was used also as a cemetery. There the queens and princesses were buried, who were, at the same time, priestesses of Hathor, the goddess of the mountain, who already, at the time of the XIIIth Dynasty, was worshipped under the form of a cow. At the time of the XVIIIth Dynasty the temple of Mentuhotep was still the object of a great respect, so much so that the great King of Egypt, Thotmes III., made a sanctuary to the goddess. He need not go into details about the discovery of the shrine, when they had found what experts declared to be the finest specimen of animal sculpture that Egyptian antiquity had left them. Let them remember that they had before them a building of an unknown style, and belonging to a king and to a dynasty about whom their information was very scanty.

In every respect—in architecture, art, and history—the second excavation made at Deir-el-Bahari was of first-rate importance. But there was another reason why he thought the Fund might be satisfied for having undertaken these excavations, at his request, after the clearing of the great temple. Deir-el-Bahari would be a lasting work of the Fund in Egypt. It was now one of the great attractions of the left side of Thebes. Leaving aside its scientific interest, it had become now one of the most striking sights of all the antique remains at Thebes. When they would have carried away, as they hoped to do next winter, the two mounds of rubbish which were on both sides of the ramp, the whole end of the valley at the foot of the majestic cliffs of Deir-el-Bahari would be cleared and open. The visitor, coming from the river, would have before his eyes, not a labyrinth of rubbish mounds which have been spoiled of their contents, but two temples of remarkable design, dedicated to various gods, and chiefly the goddess who was supposed to dwell in the caves of the mountain, and to go down occasionally to the river—Hathor, mistress of the west. One of these temples, the largest, was built by a mighty king; its pillars had been re-erected, and its ceilings restored by the Fund, so as to protect the sculptures. The other temple was more modest and much more ruined; but it was a thousand years older than the first, to which, in certain respects, it served as model. At the same time this excavation had produced most valuable antiquities for European and American museums.

Next winter he would like to finish Deir-el-Bahari so completely that they might finally leave it for other scenes of operations. They had two mounds in front of it to carry away, but they did not know what they would find further in the sloping passage at the foot of the cliffs. Would it lead them to a royal tomb with a deep pit like that in the tomb called Bab el Hagan, or would it end abruptly, unfinished perhaps, at the foot of the cliffs? It was always dangerous prophesy in matters of excavation. However, it seemed to be probable that they could not expect a season like the past. He was

afraid he should not have again the surprise which he experienced on February 6, when, having crept into a small hole, he found himself suddenly before the magnificent cow who had not seen the light, perhaps, for 3,000 years. But, even if the next season should prove more or less unfruitful in respect of objects to be carried away, it was certain to have an important result—to complete thoroughly the exploration of the temple of Mentuhotep, which was the only one of its kind, and the most ancient temple in Egypt, of which the whole of the ancient fabric had survived till our day.

Dr. B. P. Grenfell spoke of the literary finds at Oxyrhynchus, and said that during the past season on three occasions they made finds of literary papyri on a scale far exceeding discoveries of any previous season. The first find of nine texts comprised new odes of Pindar, parts of the lost tragedy of Euripides on Hyspiyle, parts of a new Greek historian, and of a commentary on the second book of Thucydides, the second half of the Symposium and portions of two manuscripts of the Phaedrus of Plato, of the Panegyricus of Isocrates and the speech of Demosthenes against Boeotus. These manuscripts all belonged to the IInd or IIIrd century. The second literary find comprised pieces of at least thirty different texts, and, had these been better preserved, this find would have been of the most sensational interest, and of this library the Greek lyric poets formed no inconsiderable part. The third find consisted, in the bulk, of Ist or IInd century documents. Amongst other documents was that of a new Gospel fragment, which, like the two series of Oxyrhynchus sayings, was likely to claim a niche in the fabric of early Christian literature for itself.

Builders' and Contractors' Column.

HORSE HAULAGE v. MECHANICAL TRACTION IN BUILDING WORK.

THE great increase in the use of motor-vehicles of all kinds which has taken place in the last two years has attracted much attention, and is of importance to all those in whose business the cost of handling and moving quantities of materials from place to place runs into large sums, in the course of a year.

It is a question which concerns builders and contractors particularly, and is worthy of the most careful consideration by them. The points for and against both forms of traction as regards economy and suitability should be carefully weighed by the builders, as it is probable that they employ, either directly or indirectly, more horses and carts than any other persons, and their cartage bills form very serious items in the annual expenditure, so that any real economy which can be effected in this direction should be most welcome.

If we consider the process of erecting a building in London we find that cartage is required from the moment the excavation is commenced until the building is decorated and finally cleaned down. As a rule the bulk of the cartage involved is in removing the excavated material from the foundations, and in bringing to the site the ballast, sand, cement, and bricks required, the cartage of the remainder of the materials, though considerable, being small in comparison.

Let us consider the advantages and disadvantages of both forms of traction for the various materials enumerated below:—

1. Excavated material.
2. Ballast and sand.
3. Bricks.
4. Joinery.
5. Stone.
6. Constructional steelwork.

1. *Excavated material.*—The general methods of dealing with foundations are either to form a ramp from the street level to the bottom of the foundation, or to employ a steam-crane, standing upon a stage, to hoist the rubbish as excavated, and fill it into carts standing at street level. If carts are to be used on a ramp it is only necessary to spread some hardcore upon it, or, perhaps, to make a rough sleeper road, either of which can be done at small expense; but if motor-

vehicles are to be employed the slope must be more gradual, a very strong road must be constructed to carry the heavy loads, and the side of the ramp must probably be timbered to prevent its slipping. The space required for a motor-vehicle to turn or manoeuvre is also much greater than is necessary in the case of a horse and cart, so that it is not possible to bring it as close to its work, and, consequently, the rubbish requires more handling. If a stage is constructed at ground level on to which the vehicles may be backed, the chief objection to the motor-wagon will be the much greater strength required in the construction of the stage. The same difficulties will be met with at the other end of the journey, the tips being, in many cases, quite unsuited to motor traffic, the roads not being made up sufficiently to carry the weight, and the manoeuvring space being usually limited. Against these disadvantages the chief advantages appear to be the larger quantity dealt with at one time, and the greater speed at which the motor-wagons can travel, though, if the distance is small, this latter advantage is negligible.

2. *Ballast and sand.*—Here, again, the advantages are with the horse and cart, which can be taken to any spot on the site and tipped alongside the trench where the concrete is to be placed, whereas the motor-wagon would have to be discharged at some point to which a good road existed, and thence distributed over the site by hand labour.

3. *Bricks.*—In the case of bricks other conditions have to be considered; for example, stock bricks are frequently unloaded from barges without bringing them alongside a wharf, the carts being merely backed down against the side of the barge in shallow water, which would be quite out of the question with a motor-vehicle. Fletton bricks, now so generally used, are brought by rail to London stations, and, in many cases, it would be quite impossible to bring a motor-vehicle alongside the trucks owing to the confined space, and the delays which occur would soon neutralise any apparent saving in actual cartage. Another objection is that the obstruction caused by a motor-vehicle standing outside a building to be unloaded would be very serious owing to the time taken, whilst a cart can generally be run inside the building and unloaded there, causing no obstruction to the street traffic. Glazed bricks also would require much more careful packing if carried in a motor-wagon, owing to the higher speed and consequent increased vibration.

4. *Joinery* could, of course, be taken on a motor-wagon equally as well as on a cart, but, owing to its light and bulky nature, it would not be possible to get a full (weight) load on the motor, and the cost of transit would therefore be increased, it being pretty generally acknowledged that a steam tractor cannot compete with horses for loads of less than three tons.

5. *Stone* could be brought in a motor-wagon and could probably be packed so as to make a full load, the chief disadvantage being that the motor must be unloaded in the street, as in the case of bricks, and that the stone would require more careful packing.

6. *Constructional steelwork.*—In this case the motor-wagon could compete favourably with the horse and cart, the weight to be handled being greater, and the facility for loading and unloading greater, and there being no danger of damage by jolting.

It may, therefore, be taken that, broadly speaking, horse haulage is more convenient than motor-traction in the case of London building work.

We now come to the comparative cost of the two systems, and for the consideration of this we have worked out several examples, as detailed hereafter.

Horse Haulage.

Capital expenditure, one horse, cart, and harness	
100%	
Cost per annum:—	£ s. d.
Interest on capital 5 per cent.	5 0 0
Depreciation 10 per cent.	10 0 0
Corn hay, etc.	36 0 0
Shoeing	3 5 0
Harness repairs and renewals	3 5 0
Reins to carts	8 0 0
Horsekeeper (proportion)	5 0 0
Veterinary	1 11 0
Carman	60 0 0
Total	£131 11 0
Say, 9s. per day, working 300 days per annum.	

Steam Traction.

Capital expenditure, 5-ton steam lorry, say, 500l.	
Cost per annum:—	£ s. d.
Interest on capital 5 per cent.	25 0 0
Depreciation 20 per cent.	116 0 0
Fuel	42 10 0
Oil, etc.	7 16 0
Repairs and renewals	50 0 0
Driver	91 0 0
Water	10 0 0
Total	£246 6 0
Say, 28s. per day, working 250 days per annum.	

Example 1. Bringing deals from docks to builder's yard, say, ½ mile, allowing the necessary time for loading and unloading.

(a) Horse and cart, load 27 cwt., two journeys a day

=27 cwt. for 2½ miles
=say, 15 ton miles at a cost of 9s.
=70l. per ton mile.

(b) Motor-wagon, load 4½ tons, two and a half journeys a day

=4½ tons for 2½ miles
=61 ton miles at a cost of 28s.
=54d. per ton mile.

Example 2. Taking worked Portland stone from builder's yard to buildings, say, ¾ mile, with light loads home.

(a) Horse and cart, load 27 cwt., three journeys a day

=27 cwt. for ¾ mile
=24½ ton miles at a cost of 9s.
=40l. per ton mile.

(b) Motor-wagon, load, say, 3 tons, three journeys a day

=3 tons for ¾ mile+2 tons 3¾ miles
=52½ ton miles at a cost of 28s.
=64d. per ton mile.

Example 3. Taking a load of joinery to a building at a distance of 9 miles, calling for a load home at another place, say, 4 miles off, and bringing it home, say, 7 miles.

(a) Horse and cart, 54d. per ton mile.

(b) Motor-wagon, 64d. per ton mile.

Taking these three examples, it will seem that, whereas the horse haulage averages 54d. per ton mile, the motor-wagon averages 6d. per ton mile.

TRIBUNAL OF APPEAL UNDER THE LONDON BUILDING ACT:

RECEIVER OF METROPOLITAN POLICE v. PICCADILLY HOTEL SYNDICATE.

ON Wednesday the Tribunal of Appeal sat at the Surveyors' Institution to hear an appeal by the Receiver for the Metropolitan Police District, under sect. 48, subsect. 2a, of the London Building Act, 1894, against the consent of the London County Council to the erection of a building, to be known as the Piccadilly Hotel, to abut upon Piccadilly, Piccadilly-place, Vine-street, Regent-street, and Air-street, to the height and as shown on the plans, dated July 16, 1906, submitted with the application of Messrs. W. Woodward and W. Emden. Mr. Freeman, K.C., and Mr. Morrell appeared for the Receiver of Police, and Mr. Horace Avory, K.C., and Mr. Daldy for the Piccadilly Hotel. Mr. Godfrey, from the Solicitors' Department of the London County Council, appeared to assist the Tribunal by the production of papers, but not as a party.

At the commencement of the proceedings Mr. Hudson said that Mr. Gruning, feeling that he had some personal interest in the matter, had asked the Royal Institute of British Architects to appoint someone in his place, and Mr. Slater had been so appointed. Mr. Penfold was unable to be present, and Mr. H. Martin had been appointed to serve in his place.

Mr. Freeman said that this was an appeal from the certificate issued by the London County Council to the Piccadilly Hotel Syndicate allowing them to carry their buildings to heights of 120 ft. in some cases, and 110 ft. in others. The objection was lodged by the Receiver of Police in respect of the Vine Street Police-station, which was one of the most important stations in the whole of London. The Syndicate held the land on which they were now building the Piccadilly Hotel under a building agreement made on March 4, 1904, with the Commissioners of Woods and Forests. The piece of land was bounded by Regent-street, Air-street, Piccadilly, Piccadilly-place, and Vine-street, and a passage which ran from Vine-street to Regent-street, and part of it was the site of the old St. James's Hall. A considerable portion of the houses fronting on Regent-street had been cleared away, and practically the whole of the block would be cleared shortly. On July 13, the Syndicate, through their architects, made application to the Superintending Architect of the London County Council for the consent of the Council

to the erection of a hotel to a greater height than 80 ft., and the application was granted on July 31. Up to this the proceedings had been entirely *ex parte*, and no notice had been given to the Receiver of Police. On September 6 the Syndicate published the necessary notice, and served a notice on the Receiver on September 10. The position of the Receiver of the Police was this: The Receiver was a corporation entitled to hold lands for the purposes of the police in London, and he held Vine-street Police-station on a term of ninety-nine years from 1897, at a ground rent of 515*l*. In order to get the land the Receiver surrendered two very valuable leases he held, and spent upon the premises between 7,000*l*. and 8,000*l*. It was reckoned that the total capital value represented by the surrendered leases and other things came to over 30,000*l*. Both parties held their leases from the Commissioners of Woods and Forests, and it was a matter of considerable surprise to the Receiver of Police that his landlords should have consented to the erection of a building without any consultation with him, and which building would inflict a serious injury on the property on which so much money had been spent in the public interest. The question for the Tribunal to consider was, whether, having regard to all the circumstances of the case, the County Council acted rightly in giving the certificate, and whether the building should be allowed to go to anything like the height prescribed, and, if so, what height should be the limit. At the police-station sleeping accommodation was provided for a number of constables, and a great deal of clerical work was done there. The streets surrounding the station were extremely narrow, and a building 120 ft. high would overshadow every window in the station, and seriously affect the use of the station for sleeping accommodation. It was a case which could not be met by any money compensation, but it was one of those cases where a mere trading syndicate should not be allowed to inflict grave injury on a public department. There was no doubt that a difficulty arose as to what height the building should be allowed to be carried to. The certificate of the London County Council purported to be given under powers which enabled it to sanction the erection of buildings to a greater height than 80 ft. If the Council had the power to extend beyond 80 ft., then he would call evidence to show that an increase to 110 ft. or 120 ft. would be an extremely detrimental thing to the property of the Receiver. Even if they could go to 80 ft., that was bad enough, for then the building would be 30 ft. higher than the buildings which were previously there. He considered that it was open to question whether the Syndicate had any right to go beyond the height of the buildings formerly there, but this depended on the definition of what was a domestic building. If it was a domestic building, he submitted that the Syndicate would not be entitled to carry their buildings higher than those previously there. In the case of the London County Council *v.* Davis and the Rowton House Company, it was held that, although a house might be a public building, it might also be a dwelling-house. He submitted that, although as a hotel this was a public building, yet it was intended to be used for human habitation, and therefore came within the definition of that case as being a domestic building also.

Mr. Avory said the whole point of that case was whether Rowton House was one to be inhabited by persons of the working classes, and it was held that it was not because it might be inhabited by anyone. The Chairman asked why the Receiver came to that Tribunal instead of bringing an action in the ordinary course for an infringement of light and air. Mr. Freeman said that, in the first place, the County Council had issued a certificate, and they had the right to come. In the second place, both parties had the same landlords, and they were bound not to bring any action for infringement of light and air. The Chairman: Do you say that we have got, under these circumstances, a kind of concurrent jurisdiction with the High Court to consider matters of the same kind as those for which an action might be brought? Mr. Freeman: Distinctly. I think your duty is primarily to have regard to the health and well-being and physical questions of

that sort, rather than to questions of depreciation of property.

The Chairman: You are not afraid that this building will fall down upon you?

Mr. Freeman: I am not at all sure. But the question is that the height of the proposed building is so great that it puts us into a well, which is bad for health and sanitation.

Mr. J. W. Butler, F.R.I.B.A., Surveyor to the Receiver of the Metropolitan Police, gave details of the arrangement of the Vine-street Police-station, in which, amongst other things, there was sleeping accommodation for thirty-four men. The height of the proposed building differed, and facing Regent-street it was limited to 64 ft. Opposite Vine-street station it would be 119 ft., as against 65 ft. previously.

In cross-examination by Mr. Avory, witness said the hotel was being set back 27 ft. on the Piccadilly front, and this shortened Piccadilly-place by 27 ft. He was advised by Dr. Parkes, the sanitary adviser to the Police, that the rooms in the police-station would not be fit for sleeping purposes.

Mr. Avory: Do you say that he advised that it is not safe for a policeman to sleep opposite a building 117 ft. high?

Witness said that Dr. Parkes advised that the hygienic conditions would probably be of such a nature that it would affect the health of those sleeping. Further questioned, witness said there was no doubt by the agreement with the Commissioners of Woods and Forests they had contracted themselves out of the right to proceed against the Commissioners for loss of air and light, but they were forced to accept the conditions or they would not have got the lease.

Mr. Chatfield Clarke corroborated the previous witness's evidence as to the prejudicial effect of the new building upon the police-station.

In answer to the Chairman, witness said that there would be more open space on the plan, but the increased height took it all away.

The Chairman asked the witness if it had struck him that the erection of this high building might improve the ventilation of Vine-street. He meant that it might catch the air and drive it down. He had noticed in passing the Russell Hotel that there was a great chance of having one's hat blown off.

Witness said, of course, high buildings would make a street more draughty, as they found in Northumberland-avenue.

Mr. A. R. Stenning and Mr. A. L. Ryde were both called in support of the contention that the Vine-street Police-station would be very prejudicially affected by the erection of the hotel to the height proposed.

After the usual midday adjournment, the Chairman said that if the parties were agreed that this was simply a question of discretion exercised by the County Council, the Tribunal would not call upon Mr. Avory. If, however, there was any question of law to be raised, on which they might be asked to state a case, they would like to hear what it was.

Mr. Avory said that, so far as he was concerned, it was simply a question of discretion.

Mr. Freeman said that, as regarded the question of 80 ft. and any height over, that was a matter entirely for the discretion of the Tribunal, and no question of law arose. A question of law might arise as to whether the proposed building was a domestic building, and therefore limited to the height of the buildings which previously occupied the ground, but he preferred again to treat that as a matter for the discretion of the Tribunal.

The Tribunal dismissed the appeal, and allowed 120 guineas costs.

STAMP DUTIES AND THE LONDON BUILDING ACT.—The Revenue Act, 1906 (6 Ed. 7, c. 20), which came into force on October 1 last, has effected a change in stamp duties which will affect parties to differences under the London Building Act who go to arbitration. Under the Stamp Act, 1891, "Awards" had to be stamped with duties varying in amount according to the "amount or value awarded" up to 1,000*l*. awarded, and in other cases with a duty of 1*l*. 15*s*. by the Revenue Act, 1906, "Awards" are now to be stamped with a uniform duty of ten shillings. Duplicates or counterparts will be charged as under the Stamp Act, 1892, i.e., when the duty does not amount to five shillings with the same duty as the original instrument, but in other cases five shillings.

SOUTHERN COUNTIES MASTER BUILDERS' FEDERATION.

THE half-yearly general meeting of this Federation, affiliated to the National Federation of Building Trade Employers, was held at the Old Ship Hotel, King's-road, Brighton, on the 2nd inst. The minutes of the last half-yearly general meeting were read, confirmed, and the financial statement of income and expenditure from December 31, 1905, to date was received and adopted, and the Secretary was instructed to urge local Secretaries to forward at once all outstanding subscriptions for the current year, arrears, and contributions to the National Reserve Fund.

The following elections were made for the coming year:

- (1) Representatives on the National Federation Executive Council, Mr. W. F. Wallis, President (Maidstone), and Mr. C. E. Skinner (Chatham).
- (2) Representative on the National Federation Administrative Committee, Mr. W. F. Wallis, President (Maidstone).
- (3) Representative on the National Federation Conciliation Board, Mr. W. F. Wallis, President (Maidstone).

The following half-yearly report was read and adopted:

"Notwithstanding the gloomy accounts given and stamped on the faces of the Board of Trade as evidence of national commercial prosperity, the wave of revival has not yet reached the building trade. Throughout the country all branches of the trade continue to suffer from 'slackness,' with little prospect of an improvement.

As anticipated, organised labour is bent upon taking full advantage of its increased Parliamentary representation to extend its power and influence. Bills of a most drastic and partial character are before the House of Commons, and, apparently, notwithstanding the extreme unfairness, will bring about their defeat or reasonable amendment.

Employers' Parliamentary interests continue to be carefully watched by the Employers' Parliamentary Council, and your representative on that Council, Mr. William Shepherd (London), has earned the gratitude and admiration of his fellow-employers by the able manner in which he has defended their interests in connection with the Census of Production Bill, Workmen's Compensation Bill, etc. A well-merited compliment was paid to Mr. Shepherd by selecting him to act as the representative of building trade employers on the expert committee appointed by the Home Office in connection with the Factory Act. Your Council heartily congratulates Mr. Shepherd.

No important trade disputes have arisen during the past half year, and it would seem that the relations between employers' and workmen's organisations are becoming more cordial. Your Council attributes this, in a large measure, to the existence and strict observance of reasonable working rule agreements. Experience and friendly intercourse have helped to reasonable men on both sides, and trade war is yearly becoming more unlikely.

The national body of building trade employers is strengthening its organisation and extending its influence year by year. It has given its strenuous attention to the extension of its membership and influence, the perfection of its National Conciliation Boards, and the accumulation of its reserve fund.

Your Council regrets that the South of England does not show so much vitality and virility in federated action as the North. To remedy this, the new Secretary will devote a certain amount of his time to tour in our area in order to infuse employers in it with more enthusiasm and earnestness.

The President gave an interesting address on Federation matters generally, including references to the Workmen's Compensation Bill, Trades Disputes Bill, Census of Production Bill, organisation, &c., and a discussion followed.

Mr. A. C. White, the newly-appointed Secretary of the National Federation, addressed the meeting, and on his suggestion the local Associations were invited to express their views on the following inter-trading rule, the observance of which has very materially strengthened the employers' associations in the North of England. Inter-trading Rule:—

"Members shall not give or take tenders for any work to or from any persons who are not members of this or kindred Associations connected with the building trade, and shall not employ any such persons to do work for them."

It was resolved:—

"That this meeting recommends to the Local Associations a careful study of the proceedings of the Conference of Secretaries, of which a full Report will shortly be sent to each Association. And further recommends that each Local Association should appoint a Special Organisation Committee to consider the said Report with a view to adopting any improved methods they may find therein described."

Members were urged to encourage in every way the use of the Form of Contract agreed upon by the Royal Institute of British Architects, the Institute of Builders, and the National Federation. Votes of thanks to the Chairman and to the Brighton M.B.A. closed the proceedings.

THE ROYAL INSTITUTE OF BRITISH ARCHITECTS.

The following announcements appear in the last issue of the R.I.B.A. Journal:—

Mr. John Belcher, A.R.A., Past President, has been elected *Membre Agrégé* of the Académie des Beaux Arts of Antwerp.

The President, Mr. Thomas E. Colcutt, has been elected *Membre d'Honneur* of the Société Centrale d'Architecture of Belgium.

Mr. W. D. Caroe, M.A., F.S.A., has been elected Master of the Worshipful Company of Plumbers.

Mr. Edwin T. Hall, Vice-President, has been awarded a Gold Medal at the Milan Exhibition for Hospital Design.

Mr. Alfred Brumwell Thomas, the architect of the Belfast City Hall, and a candidate for the Institute Fellowship, has received the honour of Knighthood in the distribution of His Majesty's birthday honours.

The newly-elected officers of the Art Standing Committee are Mr. John W. Simpson, Chairman; Mr. Henry T. Hare, Vice-Chairman; Messrs. W. D. Caroe and James S. Gibson, Hon. Secretaries. The election took place too late for inclusion of the names in the new Kalendar.

THE SURVEYORS' INSTITUTION.

The opening meeting of session 1906-07 of the Surveyors' Institution was held on Monday, at No. 12, Great George-street, Westminster, S.W., when Mr. G. C. Langridge, President occupied the chair.

Portrait of the late Secretary.

The minutes of last meeting having been read and confirmed.

The Hon. Secretary, Mr. Percival Curvey, announced the donation of seventy-three books and pamphlets, and donations of over 200l. from 113 subscribers to the Library Fund. A vote of thanks having been accorded to the donors.

The President said he had an exceedingly pleasant duty to perform as President, which would commend itself warmly to every member of the Institution, i.e., to present to their late Secretary, Mr. Julian C. Rogers, his portrait, which had been painted by Mr. Stanhope Forbes, A.R.A., and which no doubt many of them had seen at the Royal Academy Exhibition this year. The portrait was given to Mr. Rogers by the combined wish and subscriptions of the members as a token of the deep regard and respect in which they held him, and his services to them. It would be appropriate and possibly interesting to give a short record of Mr. Rogers's connexion with the Institution, and some of the work he had done for them. Mr. Rogers was appointed Secretary in 1869, when the members of the Institution numbered 202, and he resigned in 1905, when the number was nearly 4,000. He had faithfully served under twenty-three Presidents, and among the special services he had carried out were the drafting of the petition and the charter in 1880; he had superintended fifty Professional and Preliminary examinations, and he initiated *Professional Notes*, and these and the *Transactions* he edited up to the time of his resignation. The great ability with which this special work had been done must have made the knowledge thus disseminated of great use to the profession. They could hardly be surprised that after thirty-six years of such arduous work as Secretary of the Institution Mr. Rogers felt the prolonged strain would permanently affect his health, already impaired, and the Council, while recognising the necessity of a well-earned rest, accepted the resignation with regret. It must be a great source of satisfaction to Mr. Rogers that his work had passed into the hands of such an able successor as Mr. Goddard, which afforded a guarantee of its continuance in efficiency. Mr. Rogers's connexion with the Institution had not been altogether severed, for he had been unanimously elected as an honorary member, and he was, he felt sure, expressing the feelings and wish of every one of them in hoping that Mr. Rogers would long enjoy his well-earned rest, and that his health might be restored, and that the Institution might have the benefit of his friendship, which they had all learnt to value, and, if necessary, his advice and experience.

The President then unveiled the portrait,

and said he understood that it was the wish of Mr. Rogers to present the portrait to the Institution in perpetuity, and if such were the case, he was sure they would all accept it with gratitude. It would long hang on their walls as a memento of a man who did good and honest work for the Institution.

Mr. Rogers said he need hardly say that he had listened to the gracious words of the President with considerable emotion. There was always a little pathos in looking back upon a career which was closed, and rounded off, and the presentation of his portrait was the crowning event of his life. It could be only by the wildest flights of imagination that he could have thought, when he came to the Institution thirty-eight years ago, that such an honour would ever have fallen to him, and they would forgive him if he said that, in this respect and in others which he need not particularise, more than justice had been done to such merits as he happened to possess. It was an additional gratification to him to feel that the portrait would take its place on the walls beside the portraits of the eminent men which already adorned it, and the President had not misinterpreted his wish for the Institution to become the perpetual possessor of the portrait. He should like to thank most cordially the members who subscribed, and to indulge the hope that all who subscribed were imbued with feelings of personal regard for him. When he saw the large number of those present that evening, his mind instinctively reverted to a similar occasion many years ago when one of the President's distinguished predecessors came to the meeting room with three members of the Council, to find that there was not a solitary person present. They waited for about ten minutes, when it was decided that the address should be taken as read, and they went home with heavy hearts, in which, certainly, belief in the future of the Institution did not predominate. But all that changed. The Council saw that the first impulse imparted by the original founders had more or less spent itself, and it was necessary for the future of the Institution that it should throw itself open to the younger men. That policy had been most successful, and he thought it was the younger men—the fresh blood which was introduced—more than anything he or anyone else had done, which had resulted in this success. He should like to express his deep acknowledgment to his friend Mr. Stewart, who kindly presented him with a replica of the portrait for the adornment of his (the speaker's) house, and which would be a perpetual reminder of the kindness of Mr. Stewart and the members. He heartily endorsed all that the President had said in reference to Mr. Goddard. Five or six years ago, when he began to feel that the state of his health might necessitate his retirement at no distant date, he naturally resolved in his mind the names of any likely persons to be his successor. Of course, he had no voice whatever in the choice of his successor, but he was satisfied at the time that if anyone were appointed it should be Mr. Goddard, and he was gratified that the Council, without any hint or suggestion from him, had come to the same conclusion. He was proud to think that the work of the Institution had been entrusted to such able hands, and he had no doubt that Mr. Goddard would do full justice to the great trust which had been imposed upon him.

The Gold Medal.

The President announced that the Council gold medal had been awarded to Mr. W. R. B. Wiseman, Professional Associate, for his paper on "The Effect of Fire on Building Stone," read last session, and he had much pleasure in presenting the medal to Mr. Wiseman, whose paper had been unanimously selected by the Council. The power of acquiring and retaining knowledge was a great gift, and it was to be desired that it should be accompanied by the other power of disseminating it either by speech or writing so as to make it understood by others, and Mr. Wiseman seemed to possess that ability in a marked degree. He might add that Mr. Wiseman had just been awarded the Telford premium at the Institution of Civil Engineers.

The President also announced that the following gentlemen had been elected as honorary members—i.e. Judge Wills, K.C.,

and Sir T. H. Elliott, K.C.B., Permanent Secretary to the Board of Agriculture.

President's Address.

The President then delivered the opening address of the session. He said that what was, he believed, the thirty-ninth occasion on which a President had been called on to deliver an address at the opening of the session. They had entrusted to him a serious responsibility in carrying on the good work of the Institution, which, founded in 1868 with but few members, had now reached a total of over 4,000. This phenomenal growth spoke volumes for the foresight of the founders of the Institution, and for the rules and principles originally laid down for its guidance, which had resulted, in so comparatively short a period, not only in the large accession of members, now meeting in their own home, but also in the acquiring of a large and valuable library bearing on all subjects connected with the profession, in the dissemination through the *Professional Notes* and *Transactions* of a vast amount of information most useful to the members, and in a substantial annual income to be devoted to the increase of their usefulness.

The subject which he had chosen for the few remarks he had to offer was one of great importance and interest to surveyors, especially to those whose practice was mainly connected with agricultural land—on which branch of the profession alone he felt confident to venture an opinion, it having been his life's work. The future of the land, its ownership, occupation, and rights, were of such vital interest to the nation at large, while the changes during the last generation in both ownership and occupation—especially the latter—had been so numerous, and in late years the legislation, or the proposals for legislation, designed to meet the changed circumstances, had followed one another so quickly, that some doubt arose lest, in grasping at the shadow, they might lose the substance.

Although there might be differences of opinion as to the way it was to be reached, every agent and surveyor who had given attention to the subject had the same object in view—that was, a fair division of the income derived from the land between the landlord, tenant, and the labourer, who roughly represented the capital, intelligence, and sinews on which agriculture depends, and who were all necessary to obtain the fullest development and best results from the outlay of these three essentials of successful cultivation. The question arose whether, by legislation or otherwise, they were doing the best they could to obtain these results, by giving such security of ownership and prospect of reasonable return—which, in view of the many amenities of landowning, would not be a high rate of interest—as would attract capital to the land. Then, was the occupier encouraged to give his time and best abilities to the cultivation of the soil by the prospect of fair remuneration? And, lastly, were the present income, housing, and future prospects of the labourer when past work a sufficient inducement to him to bring up his children with a love of and desire to live on the land? Was education in rural districts of such a character as to fit his children for what, in most circumstances, should be their life-work, with an opening for cases of special ability and prudence?

He thought all must agree that we are very far from this ideal, and feel strong doubts whether the legislation proposed with the view of obtaining these objects would, to any large extent, assist an advance on the desired lines. The opening up of the land over the greater portion of the world by railways, the cheap and rapid water carriage by steamers, and the effect of combination of capital, made possible by telegraph, on prices of commodities, had brought about a great national increase of wealth, resulting in a higher standard of living generally, and an increase in local and national expenditure. But this increase of wealth had not benefited the agricultural landowner, the tenant farmer, or the labourer to so large an extent as other classes of the community. On the other hand, it had tempted them to use their capital, intelligence, or labour in other walks of life, offering, it would seem, a better chance than agriculture of securing the good things going. This appeared to him to be one of the chief causes of the almost entire

extinction of the yeoman class, with whose good qualities many of them were familiar in their younger days, and of the exodus to the towns which had resulted in difficulty in obtaining skilled labour of any description for the ordinary working of the farm. The effect of this on the agriculture of the country became, he feared, more and more noticeable each year.

British agriculture was by no means played out, and the land might produce more. Was legislation following the best lines for the relief of each of the three classes suffering from the depression, and, if so, how could we assist in forwarding this object, which we all have at heart, without benefiting one class at the expense of the other two? He thought the value of any legislation could best be tested by the following questions:—

1. Is it of a nature to give confidence in investment in land, and to offer the prospect of a reasonable return to the investor?

2. Is it of a nature to give security to the occupier for his improvements, clearly defining his rights so that he may know where he stands?

3. Is it tending to the better housing of the labourer, giving him a greater interest in the soil and improved prospects for old age; and will it offer a fitting education for his children in the means of gaining their livelihood in the manner for which possibly nine-tenths are best qualified, viz., on the land, with additional opportunities to the minority who show special capabilities for other walks in life?

The President then dealt with these and kindred questions, and, on the motion of Mr. T. M. Rickman, seconded by Mr. Hayward, a hearty vote of thanks was accorded to him for his address.

It was announced that the next meeting will be held on the 26th inst., when Mr. E. H. Blake will read a paper, entitled "Some Notes on Sanitary Law."

The meeting then terminated.

THE LONDON COUNTY COUNCIL.

The usual weekly meeting of the London County Council was held on Tuesday in the County Hall, Spring gardens, Alderman Spicer, Chairman, presiding.

Loans.—On the recommendation of the Finance Committee, it was agreed to sanction the borrowing of 3,619l. by Deptford Borough Council. The following loans were also agreed to:—Islington Borough Council 2,400l. for paving works, and Stepney Borough Council 13,713l. for electric lighting.

Sale of Land, White Hart-lane Estate.—The following recommendation of the Improvements Committee was agreed to:—

"That the freehold interest in a portion of the northern section of the White Hart-lane Estate, having an area of about 1½ acres, and shown by red colour on the plan, be sold at the rate of 450l. an acre to the Home Workers' Aid Association; that the solicitor do apply for any necessary consent of the Local Government Board, and, subject thereto, do complete the sale."

London Building Act Amendment.—The debate on the adjourned recommendation of the Building Act Committee asking that the standing orders be suspended in order to allow of application being made to Parliament in the ensuing session to amend the London Building Acts so far as may be necessary to alter the constitution and duties of the Tribunal of Appeal, and to enable the Council to establish a satisfactory system of payment of District Surveyors' salaries,* was resumed by Sir M. Beachcroft. He said that the subject was one of the greatest importance in London, and he protested against the piecemeal way in which the Committee proposed to deal with it. The Committee did not tell them what proposals they had in connexion with the Tribunal of Appeal. He knew it had been suggested that there should be another member added to the Tribunal nominated by the London County Council, and that an eminent barrister should be appointed to act as chairman. He fancied, however, that that was not now the opinion of the Committee. Then the Committee wanted to pay District Surveyors by salary instead of by fees. At the present time the fees, which amounted to about 55,000l. per annum, were paid by the building owners, but if the proposal to pay them by salary was carried that charge would fall upon the ratepayers. The Finance Com-

mittee had considered the subject on more than one occasion, and had emphatically negatived it.

Mr. Phillimore said that the proposal was one by which a very substantial saving could be made with a minimum of trouble. He did not think that the Finance Committee ever suggested that, if the proposal to pay District Surveyors by salary was agreed to, the whole cost would fall on the ratepayers instead of on the building owners. With regard to the Tribunal of Appeal, a great saving could be effected if the report of the Committee were adopted. In the twelve years since the Tribunal had been constituted, something like about sixty-eight appeals had been prosecuted to their final completion. The net cost of each case, exclusive of counsel's fees and solicitor's charges, had worked out at about 96l., and they were informed by their Solicitor's Department that the work could be done at almost a nominal amount.

Mr. R. A. Robinson said he hoped that the Council would not suspend the standing orders at this time of the day. What it really amounted to was that the Committee did not like the decisions which the Tribunal had given, and therefore they wanted to go and ask Parliament to do away with it, and put something in its place which was not specifically indicated in the report.

Mr. Howell Williams said that what the building trade of London wanted was to see the whole of the Building Acts codified and made plain. For some years past builders had been worried and harassed and they wanted to know where they were. The Tribunal of Appeal, as at present constituted, was most unsatisfactory. It was a most invidious and anomalous thing that gentlemen who acted as judges one day should be allowed to hire themselves out as expert witnesses the next. He thought it was a great mistake to attempt to rush this matter through in the expiring days of the Council. He protested against this constant tinkering with the building laws, and appealed to the Committee to take back the report so that later on a comprehensive scheme might be brought forward which would satisfy the building trade and the ratepayers. He did not wish the public to feel that District Surveyors were wholly in the service of the Council, as would be the case if they were paid by salary.

Mr. E. White said he thought the Council might justly complain that it was not being fairly treated by the Building Act Committee in being asked to suspend the standing orders without laying before them any concrete proposals. As to the Tribunal of Appeal, it was not a strong argument to go to Parliament and ask for its abolition, simply because the Council did not like its decisions. The Council had powers to appoint District Surveyors and pay them by salary—he supposed the idea of the Committee was to force present surveyors who were paid by fee to come into the new arrangement. The London Building Act was now in the crucible, and it was absurd to ask the Council to suspend its standing orders, to go to Parliament to obtain what were, after all, minor amendments. The Building Act at present was a puzzle, and ought to be simplified, whereas these constant tinkering with it only made the Act more confusing.

Capt. Hemphill said that the case for an alteration of the Tribunal of Appeal was extremely urgent. The latest of their decisions relating to the building line in the Pentonville-road was a most extraordinary one, and he was not surprised that it should be supported by some of its friends.

Sir M. Beachcroft appealed to the Chairman to call upon Capt. Hemphill to withdraw such an offensive remark.

Capt. Hemphill said that he made the observation in a general sense, and did not mean to reflect upon any individual. What the Committee wanted was another Tribunal of Appeal, and probably the best form would be some gentleman occupying a judicial position. He might say that the Building Act Committee, at its meeting the previous day, decided to recommend that the Tribunal should consist of one of the London police magistrates, with the right of calling in a surveyor for assistance and advice.

On a division, the proposal to suspend the standing orders was negatived, and the matter therefore fell to the ground.

Regulations: Electric Lighting and Heat-

ing.—The Theatres and Music-halls Committee reported as follows:—

"We have for some time past had under consideration the question of the revision of the regulations made by the Council on March 25, 1902, with respect to the electric lighting and heating installations in theatres and other places of public entertainment in London. The regulations in question are extremely technical, and it is impossible to indicate briefly the various alterations proposed, but, generally speaking, the object has been to make the meaning of the regulations clearer than it is at present, and in very few instances are the regulations made more stringent. We have been in communication with the Theatrical Managers' Association, the Suburban Theatre Managers' Association, and the London Entertainments Protection Association, and have had the advantage of their criticisms on our proposed amendments. A satisfactory understanding has now been arrived at on the whole question, and this result is largely due to the fact that we propose to give a right of arbitration in cases where the regulations require work to be done to the satisfaction or approval of the Council or do not definitely specify the work to be done, and in cases where, in consequence of alterations to premises, it is proposed to apply the regulations to an existing installation which has already been approved by the Council. We think it reasonable that arbitration on these points should be allowed, provided it is distinctly understood that it is not to be regarded as a precedent for allowing arbitration on the structural regulations of the Council, and, further, that the Council reserve to itself the right to withdraw the clause if it is found to be unsatisfactory in practice. As regards the application of the amended regulations to existing installations which have been approved by the Council, we have given an assurance that the regulations would not be retrospective except in unusual instances, such as the carrying out of extensive alterations, etc. Certain of these regulations, including the rules relating to promises licensed by the Council, which rules were made by the Council on October 25, 1904, and in the structural regulations made by the Council on July 20, 1901, and February 4, 1902, a copy of the electric lighting and heating regulations showing the alterations proposed will be found in the statement separately submitted to the Council."

The Committee recommended accordingly, and the recommendation was carried.

The Embankment Trees.—The Parks and Open Spaces Committee recommended that the necessary work be done to the trees on the river side of the Victoria-embankment to admit of the passage of tramscars along the tramways in course of construction.

Mr. Jesson moved to add the words, "and that special attention be paid to the roots of the trees so that the growth of the trees may be stimulated."

Lord Elcho said there was a perfect agreement between the Highways Committee and the Parks Committee to do everything they could to protect the trees in one of the few thoroughfares of which London could justly be proud.

Only two voted for the rider, which was accordingly defeated, and the recommendation of the Committee was adopted.

Repairs to Schools on Schedule of Prices.—The Education Committee recommended, and it was agreed:—

"That the tender of Marchant & Hirst be accepted for carrying out repairs to schools, so far as the buildings only are concerned, in the county electoral areas specified below, at the printed schedule of percentages advised, and to be carried as respectively stated hereunder; that each contract be for a period of one year in the first instance, and do remain in force thereafter until determined by three months' previous written notice by either party, such notice to expire at any time; that the Solicitor do prepare, and obtain execution of, the necessary contract; and that the seal of the Council be affixed thereto when ready."

Marleybone, E.—For repairs (measured work), 15 per cent. For sanitary (measured work), 20 per cent. For day work generally, 12½ per cent.
St. Pancras, E. N. S.—For repairs (measured work), 12½ per cent. For sanitary (measured work), 15 per cent. For day work generally, 10 per cent.†

Houses Let in Lodgings.—The Public Health Committee brought up a report on this subject, in the course of which they stated that:—

"With a view of ascertaining what proportion of the tenements of less than five rooms were in insanitary dwellings, we instructed the Medical Officer to inquire as to the number of rooms and the rents of the tenements in block buildings in the several metropolitan boroughs, and he has presented to us the result of his inquiries, as set out in the statement (No. 1) separately submitted."

It will be seen from this statement that of 672,050 tenements of less than five rooms in London as shown in the census return of 1901, 53,071, or 7·9 per cent., are in block dwellings. In the central districts of Westminster, Holborn, and Finsbury the percentages are 21·4, 21·4, and 18·5, while in the outlying districts of Lewisham, Wandsworth, and Woolwich the percentages are 0·7, 0·15, and 0·26 respectively. A comparison of the numbers of tenements of one, two, three, and four rooms in the block dwellings with those in London generally shows that 38, 11·6, 11·3, and 2·6 per cent. respectively are in artisans' dwellings. Thus, over 11 per cent. of the tenements of two and three rooms are in the artisans' dwellings, while only 2½ per cent. of

* See our last issue, p. 541.

the one and four room tenements are in these dwellings.

The large proportion of two and three room tenements in block dwellings when compared with the proportion of such tenements in London generally may be further seen on percentage to the subjoined table, which shows the percentage of one, two, three, and four room tenements in every 100 tenements of less than five rooms in London generally and in block dwellings:—

	London generally.	Block dwellings.
	per cent.	per cent.
One-room tenements.....	22.2	10.6
Two-room tenements.....	30.0	43.9
Three-room tenements.....	27.0	38.6
Four-room tenements.....	20.8	6.9
Total	100.0	100.0

The number of the population inhabiting block dwellings in London was not ascertained in the course of the inquiry, but if it be assumed that the number of persons per room in such dwellings is equal to that in tenements of less than five rooms in London as a whole it will be found that some 189,885 persons are at present living in tenements of less than five rooms in block dwellings in the county. The rents of the tenements in block dwellings vary considerably in each district, but it will be seen from the statement that about 2s. per room is the average charge.

Improvements.—The Improvements Committee recommended:—

(a) That the estimate of expenditure on capital account of 4,050l., submitted by the Finance Committee in respect of the widening of Dartmouth-road, Forest-hill, at Nos. 28, 26, and 24, shown on the plan, be approved.

(b) That expenditure not exceeding 4,050l. be sanctioned in respect of the widening of Dartmouth-road, Forest-hill, as provided in resolution (a); and that, subject to the Lewisham Metropolitan Borough Council agreeing to contribute one-third of the net cost, the Improvements Committee be authorised to arrange for the said widening.

That the amount of the Council's contribution towards the cost of the widening of Bell-lane, Whitechapel, executed by the Stepney Metropolitan Borough Council, as successor to the Whitechapel District Board, be 1,627l. 13s.; and that the matter be referred to the Finance Committee with a view to the payment of the money.

Having transacted other business, the Council adjourned.

APPLICATIONS UNDER THE 1894 BUILDING ACT.

THE London County Council at their meeting on Tuesday dealt with the following applications under the London Building Act, 1894. The names of applicants are given between parentheses:—

Lines of Frontage and Projections.

Hackney, South.—A building on the western side of Chatsworth-road, Hackney, to abut upon the southern side of Elderfield-road (Messrs. H. Deansly & Son).—Consent.

Kensington, South.—The retention of a wooden summer-house in front of No. 2, Moreton-gardens, Gilston-road, Kensington (Mr. C. G. F. Rees, for Mr. C. E. Melchers).—Consent.

Norwood.—Houses with bay windows upon the site of Nos. 81 to 87 (odd numbers only) inclusive, Dulwich-road, Herne-hill, to abut also upon Herne-place (Messrs. H. Wakeford & Sons for Mr. E. Lyne).—Consent.

Rotherhithe.—Permission to retain for a further period a wood and iron chute of a temporary character, connecting Hay's wharf with Wilson's wharf, over the public-way of Battlebridge-lane, Rotherhithe (for the proprietors of Hay's wharf).—Consent.

Strand.—Four projecting balconies at the Holborn station of the Great Northern, Piccadilly and Brompton Railway, two of such balconies to abut upon Kingway, and two upon Gato-street (Mr. L. W. Green for the Underground Electric Railways Company of London, Ltd.).—Consent.

Strand.—A water-closet and lavatory addition at No. 6, Carlton-gardens, Waterloo-place (Messrs. Bywaters & Sons, Limited, for the Rt. Hon. Viscount Llandaff).—Consent.

Strand.—The retention of three projecting signs at Nos. 22 and 23, Long-acre (for Messrs. Windover, Turrill, & Sons).—Consent.

Wandsworth.—A building on the eastern side of Gwendolen-avenue, Putney, adjoining the Putney Wesleyan Church (Mr. A. Dawkins for the trustees of the Putney Wesleyan Church).—Consent.

Width of Way.

Southwark, West.—Retention of an addition to No. 47, Great Guildford-street, at less than the prescribed distance from the centre of the roadway of the street (Mr. G. Newton).—Consent.

Width of Way and Construction.

Fulham.—A wood and iron building of a temporary character, at the side of No. 39, Munster-road, Fulham (Mr. J. Cable for Mr. J. H. Neave).—Refusal.

Formation of Streets.

Wandsworth.—The formation of new streets for carriage traffic to lead out of Wavertree-road and Nuthurst-avenue, Brixton, so far as relates to an alteration in the cross-section of the streets (Messrs. Briant & Son).—Consent.

Wandsworth.—The retention of barriers across the entrances to a new street leading out of the eastern side of Merton-road, Wandsworth (Mr. H. O. Carr for the Wandsworth and Putney Gas Light and Coke Company).—Consent.

Formation of Streets and Line of Frontage.

Wandsworth (detached).—That an order be issued to Mr. W. E. Wallis sanctioning the formation or laying out of two new streets on a site abutting upon the south-western side of Rosendale-road, Herne-hill, southward of Norwood-road, in connexion with a scheme for the erection of working-class dwellings upon such site, and consent to the erection of Block 2 and the flank of Block 1 of the said working-class dwellings to the line in Rosendale-road (for the governors of the Peabody Donation Fund).—Consent.

Space at Rear.

Holborn.—A modification of the provisions of sect. 41 with regard to open spaces about buildings, so far as it relates to the proposed retention of an addition on the space at the rear of No. 18, Handel-street, Bloomsbury (Messrs. Johnson & Co.).—Refused.

Buildings for the Supply of Electricity.

Fulham.—The construction of an elevator, a conveyor and a weigh-house at the generating station, Townmead-road, Fulham. (Mr. A. J. Fuller for the Fulham Metropolitan Borough Council).—Consent.

Uniting of Buildings and Alteration of Buildings.

City of London.—The formation of openings at the ground floor level between Nos. 5, Thread-needle-street and No. 8, Finch-lane, City (Mr. T. B. Whitney for the London, City, and Midland Bank).—Refused.

Architectural Societies.

SHEFFIELD SOCIETY OF ARCHITECTS AND SURVEYORS.—At the monthly meeting of the Sheffield Society of Architects and Surveyors, held on the 8th inst. in the lecture-room of the Literary and Philosophical Society, Mr. W. J. Hale lectured upon "The Architectural Treatment of Stone-work." Mr. W. C. Fenton occupied the chair. The lecture formed the first of a series dealing with the treatment of materials used in building. The lecturer remarked that any treatment of materials to be satisfactory must take into account the nature, qualities, and limitations of that material. The first thing, therefore, was to consider the composition and special characteristics of stone. The most common building stones found in this district were sandstones. Limestone, which was also used to a less degree, consisted practically of grains of silica or carbonate of lime, cemented together by a matrix of silicic acid or carbonate of lime, or carbonate of magnesia, and therefore depended for cohesion upon the power of the cementing material. Two characteristics which made stone useful as a building material were its weight and its power to resist a crushing force. One of the charms of stone-work lay in its capacity to receive the impress of the individual man's power and thought. Its surface could be made to reflect his mind by the manual labour he expended upon it, and the monotony of a modelled and cast material was avoided. Although stone was granular it was generally more or less laminated, and care should be taken to place the blocks in the building so that edges of the leaves only might be exposed to the weather, otherwise the stone would more easily decay and the surface peel off. Jointing should be carefully considered, acute angles avoided, and right angles used where possible. Bonding, i.e., the arrangement of the various stones in a wall so that the vertical joints of one course do not coincide with the vertical joints of the course above or below, also played an important part in the stability of a building. As stone was granular and without fibre the size of the opening which could be safely bridged by a single stone was very limited. It was the invention of the arch which made the spanning of large spaces possible. The arch utilised in its shape and design the prominent characteristics of stone, its weight and its power to resist crushing force, and the introduction of

this feature caused one of the greatest changes in architecture. A further development of the arch was the groined or vaulted ceiling which relied for stability upon the same qualities, and had also certain fire-resisting powers, the absence of which in the wooden roofs of the nave and choir of Selby Abbey they all deplored. One method of beautifying the stone was by mouldings, i.e., the working of surfaces or edges of the stones with ridges and hollows of various forms in order to obtain parallel lines of light and shadow. As variety was the object it was well to get variety also in the size of the light and dark strips. Carving also had its place either as simple surface working, deeply undercut foliage, or the representation of animal form, grotesque or natural. One of the problems of the day with regard to architecture in stone was the modern street front. Surely the craze for carrying tons of stone on sheets of plate-glass had gone far enough. Any building to be satisfactory must not only have supports strong enough to carry the superimposed weight, but the supports must look strong enough for their burden. Ruskin said, "All architecture proposes an effect on the human mind, not merely a service to the human frame." If the needs of the mind were not to be provided for, and if the needs of the body were only to be considered, then there was no place for architecture, but who would enunciate such a proposition as that? If, however, the training and satisfying of the mind was as important as the satisfying of bodily needs, and the air was full of education nowadays, then architecture still had, and would continue to have, a place in the world. Any treatment of the stone should, then, in the first place, be examined as to whether or not it took advantage of the inherent qualities of the materials, and, secondly, as to whether it satisfied man's trained artistic perceptions. If it stood these tests then, although the particular feature might not be capable of defence on strictly utilitarian grounds, still, he thought, it had justified its existence. The lecture was illustrated by lantern slides. It was followed by an interesting discussion, in which Messrs. E. M. Gibbs, H. L. Paterson, G. Osborn, and the Chairman took part.

BIRMINGHAM MASTER BUILDERS' ASSOCIATION.

THE annual meeting and banquet of the Birmingham Master Builders' Association were held, on the 12th inst., at the Grand Hotel, Colmore-row. At the meeting, which took place first, the chair was occupied by Mr. J. B. Whitehouse (President). The committee's report for the year ended October 31, stated that, although there had been increased activity in some of the manufacturing trades in the city, the looked-for improvement in the building trade was not yet apparent. Employment throughout the year had continued dull. The claims of the national reserve fund had again been brought forward, and members of the Association had already contributed 444l. With regard to the establishment of conciliation boards throughout the country, a local board had been formed during the year, and was now in working order, so far as carpenters, bricklayers, and masons were concerned. During the ensuing year it was hoped that the remaining branches of the trade, not at present parties to the agreement, would come into line. It had been decided by the committee not to give notices for any alterations in the working rules with the operatives this year. The balance-sheet showed total ordinary receipts for the year 218l. 10s. 7d., which, with the balance from last year, made a total of 413l. 14s. 10d., and the various disbursements to 203l. 6s. 6d., leaving a sum of 210l. 8s. 4d. to the credit of the Association.

The President, in moving the adoption of the report and statement of accounts, said that the depression in the building trade had been greater than it had been for many years. As they knew, a return was made by their secretary of the wages paid in their various businesses, and this year the deficit was a very large one, and if they were to add to that amount a fair average for those outside the Association, and also included an amount for speculative builders, who had not been so busy as heretofore, he thought he should not be far off the mark when he said that 40,000l. less had been paid in wages during the year than in the preceding one. He hoped and trusted that they might have a speedy return to good trade, so that distress might be avoided, but he was bound to say he could not see any material signs to build optimistic hopes upon.

It had been suggested to him during the past year that it was opportune for reducing the men's wages, but he had said before that the lowering of wages would not tend to promote good trade. He did not say, however, that there were no means whereby the building trade could be greatly influenced, and those means, he frankly stated, were in the hands of the men's unions. The men had been taught gradually, but only too surely, that the less amount of work they did the more employment it would find for the larger number of members of trades unions. There never was a more false impression, never a greater fallacy existing, than that, because if they wanted to promote industry they must be able to do a good article at a cheap rate, and the cheaper they could produce that good article the greater would be the influx of business. To state that the men's unions had the matter in their power was no dream. There were gentlemen in that room whose experience extended over a greater number of years than his, who knew the amount of work men used to do, say, twenty years ago, in comparison with what they did to-day, and in many instances it had decreased from 30 per cent. to 50 per cent. If the unions would only educate their members up to a right and proper feeling they would do something that would stimulate the growth of the building trade. He was glad to say that their relations with the employees continued to be of a very pacific character. No notices had been given or received, so that there was no probability of any disturbance taking place in case they should have an increased volume of trade. As a subject they had to congratulate themselves upon the satisfactory working of the conciliation boards. So far the local conciliation boards, with one exception, had been able to settle their disputes. That one case was referred, the dispute settled, and any strike or lockout avoided. He should like to call the attention to one or two matters. The first was the Trades Disputes Bill, which, as they knew, had passed the third reading in the House of Commons, and he trusted that the powers given would not in any way tend to lessen the good work which had been commenced by the establishment of the conciliation boards. Another bill he would like to call their attention to was the Amendment of the Workmen's Compensation Act. The present law was so incomplete, so full of defects and so badly drawn that neither masters nor men were secure under its provisions. What they wanted was a complete Act. They were in agreement that some compensation should be paid to a workman if he met with an accident in the course of his employment. They wanted the man to feel that he was safe, and they wanted, on the other hand, to feel that they were protected. He should like to quote a case where the present Act was not a good one. They would take a small employer with very little capital, who did not insure, and one of whose workmen met with a serious accident. The workman was entitled by law to compensation from that employer, but if the latter were not insured, and had nothing, the position of the man was a very bad one. If it were a case of total disablement he was in a precarious position for the whole of his life. If it were a fatal accident then it was hard lines on the widow and children. The Government had said nothing in the present Bill to remedy many of the defects which were known to exist under the present law. There was nothing about compulsory insurance, but that alone would not be sufficient, because if they took the case he had just quoted, and granted that the employer had been insured, he was sorry to say there were too many insurance companies who were prepared to take the premiums, but had no intention to meet their claims and liabilities. They had printed at the back of their policies, in very small type, clauses that rendered void any of the liabilities which might come from those employers upon some technical point. With compulsory insurance alone the man was still in a very bad position. What was required was a Bill containing clauses of compulsory and national insurance. There ought to be compulsory and national insurance because the Government had the powers of obtaining money cheaper than any other body. Under national insurance it would not matter whether the workman was in the employ of a sub-contractor, chief contractor, or an undertaker; he would be entitled to compensation by law, and would be able to receive it without having deductions, as at present, owing to litigation. He was surprised that the trades unionists had not seen the very evil position a large number of men occupied under the present Act, and would occupy under the proposed measure unless it were amended. They were not safeguarded, and the masters, too, were in a false position.

Mr. T. Johnson seconded the resolution, which was carried unanimously.

Mr. J. B. Whitehouse was thanked for his services as President, and was unanimously re-elected; Mr. T. Johnson was reappointed vice-president, Mr. George Twigg, hon. treasurer, and Mr. E. J. Birwood, secretary. Messrs. J. S. Surman and Ralph Webb were re-chosen as auditors, and after the reappointment of the committee the meeting terminated.

In the evening there was a large attendance at the Grand Hotel, where the annual dinner took place, under the chairmanship of Mr. John B. Whitehouse, who was supported by the Lord Mayor of Birmingham (Councillor H. J. Sayer). The toast of "Success to the Birmingham Builders' Association and the Trade of the City" was proposed by the Lord Mayor, who congratulated the members upon another year of success, so far as the Association went.

In his response the President, speaking of town planning, said he thought the authorities in all communities should have the power to decide how the land within their district should be laid out. If that had been taken in hand in Birmingham fifty years ago the city would have now been rich beyond the dreams of avarice, and, more than that, the slum question would never have arisen, and it would have been unnecessary to purchase public parks or to widen thoroughfares.

In giving the toast of "The Architects and Surveyors," Lieutenant-Colonel Barnsley said he had asked himself the question, "Is Birmingham a beautiful city?" He thought it could compare in point of beauty with any other city in the kingdom. They had sordid spots and slums, but on the whole they were content so far as their great thoroughfares and buildings were concerned. The toast was responded to by Mr. J. B. Whitehouse, President of the Birmingham Architectural Association, and by Mr. G. Kenwick, on behalf of the surveyors.

Alderman T. E. Lowe, Mayor of Burton-on-Trent, proposed "Kindred Associations," which was replied to by Mr. F. G. Whittall, President of the Midland Federation. The following toast, that of "The Visitors," was submitted by the vice-chairman, Mr. Thomas Johnson.

The Birmingham City Surveyor, Mr. Henry E. Stilgoe, who responded, said he always found in regard to by-laws that a policy of give-and-take tended to make matters work smoothly.

Fifty Years Ago.

FROM THE *Builder* OF NOVEMBER 15, 1856.

BIT BY BIT, and this not slowly, the Palace of Parliament, the greatest architectural work of modern times, approaches completion. The pinnacled turrets of the Victoria Tower are being proceeded with rapidly, and by the end of the year the whole outline of this enormous building will be seen. Long may it stand a symbol of the stability, the dignity, the power, and the greatness of the kingdom! The pinnacles measure 70 ft. in height from the top of the parapet on the tower, no trifling work of themselves. Viewed from the ground, the man now at work at the crane is little bigger than your hand. Who shall tell—who asks, indeed—how many sleepless nights this structure has cost its architect? Putting aside the question of art, its successful completion in a constructional point of view must be regarded as a great achievement. Had the foundation proved insufficient, had it settled unequally and fallen out of upright, had an arch yielded, or the ponderous groined vaulting slipped, loud, of course, would have been the outcry—ruinous, probably, the blame. But disaster being avoided, difficulties overcome, the structure successfully raised, how few stop to appreciate the comprehensive grasp of all circumstances, the provision, and the varied skill demanded for the result!

LADIES' INDUSTRIAL SCHOOL, BELFAST.—New premises are being erected for the Belfast Ladies' Industrial National School. The new building will have a frontage to Lancaster-street. The contractors are Messrs. McDowell Leatham & Frazer, Belfast. Messrs. Blackwood & Jury being the architects.

PRESENTATION TO A CITY BUILDING SURVEYOR.—A presentation was made to Mr. W. Goldstraw, who has been for thirty-one years City Building Surveyor of Liverpool, at the Liverpool Municipal Buildings, on Wednesday, the 7th inst., when Mr. J. T. Alexander, the newly-appointed City Building Surveyor, occupied the chair. The presentation consisted of a tea and coffee service of the Queen Anne period, with tray, teapot, coffee-pot, hot-water jug, kettle with spirit-lamp, sugar-bowl and cream-jug. The following inscription is engraved on the tray:—

Presented
to
Mr. William Goldstraw
as a token of esteem and good wishes
by colleagues and members of his staff
on the occasion of his retirement
from the position of
City Building Surveyor
of Liverpool.
1906.

Illustrations.

THE KING EDWARD VII. GRAMMAR SCHOOL, LYNN.



WE have devoted our plates this week to the illustration of this important school building, which was opened by the King two or three weeks ago.

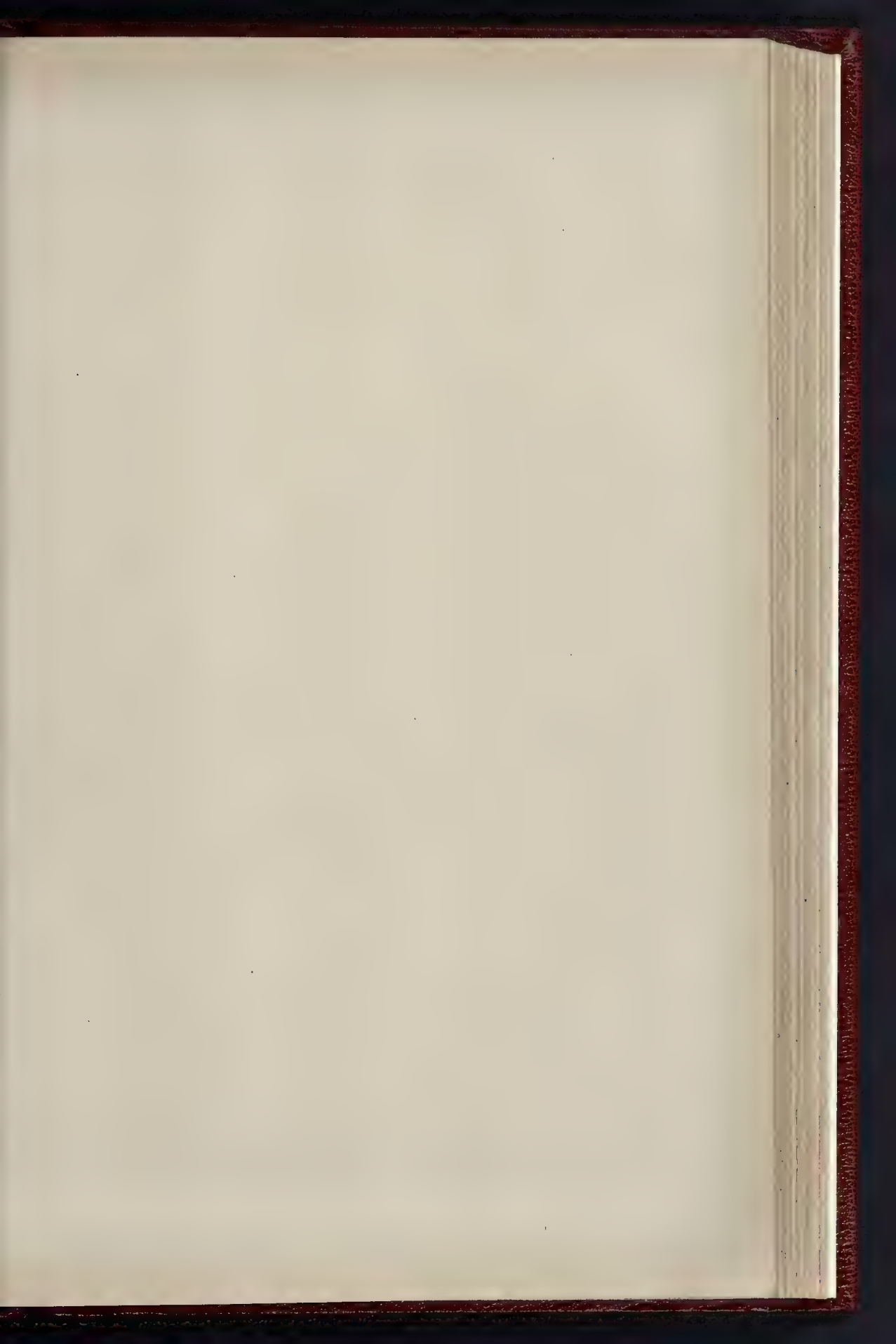
A school here is an affair of ancient date. In the XVIIth century Thomas Thoresby devised to the mayor and burgesses of Lynn four pieces of pasture in Gaywood, upon condition that they should appoint a priest to be master of the chancel-house adjoining St. Margaret's church; that he should instruct six poor children in grammar and song; and that the six children whom he taught should "daily on their knees before the tomb" in the Thoresby chapel pray for the souls of the donor and others. The chapel referred to appears to have been built by Henry Thoresby, who was Mayor of Lynn in 1456-7.

To the north of this chapel, in Thoresby's time, stood the chancel-house, which Taylor describes as "a sacred depository for the mouldering remains of frail mortality that might of necessity be disturbed in forming new graves." The upper story of this structure was originally a chapel, and was evidently the apartment in which the priest of the chancel taught the "six singing boys." In the reign of Edward VI. the land bequeathed by Thomas Thoresby to the Corporation was seized by the Crown as being for a purpose then considered superstitious, but was again vested in the Corporation, who from that time carried on a grammar school in the upper story of the chancel-house. In 1779 the chancel-house was demolished, and the market building which now stands on Saturday market-place was erected on the same site. Here, in the upper story, the school continued to be carried on until 1825. Then some prominent residents in the town, who desired to use it as a club, were granted a lease of it, as a consideration for which they purchased a piece of land in St. James-street and erected two school-rooms, which formed the nucleus of the buildings that have served the purposes of the school until the present day.

The grammar school remained under the direct control of the Town Council until 1884, when it was handed over to a body of governors, of whom one was appointed by the Prince of Wales (the present King), who had throughout his residence in Norfolk presented annually a medal to the head boy in the school. A few years ago Mr. W. J. Lancaster, an old Lynn boy, who was educated at the Lynn Grammar School, offered to build a new school, and his offer was accepted by the Town Council, who undertook to provide a site, and eventually obtained a lease of a piece of land adjoining the railway at Gaywood-road, belonging to the Gaywood Hospital estate.

The main disposition of the building is sufficiently shown by the plans which the architect has kindly put at our disposal, as far at least as the ground and first floors are concerned. The outside walls are faced with Bawsey bricks, the string courses, window heads, and other ornamental work being of "rubber" bricks, of a somewhat brighter colour than the facing bricks. The gables are ornamented with rubber work, which is also used for carved "swags" above some of the windows. The roofs of the main hall and the classrooms to north and south of it are covered with bonding-roll tiles, and the other roofs with plain tiles. All the windows, except those in the master's residence, are of the casement pattern. All the external woodwork, including doors and windows, as well as rain-water pipes, etc., is painted white. The clock face is black with gilt figures and hands, and above it is the inscription: "*Hora percutit et imputatur.*"

Internally the walls have a Parian cement dado to the height of 6 ft., painted a very light colour, the upper portions of the walls being finished in ordinary plaster and discoloured the same colour as the dado. On all the staircases the colour of the dado is a dark terra-cotta. The corridors, the main hall, and the physical and chemical laboratories and lecture-rooms are paved with wood blocks. Every room and corridor (with the exception of the bedrooms in the master's

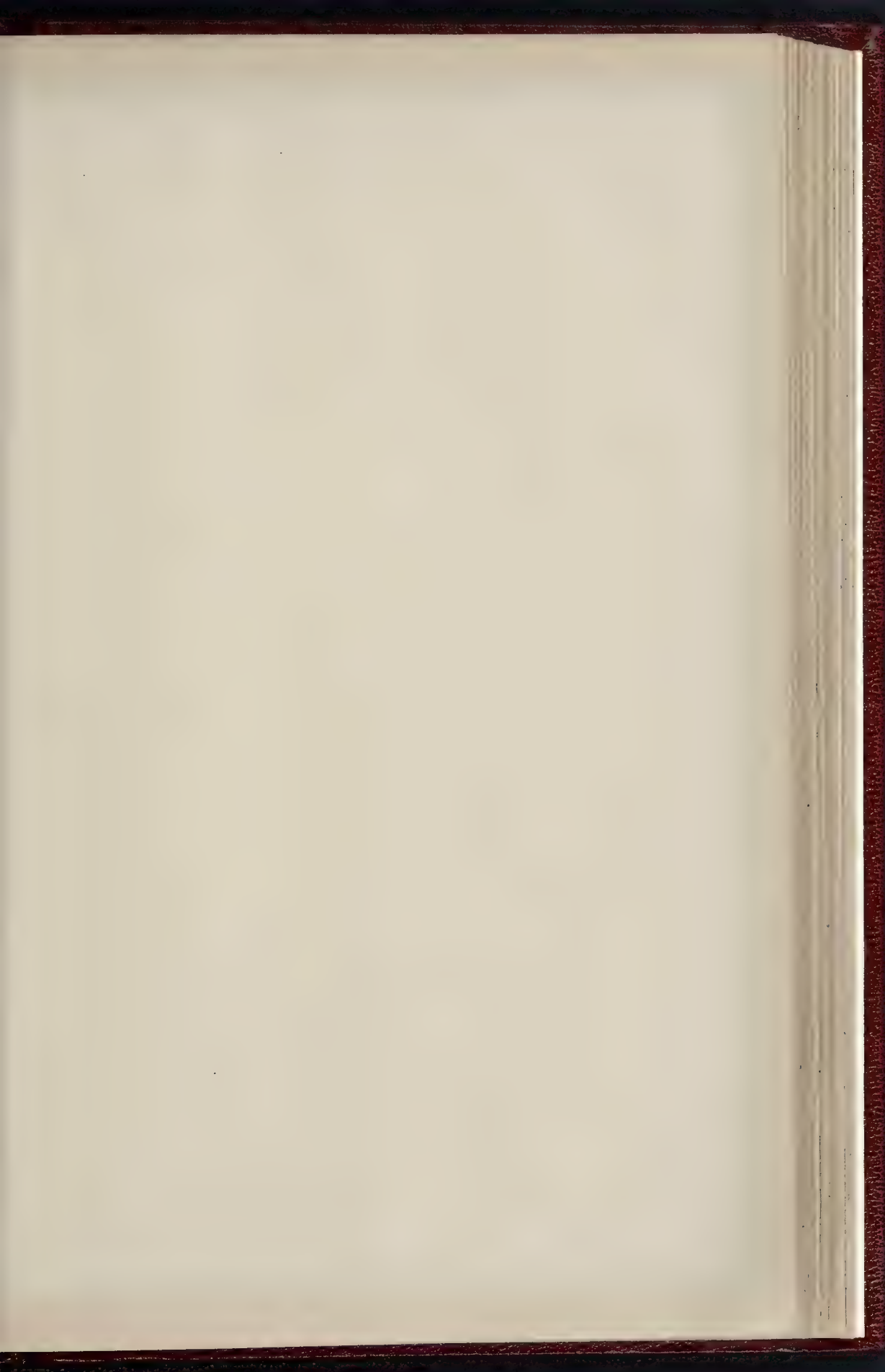




KING EDWARD VII. GRAMMAR SCHOOL,
GENE



LYNN — MR BASIL CHAMPNEYS, ARCHITECT

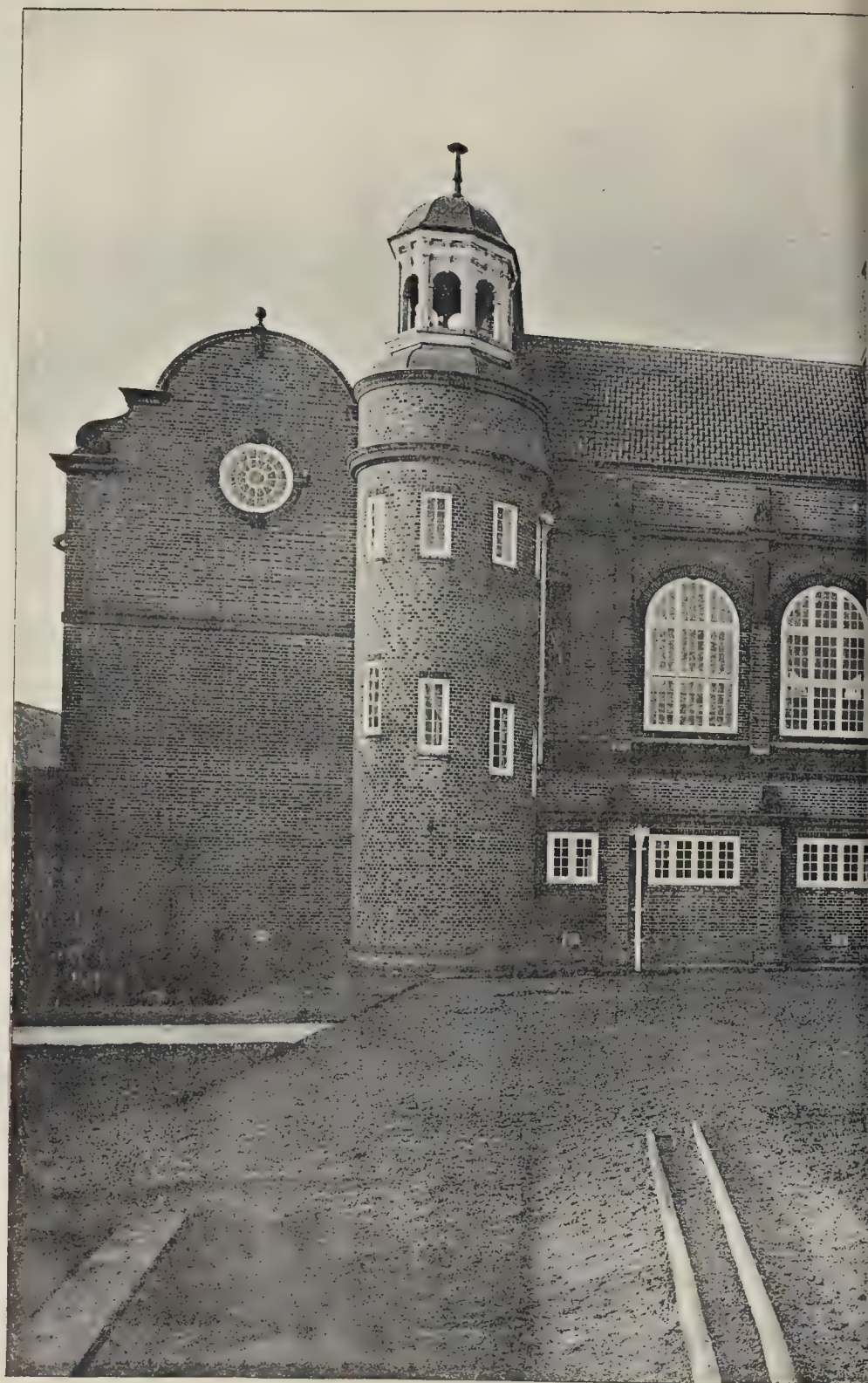


THE BUILDER, NOVEMBER 17, 1906



KING EDWARD VII. GRAMMAR SCHOOL, KING'S LYNN.—MR. BASIL CHAMPNEYS, ARCHITECT.

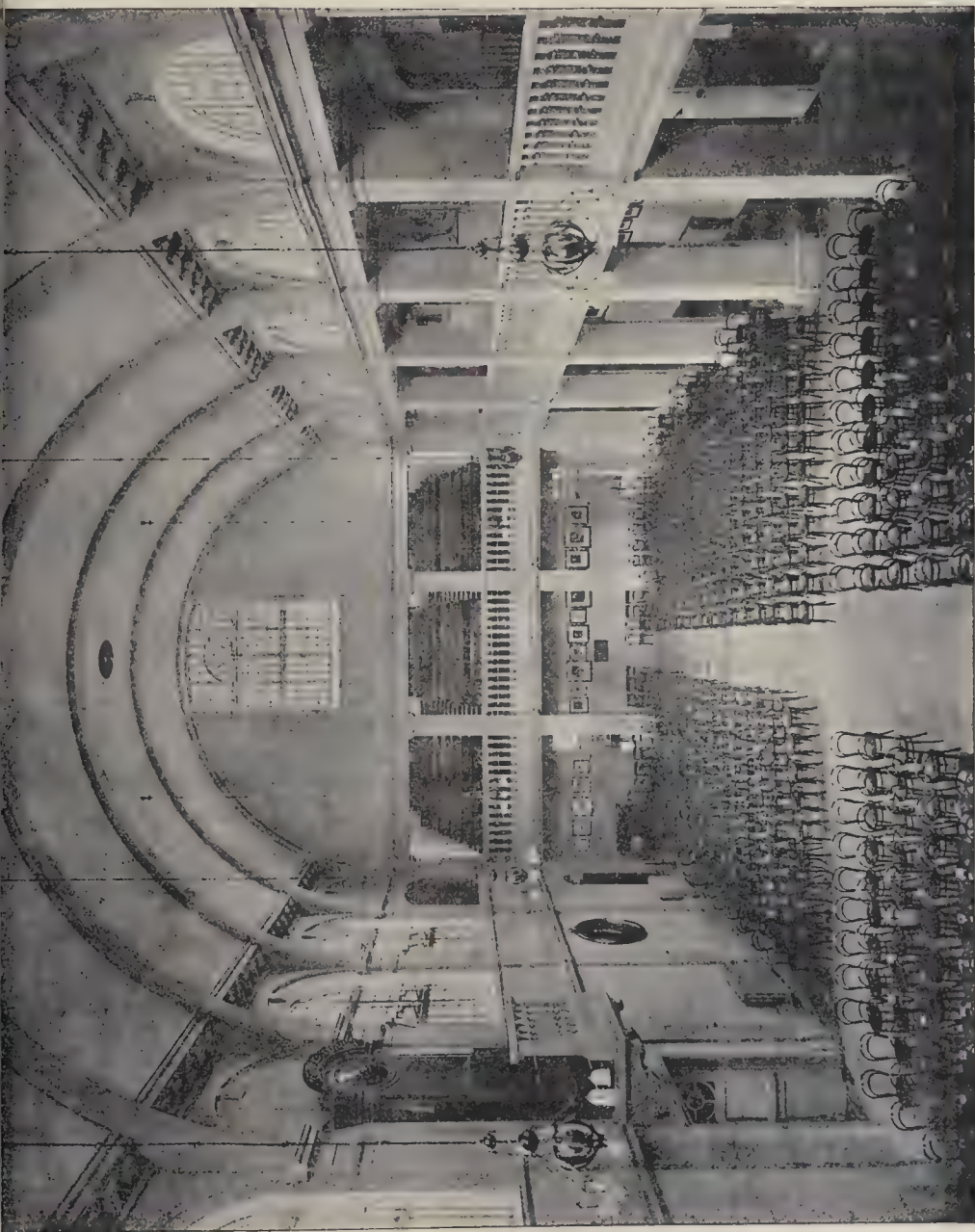




KING EDWARD VII. GRAMMAR SCHOOL

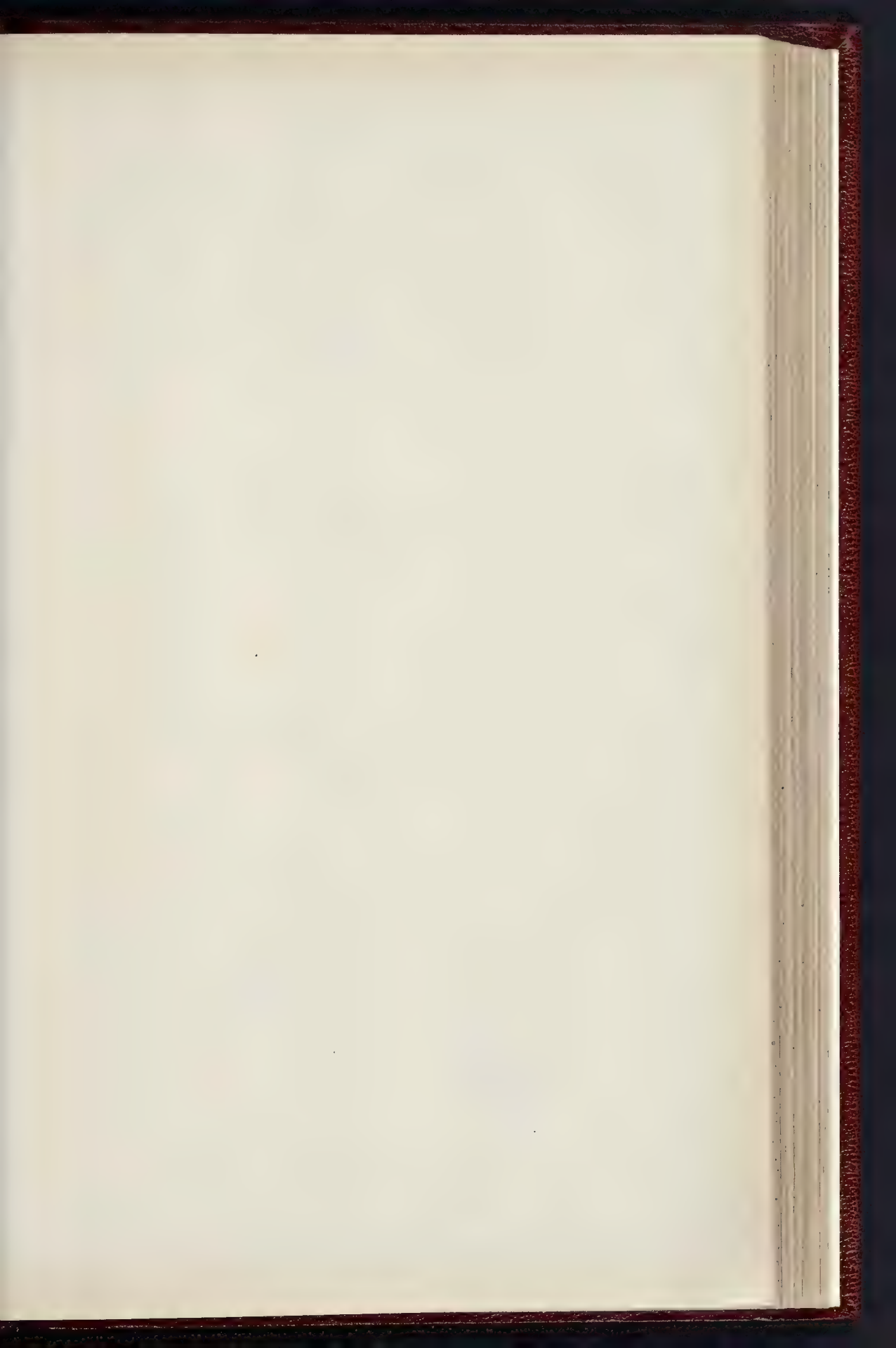


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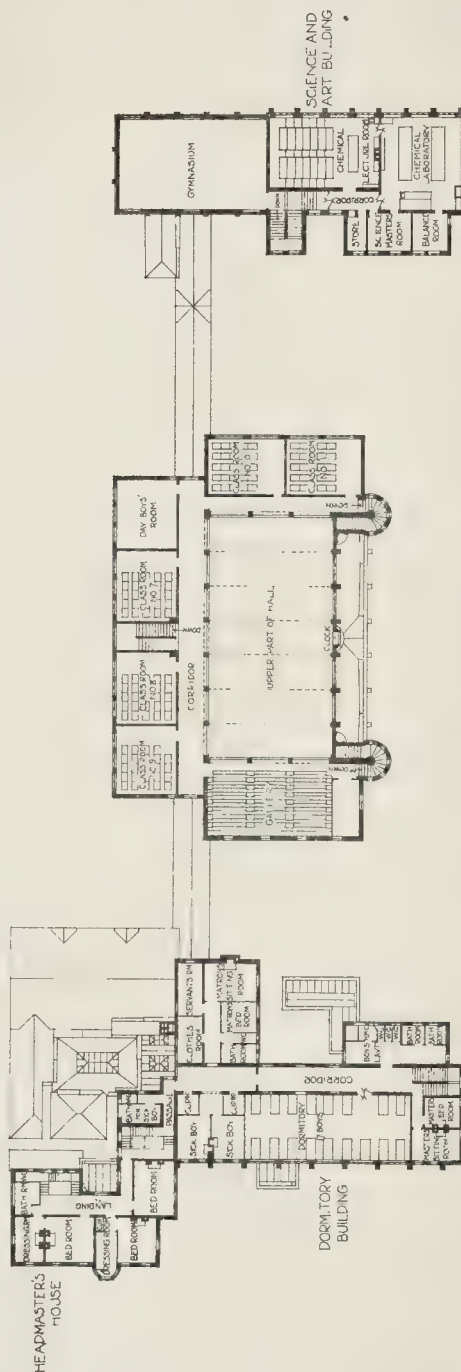


KING EDWARD VII. GRAMMAR SCHOOL, KING'S LYNN.—MR. BASIL CHAMPNEYS, ARCHITECT.

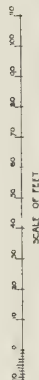
REV. J. H. I.



THE BUILDER, NOVEMBER 17, 1906.



FIRST FLOOR PLAN



Trade Catalogues.

THE Invetrol Gas Light Company, of Burton-on-Trent, have sent us an interesting pamphlet describing a novel system of lighting which they are introducing. A clean, inverted Bunsen flame from petrol vapour is employed. The light apparently is very similar to that given out by an inverted incandescent gas-lamp. The burning cost of a 70 candle-power lamp is stated to be a penny for seven hours, or, roughly, four times the light of a paraffin lamp at one half the cost. One gallon of petrol would be consumed in sixty or seventy hours by an upright burner, but with an inverted burner it lasts for nearly 100 hours. The containers must always be filled out of doors in daylight with no light or fires in the immediate neighbourhood. The ordinary rate is charged for the insurance of the company's premises, which are illuminated by invetrol lights on the inverted system. It is stated that the only danger is in careless handling of the petrol when filling the container.

Messrs. R. T. Nicholson & Co., of Corporation-street, Manchester, have sent us an interesting little pamphlet entitled "Light in the Country." Excellent diagrams and descriptions are given of modern electric appliances, and prices and particulars of electrical outfit for country houses are also given. The outfits, which comprise a petrol engine, dynamo, storage battery, switch-board, tanks, piping, and, in fact, everything necessary for a completely-equipped although small power-station, range in price from 65*l.* to 200*l.* The smallest outfit is capable of maintaining eight candle-power lamps burning for five hours, and the largest can supply 180 lamps for the same time. An advantage of having your own electric-light installation is that you can charge the accumulators required for motor-cars or boats without the trouble of sending them to a public charging-station. Anyone contemplating the lighting of a small country house, or even a cottage, by means of a small private plant, and wishing to form an accurate estimate of the cost, would do well to write to Messrs. Nicholson for a price-list.

The catalogue sent us by the British Prometheus Company, of Birmingham, is the most complete one on electric heaters that we have yet received. This industry is developing very rapidly, and this company, which devotes its whole attention to the manufacture of electric heating and cooking apparatus, is now well known. There are many excellent designs from the scientific point of view at least illustrated, and the letterpress is clear and accurate. Electric heaters are of three kinds—convector, radiators, and convector-radiators. Most of the heaters shown belong to the first class. Flat strips of resistance material having a large emissive surface for heat are kept at a moderately high temperature by the electric current, and the currents of warm air set up soon heat the room. In the radiators large electric lamps, with thick filaments maintained at a dull red heat, are employed. The heaters are made for all voltages, and for either direct or alternating current. The company guarantee all their apparatus for a period of twelve months after leaving the works, and they give full and accurate data in this catalogue for obtaining the cost of heating rooms of various sizes.

In the October issue issued by the General Electric Company a system of "earthing clips" is described which will be of use in connexion with conduit systems of wiring. The clips are so constructed that they can, when necessary, be fitted to the conduit after erection. They will be valuable for earthing wood blocks, and for linking up tubes when run into wood distributing boards. In the rules issued by the Institution of Electrical Engineers the importance of having the conduits "well earthed" is insisted on, and these clips seem to be very suitable for this purpose. A high candle-power "Robertson Wytelite" lamp is listed for circuits of any voltage. This should prove useful for hall lighting. The General Electric Company have also sent us a catalogue giving a complete description of the "air-to-earth" lighting conductor system devised by Mr. Hedges. This will be of interest to all who have read the "Lightning Research

Committee's Suggestions and Rules," published in the *Journal* for 1905.

Messrs. Frederick Smith & Co., wire manufacturers, of the Anaconda Works, Salford, have sent us a leaflet giving extracts from the Lightning Research Committee's Report and Rules (*Trans. R.I.B.A.*, May, 1906). The "Air to Earth System," patented by Mr. Killingworth Hedges, is also described. It is stated that a descriptive price-list will be sent on application.

Messrs. Geipel & Lange send us a circular giving particulars and illustrations of their "Rapidity" type steam trap, an improvement upon the "Geipel" trap, which has been so extensively used since its introduction some ten years ago. In the new trap the makers have retained the method adopted in the original apparatus whereby the expansion is multiplied without the employment of levers or analogous devices, and have embodied the following improvements:—The valve is arranged so as to be held on its seat by steam pressure, thus permitting a much larger valve to be used than in a trap where the valve is closed against steam pressure; the valve is of the rotary type, and in consequence every discharge helps to grind the valve in; the valve is so designed that when open it is forced well off its seat to give the maximum opening; and for the purpose of obviating the noise and other effects due to the rapid discharge of water under high pressure an automatic arrangement is provided reducing the velocity of the water when the rate of discharge tends to become excessive. As architects in the present day are called upon to deal with steam boiler and pipe installations, as well as with heating and drying apparatus and sundry forms of machinery necessitating the use of steam traps, some of our readers will probably consider it desirable to inquire for themselves into the advantages claimed for the appliance described and illustrated in this circular.

We have received from the Simplex Conduits, Ltd., of Garrison-lane, Birmingham, a very convenient pocket price-list of the socket material required for the Simplex system of steel conduits. The Company naturally refer to the British standard specification for steel conduits for electric wiring which has recently been issued. They point out that the requirements follow very closely the "Simplex" practice, as illustrated in their pamphlets for many years. They are quite justified in saying that, with one or two exceptions of trifling importance, the Standard specification is the Simplex specification. It will be remembered that we criticised at the time some novel matter in connexion with the measurement of bends introduced into the "Standard" specification. The firms whose catalogues have been of assistance to the "Standards Committee" are quite justified in using their reports as a recommendation of their work.

The Student's Column.

ROOFS: STRUCTURALLY CONSIDERED.—XVII.

21. The Complete Design of a Timber Truss (continued).

WE will next determine the dimensions of the members of the truss in accordance with the ascertained stresses.

(c) *Dimensions of Principal Rafters*.—On reference to Table XXXVIII., it will be seen that the maximum stresses for the three lengths of the left-hand principal rafter are as follows:—

$L_0 P_1$	= 34,500 lb. compression.
$P_1 P_2$	= 27,500 lb. "
$P_2 P_3$	= 20,700 lb. "

Assuming that, as usually is the case, the rafter is of uniform cross-section throughout, we must have calculations upon the stress to be withstood in the length $L_0 P_1$. The total length of the rafter in the 30-ft. roof slope is $30 \div 0.8322 = 36$ ft. There are four vertical supports spaced 12 ft. apart centre to centre, in addition to the lateral support afforded by the purlins. Consequently, we may treat each length of the rafter as a column 12 ft. long, this measurement being a little more than the actual distance between supports. The most convenient method of determining the cross-section is to employ

house) is heated by means of hot-water radiators, and the ventilation is provided in a very thorough manner. A fresh-air inlet is placed behind every radiator, and each room has one or more outlet gratings, generally in the upper portion of the walls, and, in some cases, in the ceilings. From these outlets special flues in the walls carry the foul air up to the roofs, where it is ejected through zinc shafts by means of electric fans, which are governed by switches conveniently placed in or near the rooms which they serve. All the outside doors are fitted with panic-bolts, so that when fastened they cannot be opened from outside, but give readily to pressure from within.

The fitting and furnishing of the school has been carried out at the expense of the donor of the buildings on a most thorough—it may almost be said lavish scale. With scarcely an exception the furniture is of solid oak throughout. This applies not only to the contents of classrooms, lecture-rooms, and assistant masters' apartments, but even to the kitchen, the servant's bedroom, and the carpenter's shop.

The Physical Laboratory is furnished with all the apparatus necessary for this branch of study, which need not be recapitulated in detail here, being what is familiar to architects, and has been described in our columns in connexion with other buildings of the same class. On the second floor are situated the modelling school and drawing school, over the laboratories and lecture-rooms respectively, and the art master's room and two store-rooms over the corresponding rooms in the lower stories.

At the main entrance of the great hall is a porch, with a cloak-room and lavatory on either side, and the clock, which is also seen inside, the case being here painted a light terra-cotta, relieved with gilt lines, and above the face is the inscription, "*Crescat in horas doctrina*." In the upper portion of the two end bays of the east wall two large tablets have been painted, the names of all the boys who have received the prize given annually by the King being here inscribed in gilt letters on a terra-cotta ground. A platform of panelled oak, measuring 12 ft. by 24 ft., is constructed in nine pieces, so that it is easily removable. The artificial lighting of the hall is effected by six eight-light electric fittings in bronze.

To the south of the house a lawn of considerable area is being laid down on made-up ground at a height of some 3 ft. above the level of the surrounding land. The windows of all the principal rooms in the master's residence overlook the lawn and the playing-field, which is also being prepared for use.

Between the dining-hall and classrooms is situated the boiler house, which contains two Cornish boilers, each 6 ft. in diameter, and about 15 ft. long, with condensers, pumps, etc. Next to the boiler house is a water-softening apparatus, through which all water used on the premises passes before going into the service pipes.

The contractor for the buildings was Mr. J. Cracknell, of Peterborough, and his foreman of the works is Mr. J. W. Wray. The sub-contractors include the undermentioned:—Heating and ventilating, Messrs. G. N. Haden & Sons; lighting, Messrs. Mann, Egerton, & Co. (Norwich); stone carving, Mr. R. Bridgeman (Litchfield); fireproof floors, Messrs. Homan & Rodgers; furnishing, the North of England School Furnishing Company; laboratory fittings, Messrs. Clements, Jeakes, & Co. Mr. Turkinetne was the clerk of works.

The architect is Mr. Basil Champneys, who, as in the case of other school and college buildings in which he has been concerned, has realised an excellent type of school architecture, interesting and picturesque, without being pretentious; preserving, in fact, the home like character which school architecture ought to present.

BOOKS RECEIVED.

THE LAW RELATING TO RAILWAY TRAFFIC. By T. Waghorn, Barrister-at-Law. (Effingham Wilson. 2s.)

ELEMENTARY SCIENCE APPLIED TO SANITATION. By A. Herring-Shaw, R.P.C. (Sanitary Publishing Company.)

THE BUILDING MECHANIC'S READY REFERENCE. By H. G. Richey. (Chapman & Hall.)

a reliable table giving either the ultimate strength or the safe stress of columns for different ratios of length to least transverse dimension, or of length to least radius of gyration.

Unfortunately, tables of the kind are apt to vary considerably, and they are not always accompanied by a clear statement as to the manner in which they have been calculated. Rankine's and Gordon's well-known formulae may be applied to calculate either the ultimate strength or the safe stress for columns of known dimensions, but unless accurate values for the coefficients are available for different kinds of timber, the rules are not of much use except in a general way.

A more precise method of obtaining the required dimensions is by the use of the diagram contained in Fig. 155. This is taken from a paper on "The Practical Column," contributed by Mr. J. Mitchell Moncrieff, M.Inst.C.E., to the *Proceedings of the American Society of Civil Engineers*.

In order that there may be no misapprehension as to the precise origin of the curves in this diagram, we give in Table XXXIX. the formulae by which they were calculated:—

TABLE XXXIX.—MONCRIEFF WORKING FORMULAE FOR TIMBER COLUMNS.

Material.	Maximum Compressive Fibre Stress.	For Round-Ended Columns. (For Fixed-Ended Columns the Values of $\frac{l}{r}$ Obtained by the Formulae are to be Doubled.)
Yellow pine or pitch-pine ..	2,000 = 2 units	$\frac{l}{r} = 10 \sqrt{\frac{352}{10 - 4 \cdot 4 f_d} \left(\frac{2}{f_d} - 1 \cdot 6 \right)}$
White pine	1,300 = 1·3 units	$\frac{l}{r} = 10 \sqrt{\frac{224}{6 \cdot 5 - 1 \cdot 4 f_d} \left(\frac{1 \cdot 3}{f_d} - 1 \cdot 6 \right)}$
French oak or Dantzic oak	2,000 = 2 units.	$\frac{l}{r} = 10 \sqrt{\frac{192}{10 - 4 \cdot 4 f_d} \left(\frac{2}{f_d} - 1 \cdot 6 \right)}$

f_d = compressive load in pounds per square inch, and the value is to be inserted in the formula in units of 1,000 lb.

Further particulars relative to these formulae will be found in a previous Student's Column,† and in the paper mentioned above.

To make clear the manner in which the formulae in Table XXXIX. are used we calculate the value of $\frac{l}{r}$ for the safe dead load of 800 lb. per square inch, the material to be yellow pine.

$$\begin{aligned} \frac{l}{r} &= 10 \sqrt{\frac{352}{10 - (4 \cdot 4 \times 0 \cdot 8)} \left(\frac{2}{0 \cdot 8} - 1 \cdot 6 \right)} \\ &= 10 \sqrt{\frac{352}{6 \cdot 48} (0 \cdot 9)} \\ &= 10 \sqrt{48 \cdot 9} = 70 \end{aligned}$$

* *Proceedings of American Society of Civil Engineers*, Vol. XXVI.

† *The Builder*, Vol. LXXVIII

Therefore, the values of $\frac{l}{r}$ are:—

For round ends 70

For fixed ends 140

The use of Fig. 155 is particularly simple, as shown by the following application to the rafters now under consideration.

We will assume the least transverse dimensions, as before, to be 6 in., giving $r^2 = 3$, and $r = \sqrt{3} = 1 \cdot 732$.

$$\text{Then } \frac{l}{r} = \frac{144}{1 \cdot 732} = 83$$

Referring to Fig. 155 we find that for yellow pine the safe dead load per square inch is about 1,066 lb. But as the load in question is not entirely statical it will be wise to reduce the safe dead load given in the diagram by about one-fourth, or

$$1,066 \times 0 \cdot 75 = 800.$$

Then the transverse dimensions of the rafter will be

$34,500 \div 800 = 43 \cdot 125$ sq. in. and as one dimension is 6 in. the other will be $43 \cdot 125 \div 6 = 7 \cdot 2$ in.

Thus the cross-section of the rafter would be, say, 6 in. by $7 \frac{1}{4}$ in.

For the purpose of comparison it will be

better to settle the dimensions of the rafters at 6 in. by 8 in.

Supposing now that it were thought desirable to graduate the area of the rafters in proportion to the stresses in the different parts, each of the lengths $L_1 P_1$, $P_1 P_2$, and $P_2 P_3$ ought to be considered as a column with round ends. The reason is that the rigidity resulting from the adoption of a continuous rafter is absent in the case of a rafter made up of three separately connected lengths.

Calculating upon this basis and retaining the least dimension of 6 in., giving $r = 1 \cdot 732$ and $\frac{l}{r} = 83$, we find by reference to Fig. 155 that the safe dead load is about 675 lb. per square inch.

Deducting one-fourth, as before, to allow for the live load which is included in the total load of 34,500 lb., we have $675 \times 0 \cdot 75 = 506$ lb.

Thus the sectional area of the rafter should be $34,500 \div 506 = 68 \cdot 2$ sq. in., giving the practical dimensions of 6 in. wide by $11 \frac{1}{4}$ in.

Of course, the width might be increased to about 7 in., making $r = 2$, and $\frac{l}{r} = 72$.

Then, by Fig. 155, the safe dead load would be about 800 lb. per square inch, and the reduced load $800 \times 0 \cdot 75 = 600$ lb.

This would give the sectional area of $34,500 \div 600 = 57 \cdot 5$ sq. in. and the dimensions of

$57 \cdot 5 \div 7 = 8 \cdot 2$, say, $8 \frac{1}{2}$ in.

Taking now the member $P_1 P_2$, having to withstand the total stress of 27,500 lb., we find from Fig. 155 that with the width of 6 in. the safe load for $\frac{l}{r} = 83$ is 675 lb. per square inch, and the safe reduced load = 506 lb. per square inch, as before.

Hence the sectional area is $27,500 \div 506 = 54 \cdot 3$ sq. in. and the dimensions would be, say, 6 in. by 9 in.

For the alternative width of 7 in., the safe reduced load is 600 lb. per square inch, as before.

Therefore, the sectional area becomes $27,500 \div 600 = 45 \cdot 8$, say, 46 sq. in. and the dimensions are 7 in. by 6·5, say, 7 in. square.

Similarly for the member $P_2 P_3$, in which the total stress is 20,700 lb., we find that for the width of 6 in. and the safe reduced load of 506 lb., the sectional area should be

$20,700 \div 506 = 41$ sq. in. and the dimensions 6 in. by 7 in.

Adopting the alternative width of 7 in. and the safe reduced load of 600 lb., the sectional area would be

$20,700 \div 600 = 34 \cdot 5$ sq. in.

A simple calculation shows that the graduated dimensions do not result in any

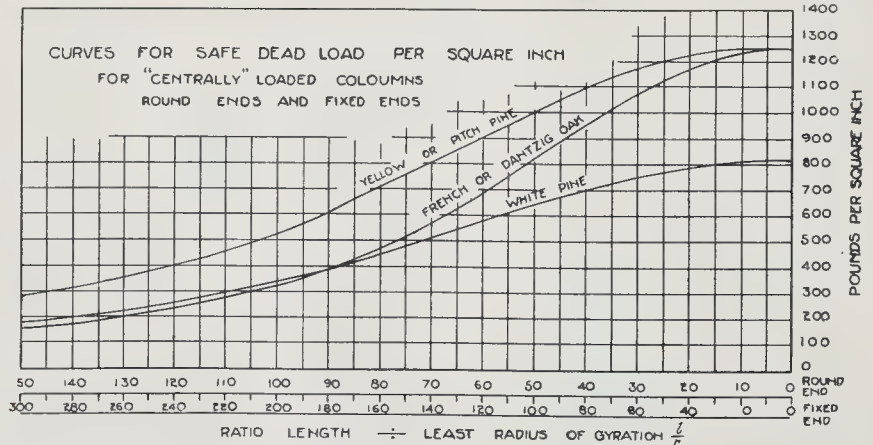


FIG. 155

saving of timber if each piece of the rafter is considered as a round-ended column. If jointed together so as to justify the treatment of each portion as a column with fixed ends, the quantity of timber saved would be counterbalanced by the increased cost of labour, bolts, and splice-plates.

(f) *Struts*.—The dimensions of the diagonal struts can be determined by the aid of Fig. 155 in the manner already indicated. For instance, the strut $P_1 L_2$, which has to carry the stress of 9,100 lb., is 12 ft. between the points of support, and, assuming the least dimension at 4 in., we obtain

$$r^2 = \frac{4^2}{12} = 1.33, \text{ and } r = 1.15$$

This gives $\frac{l}{r} = 144 \div 1.15 = 125$.

Treating this member as being rigidly fixed at the ends, we find the safe dead load in Fig. 155 to be 870 lb., and on the same basis as before this would be reduced to $870 \times 0.75 = 652.5$.

Then for the sectional area of the strut we have

$$9,100 \div 652.5 = 14.0 \text{ sq. in.}$$

and for the dimensions 4 in. by 3.45 in., say, 4 in. square.

Calculated by formula (10), page 403, the depth of the strut $P_1 L_2$ would be

$$d = \sqrt{\frac{12 \times \sqrt{24} \times 0.8}{7.66 \times 0.8}} = 6.13 \text{ in.}$$

and the width

$$b = 6.13 \times 0.6 = 3.68 \text{ in.}$$

Thus the practical dimensions would be, say, 4 in. by 6 in.

The strut $P_2 L_3$ has to withstand the stress of 12,700 lb., and measures 16 ft. 8 in. between the points of support. If we again take the least dimensions at 4 in., the value of $\frac{l}{r} = 200 \div 1.15 = 174$, and by Fig. 155 the safe dead load is about 633 lb. per square inch, and the safe reduced load $633 \times 0.75 = 475$ lb. per square inch.

Therefore, the sectional area required is

$$12,700 \div 475 = 26.7, \text{ say, } 28 \text{ sq. in.}$$

and the dimensions would be 4 in. by 7 in.

Calculated by formula (10) the dimensions of the strut $P_2 L_3$ would be

$$d = \sqrt{\frac{16.8 \times \sqrt{24} \times 0.8}{8.07 \times 0.8}} = 8.07 \times 0.8 = 7.25 \text{ in.}$$

and the width

$$b = 7.25 \times 0.6 = 4.35 \text{ in.}$$

Thus the practical dimensions would be, say, 4 in. by 8 in.

(g) *Tie-Beam*. By reference to Table XXXVIII., it will be seen that the stresses in the tie-beam vary as follows:—

$L_1 L_2$	31,300 lb. tension.
$L_1 L_3$	31,300 lb. "
$L_2 L_3$	29,700 lb. "

Taking the permissible stress per square inch from the table in paragraph (d), (p. 513), we find the effective sectional area of the tie-beam should be

$$31,300 \div 1,200 = 26.08 \text{ sq. in.}$$

But as notches for connexion of the principal rafters and struts and bolt-holes for connexion of the king, queen, princess ties will cause a considerable reduction in the effective area, the cross-section of 26.08 should be increased by a proportion of about 75 per cent. Therefore, the total area of the section should be

$$26.08 \div 1.75 = 45.64 \text{ sq. in.}$$

Adopting 6 in. as the width to suit other members of the truss, the dimensions of the tie-beam would be 6 in. by 8 in.

For comparison, let us calculate the proportion of the tie-beam by formula (7), p. 376. Assuming the width at 6 in., we have

$$d = \frac{L}{\sqrt{A}} \times 1.47$$

$$= \frac{10}{\sqrt{6}} \times 1.47 = 8.1 \text{ in.}$$

Thus the dimensions are 6 in. by 8 in., as before.

NEW CHURCH, BRITHDIR.—On the 27th ult. the Bishop of Llandaff opened a new church at Brithdir, Rhymney Valley. The building was designed by Mr. A. B. Johnstone, architect, Merthyr and Abergavenny, and was built by Mr. W. Sheak. The church has seating accommodation for 260 people, and there is also a schoolroom. The total cost was 1,550l.

METROPOLITAN ASYLUMS BOARD.

At the fortnightly sitting of the Metropolitan Asylums Board on Saturday last week the following matters were dealt with:—

Darenth Asylum.—A letter was received from the Local Government Board approving the amended plans relating to the proposed new workshops, etc., at Darenth Asylum, and stating that they would defer sanctioning any expenditure on the works until tenders had been received.

Central Stores.—A further letter was received from the Local Government Board, dated November 8, stating that they were prepared to approve the plans relating to the proposed new central stores at Peckham Rye, but suggesting that before they did so formally the managers should consider whether an appreciable saving could not be effected by putting the committee-room, clerks' office, etc., on the first floor over the mess-rooms, gate-keeper's office, etc.

Belmont Asylum.—It was agreed that the Asylums Committee be authorised to take steps for the reconstruction of the bathrooms at Caterham Asylum. The engineer estimated that the cost of carrying out the work would be from 750l. to 800l.

Park Hospital.—Authority was given for the cleaning and painting of the Male Staff Home at Park Hospital, as well as a number of minor repairs.

METROPOLITAN WATER BOARD.

At the sitting of this Board on Thursday last week, the Finance Committee reported upon the proposed new reservoirs in the Lee Valley and at Island Barn, Molesley. They stated that it had been generally anticipated that the fusion of the undertakings of the water companies would have had the effect of economising capital expenditure, but the present proposals seemed to throw some doubt on the possibilities of these anticipations being realised. They felt that it would be of great assistance to the Board, before voting over three-quarters of a million sterling, to have before them some comprehensive statement showing what their future expenditure was likely to be, but they understood that the report on the whole position was not yet complete. They were informed, however, by the Chief Engineer that both of the reservoirs were essential, whatever decision the Board may come to in respect of the general question of sources of supply. And although the proposed expenditure would not produce any extra revenue to the Board, the works were no doubt justified by the necessity of providing for a proper supply of water to London. Under the circumstances, therefore, they submitted the estimates for the consideration of the Board, but in doing so ventured to express the hope that the report which had been so long expected might shortly be forthcoming. It was recommended that estimates of 548,000l. and 250,000l. for the respective works be agreed to, and this was carried. Amongst other matters it was agreed to incur an expenditure not exceeding 750l. for the erection of a river wall at the Sunbury Riverside Works.

General Building News.

WESLEYAN CHURCH, PIRTON, HERTS.—The foundation-stones of a new Wesleyan Church were laid at Pirton on the 31st ult.

The structure when complete will be 43 ft. long by 27 ft. wide, seating 220 adults. The seating and roof timbers will be of pitch pine. Low-pressure hot-water heating will be provided. The work of construction is being carried out under contract by Messrs. F. A. Young & Co., of Luton, from the designs and under the superintendence of Messrs. George Baines & Son, architects, London. The exterior will be faced with red bricks with sand-faced terra-cotta dressings.

CHURCH REBUILDING, COLINTON, N.B.—The parish church at Colinton is, with the exception of the campanile, being rebuilt. The new church will consist of a nave, with side aisles, and a semi-octagonal apse at the east end. To the right of the apse will be the organ, and to the left of it the choir. The aisles will be separated from the nave by a stone arcade of three bays, the columns of which having carved capitals, with cherubs' heads at each corner. The ceiling of the nave is to be arched, and the ceilings of the aisles will also be arched, transversely to the nave ceiling. The apse will be divided from the choir by a marble archway and an oak screen. The walls of the apse are panelled in oak, and the floor and steps are of marble and stone. The church will accommodate 750 sitters. The architects are Messrs. Sydney Mitchell & Wilson, Edinburgh.

ST. ANDREW'S PARISH CHURCH, GLASGOW.—The alterations and improvements that have been in progress for some time past at this church, have now been completed. The chancel has been opened up, and the organ, entirely reconstructed and enlarged by Messrs. Lewis & Co., has been divided and placed in two chambers north and south of the chancel. The archways

at either side of the chancel are filled with gilded organ pipes resting upon carved cornices of Spanish mahogany. The floor of the chancel has been laid with slabs of Sienna and black marble with marble steps. There is a panel in the east wall behind the communion table, composed of marbles, agates, and mosaics. The whole interior of the church has been redecorated by Mr. Andrew Wells, of Messrs. Guthrie & Wells. As the stone Corinthian columns and polished stone walls have been painted a stone colour with stencil designs on the side walls. The hand-modelled plaster-vaulted ceilings have been treated in shades of ivory colour. The church has also been lit with electric light. The alterations and the new furnishings have been designed and carried out by Mr. F. Macgregor Chalmers, architect, under the supervision of Mr. A. B. Macdonald, City Engineer.

CHURCH ENLARGEMENT, LONGRIDGE.—St. Wilfrid's Church, Longridge, is to be enlarged. The building of St. Wilfrid's was commenced in 1883, but only the nave and sanctuary were erected. The length of the nave without the sanctuary is 96 ft., while its breadth is 42 ft. The measurements of the sanctuary are 24 ft. in length and 21 ft. in breadth. The improvements consist of adding one bay to the nave, 13 ft. long by 42 ft. wide, a vestibule 23 ft. long by 4 ft. wide, and a porch of 23 ft. by 3 ft. To the right of the porch will be a baptistry, with an octagonal end 8 ft. by 8 ft., and to the left a tower and spire, 120 ft. high to the cross. This will have a ringing chamber, with provision for a peal of bells and a clock room. The extension will be carried out from plans and designs prepared by Mr. Wilfrid, of Preston. It is estimated that the cost of the work will be about 2,000l.

CHURCH BUILDING SCHEME, PLAISTOW.—Early this year the Bishop of St. Albans amalgamated the two mission churches of St. Matthias, Garfield-road, and St. Cyprian's, Beaconsfield-road, with the intention of making one parish and erecting a permanent church in the centre. The work will cost about 7,000l. The architects are Messrs. Cutts. The contract for the building has been given to Messrs. Maddison, of Canning Town.

IMPROVEMENTS AT ST. THOMAS'S, PORTMAN-SQUARE.—The Bishop of Kensington has dedicated the improvements which have been recently carried out at St. Thomas's, Portman-square, under the direction of Mr. Arthur Blomfield. These consist of the enlargement of the sanctuary and chancel, which have been laid down with a mosaic floor; a dosal with wings has been erected, and the apse hung with tapestry, besides which, carved-oak choir stalls have been installed.

ST. JOHN'S HOSPITAL CHAPEL, RIFON.—A new vestry, organ-chamber, and new organ, have been added to this old foundation. The work has been under the direction of Mr. C. Hodgson Fowler, of Durham, who has arranged for a lofty arch to open into the organ-chamber, allowing the instrument to be placed in a loft 7 ft. from the ground floor, thus enabling the space under the loft to be utilised.

MEMORIAL CHAPEL, WALTON CHURCH.—At St. Luke's Church, Walton, near Liverpool, a memorial chapel on the south side of the chancel has just been completed and consecrated. The chapel, erected in red brick and stone, has seating accommodation for about fifty people, and is divided from the church by a pair of wrought-iron gates. The windows are filled with stained glass by Messrs. James Powell & Sons, London; the gates and screens are by Messrs. Thos. Easley, the contractor was Mr. Samuel Webster, Bootle (Liverpool); the whole from the design of Mr. T. Francis Doyle, architect (Liverpool).

SCHOOL ENLARGEMENT, CANTERBURY.—The additional buildings which have been erected at the Simon Langton Girls' School, Canterbury, were opened a short time ago. Mr. W. J. Jennings, architect, prepared the plans for the additions.

SECONDARY SCHOOL, PRESTON.—The foundation-stone of a new secondary school for girls was laid recently at Preston. The site of the school is off Moor Park-avenue, and it is intended to provide accommodation for 300 girls. The cost is expected to be 15,000l., which includes 2,000l. for furnishing. The architects are Messrs. Woolfall, of Liverpool, Messrs. Croft & Son being the contractors.

SCHOOL EXTENSIONS, CLEWER.—The managers of St. Stephen's Schools, Clewer, have recently enlarged and improved their school accommodation by the erection of a new school for girls and internal structural alterations to the old buildings. The cost of the girls' school, together with the acquisition of the land necessary, and the furnishing, was about 3,000l., and the cost of the alterations to the old schools another 1,000l. The new buildings, which stand on a site in Vansittart-road, consist of six class-rooms, all on the ground floor, and a central hall, which will hold 500 persons, and capable of extension by throwing into it two class-rooms divided by removable partitions, which will accommodate an increased audience of 800 persons. Over the

class-rooms, etc., are rooms and apartments for the headmistress and teachers. The block is of red brick. The building was designed by Mr. J. Wightman Douglas, of Newcastle-on-Tyne, and the contract entrusted to local builders, Messrs. W. Green and Son, of Clewer. In the old buildings the structural alterations—which work has also been entrusted to Messrs. Green & Son—consist of throwing a portion of the former girls' school into the boys' department, the alteration of the staircases to and the enlargement of the Higher Grade schoolrooms, new class-rooms, partitions, enlargement of other rooms, new lavatories, and heating apparatus.

WESLEYAN SCHOOL, DEANBANK.—A school has been erected by the Wesleyan Methodists of Deanbank and Ferryhill in Kelvin-street, Deanbank. The building is faced with Serburn bricks relieved by moulded window arches and labels from Peasey Works. The schoolroom is 53 ft. by 30 ft., and will accommodate about 300 adults. In addition a gallery has been erected at the end, which will hold about fifty persons. At the other end of the room a raised platform has been erected. On the right of this is a large infants' class-room divided by a swivel partition to allow of its being added to the main schoolroom as occasion demands. The exposed parts of the roof are pitch pine, stained and varnished, and the walls have pitch-pine cleading to a height of 4 ft. The room is heated by the low-pressure hot-water system. The building will be lighted by electricity. The whole scheme is expected to cost £2,500, the school costing 1,000l. The architect of the new building is Mr. J. Walton Taylor, of Newcastle-on-Tyne; the builders Messrs. R. Blackett, of Darlington, while Messrs. Dinning & Cooke, of Newcastle, supplied the heating apparatus. Mr. G. J. Baguley, of Newcastle, has supplied the leaded glazing, and Messrs. F. M. Thornborough & Son the swivel partition.

GRAMMAR SCHOOL ENLARGEMENT, BATTERSEA.—A new wing of the Battersea Grammar School was recently opened by Mr. W. H. Dickinson, M.P., L.C.C. On the ground floor there is a cloakroom, connected by a covered way, with a manual training room accommodating twenty scholars and instructor; also a store. On the first floor are two classrooms, to seat thirty scholars each, and a master's room. The third floor consists of a classroom capable of seating thirty scholars and master, and an art-room seating twenty-five scholars and master. The new wing is the work of Mr. Hammond, of Battersea, and the architect was Mr. Ryan Tenison.

SCIENCE SCHOOLS AT CHARTERHOUSE.—The buildings at Charterhouse are being added to by the erection of new science schools. The work is being carried out at a cost of 11,000l., by Mr. H. G. Bunning, of Godalming, from the designs of Mr. W. D. Carge, F.S.A. The new buildings will be of three stories, and will comprise chemistry, physics and biology lecture and class-rooms, and a drawing school, with rooms for the masters. There will be laboratories on each floor, together with dark rooms, and the whole will be surmounted by an observatory. A lift is being provided, as well as a staircase.

DRILL HALL, GARMOUTH, N.B.—The old Drill House at Garmouth has been turned into a drill and public hall. The necessary alterations have been made from plans by Mr. Chas. Doig, architect, Elgin. The contractors were: Mason, Mr. John Grigor, Grove, Elgin; carpenter, Mr. Archibald Robb, Rothes; slater, Mr. George Bain, Elgin; plasterer, Mr. John Brown, Elgin; plumber, Mr. Hugh Douglas, Elgin; painter, Mr. Stewart, Rothes.

HIPPODROME, PUTNEY.—A new hippodrome, designed by Mr. Frederic W. Hingston, has been erected in Felsham-road, Putney. The main elevation, covering a frontage of 110 ft., is of red brick with white facings. The house is planned in two tiers, and is capable of accommodating about 2,000 persons. The upholstery work has been carried out by Messrs. Waring & Gillow.

NORTH LONDON HOSPITAL.—The Duke of Connaught, who was accompanied by the Duchess, opened, on the 6th inst., the new building of the North London or University College Hospital, recently erected through the generosity of the late Sir John Blundell Maple. The site of the new hospital is a square bounded by Gower-street, Grafton-street, Huntley-street, and University-street. The style of the building is a free treatment of Renaissance, and the materials are red brick with terra-cotta dressings. The plan of the main building is cruciform, and this form is retained in each of the wards. The wards are roomy and lofty, and contain twenty-four beds each, there being about 300 beds in all. Each ward is isolated, in accordance with the plan of the late Dr. Foote, and is connected with the central block by a covered bridge, with windows admitting a free supply of air. The architects were the late Mr. Alfred Waterhouse, R.A., and his son and successor, Mr. Paul Waterhouse. Since the erection of the new building a gift of 100,000l. has been made by Sir Donald Currie for

the erection of a school of advanced medical studies, a home for nurses, and a home for students attending midwifery cases.

EAST SUFFOLK COUNTY BUILDINGS, IPSWICH.—The completion and opening of the addition to the county buildings for East Suffolk, which has been erected in St. Helen's-street, Ipswich, was celebrated recently by the entertainment of the members of the East Suffolk County Council at a luncheon in the new Council Chamber, given by Lord Rendlesham. The flooring of the lower rooms and corridors is of pitch-pine blocks, laid in herring-bone pattern with borders, supplied and laid by Ellis, Geary and Company, of Cannon-street. The heating is by radiation, and hot water from an "Ideal" boiler in the basement; these were supplied and fixed by Messrs. H. Warner & Son, of Ipswich. All the rooms have also fireplaces. The lighting is by electricity, the system having been installed by Messrs. Tamplin & Makowski, under the advice of Mr. Macgregor Duncan, of Westminster. The steel construction has been carried out by Messrs. Mark Fawcett and Company, of London. The general plan and design of the building was entrusted to Mr. Henry Miller, County Surveyor, and the drawings were made in his office, and the work carried out under his supervision. The Council Chamber, staircase, and other oak decorative work were designed by Mr. J. S. Corder, of Ipswich, who also advised the Committee upon the colouring of the walls and woodwork, other than oak. The contractors for the building were Messrs. Thomas Parkington & Son, of Ipswich. Mr. James Varnoe, of Ipswich, was clerk of the works. All the stained glass work has been carried out by the Norwich Glass Company, of Norwich, and the wrought iron work by Mr. A. Clarke, of Ipswich. The carving has all been executed by Mr. P. Groom, of Ipswich.

DRILL HALL, HOVE, WYCOMBE.—On a site given by Lord Catherine, the foundation stone was laid recently of a Church Lads' Brigade drill-hall, Wycombe. The building has been designed by Mr. F. P. Oakley, architect, of Manchester. The cost will be about 1,500l.

FREE LIBRARY, WHITEHAVEN.—The new Carnegie Free Library, Whitehaven, was opened on the 5th inst. The building occupies a site at the end of Catherine-street. The whole of the library rooms are on the ground floor, the storage and workroom only being on the upper floor. The librarian's house is placed over the centre of the front building. The principal entrance is in the centre of the building, leading to an entrance-hall. The external walls are built of freestone, the front elevation being of ashlar, and the sides of square rock-faced rubble, with scabbled dressings, the back walls being of ordinary rubble. The floors are of concrete. The building has been erected from competitive designs sent in by Messrs. Greig, Fairbairn, & Macniven, of Edinburgh. The cost of the building was estimated to be slightly under 4,000l.

MISSION HALL, TOTTENHAM.—A new block of buildings to be known as the "Marlborough Boys' Hall," has been opened in this district. The premises contain an upper hall, 70 ft. by 30 ft., and on the ground floor another hall, 65 ft. by 30 ft., with a gymnasium, 23 ft. by 30 ft., opening off it, and a miniature rifle-range is to be fitted up in the lower hall. Messrs. Cutts were the architects, and the total cost of building and site is 3,940l.

Appointments.

LABOUR IN INDIAN FACTORIES.—Commander Sir Hamilton P. Freer-Smith, late Superintendent Inspector for Dangerous Trades, Home Office, has been nominated by the Secretary of State for India to go to India to enquire into and report upon the hours of work and the conditions of labour in factories in that country.

APPOINTMENT OF SANITARY OFFICERS.—The Local Government Board have sanctioned the appointment of Mr. A. Pefferett, in place of Mr. P. A. Heath, resigning, as sanitary inspector of the Metropolitan Borough of Hammersmith, as from October 29, 1906, and have sanctioned an increase, as from April 1st, 1906, in the salary of Mr. C. B. Jones, sanitary inspector in the Metropolitan Borough of Fulham.

Sanitary and Engineering News.

GRAVING-DOCK, BELFAST.—The repairs rendered necessary by the collapse of the Alexandra graving-dock will be completed in about four months' time. Sir William Arrol & Co. are constructing a large iron caisson, for the sinking of which the walls and floor of the dock have been cut away; the dock floor is 10 ft. thick, and the

caisson, which has an air-chamber 125 ft. long by 6 ft. high, is to be sunk through 10 ft. of sand to a depth of 3 ft. in the boulder clay, the men working under an air-pressure of about 20 lb. to the square inch. For isolating the area in order to pump out the tidal water a coffer dam is extended across the dock entrance-basin, having on the west side a row of sheeting piled forced into the solid clay, with their grooves filled with concrete under hydraulic pressure. Mr. W. Redfern Kelly, C.E., Chief Engineer of the Harbour Commissioners, is in charge of the works.

RAILWAY WORKS, BIRMINGHAM.—The Great Western Railway Company have under consideration the building of a station in Moor-street to relieve the pressure of traffic at Snow-hill, where it is proposed to rebuild the station hereafter. Meanwhile they are developing and remodelling their system near Birmingham, and have already widened the line from the city to Olton, and have extended the double line from Acocks-green to Tulseley. New stations with two island platforms a-piece have been built at those places, with a large goods' shed for the local coal traffic at Tulseley, where the company will erect also engine and carriage sheds, together with fitting and repairing shops and sheds, to supplant those now used between Small Heath and Bordesley.

THE PORT OF LONDON.—A syndicate has been formed for carrying out a project to utilise the deep waters of the Long Reach of the Thames, a short distance above Greenwich, for purposes of the shipping trade, and to construct large river-side wharves, about 60 ft. wide, and having a frontage of 3,600 ft. to a minimum depth of water of 30 ft. at neap tides.

REFUGE HARBOUR AND PIER WORKS, ETC., SUNDERLAND.—Mr. H. Wake, Engineer to the Wear Commissioners, is superintending the completion of the refuge harbour for a water area of 125 acres, an undertaking begun some twenty-five years ago, on the north side of the mouth, extends to a length of 2,800 ft., and has cost some 280,000l.; the south pier is now being lengthened to an aggregate of 2,888 ft., the superstructure consisting of granite-faced concrete blocks. Sir Wm. Arrol and Company are contractors for the erection, after designs by Dr. Harrison, Chief Engineer, northern division, to the North-Eastern Railway Company, of a viaduct and bridge across the Wear to connect Southwick and Pallion. The bridge, of steel work on the Linville girder principle, will carry two rail-tracks by a span of 330 ft., giving a clear headway of 85 ft. above high-water level; the viaduct is built of Dunelm stone, piers, to the North-East, of brick; the total length of the work is nearly 1,590 ft.; the bridge has a footway 7 ft. wide on each side; the rock-faced granite piers have middle arches, and are 64 ft. wide; the north main pier rests upon a concrete-filled steel caisson, which will be sunk through clay and red sandstone to the limestone bed 75 ft. below high-water mark; on the opposite bank the limestone bed is reached at a depth of about 30 ft. Mr. Bulmer is resident engineer in charge of the work. Messrs. Mitchell Brothers, of Glasgow, are contractors for the masonry and approaches.

Foreign.

FRANCE.—Works have been commenced for the construction of an Ecole de Commerce in the XVth arrondissement of Paris.—The Municipality of Moulins have decided on the erection of a new Hotel des Postes at an estimated cost of 347,000 francs.—The Under-Secretary of State for Art has decided on the creation of a museum of Renaissance art in the ancient Château of Azay-le-Rideau, which has been purchased by the State. A long account of this château will be found in the *Builder* of March 30, 1889. It was a French Renaissance of the finest monuments of French Renaissance architecture.—M. Gout, architect, of the Monuments Historiques department, has just terminated an interesting piece of work, carried out with the object of preserving from further dilapidation the rose-window in the principal facade of Reims Cathedral, which has been endangered by the partial subsidence of the walls. M. Gout has carried over an arch in concrete-steel between the two towers, thus taking the weight off the window. The arch is concealed behind the sculptured relief of David and Goliath, which was carefully taken down, and re-set after the arch had been constructed.—M. Alfred Maet, architect, of Paris, has obtained the first premium in a competition for artisans' dwellings at Béziers. The second premium was awarded to M. Chas. Glaize, of Montpellier.—The bridge across the Yonne, at Sens, is to be rebuilt, at an estimated cost of 630,000 francs.—Important works, to cost about a million francs, are projected for the enlargement of the Hospital of Pontchaillon at Rennes.—An Exhibition of the works of Chardin and Fragonard is to be held at the

Miscellaneous.

Georges Petit gallery in Paris, next spring.—M. Antonin Carlès, sculptor, who obtained the medaille d'honneur in the Salon in 1906, has been commissioned to carry out the official bust of the President of the Republic.—The Norwegian landscape painter Fritz Thaulow has died at the age of fifty-nine. He had settled in France for many years, and for twenty-six years back had been an exhibitor at the Paris salons. He was an original member of the Salon National (New Salon). He obtained a first prize at the general Exhibition of 1900, and the cross of the Order of the Legion of Honour at the Salon of 1901.—In front of the church of Sacré Cœur, at Montmartre, there has been inaugurated, a few days since, a monument to the Chevalier de la Barre. M. Roger Bloche is the sculptor.

GERMANY.—An interesting work on the housing of peasants in Germany and its neighbouring countries has just been completed, after many years of collaboration by the German, Austrian, and Swiss Societies of Architects and Engineers. The book is dedicated to the Chancellor of the Exchequer, Fürst Billow, as a recognition of the financial support given to the scheme by the Government, and forms an important addition to the history of social development in Germany.—The Chapel of St. Apollonia, Stralsund, has just been restored at a cost of 5,100 marks. It was built in 1418, in expiation of the martyrdom of three priests who were burnt alive in 1407. The ancient pulpit holes have not been touched, and the stone renewed only where this was absolutely necessary.—The new municipal buildings, Darmstadt, opened a short time ago, were built at a cost of 544,000 marks, and are valued at 1,000,000 marks. The building was planned by the Public Works Department, the detail supplied by Herr Moritz, Municipal Architect of Frankfurt-on-Maine; while Herr Thaler, the Darmstadt Surveyor, superintended the work.—An interesting National Museum has recently been opened in Brunswick. It is built upon the site of the Dom church, and in direct communication with the XIIIth-century church of St. Giles, now used for concerts and exhibitions. The picturesque group of buildings forms one of the noteworthy sights of the town, for the architect, Hans Pfeifer, has endeavoured to follow the lines of the old work wherever this was practicable, and has incorporated into the new work as much as possible of the Romanesque remains. Thus the Hall of the Archives has become the committee-room; in the Chapter House are collected the ecclesiastical fragments, while the Chapel contains the rustic antiquities.—Julius Hoffman has just published a special number of his monthly issue, *Modern Buildings*, dealing with art in Dresden. The first part forms a collection of Schelling & Grabner's ecclesiastical designs, which show a totally new treatment of this kind of work, and a rare example on the part of patrons of giving the architects a free hand. The second and third parts record the astonishing activity of art in Dresden, with special reference to the exhibition held there this year.—On September 23 died Alfred Bohnstedt, who as a Government architect was employed on the designs of Government buildings in a number of the large towns of Germany; his work is always characterised by a refined and cultured taste.—On July 25 was the centenary of the birthday of the architect Herr Ludwig Ross, of Holstein. In 1837 he was appointed Professor at the University of Athens, and as such directed the excavations on the Acropolis. Amongst other works, he pulled down the Turkish mosque inside the Parthenon and built up the Temple to Nike Apteros. He was one of the first to acknowledge the descent of Greek art from Eastern sources. Ross has the honour of having placed his country on a level with other civilised nations where Greek archaeology is concerned. It is proposed to place a bust of him in the library of the German Archaeological Institute in Athens.

AUSTRIA.—The competition for a memorial to Andreas Hofer, to be erected in Vienna, has been won by the sculptor Herr Josef Parschall. Hofer is represented with a drawn sword in his right hand, while his left hand points to the approaching enemy. Five figures of defenders are grouped about the central figure.—On October 10 the memorial fountain to Arthaber was unveiled in the square called after him in Vienna. The fountain, whose design besides a clock, is the work of Herr Theodor Bach. The central feature is a pyramid of stone 6 metres high, upon whose base is affixed a portrait of Arthaber, a relief in bronze, modelled by Herr R. Schröer.—It is proposed to enlarge Lemberg University and add to it physiological, paleontological, botanical and zoological anatomy. The cost of these additions is estimated at 2.9 million kronen.—On the outskirts of St. Polten an interesting bridge of unusual span is in course of erection. This iron bridge, 188 metres long, over the Traismaier, is replacing an old wooden structure. The piers are of ferro-concrete, and the central span of 53.5 metres is flanked by eight overflow beds, three on the right bank and five on the left.

GUILDHALL LIBRARY AND MUSEUM.—Mr. Charles Welch has been compelled by failing health to resign his appointment as Librarian to the Corporation of the City, whose service he entered forty-three years ago. During that period he rendered valuable assistance in the re-arrangement and classifying of the contents of the Guildhall Museum, and compiled histories of the Monument, the Pewterers' Company, the Fellowship Porters, and works upon many cognate topics. Amongst the objects recently acquired for the Museum is the inscribed dedication-stone from the debtors' prison, which was built for the Sheriffs of London and Middlesex at the angle of Redcross and Whitecross streets, Cripplegate. The prison, having room for 500 debtors, was divided into six separated wards—the Middlesex, Poultry and Giltspur, Ludgate, Dietary, Remand and Female Wards—was planned and designed by William Mountague, City Surveyor, and was pulled down some years ago, when the stones of the gate-way were removed to a mineral water manufactory at South Norwood; it is opposite the City Green-yard. There also have been presented to the Museum a stake of oak from the river bed at Brentford which it is believed is a relic of a defence constructed at the time of the first Roman invasion of Britain, a curious wine-bottle discovered in the roof of an old tavern at both Fair, West London, and a large bronze medal commemorative of the siege of the Peking Legations in 1900.

CENSUS OF PRODUCTION BILL.—Mr. Lloyd-George's amendments of the Bill provide that in the projected census no demand shall be made for particulars which might be considered inquisitorial, and that the Board of Trade shall pay due regard to the importance of not disclosing trade secrets or other information which might tend to prejudice persons making the returns, and otherwise, in their official summaries or publications, shall safeguard the legitimate interests of traders and manufacturers. Particulars which the public can be compelled to supply relate to only statistics of output, the number of days during which processes of manufacture are conducted, the number of persons employed, the nature of the power used or generated, and similar matters which will enable the authorities to ascertain and collate quantities and values of production.

T-SQUARE CLUB.—The opening dinner and concert took place on Tuesday last, at the Holborn Restaurant, Mr. Geo. H. Fellowes-Pryne presiding. The concert was under the direction of Mr. Arthur Beekwith, and among the more noticeable features were the singing of Miss Lilian Evison and the *Æolian Quartet* and the musical sketch of Mr. Barclay Gammon. Madam Edith Jowers accompanied. The Chairman proposed the toast of "The T-Square Club," and spoke of the usefulness of such gatherings in promoting good fellowship. Mr. W. T. H. Leverton, in reply, said the committee wished to widen the basis of the club as much as possible, and would be glad of any suggestions by which the object of the club—the promotion of friendly intercourse between the members of the architectural and other professions—could be further attained.

PROPOSED MUNICIPAL ART SCHOOL IN EDINBURGH.—The Municipal Art School Committee of Edinburgh Town Council met on the 12th inst., and considered the report on the proposed new Art School. It stated that the new Art School should be designed so as to make provision for the most approved and up-to-date methods. It should attract students not only from Edinburgh, but from the south and east of Scotland, and should provide for a thorough training being given in the four main branches of art education—painting, sculpture, architecture, and decoration—and these should take the place of the Art School in the Royal Institution, the Life Class School of the Royal Scottish Academy, and the art classes in the Heriot-Watt. The new school should also provide for the art teaching to be done under the Committee for the Training of Teachers. The report includes a scheme indicating what it is proposed the accommodation should be, and this gives approximately:—General accommodation, 15,205 ft.; painting section, 11,196 ft.; sculpture, 6,830 ft.; architecture, 6,982 ft. The total accommodation of 34,113 ft. is suggested should be provided totals 66,327 ft. From the sketch plans it would appear that the probable cost of the buildings (inclusive of equipment) would be 50,000, or thereby, and the accommodation provided for would be, including the pupils from the colleges for the training of teachers, 2,000. It is recommended in the report that the committee should make a representation to the Town Council asking that the whole of the Cattle Market should be set aside as a site for the school, and that they should give a general approval to the plans submitted. After this is done the sub-committee will address themselves to the question of drawing up a

detailed scheme for the administration of the school. It is the desire of the committee to make Edinburgh a great art centre, and, if possible, to restore it to the high position which it previously held in the art world. The name of the new school will be "The Edinburgh Municipal College of Fine Arts and School of Arts and Crafts." The committee at their meeting approved generally of the report, which will come before the Lord Provost's Committee before it is sent to the Town Council.—*Scotsman*.

THE "LLOYD" GUIDE TO AUSTRALASIA.—A useful, convenient, and well-arranged work with this title has been published by Mr. Edward Stanford (Long Acre, W.C.). It is chiefly designed for travellers to Australasia, but it will be found of use to many other people, in Australia and elsewhere, for it contains a great deal of information put in a concise and convenient way by the editor, Mr. A. G. Plate. The work commences with a general description of the Australian Commonwealth—area and boundaries, physical features, climate and rainfall, fauna and flora, population, occupation of the people, the aborigines, history of Australia, constitution of the Commonwealth, the industries, railways, etc., etc. Then follows a detailed description of the various States and the principal cities and towns in them, and so complete does the information appear to be that a visitor to the various places mentioned is not likely to search the work in vain for what a guide may reasonably be expected to contain. A number of maps, plans, views, etc., are bound up with the work, and two maps (Australia and New Zealand) are given separately in a pocket in the back cover of the guide. Much of the information has been taken from official sources, and is stated, and no doubt it can be relied on. The work has been issued for The Norddeutscher Lloyd, Bremen.

THE LAND REGISTRY, COUNTY OF LONDON.—In his recently issued Report the Registrar states that the number of properties registered for title in 1902 was 3,945 freeholds and 11,867 leaseholds; 3,800 and 11,283 in 1903; 3,261 and 10,609 in 1904; and 3,147 and 11,014 in 1905. The aggregate of 58,916, or a total of 91,284 in all since the work of registration began. At the instance of the Registry a reduction has been made in each of certain special cases of the *ad valorem* scale of fees, including every item of incidental expense, appended to the Act of 1897; on the other hand the department has not yet found it necessary to raise the scale of charges since its adoption.

A REINFORCED CONCRETE FLOOR TEST.—We have received from Messrs. Potter & Co. the following particulars of a test conducted upon one of their floors, consisting of a concrete slab reinforced by flat steel bars, corrugated transversely so that a longitudinal section had the same appearance as that of an ordinary corrugated iron sheet. The bars were disposed cross-wise and extended from wall to wall in either direction, being anchored at each end and curved downwards towards the centre of the slab. The slab measured 5 in. thick, and the clear spans were 22 ft. 6 in. and 15 ft. The weight of reinforcement is stated at 448 lb. or 1.33 lb. per square foot. The floor was built on April 18th, and the test was commenced three months later, the following being the observed results:—July 18: Load per square foot 59 lb.; deflection $\frac{1}{4}$ in. July 19: Load per square foot 118 lb.; deflection $\frac{1}{2}$ in. August 9: Load per square foot 254 lb.; deflection $1\frac{1}{2}$ in. A fine crack was developed under the last-mentioned load extending diagonally from one corner for the length of 8 ft. 6 in., thus indicating that the ultimate resistance of the concrete had been reached. As the foundation of the supports sunk $\frac{1}{4}$ in. at one corner no additional load was imposed. In view of the large unsupported area and the absence of beams or stiffening ribs this test speaks well for the strength and rigidity of the floor system in question.

SELBY ABBEY FIRE.—The Bishop of Beverley (Archdeacon of York), Lord Wenlock, and Mr. Brooksbank, who held an official inquiry into the cause of the fire at Selby Abbey, made their report on the 8th inst. After reviewing the evidence they state that they cannot too strongly insist on the need for greater care in the employment of lights within an organ. The evidence in regard to the paraffin lamp, and the fact that the candles exposed to draughts were used in view of any protection in an organ largely constructed of perfectly dry wood, are both significant. It is said that organ builders always use unprotected candles, but a practice is not the less dangerous because it is customary, and if it is dangerous it is reprehensible. It should be added that much greater caution ought to be used in regard to the possession of matches by persons engaged in the building or repair of organs. The circumstances of the fire, they state, show how absolutely important it is that means of access to the Abbey should be obtainable close at hand at all times. Much valuable time was lost getting at the fire because the vergers, who had the keys, lived at a considerable distance from the church. Again, if, after the discovery of the lamp in

List of Competitions, Contracts, etc.

For some Contracts still open, but not included in this List, see previous issues. Those with an asterisk (*) are advertised in this Number: Competitions, iv.; Contracts, iv. vi. viii. x.; Public Appointments, xviii.; Auction Sales, xxx. Certain conditions, beyond those given in the following information, are imposed in some cases, such as: the advertisers do not bind themselves to accept the lowest or any tender; that a fair wages clause shall be observed; that no allowance will be made for tenders; and that deposits are returned on receipt of a boni-fide tender unless stated to the contrary.

Competitions.

* **DECEMBER 31.—Ireland.—LABOURERS' COTTAGES.**—The Local Government Board for Ireland invite designs for labourers' cottages in rural districts throughout Ireland, and are prepared to award 500, 100, and 200, for the three best designs. Copy of conditions of competition and instructions can be obtained on application by letter to the Secretary Local Government Board, Dublin, to whom designs are to be sent not later than 3 p.m., December 31.

Dunfermline.—LIBRARY.—Architects are invited to furnish competitive designs for the erection of a branch library in Dunfermline. For conditions of competition and other particulars apply to the Secretary of the Carnegie Dunfermline Trust, St. Margaret's Hall, Dunfermline.

Contracts.

BUILDING.

NOVEMBER 17.—Penzance.—SCHOOL.—Monmouth-shire Education Committee invite tenders for alterations and alterations to Penzance Council School. Plans and specifications may be seen either at the County Council Office, Newport, or with Mr. D. Phillips, Greenmeadow, Penzance. Sealed and endorsed tenders to be in hands of Mr. C. D. Sweeney, County Council Offices, Newport, Mon., not later than November 17, endorsed "Tender for Alterations."

NOVEMBER 17.—Sauderston.—HOTELS.—The Guardians of the Wycombe Union invite tenders for alterations at the Union House at Sauderston. Plans and specifications can be seen at the Union House on application to the Master. Tenders to be sent to Mr. J. L. Reynolds, Clerk to the Guardians, 12, Easton street, High Wycombe, on or before November 17, endorsed "Tender for Alterations."

NOVEMBER 17.—Settle.—Mewth, Consistorial.—The West Riding Education Committee invite whole or separate tenders in connection with the following, viz.: Settle proposed temporary school. Alterations, viz. (builder, joiner, plaster, painter, joiner, slater, plumber, plaster, painter). Consistorial school. Alterations, viz. (builder, joiner, slater, plumber, plaster, painter). Plans may be seen, and quantities obtained, on application to office of Mr. J. C. Edwards, County Council Office, 11, Wakefield. A deposit of 10s. is required for the Mewth-with-Darley School. Cheques to be sent to the Guardians, County Treasurer, County Hall, Wakefield. Sealed tenders, properly endorsed, to be sent to the Architect, Mr. J. Vickers-Edwards, County Architect, County Hall, Wakefield, not later than 10.30 on the morning of November 17.

NOVEMBER 17.—Eiland.—WESLEYAN MANSE.—For the erection of a Wesleyan Manse at Victoria-road, Eiland. Plans and specifications may be seen, and bills of quantities obtained, at offices of Messrs. J. G. Graham Nicholls, architects, Museum Chambers, Halifax, from November 12 to 19.

NOVEMBER 19.—Mexborough.—POLICE STATION.—The Standing Joint Committee of the West Riding C.C. invite tenders for the erection of a new Police Station at Mexborough. Plans may be seen, and bills of quantities obtained, on and after November 10. A deposit of 10s. is required. Cheques to be sent to the West Riding Treasurer, County Hall, Wakefield. Additions to teachers' house (builder, joiner, slater, plumber, plaster, painter). Plans may be seen, and quantities obtained, on application to office of Mr. J. C. Edwards, County Council Office, 11, Wakefield. A deposit of 10s. is required for the Mewth-with-Darley School. Cheques to be sent to the Guardians, County Treasurer, County Hall, Wakefield. Sealed tenders, properly endorsed, to be sent to the Architect, Mr. J. Vickers-Edwards, County Architect, County Hall, Wakefield, not later than 10.30 on the morning of November 19.

NOVEMBER 20.—Hunslet.—ALTERATIONS, ETC.—To Messrs. Hunslet Guardians invite whole tenders for the execution of certain alterations and additions required at offices, according to the plans and specifications prepared by the architect, Mr. W. E. Richardson, Rothwell, Leeds. Such plans and specifications may be seen, and bills of quantities obtained, on application to the architect. Tenders must be endorsed "Tender for Alterations" and be delivered at offices of Messrs. Fred. W. Lee, Clerk to the Guardians Union Office, Hunslet, Leeds, by 10 o'clock a.m. on November 20.

NOVEMBER 20.—Queensbury.—HOUSE.—Erection of a house at Scrivel, Queensbury. Tenders to be delivered to Mr. Herbert F. Sharp, P.A.S.I., Architect, etc., 1, Briggs-villas, Queensbury, on or before November 20, endorsed "Tender for House." **QUEENSBURY.—WAREHOUSE.**—For the erection of new warehouse and showrooms, in Arthur-street and Callender-street, for Messrs. Hanna & Brown. Bills of quantities may be obtained from Messrs. W. H. Stephens & Sons, Doncaster, on payment of deposit of 20s. Drawings and specification and conditions of contract may be seen at office of Mr. T. W. Henry, architect, Queen-buildings, Belfast. Tenders, endorsed, to be lodged with architect on or before 10 o'clock a.m. on November 21.

NOVEMBER 21.—Bristol.—HOTEL AND FIRE STATION.—Bristol Watch Committee of the Corporation invite tenders for the erection of a police and fire station at Eastville, Bristol. The drawings and

specification may be seen at this office, and bill of quantities obtained, on deposit of a cheque value 20s. Tenders must be made out on the form provided, and all blanks must be filled in, otherwise the tender will not be considered. Sealed tenders, endorsed "Tender for Police and Fire Station, Eastville," and enclosed in the envelope provided, must be delivered at the office of the City Engineer, Bristol, not later than 10 a.m. on November 21. Mr. T. H. Yablonson, M.I.C.E., City Engineer, 63, Queen-square, Bristol.

NOVEMBER 21.—Newcastle.—SLAUGHTER HOUSES.—The Finance Committee of the Corporation invite tenders for the erection of new slaughter houses at the Cattle Market, Scotswood-road. Plans and specifications may be seen, and bills of quantities and form of tender obtained, at the City Property Surveyor's Department, Town Hall, on payment of 2s. 2s. to the City Treasurer. Sealed tenders, addressed, to the Chairman of the Markets Committee, and endorsed "Tender for New Slaughter Houses, Cattle Market," must be delivered to the Committee Clerk's Office, Town Hall, before 10 a.m. on November 21. Mr. Hill Motum, Town Clerk, Town Hall, Newcastle-upon-Tyne.

NOVEMBER 21.—Stanley.—HOUSES.—The erection of twelve dwelling houses at Shield-row, Stanley, R.S.O., for Mr. S. D. Shafto, of Beamish Park, Beamish, R.S.O. Terms and specifications may be seen, and particulars obtained, on application to Mr. P. E. Crossling, architect and surveyor, Stanley, R.S.O., County Durham. Sealed tenders, endorsed "Twelve Houses, Shield-row," to be received not later than 6 p.m. on November 21. The proposed sites are within 500 yds. of Shield Row Station, N.E. Railway.

NOVEMBER 22.—Barncoose.—HOUSES.—For proposed houses at Barncoose for Mr. B. J. Hatlam, according to plans and specification, which may be seen by appointment at the residence of the proprietor, Lynwood, Barncoose, Illogan. The office of Mr. Samson Hill, architect, Greenlane, Redruth, from whom all particulars relating to the work may be obtained. Sealed, endorsed tenders are to be sent to the proprietor on or before November 22.

NOVEMBER 22.—Burnley.—SCHOOL.—Burnley Education Committee invite tenders for the various works required in the erection of the proposed school in Ormerod-road, Burnley. Drawings may be seen, and specifications, bills of quantities, and forms of tender obtained, at the office of Mr. Borough Engineer, Mr. G. H. Pickles, A.M.I.C.E., on payment of 10s. 10s. Tenders, endorsed "Tender for Technical School," and addressed to the Chairman of the Education Committee, must be delivered at the Town Clerk's Office, Town Hall, not later than 9 a.m. on December 22.

NOVEMBER 22.—Woodfield, near Blackwood.—HOUSES.—For the erection of twelve houses at Woodfield, near Blackwood, Mon., for the Penman Building Club. Plans and specifications may be seen at the office of Mr. W. Griffiths, architect, Pontillan-fraith, Mon. Sealed tenders, endorsed "Tender for Club," are to be sent to the Secretary, Mr. W. Phillips, Pontillan-fraith, Pontillan-fraith, on or before November 22.

* **NOVEMBER 24.—Gloucester.—NEW BLOCK TO ASYLUM.**—The Committee of the Governors of the Gloucester Second County Asylum invite tenders for a new block, to accommodate about 170 female patients, at the Second County Asylum, Barnwood, near Gloucester. Bills of quantities and forms of tender can be obtained from Messrs. Giles, Gough, & Trollope, architects, 28, Craven-street, Charing Cross, W.C., on payment of 10s. 10s. Plans and specifications can be seen at the architect's office at Wotton Asylum, Gloucester, on or before November 24.

NOVEMBER 24.—Halifax.—WORKS.—For the mason's, joiner's, plumber's, slater's, steel contractor's, and patent glazing works required in the erection of engineers' works at Halifax. Plans, specifications, and conditions may be seen, and quantities obtained, at offices of Mr. Lister Coates, A.R.I.B.A., architect, Central Chambers, 10, Central-street, Halifax, from November 19 to 24.

NOVEMBER 24.—Longhaven.—ADDITIONS TO HOUSES.—For the mason, carpenter, slater, and plasterer's works of additions to a house at Home Farm, Longhaven. Plans and specifications may be seen at the Farm and Mr. Wm. Davidson, architect, Eilon. Offers to be lodged with Mr. A. Brown, Sheriff, Eilon, on or before November 24.

NOVEMBER 25.—Altham Bridge.—PUMPING STATION.—Accrington District Gas and Water Board invite sole tenders for the erection of an engine and boiler house at Altham Bridge. Plans may be seen at the offices of the architects, Messrs. Haywood & Harrison, Accrington, and bills of quantities obtained from the above on payment of 2s. 2s. To be sent to Mr. A. H. Aitken, Clerk to the Board, Tran Hall, Accrington, on or before November 25.

NOVEMBER 25.—Killyman.—HALL.—The Corporation of Killyman, A.O.H. invite tenders for the erection of hall in Corr, Killyman. Specification and bills of quantities may be seen at the office of Mr. J. J. Corry, solicitor, Killyman. All tenders to be lodged not later than November 25.

* **NOVEMBER 28.—Enfield.—INFIRMARY.**—The Guardians of the Edmonton Union invite tender for the erection of an infirmary for fifty beds at the Chase Farm Schools, The Ridgeway, Enfield, N. Drawings and specifications may be seen at the architect's office, Mr. Stuart Hill, 105, Cannon-street, E.C. Sealed tenders to be delivered to the Clerk to the Guardians by 9 a.m., November 28.

NOVEMBER 28.—Chesterfield.—HOUSES AND STABLES.—Chesterfield Corporation invite tenders for the erection of a house and stables at the Chesterfield Sewage Disposal Works. Plans, specifications, and all particulars may be seen at the office of the Borough Surveyor, situated in Saller Gate, where bills of quantities may be obtained on payment of 2s. 2s. Sealed tenders, endorsed "Sewage Works, Chesterfield," to be delivered to Mr. Jno. Middleton, Town Clerk, on or before November 28.

NOVEMBER 29.—Holborn.—UNDERGROUND CONVENIENCES.—In the advertisement published in our issue of November 10 inviting tenders by the Town Clerk for the construction of an underground convenience in Theobald's-road, the stipulation for a deposit of 20s. with a tender sent in was inserted through an error on the part of the advertising agents through whom the notice was inserted. Tenders are not to be accompanied by any deposit.

NOVEMBER 30.—Ystrad Mynach.—HOTEL.—The erection of a proposed hotel at Ystrad Mynach for Messrs. D. Williams & Co., Taff Vale Brewery, Merthyr Tydfil. Plans, specifications, and bills of quantities may be seen at the above address, or at the office of Mr. Richard Edwards, architect and surveyor, Brynhydw, Treharis. Builders desiring to tender must send in their names to the architect, together with a deposit of 20s. 2s. when bills of quantities, forms of tender, and particulars will be forwarded. Sealed tenders to be sent to Mr. W. Griffiths, Messrs. D. Williams & Co., Taff Vale Brewery, Merthyr Tydfil, endorsed "Tender for Erection of Hall-way House Hotel," on or before November 30.

DECEMBER 1.—Bangor.—ADDITIONS TO HOTEL.—For the execution of extensive additions and improvements to the Criterion Hotel, Bangor, Co. Down. Plans and specifications relating to the work may be seen at offices of Mr. Y. Bannan, E. Bannan, Belfast Bank Chambers, Belfast. Sealed and endorsed tenders to be lodged with the architect, on or before December 1.

DECEMBER 1.—Blackburn.—SCHOOL.—Blackburn Education Committee invite tenders for the erection of extensions to Accrington-road Council School, to accommodate 350 children. Plans and specifications may be seen, and bills of quantities and forms of tender obtained, at the office of the architects, Messrs. Cheers & Smith, 24, Richmond-terrace, Blackburn, on payment of 10s. 10s. Sealed tenders, on forms supplied, endorsed "Accrington-road Extensions," to be sent to Mr. Alexander Gow, Director, Education Office, Library-street, Blackburn, on or before December 3.

DECEMBER 3.—Cove. STATION BUILDINGS.—Caledonian Railway Company Directors invite tenders for the works to be executed in the construction of new station buildings at Cove, Kinross-shire. The drawings may be seen at the office of the Company's Engineer, Buchanan-street Station, Glasgow, or at the office of the Company's District Engineer, General Station, Perth, where copies of the specification and schedule may be obtained on payment of 2s. 2s. Sealed tenders, endorsed "Tender for Reconstruction of Cove Station Buildings," to be lodged with Mr. J. Blackburn, Secretary, Caledonian Railway Company's Offices, 302, Buchanan-street, Glasgow, on or before December 3.

DECEMBER 5.—Dundalk.—STORES BUILDING.—Great Northern Railway Company (Ireland) Directors invite tenders for a stores building (two stories) in brick, 121 ft. long by 50 ft. wide, with steel principal roof and steel girder supported floor; also offices, 54 ft. long, making a total length of block 215 ft., at their Dundalk Station. Parties wishing to tender may see the drawings and specification at the office of Mr. H. Mills, Engineer-in-Chief, Amiens-street, Dublin, or copies of them at the office of the District Engineer, Belfast, and can obtain at the offices of the District Engineer copies of the eight drawings and specification and form of tender on payment of 2s. 2s. (not returnable) per set. Quantities supplied. Tenders, on the forms of the Company, are to be made out on the forms supplied by the Company, and endorsed "Tender for Stores Building," should be delivered to Mr. J. Morrison, Secretary, Secretary's Office, Amiens-street, Terminus, Dublin, not later than 10 a.m. on December 5.

* **DECEMBER 5.—Manchester.—SCHOOL.**—Tenders are invited for the erection of the Beaver-road Municipal School, Manchester. Plans may be seen, and copy of bills of quantities obtained, on and after November 22, at Education Offices, Deansgate, Manchester. Tenders must be delivered not later than December 5.

* **DECEMBER 6.—Leytonstone.—NURSES' HOME.**—Tenders are invited for the erection of a Nurses' Home, Whipp's Cross-road, Leytonstone, N.E. Drawings and specifications may be inspected on and after November 19 at the architect's office, 121, Plashet-street, East Ham, E., between 10 a.m. and 4 p.m. Forms of tender and bills of quantities can be obtained on application to the Clerk's office, Union Workhouse, Leytonstone, N.E. Tenders, sealed and

endorsed, to be delivered to the Clerk to the Union not later than 10 a.m. on December 6.

*** DECEMBER 15.—Woodford.—SCHOOL.**—The Woodford Local Advisory Committee of the Essex Educational Committee invite tenders for the erection and completion of a new boys' school for about 500 and for sundry alterations to the girls' and infants' schools, at Churchfields, Woodford, Essex. Plans, specification, and form of contract may be inspected at the office of the architects, Mr. Frank Whitmore, Chelmsford, and Mr. Arthur Hogwood, 33, Great Tower-street, E.C. Builders desirous of tendering must send in their names and addresses on or before November 26 to Mr. Ernest J. Bond, Clerk, 95, Leadenhall-street, E.C., with a deposit of 5*l.* Sealed tenders, endorsed "Tenders for Woodford Churchfields Council School," to Mr. E. J. Bond, Clerk, Woodford Green, Essex, not later than December 15.

*** DECEMBER 22.—Burnley.—TECHNICAL SCHOOL.**—Burnley Education Committee is prepared to receive tenders for the erection of a technical school in Ormerod-road, Burnley. Drawings may be seen, and specifications, bills of quantities, and forms of tender obtained, from the Borough Engineer. Tenders endorsed "Tender for Technical School," and addressed to the Chairman of the Education Committee, to be delivered at the Town Clerk's Office, Town Hall, Burnley, not later than 9 a.m., December 22.

NO DATE.—Carlisle.—BUSINESS PREMISES.—For any of the trades in connexion with the erection of new business premises between Lowther-street and Crosby-street for Messrs. Edgar Bros. Plans, specifications, and conditions, and copies of the quantities and all information, at offices of Mr. T. Taylor Scott, E.R.I.B.A., architect.

NO DATE.—Hereford.—VEHICLES.—For forming nurses' cubicles at Hereford Union Workhouse. Apply to Mr. W. W. Robinson, architect, 15, King-street, Hereford.

NO DATE.—Liverpool.—HOUSES.—For the erection of two dwelling houses. For plans, specifications, etc., apply Messrs. Mines & Sutherland, Ltd., 65, South John-street, Liverpool.

NO DATE.—Meiklescare.—FARM BUILDINGS.—For the builder, joiner, and slater work for reconstructing Meiklescare Farm Buildings, recently destroyed by fire. Plans and specifications may be obtained from Mr. J. A. Macgregor, architect, 49, Albert-street, Newton-Stewart, who will also receive estimates.

NO DATE.—Tranent.—HOUSES. The Tranent Co-operative Society invite tenders for the various works in the erection of twelve tenement houses at Tranent, to be completed by next May Term. Schedules from Mr. Edward C. H. Maidman, architect, 15, S. Charlotte-street, Edinburgh.

ENGINEERING, IRON, AND STEEL.

NOVEMBER 19.—Islington.—BINS.—Islington Borough Council invite tenders for the supply and delivery of galvanised wrought-iron shingle bins and cast-iron orderly bins. A specification and drawing of the shingle bins, and a specification and sample of the orderly bins, may be seen, and a form of tender obtained, upon application to the Borough Engineer, Mr. J. Patten Barber, at the Town Hall, Upper-street, N., and payment of 1*l.* is. Sealed tenders, endorsed "Tender for Bins," must be received by Mr. William F. Dewey, Town Clerk, Town Hall, Upper-street, N., not later than 4 p.m. on November 19.

NOVEMBER 20.—Fazakerley.—FOOTBRIDGE.—Lancashire and Yorkshire Railway Directors invite tenders for the construction and erection of a footbridge over the North Mersey branch, near Fazakerley Junction. Plans can be seen, and form of tender and specification obtained, on application to the Engineer's office, Hunt's Bank, Manchester. Tenders, endorsed "Tender for Footbridge near Fazakerley Junction," to be in the hands of Mr. R. C. Irwin, Secretary, Hunt's Bank, Manchester, not later than 10 o'clock on the morning of November 20.

NOVEMBER 20.—London.—COPPER INGOTS.—The Southern Railway Railway Company, Ltd., Board of Directors invite tenders for 10 tons of copper ingots, as per specification, which may be seen at the offices of the Company. The charge for the specification is 1*l.* is., which will not be returned. Tenders must be sent in, addressed to the Secretary, marked "Tender for Copper Ingots," not later than 12 o'clock noon on November 20. Mr. Edward Z. Thornton, Secretary, 46, Queen Anne's gate, S.W.

NOVEMBER 21.—London.—BOILERS, ETC.—The East Indian Railway Company invite tenders for the supply and delivery of (1) steel plates for boilers and buffer plates; (2) rolled material for engines and boilers; (3) flanged and plain copper plates, copper pipes, etc.; (4) spiral and volute springs; (5) leather belting, hides, etc.; (6) red and white lead; (7) wood screws, nails, etc.; (8) galvanized steel wire; (9) steel joists, angle plates, etc., as per specifications to be seen at the Company's offices. Tenders are to be sent to Mr. C. W. Young, Secretary, Nicholson-lane, London, E.C., marked "Tender for Boilers, etc., Plates," or as the case may be, not later than 12 o'clock noon on November 21. For each specification a fee of 1*l.* is. is charged, which cannot under any circumstances be returned.

NOVEMBER 21.—London.—PUMPS, ETC.—The Crown Agents for the Colonies acting on behalf of the Administration of the Central South African Railway invite tenders for the supply of two steam-driven or geared pumps, each capable of delivering 16,000 gallons per hour through 6-in. diameter pipes eight miles long against a head of 650 ft., boiler pressure 120 lb. per square inch, two engines complete, for driving alone, to fit in a well 21 ft. by 18 ft. Tender forms can be obtained free of charge upon application at the Crown Agents' office, Whitehall gardens, London, S.W., between the hours of 10 and 4 (Saturdays 10 to 1). Tenders to be delivered, in sealed envelopes, addressed to the Crown Agents for the Colonies, Whitehall-gardens London, S.W., not later than November 21, endorsed "Tender for Pumps."

NOVEMBER 22.—Carlrow.—BOILER.—Carlrow Board of

Guardians will, at their meeting to be held on November 22, consider tenders for the supply and erection of a vertical boiler capable of evaporating 1,100 lbs. of water per hour, and to be used for all kinds of laundry, and for other purposes—complete with all fittings and mountings, etc., in accordance with specification prepared by Mr. James O'Donnell, A.M.Inst.C.E., copies of which may be had on application to this office for the sum of 1*l.* is. each. Tenders, endorsed "Boiler," and containing the names of two solvent sureties willing to join in a bond in a sum equal to twice the amount of the contract, to be forwarded in registered covers, addressed to the Presiding Chairman, and posted so as to reach the office of Mr. Thomas F. Coyle, Acting Clerk of the Union, Clerk's Office, Workhouse-lane, not later than 12 o'clock noon on November 22.

NOVEMBER 24.—Durban, Natal.—PIPES.—The Corporation of Durban, Natal, invite from British ironfounders only tenders for the supply and delivery "free on board" of 4,300 ft. of 24-in. diameter cast-iron sewerage pipes. Specifications can be obtained from Mr. W. H. Radford, C.E. (Consulting and Representative Engineer to the Corporation), Albion-chambers, Nottingham, and deposit of 2*l.* is. Sealed and endorsed tenders must be delivered to Messrs. Webster, Steel, & Co., agents to the Durban Corporation, 5, East India-avenue, Leadenhall-street, London, E.C., on or before November 24.

NOVEMBER 24.—York.—HEATING.—York Guardians invite tenders for proposed scheme for heating the board-room and offices of the Guardians in Museum-street, York. Plans and specifications at the offices of the architect, Mr. W. H. Brerley, 13, Lendal-terrace, Second tender, addressed to Mr. George Sykes, Clerk to the Guardians, Museum-street, are to be delivered on or before 10 o'clock a.m. on November 24.

NOVEMBER 25.—West Bromwich.—BRIDGE WORKS, ETC.—West Bromwich Corporation invite tenders for the following work:—(1) Reconstruction of bridge over canal basin at Baginshall; (2) construction of underground conveyance, adjoining the New Free Library. Plans and specifications for the first contract may be seen, and bills of quantities, form of tender, and any information obtained, on application at the office of Mr. Albert D. Greatorex, M.Inst.C.E., Borough Engineer and Surveyor, Town Hall, West Bromwich. Sealed tenders to be delivered to Engineer not later than 12 noon on November 25, endorsed "Tender for Canal Bridge, or 'Underground Conveyance'." The contract to be for "Underground Conveyance."

NOVEMBER 27.—Edinburgh.—PIPES.—Edinburgh and District Water Trustees invite tenders for supplying about 1,012 tons of cast-iron pipes from 3 in. to 12 in. in diameter. The drawings may be seen, and copies of specification and forms of tender obtained, at the Superintendent of Works Office, No. 12, St. Giles-street, Edinburgh. Tenders, endorsed "Tender for Cast-iron Pipes," must be lodged with Mr. William Boyd W.S., Clerk to the Trust, Edinburgh and District Water Trust Offices, 12, St. Giles-street, Edinburgh, not later than November 27.

NOVEMBER 27.—Hilford.—IRON PIPES.—Hilford U.D.C. invite tenders for supplying and fixing about 700 lineal ft. of wrought-iron ornamental fencing and gates and about 4,570 lineal ft. of steel fencing. Plans and specifications may be seen, and form of tender obtained, on payment of a deposit of 2*l.* is. on application to Mr. H. Shaw, M.I.C.E., Engineer and Surveyor to the Council, at his offices, Town Hall, Hilford, Suffolk. The drawings for "Fence for Fencing," must be sent to Mr. John W. Bentley, Clerk to the Council, Town Hall, Hilford, Essex, on or before 12 noon on November 27.

NOVEMBER 27.—Leicester.—SPANS.—The Secretary of State for India in Council invite tenders for the supply of 94ft. spans. The conditions of contract may be obtained on application to the Director General of Supplies, India Office, Whitehall S.W., and tenders are to be delivered at that office by 2 o'clock p.m. on November 27.

NOVEMBER 28.—Durban, Natal.—IRON PIPES.—The Corporation of Durban, Natal, invite tenders for the supply and delivery "free on board" of 4,300 ft. of 24-in. diameter cast-iron sewerage pipes, together with bends, offsets, and heads. Specifications can be obtained from Mr. W. H. Radford, C.E. (Consulting and Representative Engineer to the Corporation), Albion-chambers, Nottingham. Sealed and endorsed tenders must be delivered to Messrs. Webster, Steel, & Co., agents to the Durban Corporation, 5, East India-avenue, Leadenhall-street, London, E.C. on or before November 28.

NOVEMBER 30.—Aberdeen.—HEATING.—The U.D.C. of Aberdeen Education Committee invite tenders for heating the Higher Standard Schools. Plans and specification may be seen at the office of Mr. John Morris, Director, Town Hall, Aberdeen, or at Mr. T. Roderick, Architect, Clifton-street, Aberdeen. Tenders with full particulars of scheme, to be sent to the Director, duly endorsed "Tenders for Heating Apparatus," on or before November 30.

NOVEMBER 30.—Ashford.—BRIDGE WIDENING.—For the widening of the bridge over the ditch, Beaver-road, near the sewage pumping station, in accordance with the plan and specification, which may be seen on application to Mr. William Terrill, Surveyor, at his office, New Street, Ashford. Sealed tenders, endorsed "Bridge Widening," to be sent to Mr. John Creery, solicitor, Clerk, 11, Bank-street, not later than 5 p.m. on November 30.

DECEMBER 5.—Ferrybridge.—SPANS TO BRIDGE.—The West Riding C.C. invite tenders for the repairs to Ferrybridge Bridge, situated on the Doncaster and Pontefract main road, within the rural district of Pontefract. General conditions, specification, and bill of quantities can be obtained at the office of the Chief Riding Surveyor, County Hall, Wakefield, on the 10th inst. Tenders, etc., should be sent to the West Riding Treasurer, at County Hall, Wakefield. Sealed tenders, duly endorsed, to be delivered at the office of Mr. F. G. Carpenter, West Riding Surveyor, County Hall, Wakefield, not later than December 5.

*** DECEMBER 6.—Southwark.—BOILERS.**—Tenders are invited for the removal of two externally fired boilers and one externally fired water heater, and the supply and erection of two Cornish boilers, steam

and feed pipes, pump, hotwell, calorifier, etc. For boiler, sealings, and building alterations set as per the specifications and drawings prepared by the Guardians' Consulting Engineers, the Nation Boiler and General Insurance Company, Ltd., 22, St. Paul's Church-yard, London, E.C., from whom particulars may be obtained. Tenders, endorsed "Boilers—St. George's Workhouse," to be addressed to the Guardians, and delivered at the Clerk's Office, Union Office, John-street, W. Blackfriars-road, S.E., not later than 4 p.m., December 6.

JANUARY 3.—York.—RAILWAY.—North-Eastern Railway Directors invite tenders for the construction of the Selby and Goole Railway, about 10 miles in length. The works comprise double line railways, chiefly on embankment (upwards of 1,000,000 cu. yds.), with stations, station yards, warehouses, cottages, and other buildings, sidings, and bridges. The work of the latter will amount to about 1,100 tons. Plans may be seen, and specification, detailed quantities, and form of tender obtained, on personal application at the office of Mr. W. J. Cudworth, the Company's Engineer, at York, or on and after November 21. Sealed tenders, marked "Tender for Selby and Goole Railway," to be addressed to the Secretary and delivered at his office at York not later than 10 a.m. on January 3.

NO DATE.—Burnham-on-Crouch.—ENGINE.—Burnham-on-Crouch U.D.C. invite tenders for a 20 h.p. engine and plant; pump, to raise 6,000 gallons per hour; and other plant, specifications, etc., can be seen at the Council's Office, November 21 to 28. Mr. J. Cook, Surveyor.

NO DATE.—Hyde.—HEATING.—Hyde Education Committee invite tenders for heating the Central Council School on the low-pressure system. Plans and specifications may be obtained from Mr. S. Ashford, Secretary, Education Office, Hyde, on the payment of a deposit fee of 1*l.* is.

MISCELLANEOUS.

NOVEMBER 17.—Lavenham.—SCAVENGING.—Cosford R.D.C. invite tenders for the scavenging of Lavenham, for a period of six months, for the existing cesspits at per pit, and for the emptying of all main closets twice a week at per week. The Council will provide a sanitary cart for the removal of the refuse, during the contract, and will employ all horses, men, and lights as may be necessary. The contract will be entered into for a period of six months from December 1st next. Tenders, upon forms to be obtained at the Council's office, must be sent to Mr. H. H. Suffolk, are to be forwarded to the Clerk, endorsed "Tender for Scavenging," not later than 10 a.m. on November 20.

NOVEMBER 20.—Kingstown.—LIGHTING AND PLUMBING WORK.—The Kingstown Technical Instruction Committee invite tenders for lighting and plumbing work in the technical schools, Eblana-avenue, Kingstown, in accordance with plans and specifications to be seen at the office of Mr. George T. Moore, C.E., 2, Foster-place, Dublin; also tenders for heating and plumbing work in the technical schools, and for branch of the work to be lodged with Mr. B. Macdonald, M.A., B.Sc., Principal and Secretary, Municipal Technical Schools, Kingstown, not later than November 20.

NOVEMBER 21.—Bramcote.—SCAVENGING.—The R.D.C. of Stapleford invite tenders for the removal of refuse, house refuse, etc., in the parish of Bramcote, for a period of twelve months, as from January 1, 1907. Forms of tender and general conditions may be obtained from, and tenders must be sent to, Mr. Frederic William Fox, Clerk of the Council, Clerk of the Council, Bank-chambers, 18, Market-hill, Nottingham, not later than November 21, in sealed envelopes, endorsed "Tender for Scavenging."

NOVEMBER 21.—Chorley.—FIRE-CLAY GOODS.—Chorley Corporation invite tenders for the supply and delivery at their Gasworks, of fire-clay goods required during the coming year. Specification and form of tender may be obtained from Mr. J. W. Atkinson, Gas Engineer. Tenders, endorsed "Fire-Clay Goods," to be addressed to Mr. Jno. Mills, Town Clerk, Town Hall, Chorley, and delivered not later than noon on November 21.

NOVEMBER 21.—Hastings.—TIMBER.—Hastings Education Committee invite tenders for the supply of timber for the technical schools for the year 1907. Form of tender (which must be returned to Mr. Philip O. Buswell, Clerk of the Committee, Offices, 19, Wellington-square, Hastings, endorsed "Timber," not later than noon on November 21), giving particulars of quantities required, may be obtained at the offices of the Committee.

NOVEMBER 21.—Forthmouth.—IRON FENCE.—Forthmouth Corporation invite tenders for taking down and re-erecting in new position a portion of the wrought-iron fence and gates surrounding the Peam-broke-gardens in the borough of Forthmouth, and making, supplying, and fixing sufficient similar wrought-iron fencing to complete the enclosure of the piece of land to be added to the above-mentioned gardens. The specification and plan may be seen, and a form of tender obtained at the Borough Engineer's office at the Town Hall. The form of tender is to be completely filled in and sent under cover to Mr. Alexander Hellard, Town Clerk, Town Hall, Forthmouth, not later than 10 a.m. on November 21.

NOVEMBER 23.—Cork.—BRANCHES.—The Council of the Corporation of Cork invite tenders for making, supplying, and fixing benches in City Hall, Albert Quay Cork, in accordance with the plans, etc., prepared by the City Engineer. General conditions, specification, and drawings can be seen in the City Engineer's Office, City Hall from 10 to 4 o'clock daily, where tender forms will be issued. Tending contractors must first lodge with the City Treasurer the sum of 1*l.* is. Sealed proposals, endorsed "Tender for Benches for City Hall," must be deposited in office of Mr. F. W. McCarthy, Town Clerk, City Hall, Cork, before 2 p.m. on November 23.

NOVEMBER 23.—East Coves.—FIRE APPLIANCES.—The East Coves U.D.C. invite tenders for various articles of fire appliances, particulars of which can be obtained of Mr. Albert Baylen, Surveyor, Town Hall, East Coves. Sealed tenders, endorsed "Tenders for Fire Appliances," to be sent to Mr. Atter-

U.D.C. invites tenders for the laying of about 1,750 yds. 15-in. diameter earthenware sewer and storm water drain (mostly in headings), 960 yds. 9-in. diameter earthenware sewer and storm water drain, together with the necessary manholes, iron pipes, etc., Hempstead-road, etc. Drawings, form of tender, and specifications, to be obtained from the Council, 14, High-street, Watford, between the hours of 9.30 a.m. and 1 p.m. A copy of the schedule of works and a form of tender can be obtained at the offices of the Council upon the payment of 3s. 3s. Sealed tenders, addressed to Mr. H. Morten Turner, 14, High-street, Watford, must be delivered, and endorsed "Tender for Sewerage," must be delivered under cover not later than December 5

DECEMBER 6.—Lockwood.—PAVING.—Huddersfield Corporation invite tenders for the paving and flagging of the Shoulder of Mutton-yard, Lockwood. Plans, specifications, and general conditions may be seen, and bills of quantities and forms of tender obtained, on application at the office of the Borough Engineer and Surveyor, 1, Peel-street. Sealed tenders, endorsed "Tender for Shoulder of Mutton-yard," signed in the handwriting of the tenderer or his agent, and addressed "Town Clerk, Town Hall, Huddersfield," must reach him not later than 10 a.m. on December 10.

DECEMBER 10.—Newtownards.—WATERWORKS.—The Newtownards U.D.C. invite tenders for the construction of a complete system of waterworks for Newtownards. The works comprise generally the driving of about 1,500 yds. of tunnel through Scabla Hill, the construction of a concrete reservoir of 100,000 gallons capacity in the townland of Ballycullen, the laying of an aqueduct and the various distributing pipes throughout the town, consisting of about 16,500 yds. of cast-iron pipes, varying in diameter from 10 in. to 3 in., with the supply and laying of all pipes, valves, meters, hydrants, specials, etc.; the construction of a concrete reservoir of 100,000 gallons capacity in the townland of Corporation North, and the providing and fixing of pumping engines, with all necessary fittings. Plans, etc., may be seen, and a copy of the form of tender, etc., can be obtained upon payment of 1l. 3s. which will not be returned at the office of the engineers, Messrs. Swiney & Crossland, M.M. Inst. C.E., chambers, Belfast. Tenders, endorsed "Tender for Waterworks," to be delivered, in sealed envelopes, at the office of Mr. M. J. Carrigan, Clerk to the Urban District Council, Town Hall, Newtownards, not later than 5 o'clock on December 10.

DECEMBER 17.—Castletown.—SEWERAGE AND WATERWORKS.—Castletown U.D.C. will, on December 17 next, consider tenders for carrying out the above works, which comprise the construction of a storage reservoir filters and clear water tank, the providing and laying of cast-iron pipes, the providing and fixing of fountains, hydrants, and filters of sewers, manholes, septic tanks, and bacterial filters; the laying out and preparing of land for irrigation purposes, and other works, according to plans and specifications prepared by the Engineer, Bergin, B.E., 36, Westmoreland-street, Dublin, which can be seen at the office of Mr. Brd. M'Arde, Clerk of Council, Courthouse, Castletown, during ordinary office hours. Tenders, accompanied by a schedule of prices, and containing the names and addresses of two solvent sureties willing to join in a bond of 1,000l., or a guarantee society bond for the same amount, for the due performance of the contract, will be received by the Clerk up to 12 o'clock noon on December 17. Tenders should be addressed to the preceding Chairman, and endorsed "Tender for Castletown Sewerage and Waterworks," and no tender will be considered which is not on the form to be had from the Clerk for a payment of 1l.

DECEMBER 20.—Stourport.—SEWERAGE WORKS.—Stourport U.D.C. invite tenders for the provision, laying, and jointing of cast-iron and stoneware pipe sewers, together with manholes, lampholes, and flushing chambers, the construction of tank sewer, engine-house, liquefying tanks, distributing carriers, effluent drains, and other incidental works. Drawings and specification may be seen, and bills of quantities obtained, at the offices of the engineers, Messrs. Wilcox & Raikes, of 63, Temple-row, Birmingham, on and after November 26, on payment of a deposit of 5l. 5s. Sealed tenders, in the envelopes supplied, endorsed "Stourport Sewerage-Contract No. 1," to be delivered at office of Mr. C. Hugh Watson, Clerk to the Council, Stourport, not later than 12 o'clock noon on January 7.

NO DATE.—Hazlemere.—ROADS.—For the construction of the roads on St. John's Estate, Hazlemere, the work will be divided into three contracts, and particulars can be obtained, and plans and specifications will be shown to intending applicants at the offices of the surveyors, Messrs. Kerham, Burgess, & Myers, architects and surveyors, Gerrards Cross, Bucks; and Beaconsfield; and by Mr. W. H. Matthews, at Hazlemere.

STONE, MATERIALS, AND STORES.

NOVEMBER 17.—Newcastle-on-Tyne.—STORES.—Tyne Improvement Commission invite tenders for the supply of the undermentioned stores to their various works, ferries, dredgers, steam tugs, screw hoppers, etc., for twelve months from January 1, 1907.—Section 1. ropes and canvases; section 2. nails and spikes; section 3. chains; section 4. wrought-iron and steel; section 5. rivets, bolts, nuts, etc.; section 6. steel castings; section 7. iron castings; section 8. brass and other castings; section 9. copper and lead good; section 10. ironmongery; section 11. brooms and brushes; section 12. leather; section 13. India rubber; section 14. asbestos and packing; section 15. varnishes and paints; section 16. oils; section 17. waste and oakum; section 18. coals; section 19. timber; section 20. creosoting timber; section 21. incandescent lamps and are lamp carbons. Forms of tender for the articles in any of these sections may be obtained on application at the offices of the Commissioners, Engineer, Bewick, from Newcastle-upon-Tyne. Tenders must be sent to offices of Mr. J. McDonald Manson, Secretary, Tyne Improvement Commission Offices, Bewick, from Newcastle-upon-Tyne, under cover, addressed "The Chairman, River Works Committee," not later than November 17, and the section or sections quoted for must be indicated on the cover.

NOVEMBER 20.—Wallasey.—PAVING STONE.—Wallasey U.D.C. invite tenders for supply of granite paving stones (150 tons of 54 by 34 sets, and 150 tons of 4 by 4 by 4 sets). Form of tender and further information may be obtained on application to Mr. W. H. Travers, Engineer and Surveyor, Public Offices, Egremont, Cheshire. Tenders, in sealed envelopes, endorsed "Tender for Stone," to reach Mr. H. W. Cook, Clerk to the Council, Public Offices, Egremont, Cheshire, not later than November 20.

NOVEMBER 23.—Manchester.—STORES.—The Cleansing Committee of the Manchester Corporation invite tenders for twelve months' supplies of lime

and lime ashes, 21 oz. glass, lead (sheet and pipe), mineral and paraffin oils, heavy oil for cylinders, burning oil for van and cart lamps. Specifications may be obtained from Mr. R. Williamson, superintendent, Cleansing Department, Town Hall, Manchester. Tenders must be sent in before 1 o'clock on November 23.

NOVEMBER 22.—West Hartlepool.—STORES.—West Hartlepool Corporation invite tenders for the supply of the undermentioned goods and materials for the periods hereunder named:—(a) During the year ending December 31, 1907: (1) Kerbstones, flags, setting sets, roadways, pits, and tar, lime, sewer pipes; (2) metal castings; (3) ventilating pipes; (4) cement; (5) cartage, West Hartlepool; (6) cartage, Seaton Carew; (7) general and hardware, picks, shovels, sythes, brushes, oil, firewood, sawdust, packing, blacksmith's requirements. Specifications and forms of tender can be obtained upon application at office of Mr. Nelson F. Dennis, A.M. Inst. C.E., Borough Engineer, Municipal Buildings, West Hartlepool, and samples of castings and general stores sent upon application to the storekeeper at the Corporation Depot, Station, West Hartlepool. Samples of flags, kerbstones, and provender, labelled with name and address of sender, to be delivered at office of Engineer, carriage paid. Tenders for all goods to be addressed to the Chairman of the Works Committee, endorsed with the description of goods and materials tendered for, to be delivered at the office of the Town Clerk, 78, Church-street, West Hartlepool, not later than 4 p.m. on November 22.

NOVEMBER 23.—Brighton.—GRAVIT SPILLS.—Brighton Corporation invite tenders for the supply of 1,500 tons of granite spalls. The specification and form of tender may be obtained on application at the office of the Borough Surveyor, at the Town Hall, Brighton. Sealed tenders, endorsed "Tender for Granite Spalls," must be left at his office, at the Town Hall, Brighton, 10 o'clock in the forenoon on November 23.

NOVEMBER 23.—Hull.—STORES, ETC.—Hull Corporation invite tenders for scavenging and watering cartage; iron and steel; castings; cement; lime; salt; clay; pipe and tiles; lime; paint; and oils; brushes. Forms of tender and other particulars may be obtained at the City Engineer's office. Samples of pipes and gully traps, which will be retained for the purpose of testing, and the accepted tender, are to be deposited at the City Engineer's office on or before November 23. Applications and tenders, endorsed with the trades in respect of which the tender is made, are to be addressed to the Chairman of the Works Committee, and delivered at the Town Clerk's office before noon on November 23. Mr. A. A. White, M. Inst. C.E., City Engineer, Town Hall, Hull.

NOVEMBER 24.—Bradford.—STORES.—Bradford Corporation invite tenders for the supply of miscellaneous stores required by the Tramways Department during the year ending December 31, 1907, as follows, viz.:—Schedule No. 1. bolts, nuts, screws, washers, cotter pins, rivets, hand tools, etc.; (2) files; (3) lamp fittings; (4) electric lamps for posts; (5) sand bags, painted canvas, and tar and twine; (6) trolley poles; (7) galvanised steel strand wire; (8) iron brake shoes, iron, malleable, steel, and brass castings; (9) overhead carriers; (10) pulleys; (11) bar iron, etc.; (12) insulating material (vulcanite fibre, etc.); (13) oils and grease; (14) paints; (15) dry colours; (16) genuine white lead; (17) acids and spirits; (18) glue; (19) pitch, pitch-stone, alum, common soda; (20) varnishes; (21) paint brushes and cleaning brushes; (22) soft soap, waste, wash-leathers, etc.; (23) transfers; (24) glass; (25) Cumber Corns; (26) leather and leather goods; (27) had on application at the Tramway Office, 15, Bridge-street, Bradford, on payment of the sum of 1l. 1s. Samples can be inspected at the Thornbury Car Depot, Leeds, and tenders may be sent to be sent to Mr. Frederick Stevens, Town Clerk, Town Hall, Bradford, not later than November 24.

NOVEMBER 24.—Felling.—STORES.—The U.D.C. of Felling invite tenders for the supply of the undermentioned goods for twelve months ending December 31, 1907, viz.:—Macadam, Heworth freestone kerb, flags, setts, etc.; whinstone kerb, setts, etc.; Portland cement, shovels, spades, pickaxe, hammers, coals and coke, bricks, disinfectants, sanitary pipes. Tenders must be on the printed form, which may be obtained from the Surveyor any morning between the hours of 9 and 10, and will be sent on receipt of stamped, addressed envelope. Tenders must reach Mr. George Bolam, Clerk to the Council, Council Buildings, Felling, R.S.O., co. Durham, not later than November 24, endorsed with the nature of the quotation.

NOVEMBER 24.—Newhaven.—GRANITE.—The U.D.C. of Newhaven invite tenders for the supply of 150 cubic yds. of granite, broken to pass through a 14-in. ring, and to be delivered free either into the council's carts on the west side of the harbour, or in trucks at Newhaven. Forms of tender, and particulars, which alone will be considered, can be obtained from Mr. Edward Knightley, Clerk to the Council. Tenders and samples to be sent to the Clerk under cover, marked "Granite," not later than November 24 at noon.

NOVEMBER 26.—Elgin.—ROAD METAL.—Elgin C.C. invite tenders for the supply of road metal for the year ending May 1, 1908, for the following divisions:—Belle No. 1, Speymouth No. 2, Urquhart No. 3, Duffus No. 5, Alves No. 7, Dyke and Dallas No. 14, Birnie and Marked No. 15, Rothiemay No. 16, Cromdale No. 19, Grantown No. 20. Specifications and schedules of quantities, with forms of offer may be had on application to Mr. Alexander Boggs, County Road Surveyor, 24 Academy-street, Elgin. The forms of offer, duly filled in, enclosed, and marked "Tenders for Road Metal," to be forwarded to Mr. E. D. Jameson, County Clerk, Elgin, and must be received, not later than 4 o'clock in the afternoon of November 26.

NOVEMBER 26.—Warwickshire.—ROAD MATERIAL.—Warwickshire C.C. invite tenders for the supply of road material (broken or unbroken) for the supply of the various railway-stations and wharves in the county. Sealed tenders (on forms to be obtained from the County Surveyor), addressed "Tenders for

Road Material," must be delivered or sent to Mr. John Willmot, County Surveyor, Birmingham, on or before November 26.

NOVEMBER 27.—Woodbridge.—ROAD MATERIAL.—Woodbridge R.D.C. invite tenders for the following road material, to be delivered as under:—Granite, on basalt, broken to 2-in. and 1½-in. sizes; (2) Portland Cement, 300 tons; (3) Buffed or Mottled G.E.R. Station, 1,000 tons; at Levington Creek and Nacton Hard, or at Orwell and Trinity G.E.R. Stations, 400 tons. Whole chalk, 100 tons; (4) Buffed or Mottled G.E.R. Station, 100 tons; at Boyton Dock, 200 tons; at Levington Creek and Nacton Hard, 600 tons; at Western Hill G.E.R. Station, 100 tons. All materials to be delivered between April and September, 1907. No form of tender will be supplied. Tenders, accompanied by samples, must be delivered (carriage paid) to Mr. H. E. Kel, New-street, Woodbridge, endorsed "Tender for Road Material," on or before November 27. Any further information may be obtained of the District Surveyor, Mr. George Cook, Goudsburch, near Woodbridge, by enclosed stamped, directed envelope.

NOVEMBER 28.—Chatham.—STORES.—Chatham Town Council invite tenders for the supply of the following goods and materials during the year ending December 31, 1907:—Schedule No. 1. Aylestone gravel, Aylestone sand, crushed Kentish rag-stone; (2) Portland Cement; (4) stoneware drain-pipes, (5) cast-iron pipes, (6) sewer iron pipes, (7) steel cast-iron pipes, (8) points and oils; (10) brooms and brushes, picks and shovels, sewer bolts, incandescent electric lamps, general stores and ironmongery; (12) disinfectants; (13) iron bars and other materials for blacksmiths' work, etc. Specifications, stipulations, schedules, and forms of tender can be obtained, and samples seen, on application at the Borough Engineer's office, Town Hall, Chatham. Sealed tenders, on the forms supplied, endorsed with the name of the goods tendered for, to be addressed and delivered to Mr. Charles Day, Borough Engineer, Town Hall, Chatham, before 10.30 o'clock a.m. on November 28.

DECEMBER 1.—York.—STORES.—North-Eastern Railway Directors invite tenders for the supply during the six or twelve months ending January 1, 1907, of the undermentioned articles:—(1) Bar iron; (2) iron plates; (3) steel plates; (4) iron sheets and hoop iron; (5) steel sheets; (6) iron shagbats; (7) (10) steel angles; (7) mild steel bar; (8) ironwork for waggon; (9) wheels for carts and road vehicles; (10) metal castings for engines, carriages, and wagons; (11) metal castings (permanent way); (12) iron castings (permanent way); (13) steel castings (permanent way); (14) steel fishplates; (15) cast-iron chairs; (16) cast-iron point and crossing chairs; (17) cast-iron sockets; (18) cast-iron goods; (19) steel and files; (20) buffer and bearing springs; (21) steel tubes for locomotives; (22) brass and copper tubes for locomotives; (23) copper pipes; (24) (25) and iron; (26) lamp carbons; (26) electric lamps; (27) electric wires and cables, (28) lead pipe and sheet; (29) white and red lead; (30) linseed oils (boiled and raw); (31) oils (paraffin and for gas-lighting); (32) glass (sheet and plate); (33) plates (various); (34) shovels; (35) ropes and cordage; (36) tins; (37) canvas; (38) brushes; (39) painters' brushes; (40) iron washers; (41) nails; (42) sockets; (43) iron and iron; (43) trimming pins; (44) cotter pins; (45) hinges (brass and iron); (46) steel and iron wire ropes and cords; (47) steel and iron signal wire and signal cord; (48) iron bolts and nuts and twisted spikes; (49) bolts, nuts and rivets; (50) cement (best Portland); (51) concrete and artificial stone flags; (52) flags; (53) stone; (54) whinstone; (55) concrete and artificial stone flags; (56) cast-iron drain-pipes; (57) common drain-pipes; (58) chimney pots; (59) cast iron reals. Forms of tender, specifications, and conditions may be obtained on application to the Clerk, South Hutton, Sunderland, and tenders must be sent in to the Secretary, Mr. R. P. Dunnell, at York, sealed, and marked "Tender for Stores," not later than 9 a.m. on December 1.

DECEMBER 1.—York.—STORES.—The North-Eastern Railway Directors invite tenders for the undermentioned articles, in such quantities as they may require during the six or twelve months from January 1, 1907, delivered carriage paid at the following:—(1) Telegraph apparatus; (2) telegraph wire and line stores. Payment for each month's delivery will be made at the end of three clear months, or in cash, less 24 per cent. discount. Forms of tender may be obtained on application to Mr. C. H. Ellison, the Company's telegraph superintendent, York, and tenders must be sent in to the Secretary, Mr. R. P. Dunnell, at York, sealed, and marked "Tender for Telegraph Stores," not later than 9 a.m. on December 1.

DECEMBER 3.—South Hutton.—COLLIERY STORES.—The South Hutton Coal Company, Ltd., invite tenders for next year's supply of iron, castings, wire, rope, oils, and other colliery stores, except timber. Forms of tender and specification, with full conditions, may be obtained from Mr. J. R. Lambert, South Hutton, Sunderland, and applicants for forms must state the kind of stores for which they wish to tender. Tenders, addressed to the South Hutton Coal Company, Ltd., South Hutton, Sunderland, will be received up to December 3.

DECEMBER 5.—Dublin.—STORES.—The Directors of the City of Dublin Steam Packet Company invite tenders for the supply of brass and copper work, canvas, cordage, and other materials, for the year ending December 31, 1907. Tenders, stating terms of payment, to be received by the Secretary, 15, Edenquare, Dublin, on or before December 5. Tenders to be marked "outside" "Tenders for —" Specifications can be seen at the Company's office, 9, Regent-road, Liverpool.

DECEMBER 5.—Watford.—SEWER PIPES.—Watford U.D.C. invite tenders for the supply of about 1,750 lineal yds. of earthenware or stoneware sewer pipes, 15 in. diameter, of earthenware, 1½ in. lineal yds. of earthenware or stoneware sewer pipes 9 in. in diameter. Specification and form of tender may be obtained at the Engineer's office, at No. 14, High-street, Watford. Tenders, in sealed envelopes, addressed to the Clerk to the Council, and endorsed "Tender for Sewer Pipes," are to be delivered, with samples of the pipes, not later than December 5.

Public Appointment.

Nature of Appointment.	By whom Advertised.	Salary.	Applications to be in
*STONEMASON.....	N. Nigeria Public Wks. Dept. 2501, etc.....		Nov. 20

Auction Sales.

Nature and Place of Sale.	By whom Offered.	Date of Sale.
*FREEHOLD BUILDING LAND, CHISWICK—At the Mart	Ernest Over-	Nov. 2
*BUILDER AND CONTRACTOR'S STOCK AND PLANT—144, Queen's road, Walthamstow	Izard & Izard.....	Nov. 12
*FREEHOLD BUILDING LAND—At the Torrington Hotel, North Finchley	C. Sparrow & Son.....	Nov. 26
*BUILDING SITE, GILTSFUS STREET, NEWGATE STREET—At the Mart	Jones, Lang & Co.....	Nov. 26
*FREEHOLD PROPERTY, FOREST HILL, At the Mart	H. J. Bromley.....	Nov. 27
*FREEHOLD RESIDENCE, WOOLWICH—At the Mart	Furber.....	Nov. 28
*FREEHOLD BUILDING PLOTS, TOOTING BEC—At the Castle, Tooting	Edwin Evans.....	Nov. 29

LEGAL.—Continued from page 578.
meaning land would involve consequences so serious that he could not think the Legislature meant to give compulsory powers in the case of the occupier of any land apart from premises.
Justices Ridley and Darling concurred, and the appeal was accordingly allowed and the conviction quashed.
Mr. Horace Avory, K.C., and Mr. Courthorpe-Mcneil appeared for the appellants; and Mr. Danckwerts, K.C., and Mr. Montgomery, for the respondent.

WEST-END BUILDING DISPUTE.

THE case of Bower & Co. v. The Piccadilly Hotel Co., Ltd., was mentioned to Mr. Justice Neville, in the Chancery Division, on the 9th inst., on the motion by the plaintiff for an interim injunction to restrain the defendants from building so as to obstruct his ancient lights.

Counsel now stated that the case had been settled on terms, and he had to ask for an order to stay the proceedings.

His lordship: Are all the parties *amici juris*?
The learned counsel replied in the affirmative. His lordship: Very well; take an order by consent.

Patents of the Week.

APPLICATIONS PUBLISHED.*

15,466 of 1905.—R. C. HARRISON (O. W. ALSTON): *Mechanism for Converting Rotary into Reciprocating Motion, especially applicable for Stone-sawing and like Machines.*

This relates to a mechanism especially applicable for stone-sawing machines, and consists in providing a lever which is pivotally mounted by the intermediary of a ball pivot on a rotating disc, the opposite end of said lever being attached to a rock shaft having a sector slidably mounted thereon, the said sector being suitably connected to a reciprocating rod.

18,521 of 1905.—J. GORDON: *Applying Glass and the like Tiles to Walls.*

This relates to a glass or like tile for application to the surface of walls and the like, consisting of a body of glass or the like, a coating of volatile adhesive waterproof material applied to the face of the body, a layer of elastic material applied to and held by said coating, a second coating of volatile adhesive waterproof material applied to the elastic material, and a final coating of dry sand or equivalent material applied to the latter adhesive coating.

21,010 of 1905.—R. C. HARRISON (O. W. ALSTON): *Stone-sawing Machines.*

This relates to a stone-sawing machine, and consists of means for causing the saw frame to travel in a straight line, comprising oscillating segmental rockers pivoted below the frame and adapted to support it and move in unison with it in combination with compensating links adapted to hold the segmental rockers in contact with the frame and prevent the frame from rising.

21,450 of 1905.—J. G. STIDDER: *Moulding and Pressing Machines.*

This relates to a moulding and pressing machine, and consists of a mould having a fixed floor or base, side walls on said base with or without a pressing plunger or ram working against said fixed base, one or more of said side walls being removable so as to leave a gap for the ejection of the moulded article in combination with a sliding side wall or sliding inner face adapted to slide the moulded article partially or wholly across the floor of the mould so that it may be ejected or

* All these applications are in the stage in which opposition to the grant of Patents upon them can be made.

removed through the gap left by the removable side or sides.

23,615 of 1905.—S. FIRTH: *Domestic Stoves, Kitchen Ranges, and the like.*

This relates to a domestic stove, kitchen range, and the like, and consists in constructing loose box and sides in one or more pieces with perforations and vertical ribs for fitting in the fire-basket thereof, and with means for providing an air space or passage from bottom to top between said loose perforated back and sides and the back of sides of the grate or stove, so that air may enter from the ash pit or outside the fire-basket, have a free circulation or current between the loose and permanent box and sides, and through the perforations into the fire-basket and the top.

23,672 of 1905.—W. CAMILL: *Roofing and like Tiles.*

This relates to roofing and like tiles, and consists in providing the tiles with transverse ridges on their upper and under sides capable of interlocking with each other, each alternate tile having longitudinal grooves on its upper face closed at one end and open at the other, whilst the tiles located between them have longitudinal grooves on their undersides to receive both the outer edges of the tiles so as to interlock.

25,715 of 1905.—E. V. CARRUTHERS: *Floor-paving Tiles.*

This relates to a floor-paving tile made of Portland cement, sand, and colours, and dried but not burnt in kilns, the proportion of materials used being one part of cement to two parts of sand, and about one-tenth part of colours. These materials when mixed are placed by hand and the aid of a trowel in iron moulds or dies. The dies are fixed upon a bench on which sheet zinc has been laid, the zinc producing the flatness and even surface of the tile. When the tiles have set hard enough the dies are removed and afterwards when harder the tiles are taken off the bench and placed aside in stacks to dry hard and so complete.

15,176 of 1906.—J. MACGREGOR and J. JAMIESON: *Kitchen Ranges.*

This relates to a hood device for kitchen ranges, and consists of a hinged door having hooks adapted to engage pistons formed in the ends of the arms of a bracket so shaped as to accommodate the top part of the hood and secure to the covering plate in such a position above the aperture in it that the hooks upon the door cannot be raised clear of their pivots by reason of their previously encountering the edge of the covering plate aperture.

980 of 1906.—J. D. PRIOR: *Fire Grates.*

This relates to fire grates, and consists in providing each of the front fire bars of the grate with a horizontal pivot at each end, the said pivots coinciding with the inner edge of the bar, and in the combination with the said pivoted bar of a catch which, in its acting position supports the front or unhinged edge of the bar, but which when disengaged from the bar permits the front edge of the bar to fall by gravity.

7,927 of 1906.—A. GORDON: *Manufacture of Bricks.*

This relates to an apparatus for the manufacture of bricks wherein a receptacle having a steam-jacket and provided with a brake upon the inside thereof is employed, and consists of a pipe for introducing steam into the jacket, a pipe for introducing steam into the interior of the receptacle, valves for both of these pipes, and means for connecting the pipes with the main supply pipe for the purposes of introducing steam into the jacket or receptacle at will.

16,836 of 1906.—W. NEWMAN & SONS, LTD., and G. F. NEWMAN: *Regulators employed in connexion with the Opening and Closing of Windows, Skylights, Fanlights, Ventilators, and the like.*

This relates to regulators for opening and closing

windows, skylights, and the like, in which motion is transmitted to a rod connected to the window or the like through the medium of bevel gear-wheels, and consists in providing the gear-wheels with adjustable screwed bearing-sleeves taking over and surrounding the necks of the same, and having their inner ends adapted to bear against the shoulders of the said wheels.

4,349 of 1906.—S. SAUNDERS: *Combined Ventilating and Warming Apparatus.*

This relates to a combined ventilating and warming apparatus, and consists of a movable radiator having webs extending to the back, and which abuts and bears against the face of a frame or air inlet in the rear of the radiator so as to register therewith and form continuous air-passages from the frame or air inlet.

5,271 of 1906.—C. SHOWELL: *Casement Fasteners.*

This relates to a casement fastener, and consists in the combination with a handle and tongue of a spindle having a conical part rendered exterior, a washer riveted thereto, and a square to receive said handle, with means for securing said handle, such as a screw end and its screw cap.

699 of 1906.—A. C. CHENOWETH: *Machines for Manufacturing Concrete Piles, Columns, and the like.*

This relates to an apparatus for manufacturing concrete piles, columns, and the like, and consists in the combination of a movable lower platform, means for rolling the sheet of concrete-coated wire-netting upon said platform, and for simultaneously moving such platform, and an upper movable platform adjusted to press upon the pile or column as it is being formed.

2,207 of 1906.—A. J. BOUTT (COLN-MUSENER BERGWERKS-ART-VEREIN): *Manufacture of Artificial Stone, Blocks, Pipes and Briquettes from Slag.*

This relates to a process for manufacturing stone products of any kind, paving-stones, pipes, tiles, and the like, as well as briquettes from slag, and it is characterised by the slag or slag material being exposed at the ordinary temperature to the action of carbonic acid or gas mixtures containing carbonic acid under pressure.

3,970 of 1906.—L. LUKACS: *Artificial Stone Slabs, and Process for Making Them.*

This relates to a process for making artificial stone slabs or plates of fibrous material and hydraulic binding materials, in which the ground or asbestos or other fibrous material, and cement or other hydraulic binding material, are separated and conveyed by means of known devices, in the form of sludge from separate receptacles on to an endless band in such a way that a layer of cement is laid on an asbestos layer, and on the cement layer in turn another asbestos layer, and so forth, in suitable number and alternately, the two external layers being preferably made of cement.

17,569 of 1906.—W. J. APPERLEY and F. J. D. HULLINGHOUST: *Manufacture of Artificial Stones and other Plastic Articles.*

This relates to a process for the manufacture of a mouldable mass to be used in the production of moulded, shaped or pressed articles, or for any other desired purpose, and consists in the manufacture of a double salt, which acts on chloride of magnesium in combination with magnesite and filling-in substances.

SOME RECENT SALES OF PROPERTY:

ESTATE EXCHANGE REPORT.

November 5.—By ROGERS & RUDDOCK.	
Hornsey.—2, 24, 26, and 28, Linzee-rd., u.t. 91 ym., g.t. 284, y.f. 144.....	£1,310
By WEATHERALL & GREEN.	
Fulham.—Epsom-rd., Lgt. 744, reversion in 84 yrs.....	1,820
Bectory-rd., Lgr. 906 12s., reversion in 75 yrs.....	2,175

Bromley.—Devon-rd., f.g.r. 221. 1s. reversion in 71 yrs.	£510
November 6.—By H. DONALDSON & SONS.	
Kingsland.—35, Essex-st., u.t. 624 yrs. g.r. 74, e.r. 422.	270
Dalston.—34, Greenood-rd., u.t. 46 yrs. g.r. 74, e.r. 451.	270
Tottenham.—655, Seven Sisters-rd., u.t. 70 yrs. g.r. 82, e.r. 501.	285
By NIGHTINGALE, PHILLIPS, & PAGE.	
Kingsdon, Surrey.—Richmond-rd., "Canbury House," with stabling and land, f. p.	5,600
Wandsworth.—9, Althorp-rd., f. y.r. 401.	500
7, Broadrick-rd., u.t. 634 yrs. g.r. 61, y.r. 451.	500
By POTTERS.	
Hampstead.—2, 4 and 4a, Hillfield-rd., u.t. 821 yrs. g.r. 231, y.r. 1081.	830
East Brompton, Herts.—St. Wilfred's-rd., f.g.r. 74, reversion in 74 yrs.	150
By WALTON & LEE.	
Portman Square.—No. 48, also 6 Berkeley-mews, u.t. 16 yrs. g.r. 800L. p.	1,500
By J. C. PLATT (at Hammermith).	
Hammermith.—41 Wingate-rd., u.t. 37 yrs. g.r. 74, e.r. 401.	275
November 7.—By FOSTER & CRANFIELD.	
North Woolwich.—High-st., f.g. rents 294, u.t. reversion in 45 yrs.	795
141 and 143, Albert-rd., f. y.r. 601.	680
Hackney.—316, Hackney-rd., f. y.r. 551.	1,060
317 and 319, Hackney-rd. (s.), f. y.r. 1181.	2,015
By FULLER, HORNER, SONS, & CO. SELLERS.	
Millwall.—Alpha-rd., manufacturing premises, with cottage and stabling, area 27,500 ft., beneficial lease for 23 yrs. y.r. 1801.	100
By J. GRIFFIN & SON.	
Ealing.—124 to 126 (even), Uxbridge-rd. (s.), u.t. 664 yrs. g.r. 321, y.r. 3851.	7,500
Broughton-rd., f.g. rents 751, u.t. 66 yrs. g.r. 221.	1,060
By JAMES WATTS.	
Epsom, Surrey.—South-st., "Batland House," f. y.r. 281.	360
By DOUGLAS YOUNG & CO.	
Clapham.—316, South Lambeth rd., u.t. 33 yrs. g.r. 74, e.r. 591.	550
By FURNERS (at Winchester House).	
Long Acre.—Hanover-st., f.g.r. 751, reversion in 92 yrs.	1,435
Soho.—Dean-st., f.g.r. 1351, reversion in 81 yrs. Old Comptown, f.g. 351, reversion in 86 yrs.	3,550
Frith-st., f.g.r. 651, reversion in 71 yrs.	930
Shaftebury-avenue.—Nos. 81 and 83, f.g.r. 324, u.t. 10,907 yrs. g.r. all.	1,350
Falconbridge-rd., f.g.r. 701, reversion in 37 yrs.	9,000
Charing Cross-rd.—Nos. 135 to 143, f.g.r. 6751, reversion in 96 yrs.	2,600
George Yard, f.g. rents 1601, reversion in 96 and 51 yrs.	18,000
Charing Cross-rd.—Nos. 127 and 131, f.g. rents 1651, reversion in 89 yrs.	8,410
Nos. 121 and 123, f.g.r. 271, reversion in 95 yrs.	5,670
No. 95, e.c., f.g.r. 861, reversion in 51 yrs.	7,875
By N. EASTON & SON (at Hull).	2,750
North Ferry, Yorks.—Five freehold closes of land, 100 acres, y.r. 1571. 7s.	4,350
November 8.—By ARDER, BUTTER, WAGHORN, & BROWN.	
St. John's Wood.—49 Finchley-rd., u.t. 31 yrs. g.r. 151, y.r. 801.	700
By FAREBROOKER, ELLIS & CO.	
Shepherd's Bush.—138 Uxbridge-rd. (s.), f. y.r. 901.	1,820
Chelsea.—108 Limerston-st., u.t. 60 yrs. g.r. 156, y.r. 521. 10s.	650
77 Limerston-st., u.t. 374 yrs. g.r. 81, y.r. 451.	400
Willenden.—300 High-rd., f. y.r. 261.	415
By F. JOLLY & JAMES.	
Clapton.—116 to 122 (odd), Overbury-st., u.t. 70 yrs. g.r. 301, y.r. 1871. 4s.	775
Hackney.—184 Amherst-rd., u.t. 694 yrs. g.r. 81, 8s., e.r. 551.	440
By NEWBORN, SHEPHERD, & EDWARDS.	
Holloway.—16 Devonshire-rd., u.t. 46 yrs. g.r. 61, e.r. 361.	275
Barnsbury.—82 Wyndford-rd., u.t. 864 yrs. g.r. 61, y.r. 381.	270
Forest Gate.—65 to 71 (odd), Henderson-rd., u.t. 881 yrs. g.r. 81, 8s., y.r. 1301.	900
By NORS & HOWES.	
Sydenham.—5 and 7, Coombe-rd., u.t. 67 yrs. g.r. 81, y.r. 521.	235
By Wm. STEVENS.	
Walthamton.—173 to 183 (even), Blackhorse-rd., u.t. 77 yrs. g.r. 271. 10s. w.r. 1611. 4s.	370
By STIMSON & SONS.	
Breatham.—46, Christchurch-rd., f. y.r. 1151.	1,775
Brickton.—48, Stansfield-rd., u.t. 634 yrs. g.r. 61, 10s., y.r. 571.	330
Stamford.—10, Mordaunt-st., u.t. 58 yrs. g.r. 61, 6s., y.r. 281.	280
Horne Hill.—2, Hardist-rd., u.t. 804 yrs. g.r. 4, 4s. 10s.	200
Kennington.—18 and 15, Watwick-rd., u.t. 594 yrs. g.r. 161, y.r. 1351.	1,100
Catford.—Ferry Hill-st., f.g.r. 801, u.t. 92 yrs. g.r. 51, 5s., y.r. 301.	255
Camberwell.—25 and 27, Caspian-st., f. y.r. 721. 16s.	750
Peckham.—4, Barford-rd., u.t. 90 yrs. g.r. 34, y.r. 361.	300
By FURNERS (at Winchester House).	
Charing Cross Road.—2 and 4, Manette-st. (s.), f. y.r. 1401.	2,800
Soho.—8, Batemans-st. (warehouse, etc.), f. y.r. 801.	2,000
7, 8 and 10, Little Dean-st., area 1,610 ft., f. y.r. 2001.	2,100
2 and 4 Portland-st. (Laundry, Shop and Workshops), f. y.r. 2211. 6s.	3,225
6 Portland-st. (Shop and Workshop), f. y.r. 1571. 6s.	2,000

Oxford-street.—39, 41, 42, and 43, Berwick-st., (s.), f. y.r. 3851. 16s.	£8,800
78 Berwick-st., (s.), w.r. 1781. 2s., also f.g.r. 541, reversion in 374 yrs.	3,220
81, Berwick-st., (s.), and 1, Livonia-st., f. w.r. 3181. 10s.	3,235
3 to 7, Livonia-st., f. y.r. 2401.	5,150
Portland-mews, f.g.r. 451, reversion in 894 yrs. 8 and 9, Livonia-st. (with fee simple of a wall), f. y.r. 1151.	1,070
14, Livonia-st., f. w.r. 1331. 16s.	2,490
25, Berwick-st., and 9, Wardour-mews (workshops), f. w.r. 2021. 16s.	1,275
26, Berwick-st., (s.), and 10, Wardour-mews, area 800 ft., f. y.r. 1001.	2,400
27, 28, and 29, Berwick-st. (business premises and dwellings), f. w.r. 4401. 10s.	2,560
Wardour-mews, f.g.r. 551, reversion in 52 yrs. Regent-street.—14, Foubert-pl. (s.), f. y.r. 741. Commercial-road-east.—85, Cannon-st.-rd., f. y.r. 401.	5,750
Northolt, Middx.—"Oakley's Farm," 3 a. 3 r. 32 p., f. y.r. 81.	2,350
625	

Contractions used in these lists.—F.g.r. for freehold ground-rent; l.g.r. for leasehold ground-rent; l.g.r. for improved ground-rent; p.g.r. for ground-rent; r. for rent; f. for freehold; c. for copyhold; l. for leasehold; p. for possession; e.r. for estimated rental; w.r. for weekly rental; q.r. for quarterly rental; y.r. for yearly rental; u.t. for unexpired term; p.a. for per annum; yrs. for years; in. for lane; st. for street; rd. for road; sq. for square; pl. for place; ter. for terrace; cres. for crescent; av. for avenue; gds. for gardens; f. y. for f. y. for; f. g. for f. g. for; b.h. for borough; p.h. for public-house; o. for office; a. for shops; ct. for court.

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"THE BUILDER" (Published Weekly) is supplied DIRECT from the Office to residents in any part of the United Kingdom at the rate of 10s. per annum (52 numbers) PREPAID. To all parts of Europe, America, Australia, New Zealand, India, China, Japan, &c., 20s. per annum. Remittances payable to J. MORGAN should be addressed to The Publisher of "THE BUILDER," 4, Catherine-street, W.C. SUBSCRIBERS in LONDON and the SUBURBS, by prepaying at the Publishing Office 10s. per annum (52 numbers) or 4s. 8d. per quarter (13 numbers), can ensure receiving "The Builder" by Friday Morning's Post.

MEETINGS.

FRIDAY, NOVEMBER 16.	
Glasgow Technical College (Architectural Craftsmen's Society).—Discussion on "Ideal Specification" (Plaster, Painter, and Plumber Work) by Messrs. Alex. W. R. Bell, W. G. Peddie, and Isaac Low. 8 p.m.	
Institution of Mechanical Engineers.—Mr. T. Clarkson on "Steam as a Motive Power for Public Service Vehicles." 8 p.m.	
Royal Sanitary Institute (Lectures for Sanitary Officers).—Dr. W. Hanbury on "Practical Methods of Stalling and Slaughtering Animals." 7 p.m.	
Incorporated Association of Municipal and County Engineers.—Metropolitan District Meeting to be held at Westminster, at the Institution of Civil Engineers, Great George-street Westminster. Address by Mr. T. C. Horsfall, illustrated by lantern slides, on "The Planning and Control of Town Extensions in Germany." 7 p.m.	
MONDAY, NOVEMBER 19.	
The Royal Institute of British Architects.—Mr. A. E. Henderson on "The Crusus (Vith Century B.C.) Temple of Artemis at Ephesus," illustrated by lantern slides. 8 p.m.	
University of London (Imperial Institute-road).—Mr. Basil Fletcher on "Greek Temples of the Doric Order" (continued). 8 p.m.	
Liverpool Architectural Society.—Mr. H. L. Backwith on "Thoughts and Hints for Young Quantity Surveyors." 8 p.m.	
Royal Sanitary Institute (Lectures for Sanitary Officers).—Dr. E. V. Manby on "The Appearance and Preparation of Fresh Meat, Organs, Fat, Blood, Fish, Poultry, Milk, Fruit, Vegetables, and other Food, and the Conditions Rendering them, or Preparations of them, Fit or Unfit for Human Consumption. Preserving and Storing Meat and other Foods." 7 p.m.	
National Federation of Master Builders (31 and 32, Bedford-street, Strand, W.C.).—Journal committee. Builders' Benevolent Institution (31 and 32, Bedford-street, Strand, W.C.).—Dinner committee. 6 p.m.	
TUESDAY, NOVEMBER 20.	
Institution of Civil Engineers.—Further discussion on paper by Mr. C. Frewen Jenkin, B.A., on "Single-Phase Electric Traction." 8 p.m.	
Edinburgh Architectural Association.—Associates' Smoking Concert. 8 p.m.	
National Federation of Master Builders (31 and 32, Bedford-street, Strand, W.C.).—Administrative committee. 6 p.m.	
WEDNESDAY, NOVEMBER 21.	
Builders' Foremen and Clerks of Works' Institution.—Ordinary meeting of the members. 8 p.m.	
Northern Architectural Association.—Opening meeting of Winter Session. Address by the President, Mr. J. T. Cackett. 7.30 p.m.	
Royal Sanitary Institute (Lectures and Demonstrations for Sanitary Officers).—Dr. E. V. Manby on "The Hygiene of Byres, Lairs, Cow Sheds, and Slaughter Houses, and all Places where Animals Destined for the Supply of Food are kept, and the Hygiene of Markets, Dairies, and other Places where Food is Stored, Prepared, or Exposed for Sale, and Transported." 7 p.m. (2)	
"Inspection at Harrison & Barber's Knackers' Yard, Whitechapel-street, Whitechapel, E." 3 p.m.	
Royal Meteorological Society (at the Institution of Civil Engineers, Great George-street, Westminster, S.W.).—Papers to be read.—(1) "The International Congress on Polar Exploration at Brussels, September, 1906," report by Dr. Hugh Robert Mill. (2) "The Abnormal Weather of the past Summer, and some of its Effects," by Mr. William Marriott, F.R. Met. Soc. 7.30 p.m.	
Society of Arts.—Opening Address of the 153rd session of the Society by Sir Henry Bayley, B.O.S.I., C.I.E., Chairman of the Council. 8 p.m.	
THURSDAY, NOVEMBER 22.	
Builders' Benevolent Institution.—Fifty-fifth Annual Dinner, Whitehall Rooms, Hotel Metropole, W.C. Mr. J. W. Chessum presiding. 6.30 p.m.	

Architectural Association Discussion Section (Joint meeting with Junior Art Workers' Guild at Clifford's Inn Hall, Fleet-street, E.C.).—Paper by Mr. H. G. Lubbock entitled: "Do Architects Justify their Existence?" 7.30 a.m.

Royal Sanitary Institute (Demonstrations for Sanitary Officers).—Inspection at the Metropolitan Cattle Market, York-road, N. 2 p.m.

Institution of Electrical Engineers.—At the Institution of Civil Engineers. Professor J. Epstein on "Selection and Testing of Materials for Construction of Electric Machinery." 3 p.m.

FRIDAY, NOVEMBER 23.

Royal Sanitary Institute (Lectures for Sanitary Officers).—Dr. E. V. Manby on "The Laws, By-Laws, and Regulations Affecting the Inspection and Sale of Meat and other Articles of Food, including their Preparation and Adulteration." 7 p.m.

PRICES CURRENT OF MATERIALS.

* * * Our aim in this list is to give, as far as possible, the average prices of materials, not necessarily the lowest. Quality and quantity obviously affect prices—a fact which should be remembered by those who make use of this information.

	BRICKS, &c.	
Hard Stocks.....	2 s. d.	
1 10 0 per 1000 alongside, in river.		
Round Stocks and		
Green Stocks.....	1 7 0	" delivered
Picked Stocks for		
Facings.....	2 17 6	" at railway dep't.
Flettons.....	1 8 0	" "
Bed Wire Cuts.....	1 14 0	" "
Best Fareham Bed	3 12 0	" "
Best Red Pressed		
Buckton Facing.....	5 0 0	" "
Best Blue Pressed		
Staffordshire.....	3 15 0	" "
Do, Bulbourne.....	4 0 0	" "
Best Shropshire		
Fire Bricks.....	3 14 0	" "
GLAZED BRICKS.		
Best White and		
Ivory Glazed		
Stretchers.....	12 0 0	" "
Headers.....	11 0 0	" "
Quoins, Bulbourne,		
and Flats.....	16 0 0	" "
Double Stretchers	15 0 0	" "
Double Headers.....	16 0 0	" "
One Side and two		
Ends.....	19 0 0	" "
Two Sides and one		
End.....	20 0 0	" "
Spilays, Cham-		
ferred, Squinas.....	20 0 0	" "
Best Staffordshire		
Glazed Stretch-		
ers, and Header.....	12 0 0	" "
Quoins, Bulbourne,		
and Flats.....	14 0 0	" "
Double Stretchers	15 0 0	" "
Double Headers.....	14 0 0	" "
One Side and two		
Ends.....	15 0 0	" "
Two Sides and one		
End.....	15 0 0	" "
Spilays, Cham-		
ferred, Squinas.....	14 0 0	" "
Second Quality		
White and		
Glazed Salt		
Dipped.....	2 0 0	" less than best.
Thames and Pit Sand.....	5 6 "	" 0 per yard, delivered.
Thames Ballast.....	5 6 "	" "
Bed Portland Cement.....	2 2 0	" per ton, "
Best Ground Blue Lias.....	19 0 "	" "
NOTE.—The cement or lime is exclusive of the ordinary charge for sacks.		
Grey Stone Lime.....	11s. 6d.	per yard, delivered.
Stourbridge Fireclay in sacks.....	27s. 6d.	per ton at rly. dep't.
STONE.		
Bath Stone—delivered on road wag- a. d.		
ons, Paddington Depot.....	1 6s. 10 p.	per ft. cube.
Do, do, delivered on road wagons.....		
Nine Elms Depot.....	1 8s. "	" "
Portland Stone (20 ft. average).....		
Brown Whitbed, delivered on road		
wagons, Paddington Depot, Nine		
Elms Depot, or Fimlico Wharf.....	2 1 "	" "
White Banded, delivered on road		
wagons, Paddington Depot, Nine		
Elms Depot, or Fimlico Wharf.....	2 2s. "	" "
ANCASTER in blocks.....	1 0	" 10 p. per ft. cube, deld. rly. depot.
Beer.....	1 6 "	" "
Greenshill.....	1 10 "	" "
Darley Dale in blocks.....	2 4 "	" "
Bed Cornhill.....	2 0 "	" "
Cloaburn Bed Freestone.....	2 0 "	" "
Bed Mansfield.....	2 4 "	" "
YORK STONE—Robin Hood Quality.		
Scrapped random blocks.....	2 10 "	" "
6 in. sawn two sides land-		
ings to size (under		
4 ft. super.).....	2 3 p.	per ft. super., "
6 in. rubbed two sides		
ditto, ditto.....	2 6 "	" "
3 in. sawn two sides		
(random sizes).....	0 11s. "	" "
2 in. to 2 1/2 in. sawn one		
side slabs (random		
sizes).....	0 7s. "	" "
1 1/2 in. to 2 in. ditto, ditto		
0 6 "	" "	
HARD YORK—		
Scrapped random blocks.....	3 0 p.	per ft. cube, "
6 in. sawn two sides land-		
ings to size (under		
4 ft. super.).....	2 8 p.	per ft. super., "
6 in. rubbed two sides		
ditto.....	3 0 "	" "
3 in. sawn two sides		
(random sizes).....	1 2 "	" "
2 in. self-faced random		
flags.....	0 5 "	" "

STONE (continued).	
HARD YORK (continued)—	a. d.
Hopton Wood (Hard Bed) in blocks 5 6 per ft. cubo, deld.	ry. depot.
" " " 6 in. sawn both	ry. super. deld.
" " " 3 in. sawn both	ry. super. deld.
" " " 2 in. sawn both	ry. super. deld.
" " " 1 in. sawn both	ry. super. deld.
" " " 1/2 in. sawn both	ry. super. deld.
" " " 1/4 in. sawn both	ry. super. deld.
" " " 1/8 in. sawn both	ry. super. deld.
" " " 1/16 in. sawn both	ry. super. deld.
" " " 1/32 in. sawn both	ry. super. deld.
" " " 1/64 in. sawn both	ry. super. deld.
" " " 1/128 in. sawn both	ry. super. deld.
" " " 1/256 in. sawn both	ry. super. deld.
" " " 1/512 in. sawn both	ry. super. deld.
" " " 1/1024 in. sawn both	ry. super. deld.
" " " 1/2048 in. sawn both	ry. super. deld.
" " " 1/4096 in. sawn both	ry. super. deld.
" " " 1/8192 in. sawn both	ry. super. deld.
" " " 1/16384 in. sawn both	ry. super. deld.
" " " 1/32768 in. sawn both	ry. super. deld.
" " " 1/65536 in. sawn both	ry. super. deld.
" " " 1/131072 in. sawn both	ry. super. deld.
" " " 1/262144 in. sawn both	ry. super. deld.
" " " 1/524288 in. sawn both	ry. super. deld.
" " " 1/1048576 in. sawn both	ry. super. deld.
" " " 1/2097152 in. sawn both	ry. super. deld.
" " " 1/4194304 in. sawn both	ry. super. deld.
" " " 1/8388608 in. sawn both	ry. super. deld.
" " " 1/16777216 in. sawn both	ry. super. deld.
" " " 1/33554432 in. sawn both	ry. super. deld.
" " " 1/67108864 in. sawn both	ry. super. deld.
" " " 1/134217728 in. sawn both	ry. super. deld.
" " " 1/268435456 in. sawn both	ry. super. deld.
" " " 1/536870912 in. sawn both	ry. super. deld.
" " " 1/1073741824 in. sawn both	ry. super. deld.
" " " 1/2147483648 in. sawn both	ry. super. deld.
" " " 1/4294967296 in. sawn both	ry. super. deld.
" " " 1/8589934592 in. sawn both	ry. super. deld.
" " " 1/17179869184 in. sawn both	ry. super. deld.
" " " 1/34359738368 in. sawn both	ry. super. deld.
" " " 1/68719476736 in. sawn both	ry. super. deld.
" " " 1/137438953472 in. sawn both	ry. super. deld.
" " " 1/274877906944 in. sawn both	ry. super. deld.
" " " 1/549755813888 in. sawn both	ry. super. deld.
" " " 1/1099511627776 in. sawn both	ry. super. deld.
" " " 1/2199023255552 in. sawn both	ry. super. deld.
" " " 1/4398046511104 in. sawn both	ry. super. deld.
" " " 1/8796093022208 in. sawn both	ry. super. deld.
" " " 1/17592186044416 in. sawn both	ry. super. deld.
" " " 1/35184372088832 in. sawn both	ry. super. deld.
" " " 1/70368744177664 in. sawn both	ry. super. deld.
" " " 1/140737488355328 in. sawn both	ry. super. deld.
" " " 1/281474976710656 in. sawn both	ry. super. deld.
" " " 1/562949953421312 in. sawn both	ry. super. deld.
" " " 1/1125899906842624 in. sawn both	ry. super. deld.
" " " 1/2251799813685248 in. sawn both	ry. super. deld.
" " " 1/4503599627370496 in. sawn both	ry. super. deld.
" " " 1/9007199254740992 in. sawn both	ry. super. deld.
" " " 1/18014398509481984 in. sawn both	ry. super. deld.
" " " 1/36028797018963968 in. sawn both	ry. super. deld.
" " " 1/72057594037927936 in. sawn both	ry. super. deld.
" " " 1/144115188075855872 in. sawn both	ry. super. deld.
" " " 1/288230376151711744 in. sawn both	ry. super. deld.
" " " 1/576460752303423488 in. sawn both	ry. super. deld.
" " " 1/1152921504606846976 in. sawn both	ry. super. deld.
" " " 1/2305843009213693952 in. sawn both	ry. super. deld.
" " " 1/4611686018427387904 in. sawn both	ry. super. deld.
" " " 1/9223372036854775808 in. sawn both	ry. super. deld.
" " " 1/18446740073709551616 in. sawn both	ry. super. deld.
" " " 1/36893480147419103232 in. sawn both	ry. super. deld.
" " " 1/73786960294838206464 in. sawn both	ry. super. deld.
" " " 1/147573920589676412928 in. sawn both	ry. super. deld.
" " " 1/295147841179352825856 in. sawn both	ry. super. deld.
" " " 1/590295682358705651712 in. sawn both	ry. super. deld.
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EWORTH.—For the erection of a Central school, etc., for Leicestershire County Council Education Committee. Messrs. Coles & Johnson, architects, Bank-chambers, Market Harborough.

A. T. Cost.....	£2,030 0	O. P. Driver ..	£1,587 0
J. Bentley & Co.	1,852 0	W. Corah & Son	1,570 0
W. A. Bolton ..	1,800 0	T. Rickman	1,355 0
G. Benson & Son	1,725 0	E. Mason	1,340 0
Markley Bros.	1,710 0	E. Haycock &	
G. L. Martin.....	1,682 0	Sons	1,540 0
Co-operative		H. H. Garlick,	
"Builders, Ltd.	1,615 0	Mowley*	1,449 15

LONDON.—For alterations and additions to porter's lodge of the House for Aged Poor, Elder-road, West Norwood, for Lambeth Guardians. Mr. E. C. Beaumont, architect, 78, Fleet-street, E.C.4.

Paternfield & Lugsch, 3, Maude-road, Peckham-road, S.E.	£91 0 0
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LONDON.—For electric light installation (wiring and fuses, at the new installation in course of erection in Cannon-street, E.C.4, for the London County Council.

F. Barker & Co., Ltd.	£45 6 0	Durrell & Co., Ltd.	323 0 0
J. Deane & Sons, Ltd.	44 0 0	R. R. R. & Co., Ltd.	300 0 0
Barlow & Young	41 0 0	E. J. Gibbs & Co.	288 0 0
J. O. Grant & Taylor	301 0 0	L. W. Runderland & Co., 39, G. L. Lyster & Co.	386 14 9
K. Dawson, Ltd.	340 0 0	S.W.*	357 0 0

LONDON.—For altering and fitting up the rooms adjacent to the cookery and laundry centres on the "Dulwich Hamlet" site, Dulwich, for the purpose of a housewifery centre; for improving the ventilation of the centre, and converting the existing store and w.c., etc., into a washhouse for the schoolkeeper, for the London County Council.

H. Burnham.....	£248 0	W. J. Mitchell & Co.	1175 10 0
G. Dyerhill	225 0	H. Briggs & Sons,	
T. D. Long	205 0	Ltd.	167 0 0
H. Leary & Son ..	199 0	H. Line	166 0 0
Rice & Son	167 0	E. Mills	163 0 0
J. & C. Boyer	160 0	T. J. Sharpington	
Ladlow Bros.	160 0	Marchet-road	
E. Triggs	160 0	Works, Nun-	
W. Akers & Co., Ltd.	189 0	head*	156 0 0
W. Downs	183 0		

[The estimate of the Architect (Education), comparable with the tenders, is £180.]

LONDON.—For removing two iron buildings standing upon the "Gordon" site (Woolwich) and one iron building upon the Sandhurst-road site (Lewisham), and re-erecting them on the site in Harrow-road (Paddington, N.), for the London County Council:—

W. Bain & Co.,	£2,199 0	F. Smith & Co., Ltd.,	
Humphreys, Ltd., ..	2,081	Carpenter's road,	
T. J. Hawkins & Co.	1,660	Stratford*	£1,014
W. Harbrow	1,644		

LONDON.—For manual training centre to accommodate forty boys, Shap-street, Baggerston, for the London County Council:

Bar-lane	£1,000 0	G. Hodson & Son	1,701 0 0
M. Cormick & Sons	1,890 0 0	J. Grover & Son	1,669 0 0
Stevens & Sons	1,798 0 0	E. Lawrence & Son	1,617 0 0
Perry & Co.	1,792 0 0	A. E. Symes, Stratford* ..	1,602 0 0
W. H. L. Lister & Co., Ltd.	1,769 19 8		
W. M. Dabbs	1,683 0		
J. Son	1,708 0 0		

MANCHESTER.—For supplying and erecting boiler mountings, etc., at the Royal Infirmary. Mr. E. T. Hall, F.R.I.B.A., and Mr. J. Brooke, A.R.I.B.A., architects.

Galloways, Ltd., ..	£1,518 1	J. Adamson & Co.	£1,111
T. Bentley & Son ..	1,445	Yates & Thom ..	1,390
D. Adamson & Co.	1,435	Tinkers, Ltd., ..	1,390
Tinker, Shepton, & Co.	1,431	Oldham Boiler Co.	1,370
		E. Heaton & Son.	1,343

Tinkers, Ltd.,	£1,626	Bealcliffe Foundry	£1,255
D. Adamson & Co.	1,598	Dargue, Griffiths, & Co.	1,236
Yates & Thom	1,297		

PEWSEY.—For sinking a well, etc., for waterworks, for the Rural District Council. Messrs. Fairbank & Son, C.E., Lendal-chambers, York:—

J. Thom, Patricot, Manchester*	£473 10
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POOLE.—For the erection of a secondary school for 200 scholars at Seldown, Poole, for the Poole Education Committee, Poole. Mr. W. Andrew, architect, Park-stone.

W. L. Jones & Sons	£3,600	Burt & Visk	£3,245
C. Trask & Sons ..	5,498	S. Whitaker	5,197
Jenkins & Sons ..	5,138	George & Harding ..	5,075
G. A. Drake	5,350	Baker & Peery	4,932
A. & P. Wilson ..	5,297	J. T. Harris	4,573

* Accepted subject to reductions. * Withdrawn.

TEMPLENEWSAM.—For extension of water mains, for Huuslet Rural District Council:—

G. L. Briggs, High-street, Hailton	£38 16 0
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TOTTENHAM.—For the erection of ten houses, for the Incorporated Society of Licensed Victuallers, Messrs. Treacher & Son, architects, 73, Moor-gate-street, London, E.C.4.

W. Irwin	£3,507	C. Hale & Co.,	£2,775
Parrott & Son	3,355	W. Hawley	1,915
Rice & Sons	3,431		

* Withdrawn.

WALBOURNE.—For Walbottle School, Northumberland, for H. Grace the Duke of Northumberland, E.C.6. Mr. J. Wightman Douglas, architect and surveyor, 1, St. Nicholas-buildings, Newcastle-on-Tyne:—

Maughan & Jordan	£12 3 0		
J. McNeill & Son	5,199 0		
Harwell & Waugh	2,405 0 0		
S. Easton, Ltd.	3,301 0 0		
W. S. Anderson	2,297 1 6		
P. Thirwell & Son	2,284 0 0		
G. H. Marchant	2,284 0 0		
Charlton & Henderson	2,238 6 7		
W. H. Jordan	2,231 11 11		
W. Hall	2,230 6 8		
J. Craven	2,215 1 1		
W. Porter	2,187 0 0		
J. & W. Lowry	2,166 0 0		
J. C. Hope	2,164 0 0		
E. T. George	2,138 0 0		
Middlemas Bros.	2,113 17 6		
J. Jackson & Son	2,043 8 2		
W. Wilson	2,042 5 5		
E. Henderson & Son	1,987 8 7		
W. H. Ayton	1,967 15 6		
L. E. Davidson, Blaydon ..	1,898 7 11		

WIMBLEDON.—For new premises, Raynes Park, Wimbeldon, S.W., for the London & S.W. Bank, Ltd. Mr. C. L. Moran, architect, 43, Cannon-street, E.C., and Haslemere, Surrey:—

Haslemere Builders, Ltd.,	£3,875	H. Young	£3,348
Burgess	3,322		
Rows & Co., Ltd., ..	3,511	W. Smith & Son ..	3,298
L. & M. Patrick	3,500	Turtle & Appleton	3,290
Gibbins & Co.	3,411	Whitehead & Co.	3,264
Lofe & Co.	3,399	F. G. Lawrence ..	
T. Holloway	3,398	Kings London	
W. Hammond	3,348	Thames*	3,350

[Architect's Estimate, £3,500.]

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NOVEMBER 24, 1906.

ILLUSTRATIONS.

Statue in Front of King Edward VII. School, King's Lynn.....	Mr. W. R. Colton, A.R.A., Sculptor.
National Provincial Bank of England, Worcester.....	Messrs. Chas. Heathcote & Sons, Architects.
Interior, Hambleton Church.....	Mr. John T. Lee, F.R.I.B.A., Architect.
Sketches in Spain.....	By Mr. H. C. Brewer.

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Ideals in Art.



If we judge only by the amount of artistic work or artistic effort going on among us at the present time, this should be, even in England, an artistic age. In France it really is so; though French art, as illustrated in sculpture and painting, is hardly in so healthy a state as it was some fifteen years ago. Still, there is in France an immense amount of artistic talent and energy, and there is a much more widespread feeling than in England in regard to the desirability of nourishing an artistic element in life. We see this in the obvious intention, in France, to treat necessary practical creations, such as railway stations, bridges, etc., in an architectural manner. We may not approve the manner always; we may think, for instance, that the pavilions which shelter the stairways to the underground railway in Paris are in a bad and restless form of *art nouveau*, but there is nevertheless the evidence that what was thought to be an artistic treatment was intended. And on a great scale there are the Orléans railway station and the Alexandre III. bridge as evidence. In England no one cares what the front of a railway station is like; or if a small minority do care, they cannot get anyone to attend to them. By dint of much speaking we have obtained that some artistic element should be put into our

latest Thames bridge; but in the case of the Alexandre III. bridge no public criticism or contention was necessary to induce the authorities to aim at an artistic treatment; they called in the best artists as a matter of course, with the general approval of their public. In England a good deal of what was spent on that bridge would have been considered a sinful waste of public money.

Yet there was never a time when there were so many art-exhibitions as are to be seen in London at present—or at all events picture-exhibitions; an important distinction, since pictures do not include the whole of art. The tacit impression that they do is one of the popular fallacies of the day; and it is one which is practically countenanced by the Royal Academy, who make pictures the staple of their annual exhibitions, give a somewhat grudging place to sculpture, and leave decorative art and applied art almost unrecognised. In all this there is evidence of something wrong in our conception as to the real meaning of the word Art, and the real objects which it should aim at. Art does not consist in painting pictures, though painting pictures is a very important branch of Art. And in regard to pictures themselves, the ideas both of painters and of spectators need a great deal of winnowing. How many pictures are painted and exhibited every year which add nothing to art in the true sense of the word; which represent only what may be called an acquired sleight of hand in imitating the appearances of things—acquired not without hard and severe study, it is

true: but a study the results of which are of little importance or significance. And how many of those go round our annual picture-gallery shows really know what they want or what they ought to want from a picture-exhibition?

The two sides of the subject—what goes to make a general artistic atmosphere (so to speak) in a country, and what should be the aims of the particular art of painting, are considered respectively in two books recently published, one by an eminent decorative artist,* the other by an eminent painter.† The scope of neither book is quite accurately represented by its title. Mr. Crane's should rather have been called, perhaps, "Artistic Ideals in Life," or some such title, indicating the real range of the book, which is to suggest how our daily life may be more permeated with artistic sympathies and more fitted for artistic production; and Mr. Clausen's book should certainly have been entitled "Aims and Ideals in Painting," as, with the exception of one or two illustrations from antique sculpture, it is with painting that he almost exclusively deals, and it is a pity to use a title calculated to confirm people in the prevalent belief that art means pictures. Both books, however, contain much that is valuable.

Mr. Crane's book consists of papers read on various occasions; but there is sufficient unity in its main object.

* "Ideals in Art." Papers theoretical; practical; critical. By Walter Crane. London: Geo. Bell & Sons, 1905.

† "Aims and Ideals in Art." Eight lectures delivered to the students of the Royal Academy. By George Clausen, A.R.A., R.W.S. London: Methuen & Co.

All of them touch in one or another form on that gospel of art which Morris was the first to preach to an unwilling generation, viz.: that art consists in the first instance in a desire and endeavour to beautify the things of ordinary use. "Is Art," as the author asks in the chapter on "The Teaching of Art"—"a mere imitative impulse, a record of the superficial facts and phases of nature in a particular medium? Or is it the most subtle and expressive of languages, taking all manner of rich and varied forms in all sorts of materials, under the paramount influence of the selective search for beauty?" The latter is obviously intended to be the sound conclusion, though the author does not wish to ignore the former altogether. But in developing his idea as to the Teaching of art (as far as he admits that it can be taught), the position taken is that the study of the art of design should come first. "Before we can have art we must have sensibility to beauty, and before we can have either we must have conditions which favour their existence and growth. We must have an atmosphere." And this is why the study of abstract design in form, and based on architecture, is recommended, as the means of evolving and stimulating the sense of beauty in design, independent of mere imitation. Mr. Crane wishes his student to understand that it is one thing to make an accurate presentment of a figure or other object, and quite another to make them into organic pieces of decoration to fit a given space: with which we entirely agree. When he goes on to argue, however, that a purely pictorial training which may end in failure to produce sufficiently successful pictures, does nothing to fit the student for other fields of art, and leaves him before the simplest problem of designing helpless and ignorant, then we should say that his pictorial training has been bad. Painters who have made a real success in pictorial work have always paid a great deal of attention to lines of composition: as an eminent landscape-painter remarked to us one day, "We are as careful of our lines of pattern in a landscape as you architects are in a decorative design"; which may be a little exaggeration, but certainly pictorial work, whether of figures or landscape, does include the notion of design, if not exactly in a decorative sense (as the word "decorative" is usually understood), at all events in the sense of balance of line and of light and dark masses. To say, as Mr. Crane does on another page, that the cabinet or "competitive" gallery picture has destroyed painting as an art of design, is a statement we cannot accept. Pictorial work, in its best form, is design with something else super-added; what that is we will consider just now. Mr. Crane wants everything to be studied in relation to something else; he criticizes the Life School Study of the Academy as only "the study of the human frame as isolated from everything else." But the human frame itself is enough matter for study in the first place. The student has to know that thoroughly first; when he does, he can be at liberty to consider its treatment in composition—either in the free composition of pictorial work, or in the more bounded and conventional composition of purely

decorative work. But accurate and complete knowledge of the figure comes first. Study of design will not bring that.

Among the subjects on which Mr. Crane touches in regard to the art of common things we may mention two. One is, in regard to the ugliness and monotony of small houses for the poorer class—"small brick boxes with slate lids, packed together in straight rows." He suggests that the collective dwelling, "of which we perhaps see the germ in the better type of modern flats," may have an important future; and he gives a plan and elevations by his son, Mr. Lionel F. Crane, who is an architect, showing a collection of cottage homes around an arcaded cloister, with a green and a fountain in the centre, and a common dining-hall and reading-room occupying one side of the quadrangle. A kitchen and baths wing projects out from one angle of the parallelogram. The idea is well worth consideration. Whether the poorer class would really like a common dining-hall in preference to the family meal in the small room may be doubtful; there is no doubt, however, that it would be better for them hygienically. The other point is in regard to dress. His sketches of simple but picturesque dress for women and children are very pretty; though Mr. Crane admits that ladies' dress is at present, for the most part, artistic; but he objects (with reason) that it is so subject to the mere influence of fashion, and does not arise out of the deliberate choice of the beautiful. The dress of the modern gentleman he considers hopeless. We have to go for the picturesque to the peasants' and artisans' dress (he gives sketches of a fisherman and a navvy); a dress for utility generally comes out more or less picturesque; even the modern gentleman's dress becomes picturesque when he dresses for athletics—for use and not for show. "If we lived simple useful and beautiful lives, we could not help being picturesque in the highest sense." Mr. Crane gives an amusing sketch (reminding one of Pugin's "Contrasts" in architecture) of a gentleman in the present-day evening-dress contrasted with one of the XIVth century. He has rather made the worst (one is tempted to do so in such cases) of the modern gentleman, making him look like a fool, which is not a necessary part of the programme. But it must be remembered that the ideal of the gentleman in modern society includes a feeling in favour of a certain reserve and quietude of manner, which is at variance with and would not be expressed by any special picturesqueness of costume. There may be too much of this reserve; but that is our way of life now, and the dress expresses it, as the XIVth century gentleman's dress expressed his life, which was by no means so respectable as ours. And then there is a great deal in association; what we see every day becomes commonplace to us. It may not appear so commonplace to writers on art three hundred years hence. The till hat has lasted so persistently that it seems to answer to some demand in modern life; probably the secret is that there is a certain dignity of demeanour inseparable from it. However, we are not defending it, only suggesting the possible reason for its hold on

our tastes. We do not think modern evening dress as bad as Mr. Crane does. It is reserved and dignified. What it wants is a little colour—embroidered waistcoats, for instance, which might very well be combined with it, and the substitution of knee-breeches and stockings for the shapeless trouser-leg. But even as it is we do not think it deserves all that is said against it.

Among Mr. Crane's ideals as to the conditions of art is evidently Socialism, though the word is not used. "Is it wonderful that monopoly in art should follow monopoly of land and the means of subsistence?" We doubt if such theories lead anywhere. History shows no rule on the subject. A free people like the Greeks had a great art; an aristocratic and tyrannous epoch like that of Renaissance, a period too of almost abnormal wickedness and licence, had great art also. There is no systematic and necessary connexion between art and ethics. It is probable that early Republican Rome was a very inartistic community; the best of Roman art was developed under the Empire. Therefore the pages in Mr. Crane's book devoted to "the social and ethical bearings of art" we do not find very convincing. The ideals here are too ideal. The theory of life and art set forth seems a beautiful and complete one, but it has often been falsified in history, and there is no proof that it can be realised now. What is true in the author's view is the ideal of a condition of life in which there should be a general desire and aim to make common and every-day things beautiful. On this he has much to say that is true and valuable. There was a time in England, during the mediæval period, and even during the early Renaissance or transition which we call the Jacobean period, when this was so, when there seem to have been no ugly things made. What has killed it? There is something in the idea that it is the surviving influence of the Puritan rule, but that cannot explain it altogether. Even in the Queen Anne period, when unquestionably there were ugly churches, there was beautiful silver work and interior house decoration; not rich with the richness and luxuriant beauty of the Italian Renaissance, but almost perfect in good taste. Where had the good taste vanished to in the earlier part of the XIXth century? In the Queen Anne period there was silver that was ornamental without meaning to be so; in the Victorian period there was silver that meant to be ornamental and was hideous. The explanation of it lies deeper than in forms of government or the condition of the poor. It is doubtful whether it can be explained at all on any general theory of the relation of life and art. But we can see that it is true, as Mr. Crane points out, that there is an entire change of spirit from the time when all the arts of design were centred in architecture, to the time when, as now, art has become so much more a personal and individual work.

That is the author's complaint, but surely there is a great interest in this individualism. And in the most intellectual forms of art it is inevitable. It is the same with music. With the music of the people in an early period of the art, there was a Folk-music which had its

national character, and seemed to be a spontaneous growth. But when the great composers came, each had his own personal style, as each of the great painters in the later Renaissance had his own personal style, and can be recognised by it. And it is here that we part company from Mr. Crane. We quite agree with all he says as to the need of a general feeling for the beautiful in the everyday things of life, but we must recognise that there is a higher form of art which rises above the everyday things; and it is here that personal genius and temperament come in. The industrial and applied arts are all relative; they are connected with the use of an article, and are influenced, or should be, by the material of which they are made. Mr. Crane wants all art to be "relative." He thinks the gallery picture, unrelated to anything but itself, "has destroyed painting as an art of design." As already remarked, the best painters, even of landscapes, pay much attention to composition of line. But the fact is that painting in its highest and most intellectual development is something more than an "art of design." We quite agree with the author in the remark, in the chapter on "The relation of the easel picture to decorative art," that "mural feeling" in a picture includes "a certain flatness of treatment with choice of simple planes and pure and low-toned colours, together with a certain ornamental dignity or architectural feeling in the structure of forms and lines of composition"; all this is perfectly true, and we agree with it entirely; but then he has to conclude—"and is generally antithetic to accidental or superficial characteristics or what might be called landscape effects." Exactly: but what does that come to? To this: that every picture treated relatively to something else, must give up something of its own intensity and completeness. But then what is to become of Titian, and Velasquez, and Turner, perhaps the three greatest names in easel-painting? You can never reduce them to relativity; they are far too intensely alive. Are we to give them up? And the argument applies to many other painters; to all who have original genius enough to put their own life and originality into their own creations, whether of figure pictures or of landscapes.

No: all this depreciation of the easel picture, because it is "relative" to nothing, is a mistake. We do not say that there is any gulf fixed between applied art and personal art; the one leads by steps up to the other; but no theorising will ever persuade us that decorative design is a matter of equal intellectual interest with a pictorial creation of the highest class, or that the latter has not a right to be studied and admired for itself alone, apart from any question of its relation to its surrounding. Painting in its highest form is an intellectual art in a sense in which decoration is not, and takes its stand on pretty much the same level as poetry. A great picture is a poem addressed to the intellect through form and colour, and is to be judged on its own merits and not in relation to its surroundings. And what goes to make a great picture? There we come on the subject of Mr. Clausen's book, to which we will return in another article.

THE PRESERVATION OF CASTLES IN GERMANY.

WE have received from Herr Bodo Ebhardt, whom some of our readers will remember as one of the most eminent of our foreign visitors at the recent Architectural Congress, a copy of an interesting paper on the mediæval civil architecture of Germany, especially in regard to the preservation and to some extent restoration of her ancient castles. On this latter subject Herr Ebhardt possesses a great deal of special knowledge, and has been commissioned by the German Emperor to undertake the study and the preservation of some of the most important of the mediæval castles of Germany.

Herr Ebhardt, in the paper referred to, points out how impossible it is to over-rate the important position which is held by castles in the study of the architecture of that period. The remains of mediæval castles are the oldest witnesses of civil buildings which early centuries can produce; they date mostly from a period which otherwise can offer us none other than ecclesiastical remains; and in Germany, at any rate, the ruins of these splendid structures testify to a development of stone construction which reached a far higher standard of perfection than is usually admitted.

The care of ancient castles has for long been recognised in Germany as a necessity. Only the impetus was wanting to give practical expression to the universal wish of preserving the thousands of splendid remains, interesting both historically and artistically, that are scattered over the land. Six years ago a handful of eager spirits founded what they styled "The Society for the Preservation of German Castles"; and so active has it been that it has thoroughly awakened the public conscience, and to-day in German circles the preservation of ruinous castles is considered an unquestionable duty. Even municipal authority is ready to aid and abet the movement, as is illustrated by the action recently taken with regard to Wartburg Castle, the crown of all Thuringia, and the most prominent feature in the landscape of Eisenach. In order that it may ever retain its dominating character, a blue line has been drawn on the map of the locality, which line limits the height of the buildings erected in its neighbourhood. Unfortunately, however, legislation on the matter is still far from complete, and municipal interference may hasten on destruction instead of averting it, as in the case of the Bavarian castle of Elmstein. Elmstein was one of the oldest possessions of the Counts of the Palatinate: the earliest reference to it is in records dating from 1212. The District Council recently ordered the present owner to repair certain cracks of long standing, in the ramparts, but this gentleman, rather than incur the expense entailed, ignored the order. Two weeks later he was fined by the Sheriff's Court the sum of 1 mark (1 shilling) for disregarding the order, and "for not removing the ruin." The ruin has since been "removed" for the value of its building material.

The original band of thirty members of the Society has swelled to 700, drawn from all classes and professions, from Duke

Ernst Günther of Schleswig-Holstein to hotel-keepers. Not only do the members display remarkable activity in attending the meetings, following the works and assisting in the execution of arrangements planned by the Society, but the Emperor has shown his approval of the work by attending some of the public meetings where papers of special interest were read. He has further acknowledged the Society by presenting to it the Crown property of Marksburg. This is one of the oldest but best-preserved castles on the Rhine, which was long used as a prison, and consequently was much defaced and patched up. The Society has been engaged in restoring the whole building to its original form, turning part of it into a museum and library, to which members present pictures, arms, furniture, books, etc. The enterprise is proving a financial success, in that the number of visitors has risen from 300 in previous years to 12,000 in the past year.

The Society was founded in March, 1899, with the object, first, of preserving German castles as monuments of national history and art; second, of inquiring into the historical and artistic origin of German castles, and by means of its journal, *Der Burgwart* (Care of Castles), publishing such knowledge for the public benefit. In order to compass its end, the Society undertakes to give advice and assistance to existing societies which have the care of isolated districts or particular buildings, to found new local societies when it is deemed advisable to keep a watchful eye on any ruin, to hold meetings and read papers for the benefit of the public, to support a private journal, to review literary works bearing on the subject in hand, as well as to report on the activity of the Press in such matters; to form a collection of sculpture, books, objects of art, etc.; to report on the changes occurring in the ownership or buildings of German castles; to assist with advice and money individual owners who require help in order to preserve their castles from ruin, and to acquire by purchase or gift such castles whose condition demands this, and which would prove serviceable to the Society.

Such is the programme laid out for itself by this energetic body, and that it is not mere talk is proved by the records kept by *Der Burgwart*. Each number of this monthly journal contains two short articles, illustrated by numerous plans and views, on any two castles which show particular points of interest. In the limited space allotted for each article the building cannot be dealt with exhaustively, but just so much is outlined of its origin and history, its legends hinted at, its past and present state commented on, as to arouse the interest of the reader, and to awaken his desire to see the place and pursue investigations, or to give pecuniary assistance in the work of restoration. Castles in every state of preservation are considered of equal interest, whether they be still inhabited, like Tenneberg Castle, Thuringia, which is of such remote antiquity that its founder cannot be traced, or whether their ruins lie, like the Silesian castle of Zobten, a foot below the soil.

Under the heading "Structures in Danger" are catalogued castles which have attracted the notice of members,

and which may yet be saved from total ruin or deliberate destruction, such as the fine keep of Neu-Blankenheim, which the owner proposed selling to a contractor whose intention it was to level the ruins and build a saw-mill on the site. That these warnings bear fruit is illustrated by the fate of Auerbach Castle. The owner proposed pulling down the 10 ft. high remains of an XIth century circular tower, in excellent preservation, in order to erect a villa on the spot. As such another tower is not to be found in Saxony, the *Burgwart*, ever watchful, published this proposal, with the result that the necessary steps were taken to prevent the owner from committing this act of vandalism. But such measures cannot always be taken in time, and tales are not wanting of reckless demolition such as was perpetrated at Altona Castle, Schüttorf. The castle had been recently bought by a banker, who, for motives of safety, took down the greater part of "the tottering walls." The only way in which these tottering walls could be induced to fall was by blasting them steadily for five days with dynamite.

Under the heading "Reconstructions" one finds much instructive and interesting reading. Those castles are catalogued that are undergoing repair, and advice is offered in a friendly way, when the plans or methods adopted are open to criticism. For instance, the proposed alterations to Castle Elsterberg, partly undertaken by the State, are strongly objected to, and the free use of iron ties and cement coping condemned as harmful in the end to the building, and unworthy make-shifts for a State to resort to. This poor work is the result of the practice, unfortunately very common in Germany, of saving architects' fees by leaving the work of restoration to builders. It is pointed out, as a general principle, that the first care should be to retain the original form of a monument, and that the next most important point is the material. Repairs are generally delayed so long that the original outer skin has too often to be removed and replaced by new material.

Not only advice but pecuniary aid is given when a case is urgent. In 1902, when the Association was only in its fourth year, and consequently not overburdened with funds, it gave 8,000 marks towards various restorations. As it is not in a position to assist all deserving cases, the Society appeals eloquently to the State to come forward and help impecunious owners who cannot, and should not be expected, to bear alone the expense of preserving for posterity their costly national inheritances.

EXTENSION OF TRAINING COLLEGE, PRESTWICK, SALFORD.—Salford College, which is situated on a site in Sedgley Park, and is used for the training of female teachers for the Catholic elementary schools, has been enlarged by the erection of an annexe. In the basement of the new structure are the students' common-room, an assembly-room, about 80 ft. by 40 ft., to seat about 250 persons, a lecture-room, with the seats arranged in tiers, a physical and chemical laboratory. The ground floor is occupied by three classrooms, an art-room, the principal's apartment, dining-room, and pantry. A corridor, with tiled floor and dado, runs down the middle, 120 ft. long and 13 ft. wide. Upstairs are the three dormitories, divided into separate cubicles. The contractors were Messrs. Neill & Sons, and the architect was Mr. Oswald Hill, of Manchester. The cost of the extension has been 10,000l.

NOTES.

The Thames Ocean Wharf Project. SINCE the publication of our "Note" on March 11 last year the scheme for the construction of extensive wharves, transit sheds, and incidental works near Greenhithe has begun to assume practical shape. Therefore the time is appropriate for a word of protest against the announced intention to build the wharves entirely of timber. Disastrous fires on the Thames, in New York Harbour, in Antwerp Docks, and elsewhere have sufficiently proved the undesirability of timber for the construction of wharves, quays, and sheds; and practical experience shows how liable it is in all tidal waters to injury by sea worms and decay. In view of the satisfactory results given by concrete-steel wharves and jetties on the Thames and in various harbours of the United Kingdom, we are somewhat surprised that an engineer of such repute as Sir John Wolfe Barry should allow his name to be associated with the proposal to construct these important works of a material whose inferiority is now generally admitted.

Trade Effluents and Public Sewers. THE *Times* on the 19th inst. stated that the Local Government Board in connexion with the amendment of the Public Health Acts was considering the advisability of establishing a Central Board capable of acting as referees or arbitrators in matters in dispute between manufacturers and the local authorities arising out of the discharge of trade effluents into public sewers. The *Times* points out that the Police and Sanitary Committee recently presented a report to the House of Commons recommending that steps should be taken to carry out the recommendations of the Royal Commission on Sewage Disposal in the third interim report, which was presented so long ago as March, 1903, which recommended the establishment of a central authority. It appears, however, that there is some difference of opinion in various parts of the country as to whether the manufacturers should be allowed the use of the sewers subject to previous treatment of the effluent by the manufacturers, relief being given in exceptional cases from treatment of the effluent on payment of a special contribution (the course recommended by the Royal Commission), or whether the special charge should be the rule, and the manufacturers should be relieved from treating the effluent. Whichever of these two views be adopted there appears to be little doubt that uniformity in practice is most desirable, and that the difficult questions likely to arise in connexion with this subject should be determined as expeditiously and economically as possible.

Builders and Workmen's Compensation. A CURIOUS contention was raised in the case of Greenwood v. Hawkins, an action for indemnity for compensation paid under the Workmen's Compensation Act, 1897. The plaintiffs in the action were the undertakers of the building work at the Guildhall Tavern, King-street, the defendants were sub-contractors, who had undertaken the carving work on the stone of the building. One

of the defendant's men was killed in the operations, and the plaintiffs had, under sect. 4 of the Workmen's Compensation Act, been proceeded against by the man's dependants for compensation, and now claimed the amount paid as compensation, and the costs of the arbitration from the defendants. The defendants had been selected by the architect to do the work, and they contended that their contract was not with the plaintiff but with the architect. A letter had been sent by the plaintiff to the defendant which contained the following passage: "Execute the whole of the carving. . . . You agree in accepting this order to sign and send by return of post the enclosed accident indemnity." This indemnity was an undertaking to indemnify the plaintiff from claims made by the defendant's workmen under the Workmen's Compensation Act. The defendants did not sign and return the form of indemnity, but they proceeded to carry out the work. The judge held that by thus proceeding with the work they had tacitly assented to the terms of the contract and had entered into contractual relations with the plaintiffs. A second contention was that the accident had been caused by the negligence of the plaintiffs themselves in the lighting and fencing, but this was also negatived, and the plaintiff recovered the compensation paid and costs incurred. The indemnity offered to the defendant to sign seems to have been directed to avoiding the difficulties experienced in construing sect. 4 of the Act. By that section the undertakers are entitled to be indemnified by their subordinates; but its language has caused some difficulties. In this case it would appear there would have been no difficulty in claiming indemnity under the section, apart from the contract, but the point on which the latter became material was whether such a contract existed between the parties as to make the section apply.

Fire Risks in Parish Churches. In a letter to the *Times*, Mr. Eustace Balfour directs further attention to the necessity of providing fire-extinguishing apparatus in parish churches. His experience is that the average village church is totally unprovided with means for preventing damage by fire—a state of things suggesting neglect of an obvious duty rather than praiseworthy trust in Providence. The cost of the necessary appliances is not heavy, and we feel sure would be defrayed by the inhabitants of parishes containing historic churches, or even modern ecclesiastical buildings. As Mr. Balfour points out, the problem of water supply may be variable, but can always be solved in satisfactory manner: Mr. Balfour's description of organ construction must not be read too literally. An organ is by no means "entirely of wood, in thin pieces"; metal pipes are far more numerous than those of wood; metal is employed for various mechanical movements, and much of the wood is in fairly thick pieces. Still, as stated in our "Note" of November 17th, the construction is highly inflammable, and naked lights ought to be strictly prohibited. A useful suggestion by Mr. Thackeray Turner, is that electric torches should be substituted for the customary

candle, and we may add that compact forms of portable electric hand lamps with accumulators—such as are used in mines, factories, and ships—can now be obtained, giving a 6 c.-p. light for upwards of fourteen hours. These provide a perfectly safe alternative to the candle for all places where electricity is not otherwise available.

Motor Omnibuses and Noise. At the dinner of the Motor Union, held last week to celebrate the tenth anniversary of the Act legalising motor-cars, Sir Edward Henry, in responding on behalf of the police, made an interesting statement in connexion with motor omnibuses. He stated that draft regulations had been drawn up and had received the approval of the omnibus owners, with the exception of that provision which provided that the machinery must not make "undue noise." What amounted to "undue noise," Sir Edward observed, had given rise to some contention, because there was no fixed standard by which noise could be estimated, and it depended on the hearing, nerves, and opinion of the individual; but he intimated that an eminent scientist in connexion with Lord Rayleigh was considering the possibility of inventing a machine to standardise noise. Noise, however, as has been proved in connexion with sound signals from light-houses, varies considerably with both atmospheric conditions and the immediate surroundings of the object which emits the noise. London streets are peculiarly resonant, and noise is often more apparent from the upper stories of the houses than on the ground floors. Machinery also is capable of being worked noisily, and mechanics, if once their omnibuses had passed the standard, might become careless in the subsequent working.

Liabilities of Motor-Car Owners. The case of Du Cros v. Lambourne, recently decided by a Divisional Court, is one of considerable importance on motor-car law. The appellant was the owner of a powerful motor-car, and was also a duly licensed driver. He was summoned for driving to the danger of the public at a speed of about 50 miles an hour. At the time in question a lady was occupying one of the front seats in the car, who also was a licensed driver. There was a conflict of evidence as to whether the appellant or this lady was driving the car. The justices, without determining this issue, had convicted the appellant on the ground that if he was not driving himself, as an experienced driver of motor-cars he must have known that the speed the car was travelling was dangerous to the public, and should have prevented the lady from so driving—in other words, that he was aiding and abetting the offence. The Divisional Court have upheld the conviction, and laid it down that the person aiding and abetting can be charged with the principal offence. This being the law, it would appear that in future owners who are experienced drivers will no longer be able to allow their chauffeurs to drive to the danger of the public without themselves being amenable to the law. Since the above decision was delivered the Motor Union,

at the recent conference, have intimated that no objection should be raised to a change in the law making an owner liable for abetting. The decision in this case apparently had not been brought to their notice.

Damages for Causing Subsidence in Highways. The case of Mayor, etc., of Wednesbury, v. Lodge Holes Colliery Company, commented upon by us December 16 last, has been carried to the Court of Appeal, where the decision has been reversed. The question was simply what was the measure of damages against the defendant, for having caused subsidence in a road vested in the plaintiffs by virtue of sect. 149 of the Public Health Act, 1875, by reason of the defendants' mining operations. The plaintiffs claimed 400*l.*, which was admitted to be a reasonable sum if the road had to be restored to its original levels, but the defendants contended that it could be made as commodious for the public as it was before for 80*l.*, and they paid this sum into court, and the judge of the court below had accepted the defendants' view, and given judgment for them. This view excluded the risk of continued subsidence, and limited the powers of the plaintiffs to merely maintaining the roadway as a road. The Court of Appeal, in considered judgments, have reversed this finding, and the effect of the decision is this, that the public authority as trustees for the public were entitled to have regard to all the rights and amenities of the highway, nay, were bound to do so, and that as they had acted on competent expert advice in restoring the road to its old level, they had acted reasonably in accordance with their statutory duties, and the defendants, as wrongdoers, were liable in damages for the cost of carrying out the work.

Projections over Pavements. The Liverpool Improvement Act, 1882, enacts that "It shall not be lawful without the written consent of the Corporation to construct, place, fix, or hang any . . . sign . . . so as to project over the surface of any street at any time, or so as to allow any suspended load to hang over the surface of the street at any time." In the recent case of Goldstraw v. Jones, an iron pole to support a flag or advertisement was placed through an open window, bolted to the building by a screw bolt and nut, 20 ft. above the street level, and projecting 6 ft. beyond the building-line. This pole had to be removed whenever it was required to shut the window. The magistrate considered that this projection was not of such a fixed and permanent character as to come within the terms of the section, but the Divisional Court have held this to be a "sign."

A New Point for Boiler Owners. AS THE result of the Board of Trade inquiry into the boiler explosion at Cradley Heath in July last the Commissioners stated a principle that may come as a surprise to many owners of steam boilers. The boilers to which we here refer had been duly insured and regularly examined by the inspectors of the insurance company. The Commissioners found, however, that the examinations were "loose and unsatisfactory," and characterised

as "a pure invention" the certificate, signed by the chief assistant engineer to the company, to the effect that the boiler was in order, and that it had been properly prepared for examination. Moreover, they decided against the view that the boiler owners "could escape liability by having an annual inspection of their boilers only by an inspector of an insurance company." This point ought to be noted by architects who instal steam generating plant, and are not infrequently expected to give their clients some hints on the questions of insurance and inspection.

Electric Machinery. PROFESSOR J. EPSSTEIN, of Frankfort, read an interesting paper on the "Selection and Testing of Materials for the Construction of Electric Machinery" to the Institution of Electrical Engineers this week. So many qualities—electrical, thermal, and mechanical—of materials have to be considered when judging their relative values for electrical work, that it is exceedingly difficult to lay down any general rules as a guide for the manufacturer. We think that Professor Epstein's advice to engineers not to lay too much stress on those qualities of bodies which can be easily measured to the neglect of other qualities which are of equal or even greater importance in practical work, was both timely and valuable. His account of the standard German methods will be useful, and may possibly lead to some changes in the everyday practice in this country. The diagrams illustrating the progressive deterioration or the "ageing" of some of the qualities of the iron sheets used for field magnets and transformers are valuable, as they show the magnitude of this effect, but no hint is given of the treatment by which several English manufacturers prevent this "ageing." The method described of testing the micanite tubes used for insulating the armature conductors used in high-pressure machines was not very convincing. It is not obvious that the heating effect is due to "dielectric hysteresis." Many simpler explanations might be given. In the paper, laboratory tests are occasionally disparaged when compared with workshop tests. It is stated also that the values deduced by empirical formulae from the experimental data obtained by tests on similar machines previously constructed are often notably different from those deduced from "theoretical considerations." We think that both these statements are apt to produce erroneous impressions as to the value of laboratory tests and theory. The results obtained by careful laboratory tests are rigorous. Errors arise when engineers apply these results to cases where the forces acting are measured wrongly, or when they leave some of them out of account altogether. In these cases "theory" and "laboratory" tests are blamed. One or both of these may be faulty, but a much simpler explanation often suffices:

The Cement Industry. IN a lengthy paper on "Recent Progress in the Cement Industry," recently communicated to the Society of Chemical Industry, Mr. Bertram Blount discusses

many of the problems which are at the present time occupying the attention of cement makers. Mr. Blount thinks that in the future Portland cement will be made by fusing the unground raw materials in a furnace, from which it will be tapped while liquid. The fused material will be granulated by air or steam so that it may be readily ground. Many cement makers will refuse to follow Mr. Blount in his forecast, which would include the obsolescence of rotary kilns and grinding machinery for the raw materials, but his speculations are scientifically sound and merit careful consideration. With reference to Dr. Passow's method of making slag cement, about which so much has been heard lately, Mr. Blount says that although he was at first sceptical about the quality of the cement, he now admits, after investigation of the process, that "it is practicable to prepare hydraulic cement of great strength from suitable blast furnace slag by the regulated cooling of the slag while solidifying." In the discussion much divergence of opinion was revealed on the subject of wet *versus* dry mixing of the raw materials for cement making. Mr. Spoor said that Edison's rotary kiln at Stewartville used with a dry process consumes less than 17 per cent. of fuel, and this is the best record of the world. The kiln is 150 ft. long, and makes 1,000 tons of cement per week.

Geffery's Almshouses, Shoreditch. THE Society for the Protection of Ancient Buildings, the National Trust, and the Metropolitan Public Gardens Association have addressed a memorial to the Charity Commissioners against the proposed sale of the site and materials of the almshouses in Kingsland-road, Shoreditch. The records of the Ironmongers' Company show that in 1703 Sir Robert Gefferys, or Geffrey, bequeathed to them, in trust, all of his estate, a few legacies to some relatives excepted, to be converted into money and to be laid out in the purchase of ground for an almshouse for so many as the rents and proceeds—each inmate to receive 6*l.* per annum and 15*s.* for a gown—would support. The Ironmongers' Company bought a parcel of ground at the corner of Pearson-street in Kingsland-road, and built on it fourteen houses and a chapel. Some years ago the real and personal estate of the charity yielded a total income of nearly 1,700*l.* per annum. The charity had meanwhile been augmented by means of a bequest in trust of 3,500*l.* Consols, under the will (July, 1846) of William Wild, whereby the Company became enabled to add about 93*l.* yearly to the pensions paid to the almspeople. The memorialists direct attention to the typical character of the almshouses, which retain the architectural charm of buildings of the period. They urge that their destruction would break a valuable link in the chain of the domestic history of London, and remove a standing example of the charity and benevolence of her citizens. The buildings were lately re-roofed, the chapel has been newly decorated; in front of the houses is a large garden containing some fine trees. The whole place, indeed, affords one of the few remaining examples of the many similar institutions which in the course of the XVIIth and XVIIIth

centuries were established in this and other parts of East and North-East London, forming a homely and pleasing feature in localities which at that time constituted nearer suburbs of the town.

The Fine Art Society. ALL our readers who have admired the fine and original drawings which the late H. W. Brewer for so many years contributed to the *Builder*, will be interested to learn that his son, Mr. H. C. Brewer, inherits some of his talent in the pictorial representation of architecture, and has now on view at the Fine Art Society a collection of sixty water-colours of subjects in Spain, chiefly architectural. Among our lithograph plates this week we have given small reproductions of five of these drawings, which are exhibited under the general title "The Cities of Spain," though among them there are also a few studies of the arid stony landscape of the country. The architectural subjects include representations of a great many of the most remarkable of the mediæval monuments of Spain, at Burgos, Toledo, Segovia, Cordova, etc., and the buildings are portrayed with a great feeling for colour and poetry of effect. We hope those of our readers who admired the late Mr. Brewer's drawings will go and see the work of his son. In the same gallery is a collection of "Water-colours in Devon and Cornwall" by Mr. S. J. Lamorna Birch. Though rather wanting in purity of colour, there is a great deal of effective work in these drawings, of which perhaps the best is "The Last Long Streaks of Snow" (86), which is in a broader style than most of them. Among others that we were struck with are the grey sea in "The Foot of Carn Bargaris" (63); "The Gloaming" (66); and "Solitude" (115). Miss Eulabee Dix's portrait miniatures, in the same gallery, are very good examples of a form of art which does not attract us very much.

The New English Art Club. THE early numbers in the catalogue of the New English Art Club (which again exhibits in the gallery at the back of Dering-yard, Bond-street) are rather reassuring. Mr. A. W. Rich, whose landscape sketches used to be too defiantly untidy, has reformed in this respect, and his small landscape studies on toned paper, Nos. 1, 15, 23, and 32, are very interesting. No. 15 very much reminding one of De Wint. Mr. Orpen's two pencil sketches of mother and child (7 and 11) are very good, and Mr. Muirhead Bone has made an interesting small picture of "The Great Gantry, Charing Cross Station" (16), a rather unusual subject. It is when we come round the corner to the oil paintings that we are disillusioned. We do not know what it is exactly which gives such an unattractive air to landscapes, some of which are good in composition and powerful in colour; but they have an effect of raw pigment rather than of nature, the result perhaps of the entire neglect of atmosphere. Mr. Rothenstein's "Abbey Church of St. Seine, Moonlight" (61) is a good composition and a good light effect, but the buildings suggest the idea that they are built of boards, like the practicable castles in stage scenery; there is no texture

about them; while Mr. Von Glehn's landscape, "The Old Mill" (55), suggests worsted-work. Mrs. Fagan's "The Wedding Morning" (75) looks like a bad dream. In Mr. W. Orpen's figure entitled "The Eastern Gown" (84) the left arm, stretched out under the drapery, is preposterous in length. He exhibits a curious picture called "The Reflection," a figure with her back to the spectator and draped in a voluminous dressing-gown, which the mirror shows to be open in front showing the nude figure, which in the reflection is strangely colourless and posed in a manner which the lines of the actual figure do not account for. His nude study called simply "A Woman" (97) is a painting of a model of low and commonplace type, absolutely without charm of any kind; and charm is the only excuse for exhibiting a study of this kind. Mr. Sydney Lee, whose studies of buildings we have admired on other occasions, only exhibits a small picture of an old timber bridge, good in its way but not of much consequence. Mr. Wilson-Steer's "The Bend of the River" (119) is what one can only call a scrawl of paint; its half-length, "The School Girl" (123) would be pretty if he would only have allowed her a little complexion. Mr. C. J. Holmes's "Ennerdale" is a fine little landscape with some poetry in it; and Mrs. McEvoy's "A Lady Playing" (52) has the making of a characteristic picture, but can only be considered in the light of a suggestion. As for many of the other things, we seem to go from ugliness to ugliness, culminating in Mr. Blanche's odious painting called "Mother and Child" (137) which makes us glad to escape from the room.

THE ROYAL INSTITUTE OF BRITISH ARCHITECTS.

THE usual fortnightly meeting of the Royal Institute of British Architects was held on Monday at No. 9, Conduit-street, Mr. H. T. Hare (Vice-President) in the chair.

The Cressus (Vith Century B.C.) Temple of Artemis at Ephesus.

Mr. A. E. Henderson read a paper, illustrated by a large number of lantern views, on this subject, of which the following is an abstract:—

The purpose of the lecturer was to describe the actual remains found and the fragments which remained of the Cressus (Vith century B.C.) Temple of Artemis at Ephesus, uncovered and surveyed during the British excavations directed by Mr. D. G. Hogarth in the autumn of 1904 and the spring of 1905; also to place before the Institute his suggested restorations.

He began by stating that the Cressus Temple was the fourth structure on the site, and that there were remains of yet another (a fifth), called "the Hellenistic Temple," over and beyond it, besides large concrete masses, which were late Roman or early Byzantine, sinking low down into the foundations and rising to about two metres above the Cressus pavement.

He showed a large plan and sections of the earlier temples, but did not explain them, except to say that they increased in size as one superseded the other. Yet the Cressus cella walls easily enclose the last of the three.

The general plan shown gave all the remains which were uncovered, which practically amounted to all that was left of the Cressus and Hellenistic Temples. Before commencing his survey, the lecturer was instructed by the late Dr. Murray to measure accurately every portion of Cressus pavement, and this he believes he has faithfully fulfilled.

He showed how the Hellenistic foundations extended beyond the earlier temple, and showed the position of a brick drain

ond the outermost step, which had been covered by the marble paving of the court; so where the step itself survived, and the piers foundations to support the podium base.

He further showed photographs of the temple as excavated, and described the difficulties with water, which were successfully overcome.

The Croesus Temple was then taken in detail. The central basis of the three earlier structures (from and near which the treasure is extracted, now on view, on the presentation of a visiting card, in the Coin Department of the British Museum) was used and reused as the centre.

The lecturer pointed out that the foundations were practically double the length to the width, that the walls had separate foundations, but not the columns, and he showed a conduit which passed beneath the east doorway.

Foundations to the steps to the perron, or eastern platform, were shown both in section and by a photograph.

The paving was then described: how it was laid to no pattern, but how beautifully curate all the joints were made.

The remains of the walling to the cella were then described; how markings were found indicating the position of the north wall, and the impression of the east wall in mass of concrete, and how by the portions remaining the south wall could be traced from the east cross wall to the south-west end. This walling was shown to vary somewhat to the walling left of the west wall, which shows the position of the north reveal of the great west portal.

Other portions of the superstructure were plinth and lower base surrounded by Hellenistic foundations lying to the north-east; a plinth—greatly mutilated—to a column directly south of the south-west end, and half a plinth lying directly to the south-west of this; and, lastly, a large mass of Hellenistic foundations, which was not explored, but it showed that settlements had occurred to the Croesus Temple before these foundations were laid.

He then went on to describe the fragments of architecture which came to light. He began by stating that the outer rank of columns to the peristyle had larger plinths than the inner rank, and that all had a circular lower base about two metres in diameter, formed of three orders of double astragals separated by two filleted scotias.

Many varieties of upper or torus bases were found—these he illustrated; the most usual type was parabolic in section, with horizontal flutings separated by V-grooves. Another variety was specially pointed out; the upper outline was divided up horizontally by quirked beads, the space between these in the upper half had flutings, but the lower half had reedings, the upper part being concave and the lower convex, which, as shown in the photograph, looked extremely substantial.

No complete drums of columns were uncovered, but twenty various fragments were examined and measured; it was found that fourteen of these gave forty-four, three gave forty, and three gave forty-eight flutings to the circumference. He placed the forty-four in the outer rank, the forty in the inner, and the forty-eight he did not place, as they were of an entirely new type. The flutings were alternately wide and narrow; one torus base was found to be of similar design.

Enough portions of capitals were found for the lecturer to combine these to make an entirely new drawing. He also stated that the batter outwards of the volutes was for the optical purpose of counteracting the excessive foreshortening as seen from the ground, and he mentioned that in Hellenistic times the spiral was contracted horizontally and lengthened perpendicularly for the same optical purpose.

The spiral to the Croesus Temple was found to be a simple unwinding curve, which can be easily set out.

A suggested restoration of a rosette capital was shown, which proved to be somewhat different from the one erected in the British Museum; a leaf and dark echinus took the place of the usual egg and dart, and pointed leaves instead of elliptical were given to the rosette, besides other minor alterations.

Nothing which looked like an architrave could be found, but the bed-mould and corona were both important additions.

besides several fragments of the large sculptured cymatium gutter.

The lecturer then dealt with his restored plan. He showed the data from which he planned the columns placed round the peristyle and in the pronaos. He then described his restoration within the cella enclosure, how he placed the columns along the facing found in the foundation, and he placed one column (the 127th) in the centre behind the basis, thus making the naos twice the width of its aisles.

He suggested that the thirty-six sculptured columns could be accounted for by placing them in the front rank of the ends and one at each end of the flanks, the remainder lining the central walks of the Pronaos and Porticum.

He found that the whole length of the temple platform was 109 metres 20 centimetres, and the width 55 metres 10 centimetres. He found that measuring from the central axis to the north and south faces of the columns in front of the ante was the same distance practically (about 12 metres 30 centimetres) as from these faces to the north and south faces of the outermost columns, thus dividing the façades into four equal divisions. He then showed an elevation with the height from the pavement to the underside of the architrave of this same dimension, viz., one-fourth the length of the façade. This height makes the order work out at about eight diameters. He made the entablature a quarter of this; the pediment rose another three-eighths, and with the surmounting acroteria made the proportion of superstructure to the colonnades come to as 3 is to 4.

He suggested that the roof was of tiling and timber, which would then account for the total destruction of this temple by the arson of Herostratus.

Mr. D. G. Hogarth, in proposing a vote of thanks to Mr. Henderson, said that perhaps he was the last person to have been asked to do this, because he was only less responsible than Mr. Henderson himself for certain parts of the paper. In another sense he was the right person to be called upon, as no one had seen more the assiduity and earnestness with which the reader of the paper had devoted to the work during the two seasons he was at Ephesus and for something like a year since his return. He would not venture to say much about the architectural detail which had been described, for Mr. Henderson was solely responsible for the technical detail, and the very ingenious restoration shown was entirely his own work. He might, however, say a few words chiefly from the historical point of view. Firstly, it was only right that he should lay a tribute to a very distinguished late Fellow of the Institute who was the first discoverer of the temple which had been described—he meant the late Mr. J. Wood. Of the energy and acumen which Mr. Wood showed in discovering the temple no one could speak too highly, for it was a discovery which stood in the very front rank of English archaeological discoveries. Everyone had reason to be grateful to Mr. Wood for having discovered the position of the temple in a place which no one had suspected, under a covering of 18 ft. of earth. It took more than a year to trace the clue which eventually brought to light the temple. Mr. Wood did an immense service by removing the accumulation of one and a half million cubic ft. of earth from the top of the temple. Thus he did an immense service to those who came afterwards and profited by his labours. Mr. Wood was the Columbus who discovered the site, and they who followed found that he had great deal of the work of clearing it had been done. Mr. Wood discovered some Hellenistic sculpture, and laid bare the temple of which Mr. Henderson had spoken. They found also that he measured with extreme accuracy the remains which he laid bare, and most carefully searched the earth which he removed. In fact, when they undertook a re-search of the removed earth, as they were bound to do, they were rewarded with practically nothing at all. As a piece of excavation in itself, considering the age in which it was done, it could hardly have been accomplished better. Of course, criticism began where it always commenced, and this was in connexion with Mr. Wood's publication, and in criticising that he was doing no more than had been done in that room by a very distinguished architect

and historian. It always seemed to him that Mr. Wood never did his own admirable work justice in his publication, and that was particularly true of the early temple which Mr. Wood called the archaic temple, or, rather, his earliest temple, and which Mr. Henderson had described that night. Mr. Wood laid bare the pavement and practically all the visible remains which they had found, except at the extreme west, where he was stopped, no doubt, by the inflow of water. For some reason, which he (the speaker) had never yet understood, although Mr. Wood mentioned this temple frequently in the course of his book on "Discoveries at Ephesus," yet he never gave any plan or measurement of it, or any drawings of its details as he saw them. He did to a certain extent some time afterwards take a part in a discussion which the late Dr. A. S. Murray raised as to the restoration of certain architectural details of that temple, but so far as the book was concerned, he ignored this very interesting early temple which he discovered under the Hellenistic Temple. It was possible that Mr. Wood might have had notes, and that had fate been kinder to him he might have published these. At any rate, the fact remained that he did not, and no notes were known to exist. The result was that, going out in 1904, their first task was to produce a plan of these remains, which were laid open between the years 1870 and 1874, but which had again been covered up with a thick growth of roots and bushes. In fact, it was a wild virgin forest, with trees growing up nearly 20 ft. high, which they had to destroy by fire. That was the great sin of omission which Mr. Wood made with regard to this temple. The other omission was that he considered this stratum of the Vth century B.C. to be the earliest, whereas there were the remains of three temples under it. As to that omission, it was practically inevitable at the time when Mr. Wood was working and the way in which he worked. He could not have provided himself with pumping machinery of anything like the strength they were able to get. With the aid of pumping every day and throwing out a small river they were able to keep the site sufficiently dry to get down to the bottom of it, but, of course, a great deal of their work had been merely groping in slime. Another reason why Mr. Wood would not have discovered these earlier temples was, as was always the case at that time, that he trusted to the method of pitting. He made round or square pits at certain intervals to see what was below. He had been digging for twenty years, and the more utterly did he reject this method of making pits. They could make them of any size they liked, but where there was a broken and disturbed stratum there was no tell what there was below. He remembered the case of Knossos. When Dr. Evans and he went out in 1900 they discussed what should be done with a certain place, and they decided to make 100 pits, and, having done so, they came to the conclusion that there was practically nothing at all to be found. They got certain fragments of stone and pottery, but they did not recognise the site as anything more than a rubbish heap which came from the Palace. Two years afterwards Dr. Evans found under that hill the Hall of the Double Axis and the Hall of Queens. He was not criticising either Dr. Evans or himself on the question of sinking the pits in the first place, because they were equally responsible for that. Well, Mr. Wood proceeded by that method when he examined the interior of the cella of the Croesus Temple. Everything in the cella were the remains of the earlier temples. From the architectural fragments and the great treasure of nearly 3,000 objects of gold, silver, and bronze and other things which they found scattered over the area of this primitive temple, the earliest temple was the conclusion that the earliest temple was founded about 700 B.C. or a little earlier, and that most of the broken objects found there belonged to this temple, which might have lasted fifty years. After this the Samarian went away, and for his treachery was ordered to build a temple, and this was built about the year 650 B.C. Its architecture was very poor, and its foundations were of a very meagre character. He should imagine that this was only a hasty restoration, and that it did not last long, and probably it was succeeded before the year

600 B.C. by the third and last of the primitive temples, which continued till the time of Cressus. The one certain fact they had was that the temple which Mr. Henderson had described was begun about 540 B.C., and was said to have taken 140 years to build. That was the chronology so far as he could gather of these three early temples. There was one other point. It would be remembered that Mr. Wood placed a temple between the Cressus and the Hellenistic, but Mr. Henderson assumed that there was no such temple, and with that view he (the speaker) entirely agreed. Wood's discovery of remains upon the site was apparently a mistake, for, so far as he could see, the literary evidence did not bear out such a contention. Then as to the restoration which Mr. Henderson had shown, he himself said that it rested largely on conjecture. As to the placing of the walls of the cella, that was, of course, certain, except as regarded the eastern wall. In respect of the columns there was a considerable element of uncertainty. The columns of the high colonnade and perhaps of the facade were fairly certain, but, unfortunately, they were not sure how many columns there were at any time in the Temple of Diana. There was a doubt as to there being 127 columns, and it was suggested that there should have been a comma after the hundred, so that it should read that of 100 columns, twenty-seven were given by the kings. He was afraid, however, that that point would never be solved. A good many people maintained that the full number of columns was 100, and not 127, as Mr. Henderson had placed them, and therefore it remained entirely a matter of conjecture as to what was the arrangement in the cella, and to a certain extent the number in the Pronaos and Porticum. With regard to the height of the columns, he was very glad to think that they were no more than 40 ft. Authorities told them that the columns of the latest or Hellenistic Temple were 62 ft. high, and that was no doubt true. They had various remains which showed the great height of that temple, which was the admiration of the world, but it was difficult to believe that the Cressus Temple was anything like that height. If they followed anything like proportion, they could not get columns more than eight and a half times the diameter of the drums; and there was another argument, which was that the earliest sculpture which ran along the parapet, of which so many interesting fragments were in the British Museum, was on a very small scale. To put that on an elevation of 60 ft. would be nothing less than a crime, and to put it even up to 40 ft. would render it indistinct. He did not think that such delicate work could ever have been put up to a height of 60 ft., and he had little doubt but that Mr. Henderson was right in giving the total height of the columns at about 40 ft. The arrangement of the sculptured bases and the arrangement of the capitals was also conjectural. It was quite possible that the volute and rosette capitals did not exhaust the forms in the temple. Apparently the Asiatic character preferred variety rather than the uniformity of the Greeks. As to the placing of the rosetted capitals in the middle and the voluted capitals at the end they could not possibly say, but, personally, he did not feel that the rosetted capitals were the more beautiful of the two. He preferred to have the voluted capitals in the place of honour rather than the rosetted, but it was purely a matter of taste. So, again, with the torus bases, which Mr. Henderson put in the centre of the facade; they had no remains of them. He hoped that the architectural members present would study this kind of detail with a critical eye, but also with a sympathetic eye, in the book which the British Museum was publishing, and which book would include all the drawings shown in the room that night. The excellence of the material and the work in the temple which had been described was very great, and was much better than in the Hellenistic Temple, which ranked amongst the seven wonders of the world. It was very curious that this temple, which was of such exquisite work, should not have had the fame of the temple which came afterwards, and which was considerably inferior in its detail and execution. It only showed that the ancient taste was affected by mere enormous size—by mere grandiosity, for

apparently the chief feature of the Hellenistic Temple was a certain grandiosity. At any rate, he felt that the work they had devoted to this Cressus Temple was fully justified, for it must have been one of the very finest, as it was one of the earliest, of the Dianic temples.

Mr. Cecil Smith seconded the motion, and expressed his entire sympathy with the remarks of Mr. Hogarth as to the work of Mr. Henderson. The excellent drawings reflected the greatest credit on the energy and industry of Mr. Henderson, and would, he hoped, provide for the students of architecture the best material that they had had for a long time for the study of the earlier period of the Ionic order. He thought also that thanks were due to Mr. Hogarth for the excellent address he had given, but Mr. Hogarth had not told them of the enormous difficulties under which this work was carried on. They had seen from several of the photographs that water overflowed the foundations when they started work, and none who had not been on the spot could realise what terrible difficulties there were. To recover the fragments of architecture and the wonderful series of gold and other ornaments now in the British Museum they had really to grope in the slime, and the result was that, in Mr. Hogarth's case, he was laid up with illness. The first important statement with regard to the temple at Ephesus was made by Mr. Fergusson some twenty-four years ago, and his predecessor in the office he (the speaker) now held, Dr. A. S. Murray, in 1895, read a valuable paper before the Institute on the sculpture and architecture of the Cressus temple. Perhaps he might be allowed to say a few words with regard to the inception of this excavation. Mr. Wood, as they knew, finished his excavations about 1874. The site was the property of the Trustees of the British Museum, and it had always been something of a reproach to British archaeology that the site had remained during so many years in the condition in which Mr. Wood left it. The Austrians made application to continue Mr. Wood's work, but Mr. Murray very rightly considered that, as the British Museum had begun the work, they must finish it, and before his death he arranged with the Trustees that the excavation should take place. That was frustrated by Mr. Murray's death, but it fell to him to continue the arrangement; it was thus not before the autumn of 1904 that Mr. Hogarth and Mr. Henderson went out. He might mention that, with a view to a more complete study of the details of the architecture, he had decided on a fresh arrangement in the British Museum by which he would put on one side of the Ephesus room the whole of the Hellenistic architecture, and on the other side group the whole of what they had of the Archaic temple, so that students in future would be able to compare the similarity of the detail in the Cressus temple with that of the Hellenistic. No doubt the public would at first feel rather disappointed that not more of the architecture had been found in these excavations to clear up the knotty points which had always existed with regard to the temple. He meant such points as the super-position of the sculptured drum on the sculptured pier, and the position and the details of the sculptured cornice running round the parapet of the temple; but when they remembered what the present state of the temple was, and that the Hellenistic architects quarried and reused the fragments of the architecture of the Cressus temple; that on the site of the temple for many hundreds of years afterwards, certainly starting from about 262 A.C., when the Goths destroyed it, quarrying was going on; and, further, the difficulties of finding the architecture in the mass of concrete underneath the water, there was no difficulty in explaining why it was that these problems had remained up to now still difficult to solve. Unfortunately he believed that now they would never be further solved. Mr. Hogarth and Mr. Henderson he felt had done the utmost that could be done. They thought when they first started that they would be able to leave an absolutely clean site—that was, to leave the pavement of the Hellenistic temple with the remains of the Cressus temple below it cleared for all future visitors, but that had been a matter of impossibility. The water

pumped out during the day returned in the night, and it took only a moderately wet season to leave a deposit of 2 ft. or 3 ft. of water over the entire site. When the excavation was finished complaints came to the Trustees of the British Museum that there had been a considerable epidemic of fever in the district. As a matter of fact, the fever was not due to their excavations, but to the very wet season. Still, the local official insisted that the excavation area, which was a stagnant pond of water, must be filled in and consequently they had to do this, and so future visitors to the Artemision must not expect to see anything like the plan which Mr. Henderson had drawn, for the whole of the site had been filled in. He considered, however, that they might feel satisfied that everything which could have been done had been done, and that it would never be worth while to excavate further on the site.

The Chairman, in putting the vote of thanks to the meeting, also thanked Messrs. Hogarth and Smith. Speaking for himself, and, he imagined, for others, he felt they would have understood the paper better if Mr. Hogarth's remarks had been made first. Probably, in reading the paper with the discussion, they would be able to gather a good deal more than from just listening to the paper. One thing they must all feel was, how very fascinating such investigations must be to those taking part in them.

The resolution was carried, and briefly acknowledged by Mr. Henderson.

The Chairman announced that the next meeting, on December 3, would be a business meeting for the election of members and discussion of questions.

THE BRITISH SCHOOL AT ROME.

The annual meeting of the British School at Rome was held on Tuesday evening at Burlington House, when the chair was taken by Mr. Bryce, M.P.

The Report submitted announced the appointment of Dr. T. Ashby as director of the school for three years, and referred to the work which had been carried on by the school in the past year. Amongst the many directions in which work has been done is the study of Roman portraiture and the study of sculptures at Turin and Florence, by Mr. A. J. E. Wace; the study of works bearing on the sculptures of Danophon, by Mr. Guy Dickens; the study of villas and gardens, both of the classical and Renaissance period, by Miss N. Erichsen; the study of prehistoric antiquities, and specially to the question of the origin of the iron age civilisation of South Italy and Campania, by Mr. T. E. Peet; the study of Renaissance architecture in Central Italy, by Mr. Leslie Wilkinson; and the execution of drawings of the internal decorations of the Palazzo Massimo, by Mr. J. Whitelaw. Amongst the plans for the session 1906-7 are researches in Sardinia, and the publication of a complete catalogue of the Dal Pozzo drawings, and a further instalment of Dr. Ashby's exhaustive study of the Roman Campagna.

The Chairman, in moving the adoption of the report, said it was one which could be considered wholly satisfactory in the record of varied work which it contained, and in the prospect it held out for the future. His relations with the School at Athens were most friendly, and arrangements had been made by which there would be an interchange of students. The School of Rome did not confine its operations to Rome itself, and it was proposed to organise a much more systematic investigation of Sardinian prehistoric antiquities in the next few months. The interest in Sardinia, although inferior to that of Sicily, was very great, and this and minor islands were full of prehistoric antiquities, and deserved a great deal more study than had been given so far. It would be noticed that they had received a small grant from the Government. It was small, but better than nothing, and as the British Academy had not received any grant they might congratulate themselves, at any rate, that a beginning had been made in recognising the duty of the State towards archaeological research. They had, however, much to regret as compared with many other countries, who were their partners, and friendly rivals, in these undertakings of research. France and Germany supported their schools largely out of public

honey, and the United States School at Rome was supported by grants from the American Universities, and it was in a position of comparative affluence as compared with the British School. Our Universities were, unfortunately, too poor to do anything of the kind. There was a time when the rich people in England cared for these things, and the wealthy noblemen of the XVIIIth century spent no inconsiderable part of their money in promoting studies in the fine arts. There was little of that now, and it was lamentable how little money could be got for this purpose. There was an immense field of work before them, and it was a work which was intensely interesting. Was it not a coincidence that the same age which had seen such an enormous development of new knowledge in the sphere of natural science should also be an age which had seen the greatest advance made during many centuries in researches into the history and antiquities of the earlier nations of the world? He would not pursue the analogy except to say that, whereas the interest in new discoveries in science would become fainter and fainter as time went on, because the new discoveries which were so startling now would become as familiar as the properties of steam were to us, on the other hand, the interest in inquiries into the history of the earlier nations would become greater, because the older the world got the more and more curious and singular would they appear to be, and the more lively would the interest be in the earlier stages of our own civilisation. They desired that Britain should bear her share in this great work, not from the pride of rivalry, but because they felt that they were in a true sense the children of Rome, on the ground which was expressed in the famous saying of a noble lawyer, that "Rome is the common fatherland of us all." There was no one who had not been attracted by the civilisation of Rome, and to Rome they owed so much for what was part of their own life. He would dwell for a moment on one aspect of the question, which was the value which living and studying in Rome had for the making and training of the historian. Nowhere else in the world was there so much history which could be said to lie under the eye. There had been a continuous existence of the great city and authentic records, such as could not be paralleled anywhere else. Egypt began earlier, but there were great blanks. There were records of the four periods. There was the prehistoric age which recent excavations in the Forum were helping them to know; the classical age of the Republic and Early Empire; the mediæval age; and the Renaissance age. Every one of these was a subject by itself; every one was an illustration of the history of Europe at the time; every one threw light upon the others, although, in a sense, complete in itself. He could think of nothing better for the young historian than to go to Rome, to form his mind and lead him to an understanding of its unity and diversity than living and studying in Rome.

The Italian Ambassador seconded the adoption of the Report, and it was carried.

Mr. A. H. Smith gave an explanation of the modern inscription, "Aesculapio Tarantino Salenius Arcas," which is on a relief in the British Museum. He suggested that "Salenius Arcas" was a member of the Academy of the Arcadi, probably Gregorio Massere, the Hellenist, commonly known as "Il Salentino," and that the "Aesculapio" of Tarentum was one Cataldo Antonio Mannarino, a physician of Tarentum, a pastoral poet and great-grandfather of Gregorio Messire.

Mr. H. Stuart Jones (late director of the School) gave an address on "Notes on the Reliefs of the Column of Trajan," which was illustrated by lantern slides. His object was to show that the theories of Paterson and others, founded on their reading of the reliefs on the column, as to the route taken by Trajan in his two wars against the Dacians in 101-102 and 106, were open to question. He pointed out that, until casts had been taken of the whole series of reliefs of the column, it was impossible for historians to derive any satisfactory result in regard to historical interpretation. When Napoleon caused casts to be taken it was possible for archaeologists to treat them as a historical document, and in recent years the production of the whole

series photographically had enabled anyone to treat the monument historically. At the same time, he did not feel that the subject had been exhausted. Evidence from literary sources showed them that Trajan waged two wars in Dacia, and in the first war of 101-102, they knew that he pursued the westernmost route. It had been held that in the first war Trajan's army was in two columns, and the relief which showed the Romans crossing the Danube was pointed to as proof of this. He could not see, however, that the relief afforded any clear evidence of the fact. It was true that the relief showed two columns crossing the Danube, but, to his mind, the two bridges of boats were obviously intended to be parallel and close to each other, and he could see no attempt to indicate that a distance of 100 miles separated the two columns. Paterson held that the junction of the two armies took place just before the battle, and that the juncture was shown in another relief, but here again he could see nothing to represent that the Guard of the Legions had just joined forces, and, in fact, the exact opposite was shown to him. In the second campaign a convergent march of two armies was undoubtedly shown, and he thought they were justified in asserting that, at the time of the second war, the whole of Dacia remained to be conquered. His reading of the reliefs was that Trajan himself crossed the Adriatic to Sissus, and proceeded through modern Servia. It had been previously held that the reliefs illustrated the progress of Trajan along the Italian coast of the Adriatic, but the Roman fort, depicted at the landing of the army, led him to the belief that Trajan must have crossed the Adriatic.

RECONSTRUCTED LIMESTONE.

THE invention of a process which converts the waste *debris* of any good limestone into blocks of stone possessing greater strength and density than the natural stone, and which effects this without changing the chemical composition of the stone, is one of the most recent achievements in the domain of applied science.

The process consists in heating a portion of the waste limestone to the temperature at which it is decomposed into quicklime and gaseous carbon dioxide, and converting the latter into liquid carbon dioxide. The lime is then mixed with a certain proportion of the ground limestone which has not been heated. The mixture is then slaked, and subsequently pressed into slabs or any other desired form. It is next placed in a hydraulic press, and then taken to a drying room to expel moisture, and finally it is treated in a cylinder with the carbon dioxide originally extracted from the limestone. Thus it regains its original chemical composition.

We should have expected to find that by this treatment some free lime remained in the interior of the reconstructed stone, owing to the inability of the carbon dioxide to force its way into the compressed mass, but the analytical report of Mr. Gregory, a copy of which has been forwarded to us, shows that the proportion of carbonate of lime in the reconstructed stone is quite as large as in the natural stone.

Judging from the samples of reconstructed Portland stone, Bath stone, lithographic stone, and marble submitted to us by the Lithographic Stone and Marble Company, Ltd., the stones appear to be in every way equal to the natural stones, and it is an advantage that they can be moulded in almost any size or shape during manufacture.

We should have thought that the cost of the process would have prohibited its use for the reconstruction of such stones as Bath stone and Portland stone, but no particulars as to prices have been placed before us.

WEASENHAM CHURCH.—The parish church of All Saints, Weasenham, in Norfolk, has been restored, refurnished, and reseated in oak, under the directions and superintendence of Mr. R. Creed; a new font and new organ have also been presented to the church. The church is built for the greater portion after the later English style; the tower fell down when the church was shortened at the west end about 250 years ago, and a belfry was afterwards made in the south porch, which was raised in height for the purpose.

EDINBURGH, OLD AND NEW.*

WHAT of our city and its work fifty years ago? Though to one moving with the growth of the city the changes in fifty years may not be very noticeable (just as the yearly growth of a tree is not apparent, unless annually recorded), yet the increase and expansion of the city and its industries are very apparent. Princes-street, the North Bridge, Lothian-road, and Shandwick-place have had their frontages, as in 1858, almost entirely changed, either by new faces superimposed on the old, or by entirely new creations, in substitution of the old. Taking Princes-street, East-end, the old Theatre Royal and Shakespeare-square have been entirely obliterated, and their places occupied by the General Post Office. The North Bridge of 1761, with the buildings at the south and north ends, has given place to an entirely new structure in iron, with modern commercial buildings at the south end and the rich pile of the North British Station buildings at the north end. The old Edinburgh, Perth, and Dundee Railway (which few may remember), with its tunnel to Scotland-street, is now occupied by the uniquely-devised covered Waverley Market. The old primitive open-air market, with Canal-street, and a host of other interesting minor thoroughfares, with their quaint XVIIIth century residences, have yielded to the claims of the North British Railway Company to turn its station, now covering 27 acres—the largest in Britain. The East Princes-street gardens, for many years a free Toom, are now trimmed to afford flower-bordered walks and spaces for quiet recreation and are adorned with a display of horticultural achievements perhaps unsurpassed in any modern city. The West gardens, no longer the neglected private pleasure ground of the opposing proprietors, are now the admirably trimmed and attractive retreat of the leisured citizens and tourists, and we may thank God that whatever changes may affect other parts of the city, this one place, at least, has been preserved to us, where nothing can block out the beneficent sunshine. Of the original tenements in Princes-street very few remain, nearly all having been supplanted by palatial commercial edifices, that reveal the increasing wealth of the citizen owners, through whom the valued rental of the city has been in fifty years increased at least fourfold. Shandwick-place is no longer a street of private residences, its entire length on both sides having been converted to business premises. The Lothian-road and Castle-terrace, with minor exceptions, were, in 1860, fronted with ungainly, temporary erections of timber and brickwork, screening, so far as they could, backyards of engineers, carpenters, masons, and such like industries. Railway enterprise at the West-end has made great strides since then; for, instead of the grand though obtrusive pile now representing the Caledonian Railway Station Hotel, there was, up to about thirty years ago, a very insignificant rectangular block of buildings at some distance back on the west side of the Lothian-road (where the goods department is now seen), and which did duty as a passenger station terminus and ticket office. Nearly opposite the St. Cuthbert's Church, on the present railway ground, existed "Poor House-lane," with Dr. Candlish's Free Church on one side (which was taken down and re-erected at Stockbridge), and on the other side a very popular and spacious riding-school, with the St. Cuthbert's Parish Poor House behind. These have all given place to the great cornucopia of the age—the railways.

At this part of the Lothian-road a very simple, but exceedingly valuable, improvement was effected under Lord Provost Law about 1869, namely, the filling-up, by about 14 ft., of what was then a heavy valley, opposite to St. Cuthbert's Church, to ease the gradient for the great traffic daily increasing there. For this great improvement all the buildings on the ground where now the hotel stands had to be cleared away.

The additions to the number of the city's buildings have been numerous, especially those of a commercial, educational, and residential character. Probably at no previous period has the residential section especially increased so rapidly over the suburbs as it

* Part of the Presidential Address delivered by Mr. Hippolyte J. Blanc to the Edinburgh Architectural Association on the 14th inst.

has done since 1870, when the Tramways Company extended facilities to the outskirts of the town.

Tramways have now been laid to an aggregate length of nearly twenty miles, now entering every available artery.

New educational institutions, including over forty new Board schools, now afford teaching to upwards of 60,000 children. In all, during less than fifty years, nearly 150 public buildings have been added to the city, one-half being churches.

The new infirmary, convalescent home, retreat for incurables, for sick children, for infectious diseases, for the blind and the poor, with many other liberal endowments, have been promoted and completed during the past fifty years. To the sum of these we may add the great luxuries of libraries, bath-houses, and electric lighting.

In all these advances architecture has not declined, and in the rapid marches of sanitary science the profession has proved its fitness to handle the details expertly. Whatever may be the future development of the city, it should be made a matter of first importance that the main routes should be direct and wide enough for the increasing numbers of modern speedy conveyances. Pavements in these routes also are required to be much wider, to avoid the unseemly jostling experienced every day in our chief thoroughfares. Tree planting in streets, in our links, and in the squares should not require more than mention.

This is a commercial age, in which architectural expression under dictation is, in some instances, compelled to be mean, and in others to be richly florid, even sometimes intrusive. To the architect, who is a scholar, the preparation of a design for either condition offers no problem. A building can be made to look acceptable, though plain, if its forms are in harmonious proportions; so also can a building be designed richly if the decoration be judiciously applied upon a well-proportioned body. Architects should, therefore, go with the spirit of the time, though in a thoughtful and scholarly manner, and not be led into some of the distorted expressions of modern eccentricities, which, however pleasing as novelties, have a very ephemeral attraction. To the well-informed such works soon reveal that they are against all the necessary rules, founded on the very nature of true construction. Before the steady march of commerce, however, sentiment must give way; but to infuse a fair proportion of sentimental treatment in commercial architecture is not incompatible with the requirements of commerce. Whoever, therefore, disregards this sentiment is not acting wisely in the best interests of the city.

For its size there are few cities which possess so many good examples of pure architecture as Edinburgh. The sites of many buildings have undoubtedly lent inspiration to the designers; but, apart from this circumstance, the last century was fortunate in having architects whose scholarly skill and taste were equal to the poetry of the situations. The student of to-day may therefore be congratulated on having before him, in his daily walks in this city, opportunities of educating his tastes, by making himself familiar with those specimens of masterful proportion and detail.

Compare the thoughtfulness exhibited in Craig's and Ainslie's plans, prepared soon after the opening-up of the northern fields of the city for feuing, when the Nor' Loch was spanned by the North Bridge, with the utter disregard of all amenity in the disposition of Morningside-road, Dalry road, and a few others. Why should the private interests of individual proprietors control the amenities (and often destroy them) of streets and roads, which ultimately fall upon the body of ratepayers to use and maintain? Why should not the magistrates have greater control in the genesis of such streets?

When the problem of laying-out the new town, partly upon the mounds of the Calton Hill and the slopes of Broughton, with the lands of Wood and Moray, towards the west, was under consideration, it was prudently determined to submit the whole scheme for the suggestions of architects. The result justified the resolution, and if Edinburgh had nothing else to show them, the very successful and dignified classical compositions in the squares and crescents of the "new town," it

had enough to justify its claim to be considered a truly classical city. The union of interests of coterminous proprietors then secured enabled the architectural blending of Heriot-row, Great King-street, Moray place, Great Stuart-street, Randolph-crescent, etc., to be accomplished, as it could not have been had not the wish for continuity of effect between coterminous proprietors been made indispensable.

Those works were projected in the early part of last century, when the fashion of architectural practice was academic and scholarly; and, though to many the result may seem dull and cheerless, the restfulness of such compositions is valuable and educative in a city. The later city extensions have been chiefly southwards, and the movement has been rapid. Instead of the fine streets and squares, the new extension has taken the form of gardenised residences, the distinguishing quality in which is that, from a sanitary point of view, they are in advance of their predecessors in the "new town"; but of architectural character they are mostly thoroughly devoid. Increasing industries and population have demanded tenement residences. These have been in some main thoroughfares planted stretch after stretch, painfully close, following the original irregular line of roadways without the slightest engineering. The resulting effect is anything but elevating to the resident or the passer-by.

Why should streets be so closely aligned that opposite neighbours should be enabled to see through each other's windows, and, at the same time should make the narrow streets prematurely dark by the shadows of the high tenements placed on each side? If in Paris, under modern legislation, streets can be made from 150 ft. to 200 ft. wide, affording facilities for every sort of modern traffic, and for broad pavements fringed with trees, is it necessary that the extensions of a city like Edinburgh should be laid out as a series of windy lanes? Edinburgh, on account of its hilly ground, demands even wider avenues than do cities on level plains. This is purely a citizens' question, and, as guardians of the citizens' interests, the magistrates now alive to the necessity may fairly be looked to to protect those interests. If the intramural living conditions were improved, might there not be less necessity for providing large sums for extramural recreation grounds?

Having regard to the irreparably poor appearance of the Morningside-road approach to the city, also of the Dalry and Gorgie roads, it may be hoped the Corstorphine, Queensferry, and Newington approaches may be kept broad, and guarded against the intrusion of anything affecting their present amenity such as would result from the closing in of tenements. We may take suggestions from the specimens of the "new town," and a lesson from the experiences of London and Paris (especially London), where enormous sums of money are being expended to bring back the amenity lost in a previous age of culpably careless administration.

We read that the Emperor Nero was desirous of having Rome laid out on the modern lines of that time, but was opposed by the owners of private properties and the sacred rights of temples. To attain his end, however, he fired nearly three-fourths of the city, and had his wishes carried out in the formation of new streets and squares, on which he had placed important monumental buildings where former restrictions hindered him. The means were extravagant, but the end was desirable. Prevention, however, is better than cure. To prevent injury to amenity is in our power now. As in the case of all cities, suggestions of new schemes for improving the city's amenity are continually being made. Princes-street and the Calton Hill are perennial themes for the busy mind ever on the look-out. It may be asked, however, with regard to the Calton Hill, can the picture, as we now see it, be made more beautiful? Does not the openness of the screen formed by the unfinished National Monument appear more pleasing to the eye than would be a colossal solid building abruptly terminating the vista. The picture, at present, is unique, with its charming play of form and colour effects. Already we have an unpleasant effect at the west-end of the city, where the mass building of the Caledonian Railway Station Hotel so completely blocks out all

hope of perspective. The National Monument on the Calton Hill seems more picturesque as it is, and may be left so until ample means and some useful suitable appropriation can be found for it.

Leith-street sorely wants improving and widening, but Waterloo-place and the tasteful compositions at its approach (suggested by someone to be altered) should remain as excellent types of street architecture, carefully and scholarly thought out.

One of the latest suggestions, that of forming a terrace, or boulevard, on the south side of West Princes-street, is now under consideration. Very wisely, a model has been constructed, that the citizens may judge the effect. This is a most intelligent act, and is one such as is adopted in France and elsewhere when important schemes have to be tested. The proposal, however, has not been taken—and doubtless wisely. There is more involved than can be judged from the model. At present we have, at the East Gardens, a broad terrace, adjoining Sir Walter Scott's monument, beautifully parterred and fairly well taken advantage of by the public. It composes well with the vertical masses of the building opposite, to which it seems to form a suitably approximate base. In the West Gardens the conditions are different. The gentle fall from Princes-street Walk, and the gradually ascending castle bank opposite, with the broad valley between, form a unique picture which can be appreciated only as a whole, not only by the leisuredly, but by the ordinary passer-by. To cut off any of the picture, as seen from Princes-street, would destroy it, and the contraction of the valley by the intrusion of the continuous stretch of terrace wall, as seen from the lower walk seems very undesirable.

A few feet in addition to the present Princes-street Walk, and a more dignified railing, would be an improvement, and at much less cost. The promoter of the scheme deserves credit for his public spirit, and should he not succeed in persuading its adoption, he must be consoled by Sir Walter Scott's note to a friend, in 1826, in which he says: "The walks of the West Gardens have been conducted in good taste, though Skene" (of Rubislaw, who arranged them) "has undergone much criticism, the usual reward of public exertions."

Princes-street the most valuable in the city—is fast becoming what the city was forced to be when confined within the cramped environments of the Flodden Wall—one of lofty tenements. Its limit as a commercial street has almost been reached. How can it extend? Waterloo-place at the east end offers no opportunity; the Lothian-road, with its construction at Earl Grey-street, is not promising; and the west end at present offers nothing beyond Shandwick-place. Could not the present thoroughfare towards Haymarket be interrupted, and the ground occupied by a building of the nature of a concert-hall? By diverting the traffic to Coates and Atholl crescents on each side there would be afforded considerable scope for the commercial expansion of the city westward.

An analogous instance is at St. Paul's Churchyard, London, though on a larger scale. This arrangement was suggested, among many proposals, for a site for the Usher Hall. It has the strong recommendation in its favour that it offers what seems so indispensable to a site for a concert hall—openness on all sides.

But of this Usher Hall subject it is difficult to speak. So much has already been said and tried that one would fain leave the matter at its latest stage, were it not for the pressing fact that a gift of such magnitude should have the most favourable conditions of site secured for it. Of nearly twenty concert halls I have visited on the Continent, I found that nearly all are placed where free access on the four sides is obtainable for vestibules and egress staircases. The site acquired does not, unfortunately, afford this—a *sine qua non*. The acquisition of it, moreover, has attached to it an undesirable requirement, namely, that an existing good and useful hall would have to make way for the new.

In considering such matters as the placing and designing of public buildings regard should be had to the surroundings and the possibilities of the site. The late David Bryce used to say that no one should attempt

designing a public building unless he had "slept on the job." To have solved a great problem, and to have produced such a masterful work as the Bank of Scotland by any other mode would seem to have been well-nigh impossible.

But fifty years ago, and further, all the important buildings in the city were by workmen (Hamilton, Playfair, Rhind, Bryce, Graham, and others), who thoroughly studied the sites they had to work upon. Each of these architect's works are marked by a scholarliness, artistic fitness to the surroundings, and classic dignity. Nothing can surpass the masterly appreciation of sites expressed in the refined and most artistic composition of the Royal High School, contrasting so well with the rugged rocks against which it nestles. Nothing, to my mind, in this city approaches it, as a perfect poem in architecture. The Burns Monument, sweetly perched upon an adjoining knoll, is also picturesquely placed, a welcome factor in the general picture.

If we cannot fail to read how successfully the problem of the site has been solved in the disposition of the Regent and Royal Terraces. Like many others in the city, it shows to have received very careful consideration. St. Stephen's Church, another instance of skilful planning, has always seemed to me to occupy its site well. The church façades winging out to fill the angles of the branching streets, and the robust tower sternly arresting the eye as we descend the slope of Howe Street, and relieving it from straining into vacancy among the fields beyond, have often struck me as a nobly thought-out scheme. The men who did these works evidently considered the city as a whole, not merely a spot on it. What are we as architects doing in this direction?

Before quitting the necessarily brief reference to our city, may I intrude one word in regard to the most recent compliment paid to the city by a generous donor. I refer to the legacy of a large sum of money for preserving and rendering serviceable the interesting old chapel of Holyrood. The gift of Lord Melville and Leven is one that is certain to appeal to the best sentiments of the citizens of Edinburgh. No sooner is the gift announced, however, than a crop of suggestions and opinions are daily served up in the morning press, some welcome, many not. Are not architects yet capable of dealing themselves with matters entrusted to them? Does the medical profession receive from the public budgets of anonymous correspondence when any member has a case to treat? I fail to see the difference.

Now what is the risk of all this premature criticism. It will undoubtedly restrain the hands disposed to give, with the result that the city will be poorer by being deprived of the chances of increasing its real attractions. No declaration has yet been made by the architect, Mr. Thomas Ross, in whose hands the subject is placed; so, therefore, we have nothing before us. The gift, however, as a national one cannot be over-estimated. The history of the chapel is a sacred one. It seems desirable, therefore, to do whatever is possible with sacred handling to save the building from its obvious fate. Total decay will within a very limited period certainly overtake the building if the inestimable opportunity is not now taken to arrest it. In our day much has been done by way of "restoring," and in most cases (though not always) with advantage. Increasing intelligence and wider knowledge are playing a helpful part. But the occasional bursts of antagonism are unhealthy, as much so as is the other extreme of over-zealous reconstruction. Each building must receive the special consideration it requires, and, if it can be shown that wasting and disrepair can be rectified, and the building can be made serviceable by retaining all it possesses of original material, and by having the gaps filled in, there seems no reason why this should not be done? Holyrood Chapel seems to me to present such a case. Who having his garments rent or the means of attachment wanting would not try "to gar the auld things look a'maist as weel as new." The French do more wisely, for at Dijon, last spring, I witnessed the shoring up of one side of the Cathedral nave and the entire renewal of two of the heavy clustered piers, which had gone out of the plumb and were wasting.

THE ASSOCIATION OF MUNICIPAL AND COUNTY ENGINEERS.

A METROPOLITAN district meeting of the Association of Municipal and County Engineers was held at the Institution of Civil Engineers, Westminster, on Friday, November 16, when Mr. T. C. Horsfall, of Manchester, gave an address on the planning and control of town extensions in Germany. Mr. W. Nisbet Blair, St. Pancras, Vice-President, occupied the chair, in the absence of the President (Mr. J. Patten Barber), and there were present Mayor Isaacs, Kensington; Messrs. W. Weaver, London; J. Lemon, Southampton; T. W. A. Hayward, Battersea; A. H. Campbell, East Ham; A. Giles, Westminster; Assistant Secretary Newton, Paddington; Harrison, Southwark; F. R. Durham, Westminster; J. Rush Dixon, Woolwich, and many others.

On the proposition of Mr. W. Weaver, Mr. J. Rush Dixon, of Woolwich, was unanimously re-elected Honorary Secretary of the Metropolitan district.

Town Extensions in Germany.

Mr. T. C. Horsfall, of Manchester, then gave an address on the planning and control of town extensions in Germany. He said that in the long periods in which the two movements of population had been taking place in this country—the movement from the villages and small towns into large towns and the movement from the central districts of large towns into the suburbs—similar movements had also been taking place in Germany. But though the movements had been the same in kind, there had been considerable difference in degree. The population of the large German towns had increased in a higher degree than had that of our large towns, but the movement towards suburbs had been less marked in Germany than here.

But the greatest difference that had to be noted between the two countries in connexion with the movement of population was in the nature of the new districts which had been built to receive the increase of urban population. In this country vast areas, on what were a few years ago the fringes of our towns, had been covered with new streets, nearly all of them narrow, which lie between long rows of small houses all very much alike. In most of these new districts very little vegetation existed; from the windows of the great majority of the houses in them no trees or flowering plants were to be seen; and though most of our large towns had provided in the new districts a park or parks, which, as a rule, were kept in an excellent and most attractive state, the immediate surroundings of the majority of the houses were so devoid of all that could create and keep alive desire to see beautiful things in the majority of the inhabitants that the parks were not only distant in space, but were also remote from the thoughts and feelings of most of them. In our new suburban districts there was also a great lack of playgrounds for children. We all know that in the districts in question there was so little to facilitate the living of a full and healthy life that the aid of the public-house, the music-hall, the betting agent must be almost as welcome there as in the older parts of the towns; for men and women would have some change from the sensations created in them by monotonous work, and if they could not get it, as many of them were willing to do in the occupations made possible by the existence of the beauty of nature and of interesting human productions, would seek it in the use of alcohol and other dangerous ways. Of the author's own beloved town Mr. Justice Day had said that it was no wonder that cases of drunkenness were common there, as to get drunk was the shortest way out of Manchester.

The new districts of German towns were so constructed that a stranger often could not tell when he passed through one of them whether it was inhabited chiefly by rich or by poor people. Nearly all the streets were wide, many of them were planted with trees; there were many small open spaces, made attractive with plants; public buildings were so placed as to add interest to as large a proportion of the district as possible. The tree-planted street was considered of so much importance that the *Statische Jahrbuch-deutscher Städte* always contained a table which told not only how many parks a town had, but also how many tree-planted streets and the total length of such streets. Thus they

learned that Coeln, which had about 375,000 inhabitants, had 285 tree-planted streets, the length of which was 64½ miles, and that the manufacturing town of Elberfeld, which had 157,000 inhabitants, had 27 tree-planted streets 19 miles long.

It would be difficult to overstate the value to the inhabitants of German towns of such places and of tree-planted streets. Large numbers of parents resorted to them on summer evenings, and on Sunday evenings with their children, and while the children played in almost complete safety the parents rested on the benches provided by the town. His attention was drawn to the high value of planted streets and open spaces many years ago by the statement made by one of the London coroners that he held, on an average, more than fifty inquests a year on children killed while playing in their only playground—the street; and he had, therefore, ever since tried to find out, when he had been abroad, how foreign children fare in respect of the chance of playing in safety.

The chief reason for the very great difference between the new districts of German towns and those of our towns was that German municipal authorities in common with those of every other civilised country except our own and perhaps the United States had the power to control the growth of their towns by making town extension plans, the arrangements indicated on which must be complied with by all owners of the land which was within the boundaries of the town, and by all who build on it. In Prussia the power was formally given by a law, passed in July, 1875, known as the Street-lines and Building-lines Act, but the power had been exercised for a long time before that Act was passed.

It was the few words "lines can be laid down for single streets, or parts of streets, or, to meet the foreseen needs of the near future, can be laid down by means of building plans for larger areas," which give German municipal authorities the power to save their people from the degradation which our suburban districts are bringing on ours. These words had received a very large interpretation. The foreseen needs of the near future were taken by the most enlightened authorities to mean the needs of the next twenty or thirty years, and hence building plans were sometimes made for very large areas. A few years ago the Municipal Authority of Düsseldorf published a plan for an area of nine square miles. The words were held by most of the authorities to give them not only the power to decide what streets shall be made, what shall be the width and direction of each, what squares, small planted open spaces, playgrounds, and parks shall be provided, but to give them also the power to create different zones or districts—districts for dwellings, districts for manufactures—each with building regulations differing from those of other districts. This power had been largely used, and with extremely good results.

The building plan was prepared by officials who had received the training of surveyors, and whose experience gives them some knowledge of engineering and of the tasks of the architect. These officials always, he believed, work under the supervision of a committee consisting of men cognisant of the various interests which had to be taken into account.

Land was held by far more persons in Germany than in this country; the plots held by many persons were small, and many of the plots had been strips of a few furrows in width which had been left by farmers to their children. These plots, being long and narrow, could not be used separately as sites for buildings, and therefore when a building plan was published by a municipal authority many sales or exchanges of property were needed before building could take place. In order to quicken this difficult process Dr. Adickes obtained the passing of a law, which was known as the Lex Adickes, which was at first intended for the whole of the Prussian Kingdom, but which was eventually restricted in its application to the town of Frankfurt. It enabled the Town Council to expropriate all the land in a new urban district temporarily, to deduct from the whole the land needed for streets and open spaces, and finally to redistribute the residue among the original holders in plots of shapes suitable for building purposes, each owner

contributing land in proportion to the value of his original holding.

German towns suffer far more than ours do from high rents and from the inevitable result of overcrowding of dwellings. While the evil of overcrowding in this country was felt, as a rule, only by the poorest class, in Germany a large number of persons of the middle class were compelled by the dearth of houses to occupy inconveniently small dwellings. To enable municipal authorities to remove or mitigate these evils the Governments of Hessen and Saxony had passed housing laws in the last few years which had already lessened the evil of overcrowding in some parts of those two countries.

The new Prussian Housing Bill proposed by building by-laws to regulate—

1. The grading by districts, streets, and squares of the extent to which sites shall be covered by buildings.

2. The separation of particular districts, streets, and squares in which the erection will not be allowed of buildings which are likely, in working, to cause the neighbouring inhabitants or the public danger, injury, or annoyance by diffusing bad smells, thick smoke, or unusual noise.

3. The plastering, painting, or pointing of buildings mainly serving as dwellings and of all buildings situated on streets and squares.

4. Proceedings against buildings which disfigure the streets or public places in towns or country places.

The German Governments, and all German students of the housing problem, know that towns can not be brought and kept in a condition which shall make it possible for human beings to have good health, physical, mental, and moral, in them solely by means of the town building plans and of the building regulations which form part of such plans. They believe that Town Councils must own much land, and for this purpose must have the right to buy it whenever they can get it as private persons may. They are convinced that every house containing small dwellings, and the servants' and apprentices' rooms in large houses, must be carefully inspected at not very long intervals of time; that co-operative and other societies must be encouraged to build wholesome small dwellings by being provided by direct or indirect aid from Government, with loans of money at low rates of interest, and that Town Councils must be enabled to obtain a considerable proportion of the money needed to defray the cost of making towns habitable from the persons who now gain most by the growth of the towns, by being empowered to rate land on its selling value and levy rates on unearned increment. Legislation for all these objects has been already passed by several Governments, and is promised in the near future by the others. But while the importance of all these other things is admitted by all German social reformers they all know that the supremely important thing is the building plans. In all lists of the measures needed to ensure that towns shall be made less dangerous to health and strength than they now are the improvement of the building plan and its necessary concomitant building regulations has the first place. No one connected with a German town, rich landowner, or poor landless tenant doubts that it is necessary for his welfare that such plans shall exist. In Professor Baumeister's book on the enlargement of towns the English towns are mentioned as the only modern examples known to him of the monstrosity of towns built without any plan at all. He trusted that our towns would soon cease to have this evil distinction.

The Chairman proposed a vote of thanks to Mr. Horsfall for his paper. He said the paper opened up a field to them which was almost inconceivable in the matter of dealing with land. Powers existed in Germany which certainly did not exist here, and which they could hardly anticipate coming into effect in our time. In England it practically rested with the landowner as to how he would lay his land out. He worked independently of the adjoining owner, with the result that they made streets which deliberately missed, instead of forming, a direct line. The cost of course was one

which could not be lost sight of when hearing of these immensely wide streets. They had not heard where the cost came from. The owners of the land who had given up their possessions were given back something which Mr. Horsfall told them was equivalent to what they surrendered. But there still existed a very large area absorbed by the streets which must come apparently out of the public funds.

Mr. A. H. Campbell, East Ham, who seconded, was glad Mr. Horsfall had laid such stress upon the planting of trees. Trees did more than anything else in a simple and inexpensive way to break down that dreadful monotony of bricks and mortar which was such a nightmare to many of them. It was unfortunate that the Public Health Act of 1875 and all the amending Acts had not conferred upon local authorities power to charge for the planting of trees as an improvement work. He had no doubt with the enlightened, energetic President they had now in the Department which controlled these matters there would be incorporated a clause in the Act which would empower the planting of trees by the statutory authority as part of public improvement work. In the last eight or nine years East Ham had planted 8,000 to 9,000 trees, which covered a mileage of 25 to 30 miles, and it had now become so appreciated by property owners and ratepayers that they had no difficulty in getting them to voluntarily contribute to the cost. Another matter which Mr. Horsfall had spoken of was the better inter-communication of roads which linked up different districts. There was such a variety of separate local governing authorities in London that it was difficult to get proper inter-communication through such a maze of streets. He hoped the next Public Health Act would include a compulsory clause giving local authorities some measure of control to accomplish this result. With the help of public-spirited men like Colonel Burgess, Sir John Bethell, and others, they had been able to lay out in East Ham many arterial lines of highways, and they were endeavouring to arrange by persuasion that all the building developments on these arterial lines should be subsidiary to and serve the main lines laid out on the plans. He was glad to say that was in a fair way of realisation. He was persuaded that in all our large towns, if the council and officers could apply themselves to that object with determination, a good deal could be accomplished even without the arm of the law to support them. They had heard a good deal about the enterprise and progress of Germany, yet even in Great Britain they had evidence of progress on similar lines, although perhaps not applicable to the service of districts which were inhabited by the artisan and labouring class. He instanced the new town of Edinburgh laid out 70 or 80 years ago by Mr. Playfair as a remarkable case of town planning. Then Hove, for wide roads, was one of the best examples of laying out on progressive and advanced lines.

The vote of thanks having been adopted, the address was discussed.

The Mayor of Battersea was of opinion that there were too many local authorities in London. If they had fewer local authorities and a central body with greater powers they might work on the lines proposed in the address. He considered the moral of the address was the State ownership of land for the proper carrying out of this movement of town planning. He held that the Acts they worked under in London should be consolidated, and that districts and streets should be laid out not for the interests of the few but for the interests of the people who had to occupy the land.

Alderman Thompson, Richmond, Chairman of the National Housing Reform Council, said they urged very strongly that there should be a central authority with very complete power over land and housing and transit—these three things being so intimately connected. He believed in the Public Health and Housing Bill of next year they would get power to control the lines of main roads. He suggested that they should adopt the German plan for dealing with the land and the English plan for dealing with the houses.

Councillor Andover, Paddington, said as Chairman of a public health committee he would be only too delighted if they could develop their streets with trees. If it could

be done in Germany, he did not see why it could not be done here.

Mr. C. H. W. Begg, London, said he was too much of a cynic to believe they could get one half of the things which had been hinted at that night. What he wanted to hear was that there should be a definite proposal which might be handed to the Local Government Board or Parliament, that towns should be extended by definite plans, and that so far as main thoroughfares were concerned they should be determined at all costs.

Mr. F. Durham, Westminster, said that having had twelve years in Frankfurt and other German cities he desired to reply to Mr. Horsfall, who had taken a too optimistic point of view as to Germany. Speaking with a good deal of experience, he asserted that the English working man had a good deal more happiness than the German. This was confirmed by a German friend who came over recently to study workmen's dwellings. He came over prejudiced against everything English, and after three months said: "We are sixty years behind this country in the treatment of working men, hygiene, and everything else." The principles which had been commended to them as coming from Germany originally came from England. In 1842 a very disastrous fire occurred in Hamburg, and an English Engineer, Mr. L. Lindley, was called in to sewer and relay out the town, and he laid it out on the broad principles on which towns should be laid out, with wide streets and open spaces. Mr. Lindley advised Frankfurt, Düsseldorf, and other towns, so these ideas of town planning were brought from England to Germany, and had been developed there. Germany was a military nation and Germans always waited to be ordered.

Mr. Lyon, London, said that at present a zone of houses was built near the country. There was plenty of land outside. Then another zone of houses was built outside and made the first zone uninhabitable. They became a collection of dwelling places in which it was not fit the human child should be born and brought up. The remedy seemed pretty simple. A fund should be formed to provide open spaces and proper wide streets, and the owner of each house built should subscribe to that fund a sufficient amount to meet the cost.

Mr. J. Lemon, Southampton, said the conclusion he had formed from his visit to Germany was that German towns suffered more than English from high rents and overcrowding. He admitted some controlling influence was necessary in order that our main roads and arteries should be laid out on a proper plan and not in a higgledy-piggledy way. To have that they must give up their parochial ideas and consent to some form of centralisation. That did not go down with certain people. Nothing offended local bodies so much as a controlling authority. The County Councils had power to regulate main roads; they ought to have greater powers in the laying out and controlling of new streets to be made. That would not require a great deal of legislation to bring about. The landlords were not such a bad lot as some people thought they were. Where a landowner had control of a large area of land there were many instances where he had laid it out to great advantage. He instanced Folkestone, a beautifully laid out town; Eastbourne, controlled by the Duke of Devonshire; and Newcastle-on-Tyne.

Mr. Gladwell, Eton, wondered whether the old Enclosure Acts could not be extended to meet the case. If they were to take particular areas of land there were numerous owners that could be brought within the provisions of the Enclosure Acts, and Commissioners appointed to redistribute the various areas of land, reserving for public purposes such land as would be required under a comprehensive and intelligible plan.

Mr. T. C. Horsfall, in reply, said the movement from the centre to the suburbs had been less marked in Germany than in this country. The most intelligent of the working men were removing from the centre, the semi-slum districts, because they found a satisfactory family life was impossible, to the suburbs where they found the same semi-slum conditions were being again set up. He was assured that in the poorest districts of Berlin where the overcrowding was most serious the people had more of family life

Captain Hemphill accepted Sir J. Benn's

addendum on behalf of the Highways Committee.

Mr. R. A. Robinson then moved to add the further words, "and other forms of locomotion." He particularly wanted to bring in the heavy traction engines.

Mr. Hardy stated that the latter question was already being considered by the Public Control Committee.

On a show of hands Mr. Robinson's proposed addendum was rejected.

Tramways and Street Widening.—A joint committee of the Finance, Highways, and Improvements Committees recommended that the Improvements Committee, when submitting to the Council a proposal for a street improvement upon an existing or proposed tramway route, do report (1) whether the suggested improvement is desirable and urgently needed, apart from any question of the construction or reconstruction of tramways along the thoroughfare; or (2) whether the suggested improvement, though desirable, could be postponed for a few years, except for the reason that it is required for the purposes of a tramway; or (3) whether the suggested improvement is not required except for the purposes of a tramway; that in each case falling under class (1) no charge be made against the tramways account; that in each case falling under class (2) a contribution of a fixed sum, being one-eighth of the estimated net cost of the improvement, be charged to the tramways account; that in each case falling under class (3) the whole of the cost of the improvement be charged to the tramways account; and that the recommendations of the committee do provide for such charges against the tramways account.

Captain Swinton moved that the recommendation be referred back to the Committees. He pointed out that when the Council's witnesses were before the Traffic Commission they emphatically declared that it was the practice to insist upon the charge for street widenings being apportioned as to one-third to the tramways account, one-third to the local rate, and the other third to the Council rate. The Council's figures showed that this had never been done, and in one particular case the amount charged to the tramways was only one-fortieth of the cost.

Mr. Whitaker Thompson, in seconding the amendment, said the recommendation of the joint committees was the throwing to the winds absolutely a policy which was well understood by the people of London, and it was constructing out of nothing a policy which never could be understood by the people of London.

Lord Welby stated that the one-third charges had been fixed before the Council had gained sufficient experience, and it had now been shown that that system acted harshly and unfairly, hence the proposed new conditions.

Mr. McKinnon Wood contended that the tramways must have been worked at a profit, or the Council would not have been able to put aside £480,000 as a sinking fund.

After further discussion the amendment was rejected on a division by seventy-two votes to thirty-two. The recommendation of the Committee was then adopted.

Plant for Sub-stations.—The Highways Committee recommended:

(a) That the estimate of expenditure on capital account of £500L, submitted by the Finance Committee, be approved in respect of the installation of additional motor-generators and switch-gear, including cable connections, etc., at the Battersea, Brixton, Clapham, Streatham, and Wandsworth tramways sub-stations.

(b) That expenditure on capital account not exceeding £500L be sanctioned for the provision of the motor-generators, switch-gear, etc., referred to in the foregoing resolution (a).

(c) That the contract entered into with the General Electric Company, Ltd., in pursuance of the resolution of July 25, 1905, be extended so as to include the supply, delivery, and erection, at a cost not exceeding £600L, of the additional switch-gear required for the Battersea tramways sub-station.

Tramways.—The Highways Committee recommended:—

"That the Highways Committee be authorised to communicate with the Board of Trade and the Camberwell and Lewisham Metropolitan Borough Councils with a view to the adoption of the overhead trolley, instead of the underground conduit, system of electric traction upon the authorised tramways (1) from Woodwarde road, *via* Lordship lane and London-road, to Dartmouth-road, Forest-hill, and (2) from Grove-vaile, *via* Goose-green, East Dulwich-road, and Peckham-rye, to Stuart-road, Peckham."

Pimlico Generating Station Site: Acquisition of Property.—They also recommended:—

"That the claim of the Duke of Westminster in respect of the freehold of the premises known as Nos. 1 to 7, Pultford-street, 1 to 5, Pultford terrace, 80, 81, and 140, Grosvenor-road, and land and gas-works at Pimlico, be settled for a sum of £2,500L, with 250 guineas towards the surveyors' fees, together with a solicitor's preliminary fee, and the costs allowed under the Lands Clauses Consolidation Acts; that the notice-to-treat served by the Council in respect of Nos. 8 to 35, Pultford-street, be withdrawn; that the solicitor do complete the matter; and that the seal of the Council be affixed to any necessary documents in connexion therewith."

Improvement.—The Improvements Committee recommended:—

(a) That the estimate of expenditure on capital account of 14,400L submitted by the Finance Committee in respect of the widening of Old-street at Nos. 339 to 345 shown on the plan be approved.

(b) That expenditure not exceeding 14,400L be sanctioned in respect of the widening of Old-street

	Central area.	Rest of London.	Extra-London.	Total area.
Number of rooms provided	5,072	21,004	36,874	62,950
Number of rooms demolished	8,708	3,060	245	12,013
Net addition	—3,636	17,944	36,629	50,937

as provided in resolution (a); and that, subject to the Shoreditch Metropolitan Borough Council agreeing to contribute one-third of the net cost, the Improvements Committee be authorised to arrange for the said widening.

Advertisement Sign in Front of the Palace Theatre, Cambridge-circus.—The Building Act Committee recommended that the solicitor do take all necessary steps to uphold in the High Court the magistrate's decision in the case of the Council v. The Palace Theatre, Ltd., with regard to the sign in front of the Palace Theatre, Cambridge-circus, Charing Cross-road.

Erection of a Show-case in Front of No. 8, Grafton-street.—The same Committee also recommended that the solicitor do take all the necessary steps to obtain the opinion of the High Court in the matter of the decision of the magistrate at the Marlborough-street police-court with regard to the retention of a wood and glass show-case in front of No. 8, Grafton-street, St. George, Hanover-square.

Both recommendations were agreed to.

Kensington Fire-station: Acquisition of Site.—The Fire Brigade Committee recommended that excess expenditure on capital account of 2,727L 2s. 6d. over the estimate of 14,000L approved on November 26, 1901, in respect of the acquisition of the site of the new Kensington fire-station, and of property at Deptford required for fire brigade purposes, be sanctioned.

Installation of Additional Plant, etc., Elephant and Castle Sub-station.—The Highways Committee recommended:—

"That the supplemental estimate on capital account of 3,300L submitted by the Finance Committee be approved in addition to the estimate of 7,500L approved on July 31, 1905, in respect of the erection and equipment of additional plant at the Elephant and Castle tramways sub-station, including incidental works, etc."

Working-class Accommodation Demolished and Built During the Year 1905.—The Housing of the Working Classes Committee brought up the following report:—

"We submit as a separate document a return which has been prepared showing the net addition to working-class accommodation provided in the county of London and in the adjacent districts during the year 1905. The return also shows the number of rooms and tenements contained in the houses, as well as the average weekly rents charged per tenement and per room.

The information relating to the county areas has been obtained in the first place from the provisional valuation lists of each parish, and subsequently checked by local investigation. As regards the extra-London districts, the town clerks of the boroughs and the clerks of the councils of the various urban and rural districts have either supplied statistics or given every facility for obtaining the necessary information.

The several parishes and metropolitan boroughs in London and the boroughs, parishes, and urban districts outside have for the purposes of the return been grouped into five sections, but the figures are given separately for each unit. The sections are:—

(i) Western section—From the river northwards to the Edgware-road, and the adjacent districts in Middlesex. This district includes the City of Westminster.

(ii) Northern section—From the Edgware-road to the Kingsland-road, and the adjacent districts in Middlesex. This district includes the City of London.

(iii) Eastern section—From the Kingsland road to the river, and all the adjacent parishes in Essex.

(iv) South-eastern section—From the river to the

eastern boundary of the Metropolitan Borough of Lambeth, and the adjacent parishes in Kent; and (v) South-western section—From the eastern boundary of the Metropolitan Borough of Lambeth westwards to the river, and the adjacent parishes in Surrey.

Each section is sub-divided into three zones, which are shown on a map which accompanies the return. The central zone or area comprises the City of London, the City of Westminster, the Metropolitan Boroughs of Holborn, Finsbury, Bethnal-green, St. Marylebone, Stepney, Bermondsey, and Southwark, and the northern part of Lambeth and the southern part of St. Pancras. The next zone comprises the remainder of the county of London; while the extra-London comprises the boroughs, urban districts, and parishes in the immediate neighbourhood of the county of London. We are of opinion that the scope of the return should be extended so as to include Ilford and other similar suburbs, and we have given instructions for this to be done in future years.

Taking the three zones together, the number of rooms provided and demolished in the course of the year may be summarised as follows:—

	Central area.	Rest of London.	Extra-London.	Total area.
Number of rooms provided	5,072	21,004	36,874	62,950
Number of rooms demolished	8,708	3,060	245	12,013
Net addition	—3,636	17,944	36,629	50,937

The net addition to the number of rooms in the whole area was 53,499, 59,009, and 51,566 in the years 1902, 1903, and 1904 respectively. In the county of London the net addition was considerably less than in previous years, owing to the unusually large number of houses demolished, the greater part of the new accommodation to replace this loss, so far as it has resulted from the exercise of statutory powers, having already been provided in previous years. It is worthy of note that of the 36,874 rooms added in the extra-London area, no fewer than 5,656 in the eastern section, comprising East Ham, Leyton, Walthamstow, Wanstead, and West Ham.

The extent to which the new accommodation for the working-class has sufficed to meet the increase in the working-class population is a matter which cannot be ascertained with any great degree of accuracy. Upon consideration of the number of persons occupying the Council's dwellings, it is found that on an average of one and a half persons per room is a reasonable figure to take for accommodation provided within the county area, and an average of one and a quarter persons per room may be taken as a general basis in the extra-London area. If this basis be adopted, it may be stated that in the whole area the net accommodation for 67,248 persons has been added in the course of the year, as compared with 71,317, 79,130, and 69,212 in 1902, 1903, and 1904 respectively. If the population, increased in the same ratio since the year 1891-1901, the increase would be 100,852 persons of all classes, although it is believed that an estimate on this basis shows a larger increase than has actually taken place. On the assumption that the increase in the working-class population amounted to two-thirds of the total, such increase would be 67,235 persons on the basis of the decennial period for the whole area, or 64,109 persons on the basis of the last quinquennial period for London and the decennial period for extra-London, whereas accommodation for 67,248 persons has been provided. With this exception, there has been very little variation in the rents from year to year, but the figures in the return give some indication of a tendency in the extra-London area to decrease, and in the rest of London and the extra-London districts to increase.

We have given instructions for a copy of the return to be sent to each of the Councils, and we recommend that the return submitted by the Housing of the Working Classes Committee of the working-class accommodation provided and demolished in the county of London and the adjacent districts during the year 1905 be placed on sale, and that a copy of such return be sent to each of the local authorities who have given information on the subject."

Webber-row, etc., Scheme, Southwark.—The same Committee also reported as follows:—

"Overy and Delarch-buildings, two of the five blocks of dwellings which are being erected on the Webber-row area, Southwark, are almost completed and will be open for inspection by members and their friends on Monday and Tuesday, November 19 and 20. Each of these blocks contains accommodation for 230 persons in twenty tenements of two rooms and twenty-five tenements of three rooms, and upon the completion of the remaining three blocks accommodation will have been provided for 1,150 persons. The dwellings have been erected under the provisions of the Webber-row and Wellington-place and King's Bench-walk scheme, which is being carried into effect under Part I. of the Housing of the Working Classes Act, 1890. The clearance of the areas comprised in the scheme will involve a total displacement of 997 persons of the working class."

Piccadilly, near the Circus.—The Improvements Committee reported as follows:—

"We have considered an offer by the Commissioners of H.M. Works, etc., to arrange for the raising in front of the Geological Museum in Piccadilly, subject to the approval of the Commissioners being put to no expense in respect of paving works, and subject to the payment of certain fees. The concession of pedestrian traffic at this point will be much relieved, for by means of the improvement the width of the footway, which at present

varies from 6 ft. to 7 ft., will be increased for a distance of 70 ft. to a width of about 9 ft. The Western City Council has agreed to bear the necessary expenses connected with the improvement. We desire to express our appreciation of the Commissioners' action in enabling this desirable widening of Piccadilly to be effected on such reasonable terms."

Lewisham High-road to High-road, Lee.—The Improvements Committee also recommended:—

(a) That resolution (b) of July 31, 1906, with regard to the reference to the Works Committee of paving, etc., works in High-road, Lee, be rescinded. (b) That the working drawings, specification, bills of quantities, and estimate of the cost (24,517l.) of the construction of the tramway tracks of the authorised tramways from High-street, Lewisham, to Lee-green be approved and be referred to the Works Committee with a view to the works being executed by them without the intervention of a contractor.

(c) That, subject to the Lewisham Metropolitan Borough Council agreeing to take over any contracts for kerbs, sets, etc., entered into in respect of the paving, etc., works in High-road, Lee, the offer of the borough council to undertake at a fixed cost of 5,329l. 6s. 9d., in addition to the actual cost, as certified by the Council's officers, of pipe diversions and the connexion or extension of house drains, certain paving and other works in the thoroughfare in connexion with the Lewisham High-road to High-road, Lee, improvement, authorised by the London County Council (Tramways and Improvements) Act, 1904, be accepted.

(d) That the execution by the Works Committee, as a jobbing work, of the sewer connexions and extensions of side entrances affecting the Council's sewer in High-road, Lee, be approved.

Protection of Public Buildings.—Sir W. J. Collins asked the chairman of the Fire Brigade Committee what had been the practice of the Committee with regard to the inspection of buildings of a public character, such as hospitals, etc., with a view to advising those responsible as to what course should be adopted to prevent fire. There was a great deal of uncertainty in the public mind as to what the Committee were doing at the present time.

Mr. Shrubsole said he would see that an answer was given next week.

The Council, having transacted other business, adjourned.

APPLICATIONS UNDER THE 1894 BUILDING ACT.

The London County Council at their meeting on Tuesday dealt with the following applications under the London Building Act, 1894. The names of applicants are given between parentheses:—

Lines of Frontage and Projections.

Hammermith.—A waiting-room at No. 69, Brook-green, Hammermith, to abut upon Catherine-road (Mr. J. McManus for Dr. Denne).—Consent.

Islington.—An addition in front of the Convent school of Notre-Dame, No. 55, Tooting-park, Islington (Mr. J. H. Goodchild for the trustees of the school).—Consent.

Lewisham.—Houses with bay-windows and pent roofs on the southern side of Woolstone-road, Lewisham, to abut also upon the eastern side of Broxted-road (Messrs. Norfolk & Prior for Mr. G. H. Walker).—Consent.

Marylebone, East.—That the application of Messrs. Hudson & Hunt for an extension of the period within which the erection of porches and balconies to six blocks of residential flats in Glentworth-street, St. Marylebone, was required to be completed, be granted.—Consent.

St. George, Hanover-square.—A projecting iron and glass skylight over a portion of the area of No. 28, Grosvenor-street, St. George, Hanover-square, abutting upon Dacre-street (Mr. C. W. Stephens for Lord Edward Churchill).—Consent.

St. George, Hanover-square.—An additional storey to a bay-window in front of No. 39, Berkeley-square, St. George, Hanover-square (Messrs. Bertram & Son for Mr. A. Paget).—Consent.

Strand.—A deviation from the plans approved on May 28 for the erection of two iron and glass shelters in front of the Waldorf Theatre, Aldwych and Catherine-street, so far as relates to an alteration in the method of fixing the two central cantilevers of the shelter at the main entrance to the theatre (Messrs. Waring & Galloway, Ltd.).—Consent.

Wandsworth.—One-story shops in front of Nos. 289 to 303 (odd numbers only) inclusive, Streatham High-road, Streatham (Mr. A. E. Chasemore for Mr. G. W. Elvin).—Consent.

Wandsworth.—Six houses on the northern side of Church-lane, Tooting, between Morpene-road and Lucien-road (Messrs. Nash & Lillywhite).—Consent.

Wandsworth.—The retention of bay-windows and porches to six houses on the northern side of Streatham-common North, Wandsworth, between Valley-road and Deerhurst-road (Mr. W. Newton Dunn).—Consent.

Wandsworth.—Porches to ten houses on the southern side of Hazel-road, Putney, between Larpent-avenue and Luttrell-avenue (Mr. J. C. Radford for Mr. E. R. Parry).—Consent.

Wandsworth.—A building at St. Anne's Hoe, Streatham-hill, Wandsworth (Mr. W. Begley for the Guardians of St. Pancras).—Consent.

Woolwich.—A motor-house at the rear of No. 240, Burrage-road, Wandsworth, to abut upon Cambridge-place (Mr. J. O. Cook for Dr. F. H. Preston).—Consent.

Hackney, Central.—The bringing forward of a one-story addition in front of No. 422, Mare-street, Hackney (Messrs. Davis & Emanuel for Mr. H. W. Hickman).—Refused.

Lewisham.—Additions and raised basements at Nos. 1 and 2, Albert-villas, Station-approach, Catford-bridge (Mr. A. W. Osborn for Mr. D. Murray).—Refused.

Marylebone, East.—An iron and glass shelter in front of a building on the northern side of Wigmore-street, St. Marylebone, abutting also upon Welbeck-street (Messrs. Wallace & Gibson for Messrs. Debenham, Ltd.).—Refused.

Marylebone, East.—A projecting porch in front of No. 23, Upper Wimpole-street, St. Marylebone (Mr. S. W. Neighbour for Mr. C. Gibbs).—Refused.

Norwood.—Two houses on the north-western side of Horne-hill, Norwood, to abut also upon Poplar-walk (Mr. F. J. Handforth).—Refused.

Width of Way.

Canterwell, North.—Consent, in connexion with the erection of a building at the rear of No. 111, Canterbury-road, Canterbury, to the retention of a boundary fence wall at less than the prescribed distance from the centre of the roadway of Goodyear-place (Mr. A. E. Symes for the Addington Timber, Slate and Cement Company, Ltd.).—Consent.

Kensington, North.—Additions at St. John's school, Heathfield-street, Notting-hill, at less than the prescribed distance from the centre of the roadway of Heathfield-street (Messrs. Beazley & Burrows for the managers of the school).—Consent.

Kensington, South.—Retention of a one-story building on the southern side of Seymour-place, Fulham-road, Kensington, between Nos. 9 and 11, and at less than the prescribed distance from the centre of the roadway of the street (Mr. M. King).—Consent.

Kensington, South.—Retention of manure pits on the eastern side of Logan-mews, Logan-place, Kensington, at less than the prescribed distance from the centre of the roadway of Logan-mews (Messrs. Chesterton & Sons for Mr. A. H. Farrow).—Consent.

Southwark, West.—Buildings on the northern side of Welber-street, Southwark, to abut also upon the eastern side of Valentine-place (Mr. W. Egerton for the Malina Company).—Consent.

Strand.—A one-story addition at the rear of "The Windsor" public-house, No. 427, Strand, at less than the prescribed distance from the centre of Harvey's-buildings (Mr. H. G. Leslie).—Consent.

Woolwich.—A workshop building at the rear of No. 69, Pattison-road, Woolwich, at less than the prescribed distance from the centre of a passage-way leading from Pattison-road to Hudson-road (Mr. H. Greenberg).—Refused.

Formation of Streets.

Hackney, South.—That an order be issued to Messrs. Reynolds & Eason, refusing to sanction the formation or laying out of a new street for carriage traffic on a site on the eastern side of Temple-mills-road, Hackney-wick (Messrs. A. E. & O. Bradshaw).—Refused.

Space at Rear.

Paddington, South.—Buildings upon the site of No. 112, Westbourne-grove, Paddington, with an irregular open space at the rear (Mr. G. A. Sexton for Messrs. T. Elliott & Sons).—Consent.

Whitechapel.—Buildings upon a site on the eastern side of Lolesworth-street, Whitechapel, to abut also upon Wentworth-street and Thrawl-street, with an irregular open space at the rear (Messrs. Dolley & Altman).—Consent.

Space at Rear and Alteration of Building.

St. George, Hanover-square.—An addition over a portion of the space at the rear of No. 39, Curzon-street, Mayfair (Mrs. B. Skeffington-Smyth).—Consent.

Space at Rear, Projections and Alteration of Building.

St. George, Hanover-square.—An addition to "Berkeley House," on the southern side of Hay-hill, St. George, Hanover-square, to abut also upon Berkeley-street (Mr. W. Wonnacott for Mr. A. H. Young).—Consent.

Alteration of Building.

Hamptstead.—The separation with glazed wooden screens of a proposed lock-up shop to be erected in a booking-hall of the Finchley-road station (Metropolitan Railway) (Mr. E. Owers).—Refused.

Architectural Societies.

BRISTOL SOCIETY OF ARCHITECTS.—The Society opened the new session on Monday evening, the 12th inst., at the Fine Arts Academy, Queen's-road, Bristol, the President, Mr. H. Dare Bryan, being in the chair, when a paper was read on "Public Buildings," by Mr. H. W. Wills, of London. The lecturer started with the planning of Egyptian buildings, and those of the Romans and the Greeks, and pointed out how the fine principles of planning embodied in these buildings could be adapted by the skilful planner to modern requirements. The paper was illustrated by numerous lantern slides, and was concluded by several illustrations of modern public buildings. A vote of thanks to the lecturer was proposed by Mr. M. A. Green, seconded by Mr. R. C. James, and carried by acclamation. The Society meets as usual on the second Monday in each month at the Fine Arts Academy, and at each meeting papers of interest to the members are to be read. It is hoped that it will be possible to throw some of these meetings open to the public, who would be admitted by invitation cards on those occasions when the subjects of the papers were of general interest.

MANCHESTER SOCIETY OF ARCHITECTS.—The second general meeting of the students of this Society was held on the 15th inst., when Mr. G. Hartley Goldsmith gave a paper on "The Influence of Materials on Architecture," and illustrated it by means of numerous lantern slides. The lecturer began by pointing out the origin of the Egyptian style, from the primitive use of reed and mud construction. Turning to the Greek Doric style, he showed the wooden origin of the entablature and also of the Ionic and Corinthian styles. The Roman style he described as breaking away from treasured Greek work, and developing a new style by means of arch construction combined with the use of concrete. This was carried to a further end in Byzantine times by means of the pendentive dome. He gave reasons for the origin of the stone vault which appeared in South France in the Romanesque period, and gave a very full account showing how the use of small stones laid in mortar was directly responsible for the development of the Gothic style.

Renaissance work he criticised severely, as it was not true to the material it used, whilst he considered modern architecture to be in a transition stage, architects not realising as yet the full possibilities of steel construction. Professor Capper occupied the chair, and afterwards offered some excellent suggestions on points on which the lecturer was rather uncertain, quoting Pausanias, to show that the Greek Doric column was probably derived from a wooden origin.† A very interesting and lively discussion followed.

Engineering Societies.

JUNIOR INSTITUTION OF ENGINEERS.—Under arrangements kindly made by Mr. A. L. C. Fell, M.I.E.E., Chief Officer of the London County Council Tramways, a visit to the Council's electricity generating-station at Greenwich was paid by this Institution on November 17, and was numerously attended. The Superintendent, Mr. E. W. Dickinson, and members of the staff showed the members round in parties, the features of interest being:—Pier, to land about 1,000 tons of coal per day, can accommodate heavy steam colliers; electric coal-handling machinery; mechanical conveyors, capacity of bunkers 13,500 tons; mechanical stokers; twenty-four five-drum Stirling boilers, 200 lb. pressure; superheaters; economisers; engines of reciprocating type; four steam generating sets, 3,500 kw. capacity each. Only half of the station built at present. Proposed to use turbo-generators of total capacity 20,000 kw. for second half. Existing generators are of revolving field type, delivering three-phase currents at 6,600 volts between phases, 25 cycles per second, and star-wound stators

* Is Mr. Goldsmith quite sure of that?—Ed.

† Pausanias only mentions that he had seen a wooden column, but that only proves that in a certain case wooden columns were used—possibly for economy. The whole character of the earliest known Doric columns is against the idea of a wooden origin.—Ed.

with centre point earthed. Laminated steel stamped magnets. Switchgear of oil-break, remote control, electrically operated. Provision for eight generators and thirty-two feeders. Substation contains three motor-generators of 500 kw. capacity to supply direct current at 550 volts. Battery of 280 Tudor cells. Condensing water from the river by four 30-in. cast-iron pipes. Electric crane in yard. Estimated cost of complete station 900,000/.

Fifty Years Ago.

FROM THE *Builder* OF NOVEMBER 22, 1856.

LONDON DEATH-RATES.

IN illustration of a lecture given by Mr. John Leslie at the Polytechnic on Monday last, a notice of which will be found on another page, the lecturer introduced a very remarkable map of London, thrown on the disc from a MS. map prepared by the Registrar-General, showing the average annual mortality of the various districts during ten years (1841 to 50, inclusive), and marking in black colour those parts, mostly bordering the river, where the rate of mortality is highest. Let us say in a parenthesis that this illustration alone will justify a visit to the Polytechnic on Tuesday next, when the lecture is to be repeated. And what did this death-map show? Why, that while in Putney and in the Hanover-square district, the average number of deaths annually in every thousand of the population was 16, and in Dulwich and Sydenham 14 only; in Bermondsey it was 28; in part of Chelsea, 31; in Shoreditch, 33; and in part of Greenwich no less than 47! What more striking evidence could be adduced that there are accidental and local causes in operation tending to shorten life, which causes, as Christian men, as political economists, and as egotists simply striving to save ourselves, it is our paramount and most pressing duty to strive to remove.

Illustrations.

STATUE AT KING EDWARD VII. SCHOOL, KING'S LYNN.

WE illustrated last week the new schools at King's Lynn, which were recently opened by the King in person.

The pedestal with the statue of King Edward VII., illustrated this week, stands in front of the principal façade of the building. Mr. W. R. Colton, A.R.A., is the sculptor.

NATIONAL PROVINCIAL BANK OF ENGLAND, LTD. (WORCESTER BRANCH).

THESE new premises are being erected on the site of the Golden Cross, Worcester. The former building, which had to be demolished, contained certain features interesting to antiquarians, such as an old crypt which is presumed to have been connected with the City Cathedral, in the days before the Reformation, by an underground passage.

The ground floor and basement of the front portion of the new building are occupied by the bank, and the remainder of the building is tenanted by the Inland Revenue authorities.

The front is of Portland stone, and this stone is also used on the sides, together with pressed brick. The interior woodwork about the bank is teak. An asphalt flat over the first floor takes the place of a roof.

The general contractors for the building are Messrs. Bromage & Evans, of Worcester. The heating, lighting, and ventilating will be carried out by Messrs. Pemberton, Arber, & Co., of Gray's Inn Passage, Holborn; and the architects are Messrs. Chas. Heathcote & Sons, of London and Manchester.

HAMBLETON CHURCH, RUTLAND.

THE portion of the church shown in the view, exhibited in this year's Academy, consists of one bay of the nave with 12th century arcade and 15th century clearstory, the proposed nave and aisle roofs, the screen to the chapel, with figure of S. Andrew—all in oak. A new chancel arch with metal screen, pulpit, rood, lectern, faldstool, and organ in

oak. The organ pipes are gilded with the ornament burnished.

The reredos is a triptych gilded and burnished, with a panel subject of the Crucifixion: the Ascension is illustrated in the East window above the reredos.

The chancel, with a new oak roof and a complete scheme of stained glass for the windows, was completed in 1891.

Mr. John T. Lee is the architect.

SKETCHES IN SPAIN.

THESE illustrations are reduced from some of the water-colours by Mr. H. C. Brewer which, as mentioned in a note on page 592, are at present exhibited at the Gallery of the Fine Art Society.

COURT OF COMMON COUNCIL.

A MEETING of the Corporation was held at the Guildhall on Thursday last week, the Lord Mayor, Sir William Treloar, presiding.

Widening of Cloth Fair.—The Improvements

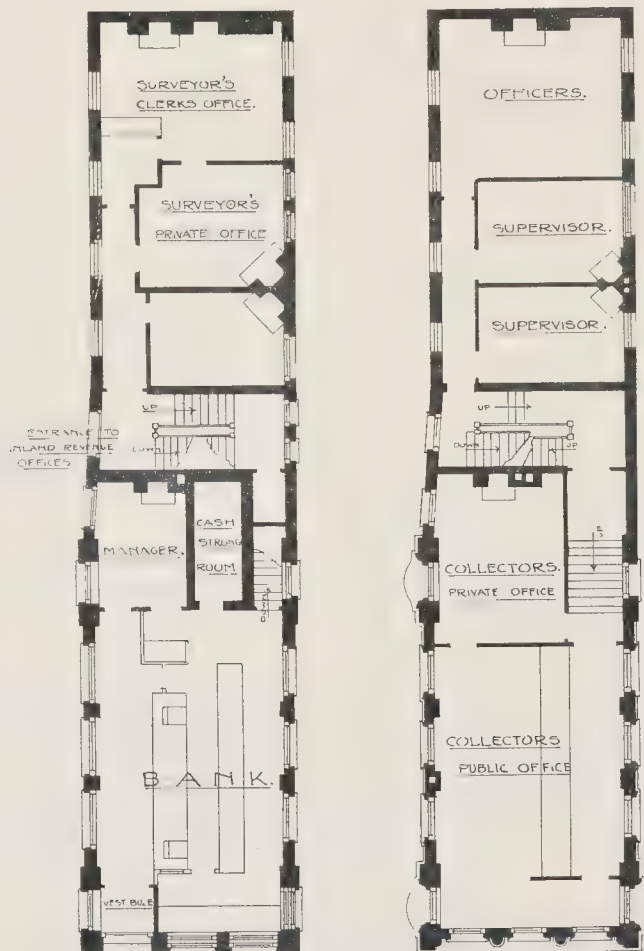
and Finance Committee submitted an arrangement, which was adopted, for acquiring the freehold interest in so much of the upper floors of No. 60, West Smithfield, as project over Cloth Fair and the party wall on the southern side supporting the same, for the sum of 2,000/.

Repairs, etc.—It was agreed, on the recommendation of the same committee, to accept the tender of Messrs. Story & Triggs for re-upholstering the seating, etc., in the committee-room; and also to carry out certain internal cleansing and painting works, etc., needed at the Artizans Dwellings in Stoney-lane, Houndsditch.

LECTURE HALL, BASINGSTOKE.—A new lecture hall is being erected in connexion with the London-street Congregational Church, Basingstoke. Messrs. Wallis & Smith, architects, prepared the plans for the work.

SALE OF LAND AT FOREST GATE.—Messrs. Boyton, Sons, & Trevor, sold recently, by private treaty, freehold ground rents amounting to 50/ per annum, secured upon a weekly property in Forest-street, Forest Gate. The price realised was, approximately, twenty-three years' purchase.

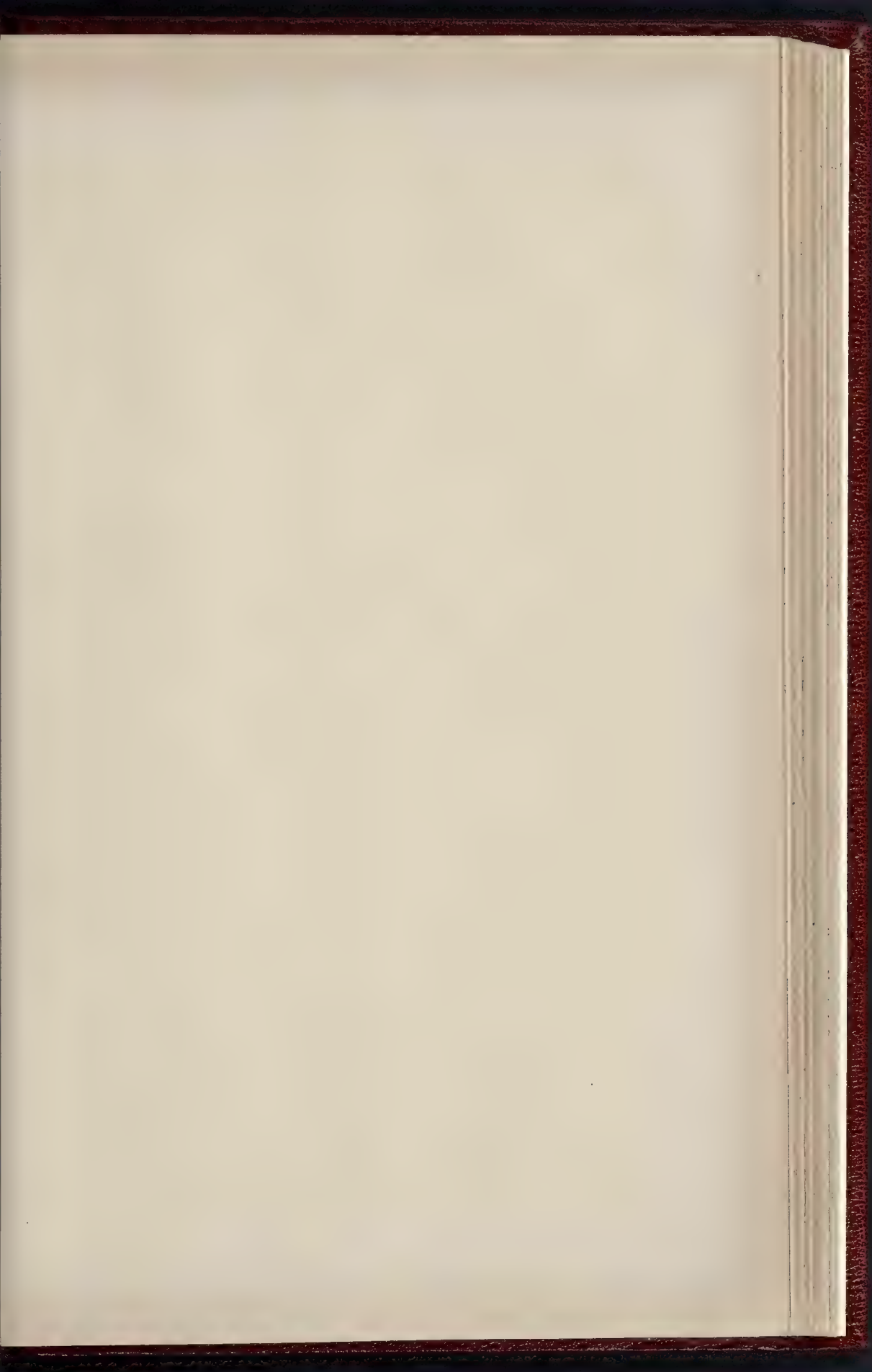
SCALE OF FEET
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GROVAD~

FIRST~

National Provincial Bank, Worcester. Plans.

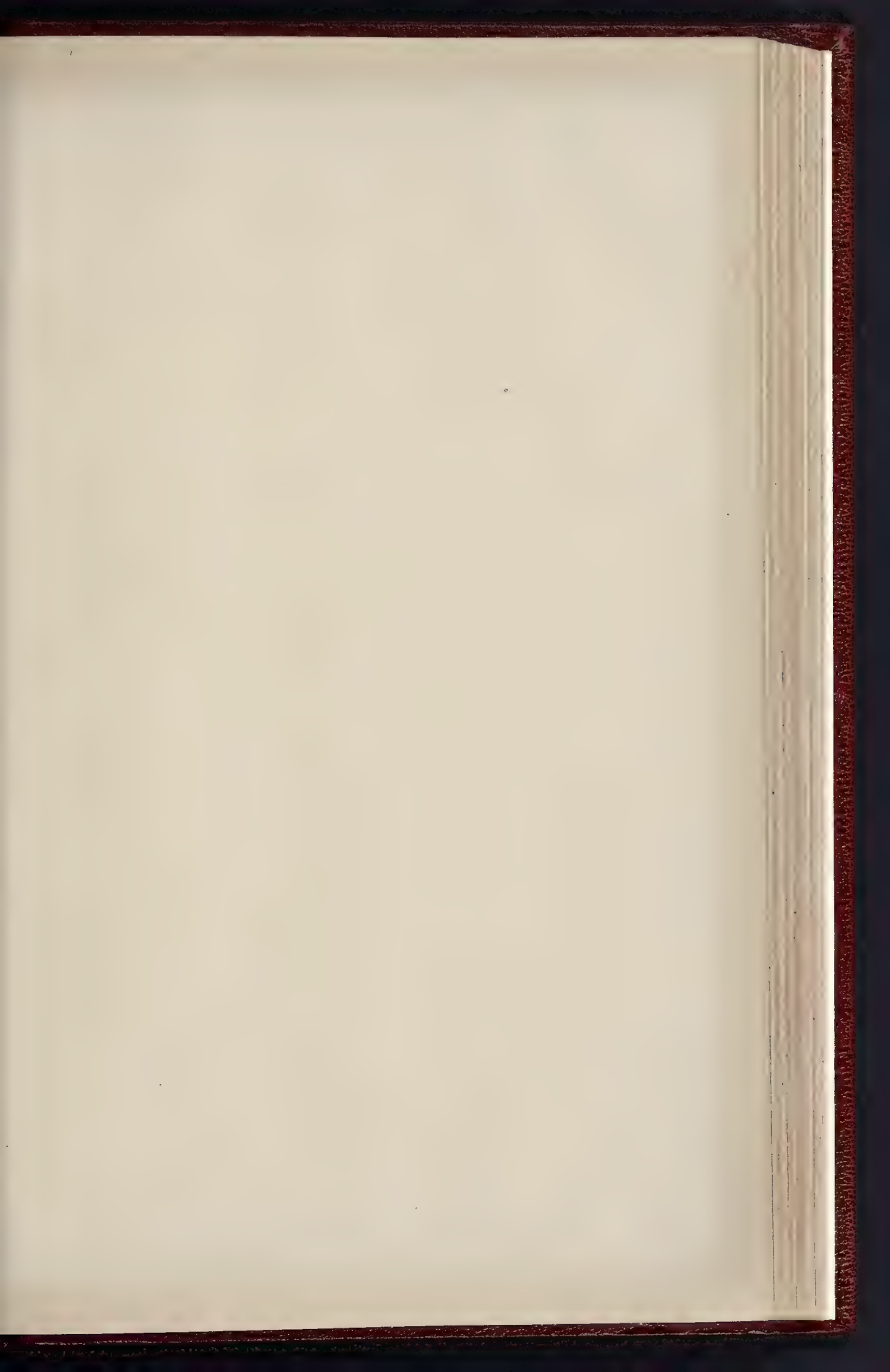




THE QUEEN AND THE KING



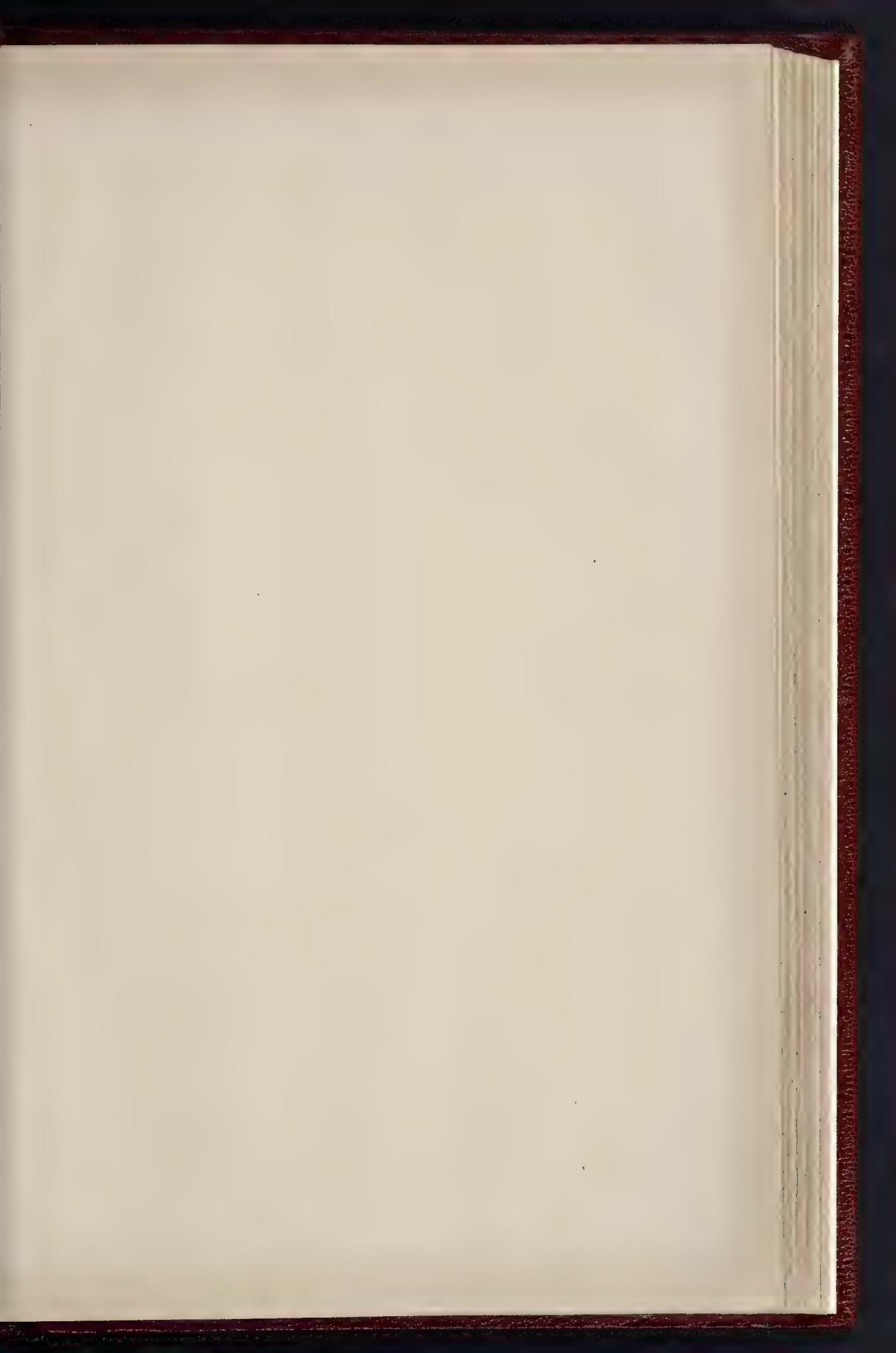
STATE IN FRONT OF KING EDWARD VII SCHOOL, KIN IS LANN - MR W R COLTON A.R.A. SCULPTOR





THE NATIONAL PROVINCIAL BANK OF ENGLAND.



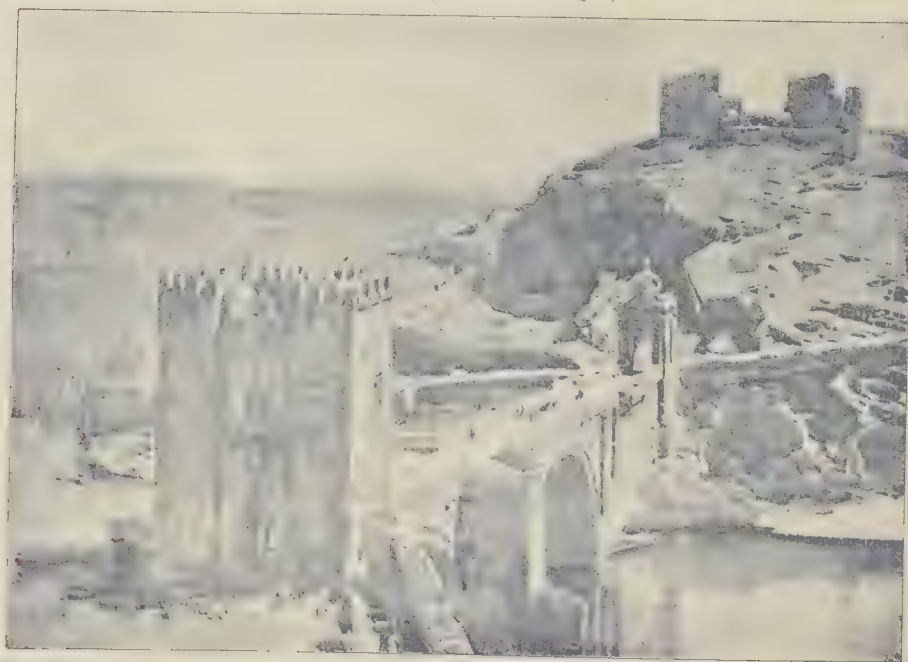




CHURCH OF CRISTO DE LA LUZ, TOLEDO (AN ANCIENT MOSQUE).



BURGOS



BRIDGE OF THE ALCANTARA, TOLEDO.



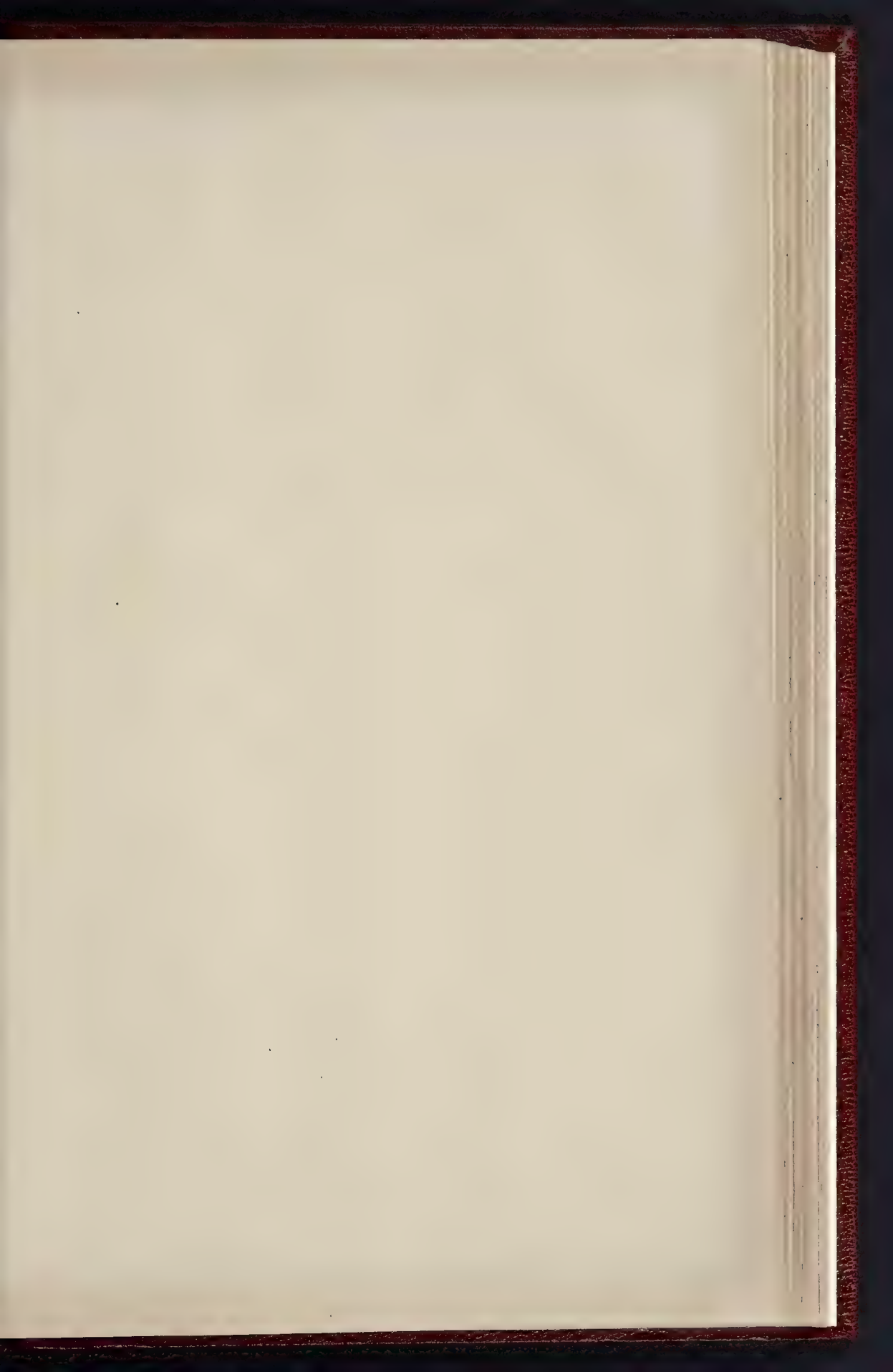
DRAL.



INTERIOR, TOLDO CATHEDRAL.

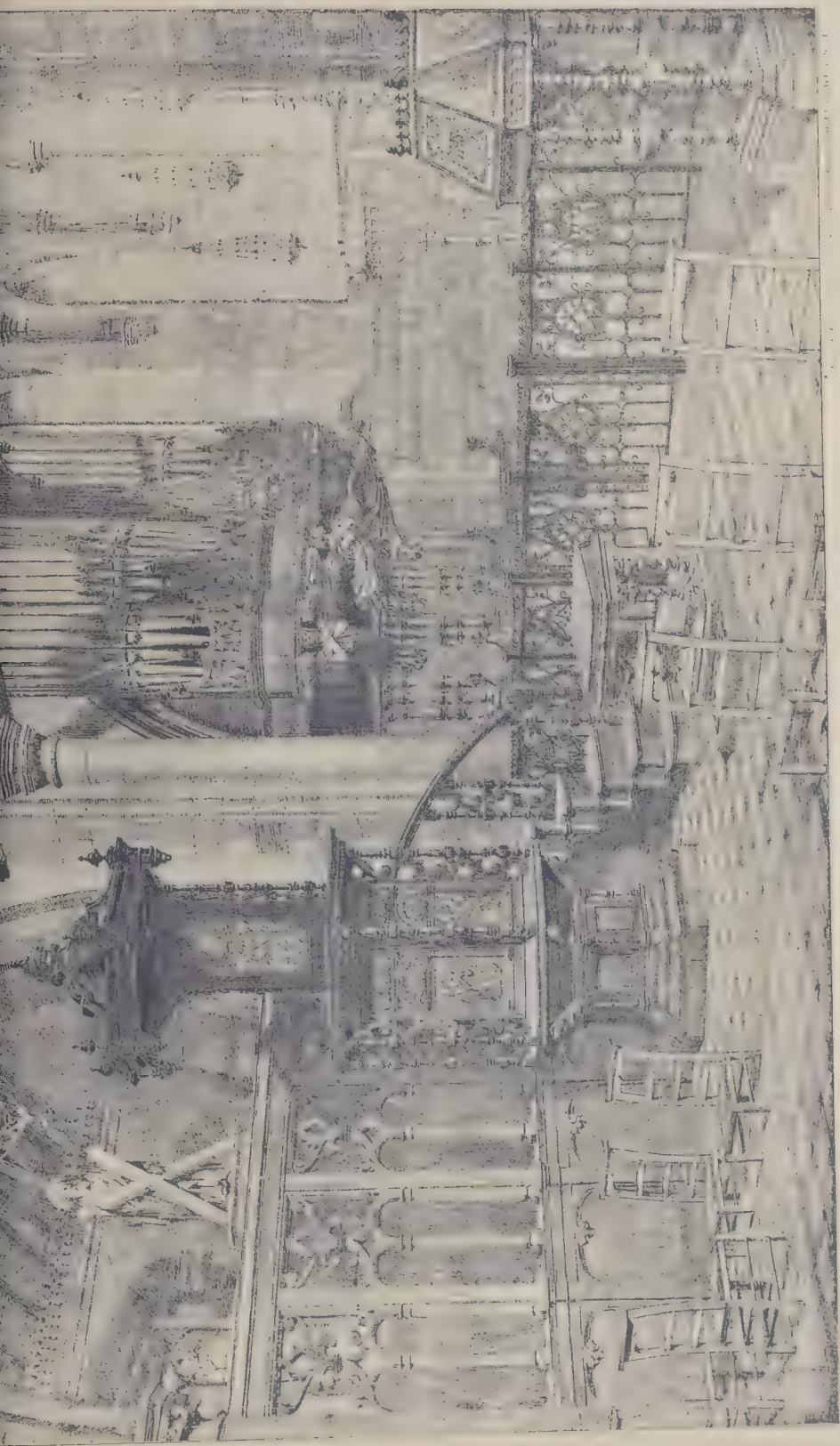


PATIO OF MOSQUE, CORDOVA.



THE BUILDER, NOVEMBER 24, 1906.





Competition.

JARNSLEY HIGH SCHOOL FOR GIRLS.—The ended time for sending in drawings expires on November 30. The assessor is Mr. R. Robson, of Westminster.

Books.

Tests of Road-making Stones. By B. J. LOVEGROVE, M.Inst.C.E. With Petrological Descriptions by JOHN S. FLETT, M.A., D.Sc., F.R.S.E., and J. ALLEN HOWE, B.Sc. (London: The St. Bride's Press.)

RECOGNISING the dearth of reliable information concerning the relative value of different kinds of stone for road-making purposes, Mr. Lovegrove, the Borough Engineer of Hornsey, made a series of tests upon a large number of rocks of various classes, and the results, together with specimens of the material before and after treatment were submitted for examination and report to the Geological Survey.

The book now published contains a tabular summary of the tests conducted at Hornsey upon numerous varieties of eight classes of rock derived from sources in different parts of the United Kingdom, and including some from France and Germany, and, in addition, upon samples of blast-furnace slag and artificial stones. The tabular attribution tests prepared by Mr. Lovegrove states the description of stone, the quarry locality whence it was derived, whether broken by hand or machine, the percentages of chips and dust detached during wet and dry tests, and the specific gravity of the material. The test number is also given and reference to the page where a petrological description of the stone will be found. The author says that "in comparing the hand and machine-broken stone, out of ten tests referred to in the list eight are in favour of the hand-broken method." This inference is a little vague. Examination of the table leads to the inference that it refers to some isolated cases where samples of the same stone, broken by hand and machine respectively, were made the subject of comparative tests. It would not be wise to draw any sweeping conclusion from these results, especially as the rocks least suitable for road-making are apt to splinter in the machine, and the most suitable rocks tend to break with a cubical fracture.

From the standpoint of the road engineer the percentage of chips detached during test may be taken as an indication of brittleness; but Mr. Lovegrove points out that, as chips help to maintain the fabric of the road itself, a moderately large percentage does not necessarily militate against the use of the stone for certain classes of work.

The percentage of dust produced by attrition tests is a valuable criterion by which to judge the merits or demerits of road metal, because every ounce of dust produced in actual practice represents absolute loss of money to the ratepayers and inconvenience to the public at large. In the case of rocks requiring equal percentages of dust in dry tests, the loss in wet tests affords a useful indication of relative resistance to abrasion in wet weather. The differences exhibited by the results for dry and wet tests are shown by the table to be extremely varied, the loss in the wet test ranging from 0 to 32 per cent. more than that given by the test.

Specific gravity has no connexion with quality, and is merely given in the table as an approximate guide to freight charges.

Useful as the information collected in the table undoubtedly is, the results are not by themselves sufficient as an absolute indication for road wear. Recognising this fact, Mr. Lovegrove took steps with the object of securing the co-operation of the Geological Survey, so that the data furnished by his tests might be published in connexion with petrological descriptions and photo-micrographs of the materials examined. Accordingly, the records of tests conducted at the establishment of the Hornsey Borough Council, together with specimens of the rocks examined, were submitted to Dr. Flett, the petrographer to the Geological Survey

and Museum, who prepared exhaustive reports, from which the "Petrological Descriptions," with photo-micrographic illustrations, occupying the greater part of the present publication, were collated by Mr. Howe, the Curator of the Museum of Practical Geology.

A minor disadvantage evidenced by comparison of Mr. Lovegrove's table with the petrological descriptions is that two entirely different systems of grouping have been adopted. Whether the discrepancy results from editorial inadvertence or from irreconcilable difference of opinion on the part of the collaborating authors we do not know. The practical effect of the conflicting groupings is that a certain amount of unnecessary trouble is entailed upon the reader who wishes to compare the results of tests with the corresponding petrological descriptions.

Following the notes by Dr. Flett and Mr. Howe are a discussion of the results, a series of general conclusions, and an additional table of results not previously made public. The record here presented and the collection of specimens at Jernyn-street should be found of the utmost value to road engineers and authorities, who have been compelled in the past to rely largely upon individual experience, and, as Mr. Lovegrove aptly says, to enter upon "the pursuit of guiding principles by means of wasteful experiment."

The Law Relating to Railway Traffic. By THOMAS WAGBORN, Barrister-at-Law, formerly Chief Accountant of the Buenos Ayres Great Southern Railway, etc. (London: Eltingham Wilson, 1906.)

THIS little treatise forms one of a series of "Legal Handy Books," and in a very compact form appears to contain much useful information on a subject of considerable complexity, but one of much interest to the general public—the law relating to railway traffic.

In the preface the author states that the statutes, rules, and orders relating to this subject occupy 304 pages of print in an octavo volume, of which he is also joint author, whilst in the same volume the decided cases occupy 500 pages; therefore in this treatise, which consists of 140 pages exclusive of the index, little can be done but to summarise the main principles, and this the author seems to have accomplished in a clear manner. The author accounts for the complication of the subject and of the legal decisions upon it by quoting from the Report of a Parliamentary Committee in 1853, which states that in the early history of railway legislation it was contemplated that the railway systems would only furnish new highways open to the public to use with engines and carriages at their own discretion—a view which presents points of interest in the now early development of motor traffic. We warmly endorse the author's remarks on the necessity for codification of the law, for, as in many other branches dealing with matters of everyday occurrence in daily life, the law relating to railways is in a condition that can only be comprehended by expert lawyers. We find no table of cases, and, as we have observed in connexion with other volumes of this series, we think this addition would much enhance the value of these volumes, and it would also be well in every instance when citing a decided case to give a reference to the Report where it is to be found. The task of compression is a difficult one, and the author seems successfully to have accomplished it in this work.

English Domestic Architecture of the XVIIth and XVIIIth Centuries. By HORACE FIELD and MICHAEL BUNNEY. (London: George Bell & Sons, 1905.)

THERE is probably no period in English domestic architecture that has contributed more to the picturesqueness and architectural value of our street architecture than that included within the scope of this very delightful volume. The city or market town that does not still preserve some examples in the material of the district, be it stone, brick, or wood and plaster, is fortunately the exception, and the perusal of these pages, and the fine photographs and measured drawings with which it is illustrated, will bring back to most the recollection of examples seen and

noted, or of others of very similar character. With such a large number to choose from selection must have been a matter of considerable difficulty, but the authors have succeeded in bringing together a good series of typical examples of the time, and have done for the smaller type of house what has already in other works been done for the larger mansions of the Renaissance. In addition to this smaller type of dwelling-house the almshouse, "hospital," and market-hall are also illustrated, and some of the many doorways that abound in a great variety of forms. The counties of Somerset, Wilts, and Gloucester supply, as is natural, some of the best examples of building entirely of stone, and the street scenes in Tetbury, Cirencester, and Wootton Bassett are good types of the charm of these old country towns. Bromley College, Kent, and the House of Matrons at the north west angle of the close at Salisbury are the most important of the almshouse type illustrated, although equal praise should be given to the more modest, if equally dignified, treatment of others at Oxford, Bradford-on-Avon, Blandford, and Buntingford. The examples of houses have been taken from such widely different districts as Lancashire, Suffolk, the Midlands, and the south and south-western counties, but, as is noted by the authors in the preface, it is in the stone districts chiefly that the traditional type of house has been most completely preserved. In all about 200 examples are given, and with the concise notes on each, and the introductory chapter, together make up a volume which will be a possession to value by all interested in this essentially English development of domestic work, quiet and refined, and of excellent proportion, equal in value to the more elaborate examples which have been described and illustrated of late years in other volumes.

Memorials of Old Hampshire. Edited by G. E. JEANS, M.A., F.S.A. (London: Bemrose & Sons, 1906.)

THIS volume consists of a series of twenty papers, and rather more than half the number deal with subjects of architectural interest. The opening chapter by the editor describes generally the chief points in the church work of the county, which, although not rich in comparison with neighbouring counties so far as its parish churches are concerned, could never be considered poor architecturally, as it possesses within its borders the grand buildings at Winchester, St. Cross, Romsey, and Christchurch, Twynham, and the beautiful detail in the ruins of Netley and Beaulieu Abbeys. With the exception of the Cathedral all the foregoing are dealt with in separate papers, and there is a highly interesting and valuable chapter on the wall-painting of the county, from the pen of that well-known authority on the subject, Mr. C. E. Keyser, Wolsey Castle, Winchester College, and the houses at Bramshul, Place House, and Basing are also described, and the stirring events connected with the siege and heroic defence of Basing House are well told by the Rev. G. N. Gibson. The description of the conventional buildings at Netley Abbey, however, requires some revision before they can be accepted as correct. The building south of the chapter-house on the east side of the cloister was certainly not the refectory but the sub-vault of the dormitory. The refectory stood on the south side of the cloister, was placed at right angles to the church, and the traces of the entrance to it have survived the Elizabethan alterations which were made on its site, and which no doubt caused its destruction.

The work throughout is very fully illustrated with a number of fine full-page photographic plates. Those of the Norman font and elaborate altar screen at Winchester Cathedral, of the east end of the Abbey Church at Netley, the pulpit at Beaulieu, and the frescoes at Bramshul and Cathering are particularly noteworthy. In addition to the foregoing are chapters on Silchester and the excavations there, on the Jewish Settlement in the Meon Valley, on Southampton, the New Forest and Portsmouth, and a short notice of the traces of the Knights Hospitallers at North Baddeley. It is a work which should find many readers, as it treats of one of the most interesting perhaps of our English counties.

The Cathedrals of England and Wales. By T. FRANCIS BUMFUS. (London: T. Werner Laurie. 1906.)

THE third and last volume includes the Cathedrals of Lichfield, Gloucester, Rochester, Carlisle, Oxford, Ripon, and St. Albans, the four Welsh Cathedrals, and the churches of the modern sees of Manchester, Wakefield, Southwark, and Truro, Liverpool, and Birmingham. The illustrations, as in the two former volumes, are chiefly from photographs of the actual buildings; one or two are from old engravings. The most interesting perhaps in the present volume are those of the exterior and interior of St. Albans, taken in 1870, before the recent restoration so altered the appearance of both, the interior of the nave of Ripon showing the curious arrangement at the "crossing," and the fine group formed by the buildings at Southwell as seen from the north-east. The letterpress is very full of interesting facts relating to the history and buildings of each cathedral, brightly and clearly written; and the whole series will make a useful book of reference for those who do not care for the more technical descriptions of other works on this ever-fascinating subject.

A Glossary of English Architecture. By T. D. ATKINSON. (Methuen. 1906.)

ACCORDING to statements in the preface, the author limits this glossary to the historical aspect of architecture, and includes "only incidentally words used in art and in building." As art and construction lie at the very root of the matter, it is not clear how such terms could well be dispensed with in a book of the sort. The publication is about the same size as Parker's "Concise Glossary," but it does not contain as many definitions. On the other hand, it includes many words which are not found in Parker, and devotes more space to excellent short articles on houses and churches rather than to purely architectural terms.

It is a pity that Gwilt's erroneous definition of Boule work as being "wood inlaid in wood" should be quoted, and the confining of strap ornament to the pierced tracery of Elizabethan parapets seems an unnecessary restriction of the term. But in the main the definitions, as well as the profuse illustrations, chiefly by the author, are good. The appendix contains several useful tables, one of the most interesting being a list of about 100 saints, with the manner in which they are represented.

Heraldic Badges. By A. C. FOX DAVIES. (London: John Lane. 1907.)

WHAT the author modestly terms a "short essay" is an account, so far as they are at present known, of the origin, history, and use of badges, which will be of value to all interested in the fascinating study of heraldry. Although, according to Mr. Fox-Davies, there seems to be no known instance of the actual grant of a badge as a badge, their use in the Middle Ages was of considerable extent, as the goodly list of examples which the author gives clearly shows. They have more than ordinary interest in connexion with architectural work in that they take very often so conspicuous a place in the decoration of ancient buildings. There are few, indeed, of our cathedrals, or of churches in any way connected with the great mediæval families, that have not examples, and, together with the "rebus," which must not however be confused with the badge, they are introduced in great variety on buildings and monuments, and are also to be found in stained glass and on tile pavements. The well-known Warwick badge, the "Bear and Ragged Staff," is still to be seen in the paving at Tewkesbury Abbey, the chained swan of the Bohuns; the knot of the Staffords at Malvern; the running horse in front of an oak tree, the badge of Thomas Fitz Alan, Earl of Arundel, is carved on the face of a buttress at Boxgrove Priory; and in one of the windows at St. Decuman's Church, in Somerset, is a good representation of the "Planta Genista" of the Plantagenet dynasty. Perhaps one of the best-known examples of a monument decorated profusely with badges is that of Prince Arthur at Worcester Cathedral. The Stafford family had no fewer than eighteen badges here illustrated, and these pages show what a very important part this branch of heraldry played in the Middle Ages.

Numerous illustrations are given chiefly from old examples; many are from "Prince Arthur's Book," now in the possession of the College of Arms.

Portfolio of Measured Drawings. School of Architecture, the University of Liverpool. (The University Press. 1906.)

THE preface explains that "during the last two years a set of measured drawings of some approved building, together with a thesis on it, and similar work, has been required from students proceeding to a Bachelor Degree in Arts in the Honours School of Architecture. In this way the majority of the drawings here reproduced have come into existence." The present volume, the first of an intended series, includes measured drawings and details of the Town Hall at Liverpool, river front of the Custom House at Dublin, the Orangery at Kensington Palace, the Senate House at Cambridge, and the two well-known palaces at Versailles, the Grand and Petit Trianon. Additional interest and value are given to these drawings by photographs of the buildings, and the whole forms a very interesting series, with explanatory notes.

Alphabets Old and New. By LEWIS F. DAX. (London: B. T. Batsford. Second Edition. 1906.)

THE first edition of this interesting and useful work has already been noticed in our pages. The second edition has, with its additional information on the subject, over two hundred examples of lettering and numerals, partly, as the title indicates, from old examples and partly from modern sources, to which later the author is a considerable contributor. The old examples have been obtained from specimens in wood, stone, and metal, and to all requiring good and authentic examples of alphabets this little book will be invaluable.

Architectural Sketching and Drawing in Perspective. By H. W. ROBERTS. (London: B. T. Batsford. 1906.)

THE author, the inventor of "R's" method of perspective, which is doubtless already known to many of our readers, has in this work based most of the drawings on that method. The drawing of an architectural perspective is, in actual fact, such a simple matter, only requiring practice and the exercise of thought and common sense, that books on the subject always appear to be unnecessarily complicated; but no doubt those who peruse the pages and illustrations of this work will find the description as simple and straightforward as seems to be possible when writing on the subject.

Quaint and Historic York. From Drawings by E. RIDSDALE TATE, and Notes by GEORGE BENSON. (London: B. T. Batsford. Edinburgh: W. J. Hay. 1906.)

THE twelve drawings by Mr. Tate are apparently photographic reproductions of carefully-finished pencil sketches, and illustrate some of the picturesque streets of the city, its walls and "Bars," for which it is so well known. The history of each building illustrated is given in the notes, and the whole is issued in an ornamental cover.

The "Mechanical World" Pocket Diary and Year-Book for 1907. (Manchester: Emmott & Co.)

THIS, the twentieth annual issue of a very convenient collection of useful data, formulae, and tables, has been entirely reset in new type, and, among other new matter, contains additional information relative to gas and oil engines and a section on suction gas producers. The book will be found nearly as useful to architects and builders as to engineers.

ST. PETER'S CHURCH, STOCKTON.—The dedication of the new tower at St. Peter's Church, Yarmoad, Stockton, took place recently. The tower is square and built of red brick, with stone ornamentation. Mr. Richardson was the architect of the work. The cost has been about 1,000*l*.

EMMANUEL CHURCH, LEEDS.—On the 17th inst. the Bishop of Ripon dedicated the new tower and spire of Emmanuel Church, Woodhouse Lane, Leeds. The work has been carried out from designs by Mr. H. S. Chorley, of the firm of Messrs. Chorley, Connon, & Chorley, architects, Leeds.

Correspondence.

THE CRESSUS TEMPLE AT EPHEBUS.

SIR, Mr. Hogarth informed us on Monday evening that Mr. Henderson's drawings would be published towards the close of next year, when we should be better able to follow his restoration of the Archaic Temple. But there are one or two questions to which I should have liked to draw attention in that restoration, which are independent of the measurements taken by him, had I caught the Chairman's eye.

Firstly, Mr. Henderson has based his restoration of the Cressus Temple on Pliny's description of the Hellenistic Temple, and although we know that they occupied the same site, and in some cases the bases of the latter were found some feet above those of the former, and a photograph was exhibited of one instance in which they are both shown *in situ*, it does not necessarily follow that there were the same number of columns in the two Temples, so that the difficulty of knowing where to locate the 127th column does not arise.

Secondly, Mr. Henderson exhibited a conjectural restoration of the Portico of the Cressus Temple, but did not show the return of the angle capital on the flank, and this is the crux of the whole question. He suggested an angle volute, but as, on the return, the capital could only be half the width, its design would have resembled the grotesque example at Teichisus. Personally, I have always looked upon the capitals of the Archaic Temple as belonging to columns placed *in antis* between walls or piers, and I should have had the courage to indicate a pier at each angle of the Portico as the only solution of the problem.

Thirdly, whilst agreeing with Mr. Henderson in the omission of the frieze from his entablature, I am at a loss to understand why he should not have included the chief characteristic of all the *Ionian Temples*, viz.: the deep projecting dentil course. This would have enabled him to give a greater thickness, in his section, to the roof, which is now reduced to a feather edge, and might have dispensed with the broken pediment shown in his restoration, broken not at the top, but towards the lower end or east side.

That which must have struck all those who followed Mr. Henderson's description the other evening was the extraordinary patience, perseverance, and energy which he had devoted to the measurement of every fragment on the site, and the delineation of one of the most elaborate plans I have ever seen, and, when published, those drawings will have an exceptional value as possibly the last record which will be made of the famous temples on the site.

R. PHENÉ SPIERS.

THE ZODIAC IN FRENCH CHURCHES.

SIR,—It may be of interest to contrast the use of the zodiac in French churches, with that in English, as already enumerated. The following instances are all that I know of:—

1. *Outside Churches.*—Vall: On the east wall of St. Paul, Isoire, are twelve medallions of the signs—Xth century—let in under the cornice. "Dictionary of Architecture," Murray: "France," 1852, p. 388.

2. *Doorways.*—In mosaic on the great doorway of Notre-Dame Cathedral, Rheims, XIth century. "Dict. Arch." "Archæologia," xlv.

On the pedestal of the right-hand doorway of the Abbey Church S. Denis. "Archæologia," xlv. Engraved in Hugo: "France Historique et Monumentale," 1836, iv. 2, 4, 9; also in Lenoir: "Des Arts," pl. 20; and a cast of it in Salle A., No. 78, Trocadéro, Paris.

With the month occupations, around the great door of Chartres Cathedral, XIIth century. Fowler: "Archæologia," xlix; Higgins: "Anacalypsis," i. 20; Le Due: "Dic. de l'Arch.," ix. 551; Murray, 114; pencil drawing of it in Salle C., Trocadéro; and photograph of it in Salle B., Trocadéro.

Cathedral at Bazas. "Archæologia," xlv; Murray, 114; "Annales Archéologiques"; cast of it in Salle A.; and photograph of it in Salle C., Trocadéro.

With the month occupations alternately, Autun Cathedral; photograph of it in the Trocadéro. In the Ecole des Beaux Arts, Paris, taken from S. Geneviève. "Musée des Mon. Français," 1800-6, vii. No. 514; Lenoir: "Statistique de Paris," 1843; engraved in Lenoir: "Des Arts de France," 1811, xxiii.

Very large, on the left hand portal, in two rows of quatrefoils, with month occupations under each sign. Amiens Cathedral. "Archæologia," xlv; "Dict. Arch." Around the Porte de la Vierge, grand

of 5,000 lb., and requires to have the effective area of

$$5,000 \div 16,000 = 0.3125 \text{ sq. in.}$$

By the British standard specification for screw threads the cross-sectional area at the bottom of the thread of a $\frac{3}{4}$ -in. bolt is 0.3038 sq. in. This being a little too small, we adopt $\frac{7}{8}$ in.—the next size in general use—with the net sectional of 0.4216 sq. in.

For convenient reference we give in Tables XL and XLII, particulars of British standard Whitworth screw threads and Whitworth standard bolt heads and nuts.

TABLE XL.—BRITISH STANDARD WHITWORTH SCREW THREADS ($\frac{1}{4}$ INCH TO 3 INCH).

Full Diameter.		Threads per Inch.	Pitch.	Standard Depth of Thread.	Effective Diameter.	Core Diameter.	Cross Sectional Area at Bottom of Thread.
Inch.	Inch.						Square Inch.
$\frac{1}{4}$	0.25	20	0.0500	0.0320	0.2180	0.1860	0.0272
$\frac{1}{2}$	0.50	14	0.0356	0.0356	0.2769	0.2414	0.0458
$\frac{3}{4}$	0.75	16	0.025	0.0400	0.0400	0.3350	0.0883
1	1.00	14	0.0714	0.0457	0.3918	0.3460	0.0940
$1\frac{1}{4}$	1.25	12	0.0833	0.0534	0.4469	0.3933	0.1215
$1\frac{1}{2}$	1.50	12	0.0833	0.0534	0.5061	0.4558	0.1632
$1\frac{3}{4}$	1.75	11	0.0909	0.0522	0.5668	0.5063	0.2332
2	2.00	11	0.0909	0.0522	0.6273	0.5711	0.2562
$2\frac{1}{4}$	2.25	10	0.1000	0.0640	0.6860	0.6219	0.3308
$2\frac{1}{2}$	2.50	10	0.1000	0.0640	0.7458	0.6811	0.3679
$2\frac{3}{4}$	2.75	9	0.1111	0.0711	0.8039	0.7427	0.4316
3	3.00	9	0.1111	0.0711	0.8651	0.7952	0.4966
$3\frac{1}{4}$	3.25	8	0.1250	0.0800	0.9200	0.8339	0.5540
$3\frac{1}{2}$	3.50	7	0.1429	0.0915	1.0335	0.9420	0.6949
$3\frac{3}{4}$	3.75	7	0.1429	0.0915	1.1583	1.0670	0.8042
4	4.00	6	0.1667	0.1067	1.2683	1.1616	1.0597
$4\frac{1}{4}$	4.25	5	0.1667	0.1067	1.3833	1.2666	1.3001
$4\frac{1}{2}$	4.50	5	0.2000	0.1200	1.4969	1.3689	1.4718
$4\frac{3}{4}$	4.75	5	0.2000	0.1200	1.6219	1.4739	1.7528
5	5.00	4	0.2222	0.1422	1.7327	1.5904	1.9866
$5\frac{1}{4}$	5.25	4	0.2222	0.1422	1.8577	1.7104	2.3111
$5\frac{1}{2}$	5.50	4	0.2500	0.1601	1.9804	1.8304	2.5349
$5\frac{3}{4}$	5.75	4	0.2500	0.1601	2.1039	1.9538	2.7638
6	6.00	3	0.2857	0.1830	2.2270	2.0711	3.1641
$6\frac{1}{4}$	6.25	3	0.2857	0.1830	2.3510	2.1941	3.4186

The tie P₂ L₂ has to withstand the tensile force of 16,100 lb., the effective area required being

$$16,100 \div 16,000 = 1.03 \text{ sq. in.}$$

As the net area of 1.0597 sq. in. is given by a $\frac{1\frac{1}{4}}$ -in. diameter rod, that size can be adopted.

But the area of a $\frac{1\frac{1}{4}}$ -in. diameter rod ($1.25^2 \times 0.7854$) = 1.227 sq. in. is ample in itself. Therefore, by upsetting the ends to the diameter of $\frac{1\frac{1}{4}}$ in. and screwing them with the same-sized thread the effective

TABLE XLII.—WHITWORTH STANDARD BOLTS AND NUTS ($\frac{1}{4}$ INCH TO 3 INCH).

Bolt Head and Nuts.				
Diameter of Bolt.		Width Across Flats.	Width Across Corners.	Height of Bolt Head.
Inch.	Inch.	Inch.	Inch.	Inch.
$\frac{1}{4}$	0.25	0.5156	0.6155	0.2187
$\frac{1}{2}$	0.50	0.8125	0.9875	0.3078
$\frac{3}{4}$	0.75	1.0731	1.3125	0.3281
1	1.00	1.3125	1.6562	0.3750
$1\frac{1}{4}$	1.25	1.5625	1.9125	0.4125
$1\frac{1}{2}$	1.50	1.8125	2.1875	0.4499
$1\frac{3}{4}$	1.75	2.0625	2.4687	0.4866
2	2.00	2.3125	2.7500	0.5231
$2\frac{1}{4}$	2.25	2.5625	3.0312	0.5597
$2\frac{1}{2}$	2.50	2.8125	3.3125	0.5962
$2\frac{3}{4}$	2.75	3.0625	3.5937	0.6327
3	3.00	3.3125	3.8750	0.6691
$3\frac{1}{4}$	3.25	3.5625	4.1562	0.7056
$3\frac{1}{2}$	3.50	3.8125	4.4375	0.7421
$3\frac{3}{4}$	3.75	4.0625	4.7187	0.7786
4	4.00	4.3125	5.0000	0.8151
$4\frac{1}{4}$	4.25	4.5625	5.2812	0.8516
$4\frac{1}{2}$	4.50	4.8125	5.5625	0.8881
$4\frac{3}{4}$	4.75	5.0625	5.8437	0.9246
5	5.00	5.3125	6.1250	0.9611

areas will be 1.227 sq. in. in the body of the rod and 1.4718 sq. in. at each end.

Either alternative may be adopted, but, as the rod with forged ends requires larger holes through the tie-beam, and as the metal saved by using the thinner rod would be counterbalanced by extra labour, we adopt the $\frac{1\frac{1}{4}}$ -in. diameter rod.

(2) Tie-beam and Rafter Joint.—Several methods of connecting tie-beams with principal rafters are illustrated in Figs. 125 to 129, p. 402. We will now consider these types

of joint, with the object of determining their relative suitability for the roof now under discussion.

Fig. 123 represents a type of joint in very general use. It is usually the case that too much faith is reposed in the resistance of the abutment constituted by the notch in the tie beam and in that of the fibres at the end of the rafter.

When the toe of the rafter presses against the abutment the tendency is to shear off the upper portion of the tie-beam along the plane represented by the line *a b* in Fig. 157.

effective area of metal must be 25,800 \div 16,000 = 1.612 sq. in.

The cross-sectional areas at the bottom of British standard Whitworth screw threads for three probably suitable sizes of bolts, together with some other data relative to the joint in question, are given in Table XLII.

TABLE XLII.—BOLTS FOR TIE-BEAM AND RAFTER-JOINT. (L₀ P₁)

Size.	Net Area per Bolt.	Number of Bolts.	Total Net Area of Metal.
$\frac{1}{2}$	sq. in. 0.3038	6	sq. in. 1.8228
$\frac{3}{4}$	0.4216	4	1.6864
1	0.5540	3	1.6620

Before deciding whether six, four, or three bolts should be applied, let us inquire into the sizes of the washers or plates necessary for distributing the tension from the bolt heads and nuts over the fibres of the timber.

Each $\frac{3}{4}$ -in. bolt has to withstand the tensile force of 25,800

= 4,300 lb., and as the permissible compressive stress across the fibres of the rafter is 350 lb. per square inch, the area of the washer must be

$$\frac{4,300}{350} = 12.3 \text{ sq. in., or, including a } \frac{3}{4}\text{-in. hole for the bolt } (12.3 \cdot 0.6) = 12.9 \text{ sq. in.}$$

The area of the washer for each $\frac{3}{4}$ -in. and 1-in. bolt with 1-in. and $\frac{1\frac{1}{4}}$ -in. holes, respectively, would be—

$$\begin{aligned} 25,800 & \div 0.7854 = 19.21 \text{ sq. in.} \\ 4 \times 350 & \div 0.9940 = 25.56 \text{ sq. in.} \end{aligned}$$

The following are the corresponding sizes of round and square washers:—

dia.	$\sqrt{a \pi}$	side = \sqrt{a}
$\frac{3}{4}$ in.	3.52 in.	
$\frac{1}{2}$ in.	4.38 in.	
$\frac{1}{4}$ in.	5.03 in.	

These dimensions show that for a rafter 6 in. wide separate washers would be out of the question for $\frac{3}{4}$ -in. and $\frac{1}{2}$ -in. bolts arranged as in Fig. 157, but might be used for 1-in. bolts.

A better plan would be to employ a steel plate beneath the heads of all the bolts, making the size of the plate 6 in. wide by, say, 20 in. long.

The thickness of the plate may be calculated by considering either end as a cantilever and the part between any two bolts as a beam.

In the case of $\frac{3}{4}$ -in. bolts, the end of the plate projects about $\frac{3}{4}$ in. beyond the bolt heads, the load per square inch is

$$\begin{aligned} 25,800 & \div (6 \times 20) = 215 \text{ lb.,} \\ \text{and the total load on the cantilever is} & 215 \times 6 \times 3.25 = 4,192 \text{ lb.} \end{aligned}$$

Resistance to the longitudinal shearing force so exerted is governed by the strength of the material and the area of the plane.

By the table in *par.* (a), p. 513, the permissible shearing stress along the grain of the timber used in the present roof design is 150 lb. per square inch; the width of the tie-beam has been calculated at 6 in., and we will take 16 in. as the distance between the abutment and the end of the tie-beam.

Then the safe resistance to shear is

$$150 \times 6 \times 16 = 14,400 \text{ lb.}$$

Similarly, the resistance of the toe of the rafter against crushing is represented by the compressive strength of the material, the width of the rafter, and the depth (*cd*, Fig. 157) of the part which bears against the abutment in the tie-beam.

By the table in *par.* (a), p. 513, the permissible compressive stress of the timber is 1,600 lb.; the width of the rafter has been calculated at 6 in., and we will assume the abutment to be $\frac{1}{2}$ in. deep.

Then the safe resistance of the rafter toe will be

$$1,600 \times 6 \times 1.5 = 14,400 \text{ lb.}$$

Thus the value of the notch is 14,400 lb. No account is taken of the resistance afforded by the tenon and mortise, or of friction between the surfaces.

Table XXXVIII. shows the total thrust exerted by the principal rafter upon the tie-beam to be 34,500 lb., of which part is resisted by the timber joint, leaving the remainder to be taken by bolts.

As shown in Fig. 156, the horizontal component, 14,400 lb., corresponds with the portion 17,300 lb. of the total force, and leaves 17,000 lb. for the bolts.

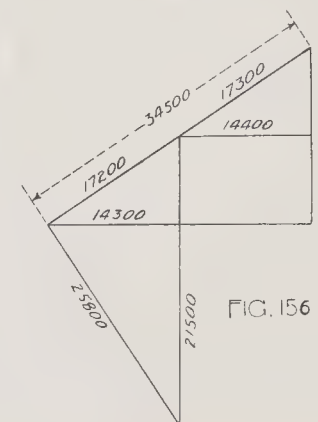
If preferred, the remainder can be calculated as follows:—

$$\begin{aligned} 34,500 & - (14,400 \div \cos 33^\circ 40') \\ & = 34,500 - (14,400 \div 0.8322) \\ & = 34,500 - 17,300 = 17,200 \text{ lb.} \end{aligned}$$

To determine the total tensile force on the bolts we resolve the remainder 17,200 into two components, one horizontal and the other in the direction of the bolts.

Fig. 156 shows that the values of the two components are 14,300 lb. and 25,800 lb. respectively, the latter representing tension in the bolts.

By *par.* (a), p. 513, the permissible unit stress on steel bolts is 16,000 lb., and the



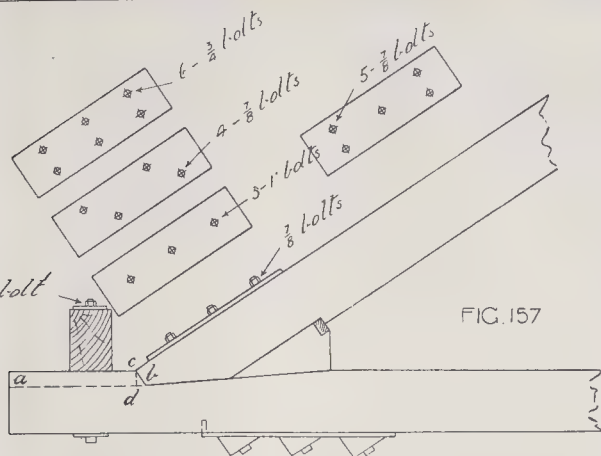


FIG. 157

Then by the usual rule the bending moment is

$$M = \frac{Wl}{2} = \frac{4,192 \times 3.25}{2} = 6,810 \text{ in.-lb.}$$

This moment must be balanced by the safe moment of resistance of the section. Therefore, as by formula (29)

$$R = \frac{fb d^2}{6}$$

the value of d^2 is thus found. Taking 16,000 lb. as the permissible stress for steel,

$$R = \frac{16,000 \times 6 \times d^2}{6} = 16,000 d^2$$

and the thickness of the plate must be

$$d = \sqrt{\frac{6,810}{16,000}} = 0.65, \text{ say, } \frac{1}{2} \text{ in.}$$

To test whether this thickness will suffice for the spans of $(6 - \frac{1}{2}) = 5\frac{1}{2}$ in. between the three pairs of bolts, we must take the total load at

$$215 \times 6 \times 4.5 = 5,805 \text{ lb.}$$

Then by the usual rule the bending moment is

$$M = \frac{Wl}{8} = \frac{5,805 \times 4.5}{8} = 3,265 \text{ in.-lb.}$$

Further calculation is unnecessary, because this value is less than half that found for the cantilever ends of the plate.

If $\frac{1}{2}$ -in. bolts were used and spaced as in Fig. 157, the plate should be a little thicker, say, $\frac{3}{4}$ in., to allow for the zig-zag spacing of the bolts. For 1-in. bolts the $\frac{3}{4}$ -in. plate is of ample thickness.

The next thing is to provide for transmitting the tension in the bolts to the tie-beam and to make provision for the horizontal component of the tension.

It is obviously undesirable to cut into the tie-beam more than can be helped. Therefore we must ascertain what would be the effect of employing a plate with bevelled bosses or collars, as shown in Fig. 157.

The thickness of the plate will be the same as calculated for the upper side of the rafter, but to provide for the angle formed by the direction of the bolts and the axis of the tie-beam the plate must be 24 in. long. Therefore the dimensions will be 6 in. by 24 in. = 144 sq. in.

As the vertical component of 25,800 lb. is only $(25,800 \cos. 33^\circ 40') = 21,470$ lb. (see Fig. 156), compressive stress in the timber across the grain will be reduced to

$$\frac{21,470}{144} = 149, \text{ say, } 150 \text{ lb. per square inch,}$$

or less than half the permissible stress.

By making the plate of cast-iron of suitable thickness the bevelled bosses would contribute largely to its rigidity, and by forming a projection notched into the tie-beam, as shown in Fig. 157, a bearing 6 in. wide by 1 in. deep could be obtained against the end grain of the timber—thus making it impossible for the plate to slip forward.

WESTMINSTER CITY COUNCIL.

At the fortnightly meeting of the Westminster City Council on Thursday last week the following matters were dealt with:—

Widening of Wardour-street.—The Improvements Committee reported that, in connexion with the widening of Wardour-street, a claim had been received from Miss E. Joseph for 2,278 ft. and value of interest in land taken and damage to remainder. The Committee were advised that the claim was excessive, and recommended that a formal offer be made to Miss Joseph, and in default the necessary steps prescribed by statute to empower a jury to assess the compensation be forthwith taken.—Agreed.

Marble Arch.—It was reported that Mr. F. W. Spaight had forwarded a framed "Bird's-eye view" of the contemplated improvement at Marble Arch, and asked that the picture might be exhibited in a prominent place at the City Hall. The sketch illustrates Mr. Spaight's original proposal, and would of necessity be somewhat modified if either of his other plans, or the further modification he understood the London County Council had suggested, were adopted instead.—The picture was ordered to be hung in Committee Room No. 1.

Combined Drainage.—The Works Committee reported having made an order approving the drainage by a combined operation of the buildings in course of erection for the Ecclesiastical Commissioners in Chapter-street and Frederick-street, with an outlet to the sewer in Frederick-street. The same Committee reported having received amended plans for the drainage of the *Morning Post* offices, and of a proposed 9-in. drain in Wellington-street and Savoy-street to connect the drainage with the sewer in Savoy-street. It was agreed to allow the plans on condition that the work was carried out by the City Council at the expense of the applicants, and that when completed the drain should be handed over to the City Council and vested in them as a sewer within the meaning of the Metropolitan Management Act, 1865.

INCORPORATED CHURCH BUILDING SOCIETY.

THIS Society held its usual monthly meeting, being the first of the present session, on Thursday, the 15th inst., at 7, Dean's-yard, Westminster. The Rev. Canon C. F. Norman in the chair. Grants of money were made in aid of the following objects, viz.: Building new churches at Aldershot, St. Augustine, Hants, 100l. for the first portion; Bedminster, St. Aldhelm, near Bristol, 55l. for the first portion; Crofton Park, St. Hilda, Kent, 300l. in lieu of a former grant of 175l.; New Brompton, St. Luke, Kent, 150l.; West Bromwich, The Good Shepherd, Staffs, 60l.; and Wolverhampton, St. Chad, Staffs, 70l. for the first portion; and towards enlarging or otherwise improving the accommodation in the churches at Chesterton, St. Michael and All Angels, near Peterborough, 15l.; Kewesdale Parish Church, Northumberland, 2l., making in all 301l.; Lyons, St. Michael and All Angels, Co. Durham, 10l.; West Thurrock, St. Clement, Essex, 40l.; Whapload Grove, St. John-the-Baptist, Lincs., 80l.; and Woodham, All Saints, near Woking, 50l. Grants were also made from the special Mission Buildings Fund towards building mission churches at Brithdir, near Brecon, Glam., 40l.; Cleeve Hill, St. Peter, near Cheltenham, 25l.; Felling, St. Oswald, Co. Durham, 30l.; Selhurst, St. Barnabas, Surrey,

20l., and Warley Woods, near Birmingham, 40l.; and towards adapting an existing building as a mission church at Thornton-le-Clay, near Flaxton, Yorks, 10l. The following grants were also paid for works completed:—Hednesford, St. Peter, Staffs, 60l.; Bunton, All Saints, Sussex, 155l.; Kilmington, St. Mary, Somerset, 10l.; Monewden, St. Mary, Norfolk, 30l.; Cleeve Prior, St. Andrew, near Evesham, 30l.; Peatling Magna, All Saints, near Luttreth, Leics., 25l.; Compton, St. Mary and St. Nicholas, near Newbury, Berks, 25l.; Borough Green, The Good Shepherd, near Wrotham, Kent, 75l.; Forton, St. John, Hants, 100l., making in all 250l.; Smethwick, St. Alban, Staffs, 150l.; Brixworth, All Saints, near Northampton, 20l.; Waltham Cross, St. George, Middlesex, 500l., making in all 1,000l.; Stretford, All Saints, near Manchester, 60l.; Netherton, All Souls, Cumberland, 140l.; New Cleethorpes, St. Aidan, near Grimsby, 125l.; Bottisham, Holy Trinity, near Cambridge, 35l. on account of a grant of 45l.; Field Dalling, St. Andrew, Norfolk, 10l. on account of a grant of 30l.; Hereford, Holy Trinity, 70l.; Bournbrook, St. Wulstan, near Birmingham, 250l.; Little Ilford, St. Michael and All Angels, Essex, 120l.; Mortlake, St. Mary, Surrey, 150l.; Egg Buckland, St. Erasmus, Devon, 20l.; South Bermondsey, St. Mary, Surrey, 50l.; Cumnor, All Saints, Mon., 35l.; Camelsdale, St. Paul, Sussex, 20l.; Woolwich, St. Martin, Kent, 25l.; Newport, St. Barnabas, Mon., 50l.; and Helliwell, St. Aidan, near Long Preston, Yorks, 50l. In addition to this the sum of 500l. was paid towards the repairs of twenty-four churches from trust funds held by the Society.

The following resolution was unanimously adopted at this meeting:

"Resolved that the Committee of the Incorporated Church Building Society, having heard with deep regret of the death of John Thomas Mickelthwait, F.S.A., for sixteen years a member of the Committee of Honorary Consulting Architects and latterly its President, desire to record their sense of the great loss they and the Church at large have sustained by his death, and to bear testimony to the very careful and thorough way in which he rendered most valuable service to the society, and they further desire to express their sympathy with the relatives of the deceased gentleman, who was so universally respected by all who knew him."

Obituary.

MR. CHARLES LOCKE EASTLAKE.—Many of our older readers will hear with personal regret of the death of Mr. C. L. Eastlake, who during the twelve years (from 1866 to 1878) that he filled the post of Secretary of the Institute of Architects, was known personally or by correspondence to a great proportion of the members of the architectural profession, with whom his courtesy and refined manners made him generally popular. Mr. Eastlake intended to practice as an architect, and received his architectural education in the office of Hardwick. He won a medal at the Royal Academy subsequently, and spent a good deal of time in sketching abroad, but as far as we are aware he never really entered into practice as an architect, or carried out any building. When the Council of the Institute of Architects decided that the secretarial work had become so large a business that they could no longer depend on voluntary effort for carrying it on, but must have a salaried Secretary to devote his time to it, Eastlake easily distanced all the other candidates and was appointed with general approval. The Secretary's work at that time was nothing like what it is now, and it was perhaps comparatively an easy post, but at all events he filled it to everyone's satisfaction. In 1878 he was given the post of Keeper and Secretary of the National Gallery, an appointment to which his name and his family connexion with a former director (he was the nephew of Sir Charles Eastlake) no doubt helped him, but for the duties of which he was we believe eminently fitted; he had a great knowledge of and interest in pictures, as well as habits of method and arrangement; and in our opinion the post of Director of the Gallery, which he had much coveted, might very well have been conferred upon him. As it was, he retired from the Keeper-ship after holding it for twenty years. His book, "Hints on Household Taste," published many years ago, had a considerable effect in preparing the way for the improvement in furniture design and applied art in which Morris was the principal influence, and in America it became almost a household word, and a house furnished in improved taste was said to be "Eastlake." Mr. Eastlake had a general interest in literature, outside of the field of art, and not long since he contributed an admirable article on Thackeray to the *Nineteenth Century*.

INFANTS' SCHOOL, CADLE. On the 16th inst. Sir John Llewellyn opened at Cadle, near Swansea, a new infants' school, which has been erected by the County Education Authority at a cost of 2,800l. The school contains a central hall and three classrooms, and was built by Messrs. Walters & John, from designs of Mr. Nash, and provides accommodation for 120 children.

General Building News.

ROMAN CATHOLIC CHURCH, NENAGH.—The Church of St. Mary's of the Rosary, at Nenagh, was recently consecrated by the Rev. Dr. Fogarty, Bishop of Killaloe. The ground plan of the church is cruciform, and comprises the nave, 29 ft. wide in the clear, aisles, two transepts, tower, baptistery, deep chancel, two side chapels, and sacristies. The nave consists of five bays of pointed arches, heavily moulded, and all carried out in Portland stone. To these five bays succeed the transept arches. The shafts supporting the arches are of warm cream-coloured stone, quatrefoil in section, with capitals and bases moulded to correspond. The roof is open, timbered to the ridge, every principal supported on wall shafts and corbels of stone and polished marble. The capitals of the nave arcade and the bosses of the arches have been carved by Mr. J. A. O'Connell, of Cork. The transepts are lighted by three-light windows, and contain recesses for confessionals. The chancel is divided from the nave by a tall and recessed chancel arch, all in Portland stone, the drop arch, carried on Irish marble shafts. The baptistery has two-light tracery windows, and is richly tiled to correspond with the chancel, and is covered with a timber-grained roof, supported on marble shafts. The wrought-iron work throughout the church is the work of Mr. John Fagan, of Dublin, who was also responsible for the system of lightning conductors. The floors throughout are of solid concrete covered with selected wood blocks, laid on Mr. J. Duffy's patent interlocking system. The sacristies, which lie to the north of the chancel and Lady Chapel, are divided into two for priests and for boys by means of folding doors. The church is nearly 200 ft. in length, while the width across nave and aisles is over 60 ft. The heating on the combined hot-air and hot-water system, by Messrs. Musgrave & Co., Belfast. The bell, of about 45 cwt., is by Mr. Mathew Byrne, bell-founder. The tower, which contains the bell, is surmounted by a spire rising to an altitude of nearly 200 ft. The external walling is of a blue limestone procured from the neighbourhood, relieved with cut-stone dressings of a white limestone. The roofs are covered with Killaloe slates, and Messrs. Cooper's Drinagh cement, from Wexford, was used for the cement work throughout. The contractors for the whole of the general works were Messrs. John Sisk & Sons, Cork, their tender amounting to 24,000*z*.; and the architect, the late Mr. W. G. Doolin, M. A. (Doolin, Butler, & Donnelly), of Dublin, whose designs were accepted in open competition.

NEW CHURCH, SLOUGH.—St. Paul's Church, which has been erected in the Stoke-road, Slough, was recently consecrated by the Bishop of Oxford. The building consists of a chancel, with a semi-octagonal apse, and a nave, with a range of clerestory windows round three sides. On the south side the chancel opens, through three arches, into the morning chapel, which has a semi-dodecagon apsidal end. On the north side the chancel opens into the organ chamber through two arches, corresponding to those opening into the chancel on the south side. The North end of the organ chamber are the choir and clergy vestries. The nave is 86 ft. in length by 25 ft. wide, and 56 ft. high to the roof ridge. It opens into the north and south aisles through a range of six arches on either side and into the narthex at the west end through three arches, which support the west wall and gable. The nave is lighted by a clerestory of lancet windows in triplets on the north and south aisles and through two windows in the west. The aisles are 87 ft. long by 11 ft. wide, lighted by lancet windows in couples. The main entrance porches are planned in the corners, at the west end, formed by the aisles and narthex, and the main doors open into the west end of aisles. One of the features of the west end is the semi-circular baptistery, opening externally. The extreme length of the church is 154 ft., and the width 14 ft., the height to the top of the bell-gamble being 78 ft. The building is faced with Messrs. Nash's best red bricks externally and internally, except such wall space as is coloured, and these are finished with cement. The stone work generally is Monks Park Bath. The columns being worked in the weather bed Ancaster stone. The roofs are covered with dark red Broseley tiles, whilst the roofs are boarded, the whole in the main roofs, which is visible, being in wrought iron. The seats are of Canadian oak, and accommodation is provided for 684 adults. The cost exceeds 10,000*l*. Messrs. Cutts, of London, are the architects, and the contractor is Mr. H. Flint, of High Wycombe.

SUNDAY SCHOOL, MOUNTPOTTINGER, BELFAST.—New Sunday School premises have been erected in connexion with the Mountpottinger Unitarian Church. The work has been executed in Scrabo stone, rough-dressed. The contract was entrusted to Mr. Hutchinson Keith, who acted on the plans of Messrs. Young & McKenzie, Messrs. Davidson, of the Sirocco Works, installed the heating apparatus.

CHEWELL HALL TRAINING COLLEGE AND MILHAM FORD SECONDARY SCHOOL, OXFORD.—The opening of the new wing at Chewell Hall and the new Milham Ford school takes place this Saturday. The opening ceremony will be performed by the President of the Board of Education. The Chewell Hall extension, which has been erected with half brick and tile, with Bathstone dressings and Broseley tile roof, contains on the ground floor, entrance-hall, and staircase, eight study bedrooms, cloakroom and lavatory, bathrooms and water-closets; on the first floor, common room, 25 ft. by 18½ ft., and seven study bedrooms, bathrooms and closets; on the second floor, ten study bedrooms, bathrooms and closets; the corridors are airy and well-lighted. Access to the old building is given on each floor by corridors. Each study bedroom is provided with fresh and foul air-ventilators and heated by radiators, and fitted with electric reading-lamps. Chewell Hall has now accommodation for fifty students. Milham Ford, with the exception of the caretaker's portion, has been entirely rebuilt, and executed with red facing bricks and Bathstone dressings, with stone mullioned windows and slate roof. This school contains on the ground floor entrance-hall and staircase, three classrooms giving accommodation for eighty-four scholars, science room for thirty, common room, cloakroom, lavatories and latrine. On the first floor the accommodation comprises two classrooms giving accommodation for fifty-six scholars, studio for fourteen, lecture-room for thirty, lavatories for teachers, and bedroom accommodation for caretaker and two teachers. The whole of the heating has been carried out on the independent system of radiators at Chewell Hall and pipes at Milham Ford, by Messrs. Bacon & Curtis, of Bourne-mouth, who have also executed the electric lighting at both schools. The locks and fittings were supplied by Mr. James Gibbons, of Wolverhampton. Both buildings were executed by Messrs. T. H. Skirrow & Sons, Ltd., contractors, Oxford, from plans by Mr. Walter Andrew, architect, Parkstone.

CHURCH HOUSE, ST. CLEMENT'S PARISH, HASTINGS.—On Tuesday last the Bishop of Chichester opened the new Church House, which has been erected from the design and under the superintendence of Messrs. Cooper & Cousens, architects, of Hastings. The building consists of a basement and a ground floor, the former with two good classrooms, divided by a movable partition; a kitchen and suitable lavatories and stores, and the latter with one room about 52 ft. by 25 ft., which is connected with the basement by a staircase, and by a service lift from the kitchen. There is also a separate entrance to the basement. Externally the building is faced with red bricks, and is covered with a green slate roof, and internally the walls are finished with a boarded dado and plaster above. The floors are of pitch-pine wood-blocks on concrete. The work has been carried out by Mr. F. E. Hetch, builder, of Hastings, at a cost of about 1,570*l*.

GENERAL POST OFFICE, NEWGATE-STREET.—The plans and designs for the new buildings on the site of the Bluecoat School have been prepared by Sir Henry Tanner, of H.M.'s Office of Works. It is stated that they will be constructed on the Hennebique system of ferro-concrete.

PROPOSED NEW WORKHOUSE, HOMERTON.—The City Guardians have decided not to invite competition for the new amalgamated workhouse and infirmary to be erected on one site at Homerton. The special committee appointed to consider the whole question reported that, after several consultations with Local Government Board officials, it had been agreed to erect, not an entirely new building, but to let part of the existing building at Homerton remain, and to add to and alter it, so as to make a complete scheme for the two institutions. The accommodation would be for 276 infirmary cases, thirty-two lunatics, twelve married couples, four isolation cases, and 336 workhouse inmates, making a total of 660. The committee recommended, "That, in view of the opinion expressed by the architect to the Local Government Board, they be empowered to negotiate with the architect, Mr. A. E. Primrose, for his employment by them to prepare the final scheme and plans upon which tenders would be invited, and the work carried out subject to the approval of the guardians and the Local Government Board." In moving the adoption of the report, Mr. J. B. Wild stated that by not shutting up an entirely new building a saving of something like 50,000*l*. would be effected, the original estimate being reduced from 140,000*l*. to between 80,000*l*. and 90,000*l*. Mr. Brock Kitchin, architect, of the Local Government Board, when questioned by a member who was in favour of inviting architects to submit competitive designs, declared that it was a great mistake in such matters to invite competition when they already had the services of a capable architect. This was the reason why the committee proposed to consult Mr. Primrose at once. Mr. A. Monckton moved as an amendment that six architects be asked to submit

designs, but after considerable discussion the amendment was lost, and the report of the committee adopted.

FEVER HOSPITAL, PERTH.—The new Fever Hospital, which has been built at a cost of between 11,000*l*. and 12,000*l*. by the Perth Town Council, is situated at Friarton, about a mile and a quarter to the south of the city. The administrative block is placed in the centre of the site, having the scarlet fever pavilion on the east and the diphtheria and typhoid pavilion on the west. The laundry block is placed on the low ground to the west, while the lodge is at the entrance gateway, which is about 170 ft. from the Edinburgh-road. The ward pavilions are 120 ft. apart, and the number of beds provided for are thirty-six. In addition to the above there is a temporary hospital capable of accommodating eight or ten patients, and which it is proposed to utilise for convalescent scarlet fever patients previous to their discharge from hospital. The scarlet fever pavilion has one ward of twelve beds, and one of eight, with two observation wards of one bed each. The diphtheria, typhoid, and separation pavilions has six wards, divided into two wards of four beds each for diphtheria, two wards of two beds each for typhoid, and two wards of one bed each for separation. The accommodation provided in the administrative block is one for matron, ten nurses, and four domestic servants, cleaners, and cook, with a private room, dispensary, and lavatory for the non-resident physician. On the ground floor are the matron's parlour and bedroom, nurses' dining-room, doctor's room, with dispensary and store-room; while the kitchen is placed at the back. A corridor runs outside, and communicates with the kitchen by the window, through which the food is passed. On the first floor there are two double-bedded rooms, and two single-bedded rooms, with bath and lavatory accommodation, the servants' quarters being on the second floor. The buildings generally, including the wards, are heated by open fires. Natural ventilation is relied on throughout in the wards by means of windows with hopper fanlights in upper parts of the wall, and at floor level at each bed and outlet flues at intervals at the ceiling level. In each duty-room hot water is supplied by means of a steam coil supplied by the steam boiler at the laundry, and when this is not available by means of a boiler at the back of the range in the duty-room. A water tank, holding about 1,500 gallons, has been provided in the attic floor of the administrative block, while there is a supplementary tank near the convalescent wards. The entrance lobbies and sanitary annexes are tiled, and the floors are laid with marble terrazzo. The decoration of the wards is in "Satinette" enamel in pale shades of colour, the ceilings being ivory white. The laundry is fitted up with washing machine, hydro-extractor, steam drying horses, and steam mangle. There is a steam disinfecter of a new type, with an independent generator. The hospital was designed and has been built under the supervision of Mr. G. P. K. Young, architect, Perth. Mr. Alex. Beveridge was clerk of works, and the contractors were: Mason and brick work, Messrs. J. J. & P. Macrauchan, Larbert; joiner work, Mr. Robert Hill, Perth; plumber work, Messrs. Watson & Sons, Perth; plaster work, Mr. Alex. Patterson, Arbroath; slater work, Mr. A. Drysdale, Perth; glazier work, Messrs. G. R. Douglas, Perth; painter work, Messrs. George Muirhead & Sons, Perth; bells and telephones, Messrs. A. Westwood & Sons, Perth; laundry fittings, Messrs. D. & J. Tullis, Clydebank; sanitary fittings, Messrs. Doultou & Co., Ltd., Lambeth, London; ironmongery, Messrs. Garvie & Syme, Perth; grates and ranges, Messrs. Lindsay & Fenwick, Perth; wrought iron gates, etc., Messrs. J. Milne & Sons, Ltd., Perth; blinds, Messrs. J. A. & D. Cameron, Perth; laying-out of grounds, Messrs. D. & R. Taylor, Perth.

Sanitary and Engineering News.

IRVINE DISTRICT WATER BOARD, N.B.—The new reservoir which has just been completed at Caaf to supplement the reservoir at Munnoch was constructed by Messrs. James Young, Ltd., of Glasgow, at a cost of 40,000*l*. The water area extends over 37 acres, with a maximum depth of 67 ft., and the reservoir when quite full will hold 190 million gallons.

WHARF, ETC., ELSWICK.—Messrs. J. Howe & Co., of West Hartlepool, have nearly completed a wharf, measuring about 500 ft. by 50 ft., at Elswick-on-Tyne, for an extension of the ordnance works of Sir W. G. Armstrong, Whitworth, & Co.; and a new berth for armour-clad ships is being added to the shipyard. The berth, 550 ft. long, has a platform of ferro-concrete (Hennebique patents), sustained by some 600 piles of that material, which is also used for

the piles of the wharf and of the foundations of the travelling cranes. The contract provides for a normal superload of 6 cwt. per square foot in the decking of the wharf. Messrs. Purdie & Thompson, of Newcastle, are the contractors for the shipyard berth.

BRADFORD SEWAGE DISPOSAL.—A meeting of the Bradford Sewage Committee was held on the 20th inst., at the Town Hall, Mr. E. J. Smith presiding. The special business of the meeting was to consider the scheme drawn up by Mr. Garfield, the City Sewage Engineer, for the sewage disposal works at Eholst. The scheme, as outlined in the report, is estimated to cost about a million sterling, independent of the land which has been acquired. Mr. Garfield makes detailed suggestions as to the situation and construction of the disposal works at Eholst, of the buildings which he considers necessary, and also as to the situation and construction of the great tunnel which will require to be constructed through Wrose Hill. After discussing the project at some length the committee decided to hold another meeting at Eholst, at which a resolution for the adoption of the scheme by the committee will be submitted by the chairman.

MARKET HARBOUR WATER SUPPLY.—Mr. H. G. Coates, Surveyor to the Market Harbour Urban District Council, has submitted to the Local Government Board for approval a report on the present and proposed additional water supply of Market Harborough.

Appointments.

COMMITTEE OF INQUIRY INTO DANGERS IN BUILDING OPERATIONS.—The Home Secretary has appointed Mr. G. Macfarlane, President of the National Federation of Building Trade Employers, and Mr. Dennis Hogarty, general secretary of the United Builders' Labourers Union, to be additional members of the Committee of Inquiry into the Dangers attendant on Building Operations.

LIVERPOOL.—Pending the approval of the proposed building scheme, plans and specifications of the proposed office to be erected by the Royal Liver Friendly Society on the northern portion of the George's Dock site, are being prepared by Mr. Aubrey Thomas, Dale-street, Liverpool, who has been appointed architect of the building. Messrs. Richard Holt and Henry L. Goldsmith, of Victoria-street, and Dale-street, have been appointed as quantity surveyors. It is anticipated that some of the leading steamship lines will take suites of offices in the new building, and applications with this object have already been received from local firms. *—Liverpool Post.*

Foreign.

GERMANY.—Castle Richmond, Brunswick, was built for the Duchess Augusta, sister of George III., of England, in 1793, at a cost of 190,000 thalers. Unfortunately the building was pulled down in the seventies when the authorities decided to restore the fortress of Dankwardrode, within whose walls the castle had been built. This the more to be regretted in that it was the *chef d'œuvre* of Karl Christian Fleischer, a prolific 18th century architect, who, like Christopher Wren, was mathematician, engineer, and architect. The versatility of this man is remarkable, but his architectural works are characterised by a thorough and scientific spirit rather than by conspicuous artistic merit, with the single exception of Schloss Richmond, now only preserved to us in carefully-measured drawings. A public school for 250 pupils has lately been opened in Worms. The buildings are rough-cast and their steep slate roofs and numerous gables give them the stamp of Rhinish Late Renaissance architecture. The designs were prepared in the grand ducal municipal offices, under the direction of Messrs. Hofman & Klingelhöffer. The cost amounted to 560,000 marks. On October 25 were opened the new theatre and the Mozart Concert Hall in Nollendorf Platz, Berlin. The buildings, which were designed by the architect Messrs. Bosenau & Knauer. The concert hall can seat 1,600 persons, while the theatre, which has the largest revolving stage in Germany, can accommodate 1,200 spectators. In the competition for designs for a colonnade to be built in Carlsbad, the first prize of 8,000 k. was won by Herr Franz Josef Weiz, of Posen. Out of fifty competitors, only six advocated the removal of the old city tower, and ten the removal of the old colonnade. Professor Gabriel von Seidl, of Munich, has won the first prize of 15,000 m., in the competition for a German museum to be built in Munich. On August 18, 1901, the Government Offices in Coblenz were burnt down. The buildings had been erected early in the XVIIIth century as a monastery and an orphanage, and had since been used during fifty-eight years for Government purposes. The new offices are a free rendering of Romanesque, and the designs were prepared in the Public Works Department

under the direction of the late Herr Kieschke. The cost amounted to 2,110,450 marks. —A short while since the memorial fountain to Goethe was unveiled in Franzensbad.

work of the sculptor, Karl Wilfert, jun., of Eger, who to the simplest architectural outlines has added a happy combination in colours resulting from yellow granite, white marble, and bronze. The central feature is a heroic-sized head of the poet, beneath which spout two water-jets, the one the Source of Beauty, as is indicated by the marble figure of a maiden, over life-size, gazing at her own reflection in the water basin at her feet, and the other jet, the Source of Truth, symbolised by the figure of a youth drinking from an antique bowl, supposed to be filled at the Well of Truth. On either side of the figures two marble reliefs are let in to the granite: the one representing Drama, and the other Lyric poetry.

AUSTRIA.—The New School of Commerce, Innsbruck, shows an important advance in the designing of school buildings. Its irregular, picturesque outline is the outcome of a plan which exactly carries out the required conditions. It is the work of Eduard Klingler, of Innsbruck, and cost 550,000 kronen. Just as Brunn was the first Continental town to light its theatre with electricity, so it is among the first to make use of a refuse destructor. The mountains of refuse formerly surrounding the town are now converted into marketable matter, gas, cinder, and ash. Contractors will shortly be compelled to use the two latter products on all large municipal buildings, in concrete and mortar, as well as on the construction of roads, so that the demand will in all probability exceed the supply from the furnaces. On October 30 the monument to Rafael Donner, by Richard Kaufmann, was unveiled. One of the finest monuments erected in recent times in Vienna. The sculptor is portrayed, over life-size, in his working-dress on a vast red granite pedestal. On a stand at his side is a small model of the principal figure on Donner's fountain in the Neu Markt, Vienna. In a railway tunnel it was discovered that the concrete vault was yielding to the influence of sulphuric acid given off by the gases in smoke. By washing the vault with preelite the destructive effect of the acid was checked.

BULGARIA.—An international competition is announced for Law Courts to be built in Sofia. Designs to be sent in from January 15-28, 1907, inclusive. Four premiums are offered; the first premium being of 5,000 francs. Conditions and particulars to be obtained gratis from the "Ministère de l'Instruction Publique," Sofia.

INDIA.—The Public Works Department state in their annual review of irrigation for 1904-5, that in a total area of more than 20,000,000 acres under irrigation, the estimated value of crops raised by means of works for which capital accounts are kept exceeds 41 crores of rupees (27,333,333*l.*), or 87 per cent. of the capital outlay, and that the net revenue is 7-60 per cent. on "productive" works, is the highest yet recorded. The rates, which are affected by natural causes, vary from 0-23 per cent. for Burma to 14-17 per cent. in the Punjab, and 22-82 per cent. for the Eastern Jumna Canal. A large proportion of the centrifugal pumps with oil engines for their working is furnished by Messrs. Holt, Caterpillar & Co., of Lincoln.

As part of the Central Provinces' memorial to the late Queen and Empress a statue, life-sized, sculptured in white marble, by Mr. Hubert Hampton, has been unveiled at Nagpore by Sir Andrew Fraser, late Chief Commissioner, and now Lieutenant-Governor of Bengal. The memorial scheme comprises a Victoria Technical Institute for the cultivation of scientific and technical studies, and the promotion and improvement of agricultural and other industries.

EGYPT.—It is anticipated that by the end of next year will be completed the dredging of the new entrance to the port of Alexandria, to a width of 600 ft. and a low-water depth of 35 ft. In the careening basin the wooden jetties are being replaced with quays of stone, a system of drainage for the quays is planned, new ship berths and storage-magazines are provided; the entire scheme for enlarging and improving the port, for traffic in cattle, coal, and general commodities, for protecting the outer harbour, and for the new pass through the reefs, will be finished in the course of three years.

AUSTRALIA.—Messrs. J. M. & H. E. Coane, of Melbourne, engineers, and Mr. G. Kilburn Scott, Professor of Electrical Engineering, Sydney University, have jointly drawn up tables of figures relating to the costs and working expenses of a revived proposal to use the head waters of the river Goulburn, Victoria, in the generation of electricity, with a power-station at Travool.

The undertakers will, they expect, be able to supply Melbourne (where the price now charged is 2*d.* per unit), Bendigo, and Ballarat, at a price of about 3*d.* per unit, with energy sufficient for the whole requirements of Melbourne, and for nearly all the mines of the two other named towns. The scheme extends to the provision of large irrigation works.

ECUADOR.—Mr. Consul Alfred Cartwright, reporting on the trade and commerce of Ecuador,

South America, points out that during the last seven years Guayaquil, the largest town and chief port in the Republic, has passed through a state of transition, recovering from many severe disasters, which commenced with the two conflagrations in 1896, followed, before the city had yet recovered from these, by three conflagrations in 1899, 1901, and 1902, which latter disasters caused losses amounting in the aggregate to 850,000*l.* The fires of 1896 had destroyed the northern part of the city, including the four banks, the artillery barracks, the custom-house, the Girls' Conventual College, five of the principal churches, and in value more than two-thirds of the whole city. Of these buildings the churches of San Francisco, the Merced, San Augustine, Concepcion, and Parroquia have been rebuilt. The four banks have erected buildings for their own service on their own lands. The custom-house has been reconstructed, although only in the commonest and cheapest form of cane buildings, yet sufficient for the storage of all the imports to Guayaquil. About one-half to two-thirds of the house property destroyed in these and subsequent fires has been rebuilt, with wide streets and better precautions against fire risk, so that the city has resumed its ordinary businesslike appearance. The municipality, after the costly experience of 1902, insisted on all streets in the burned districts being widened to nearly 100 ft., or no house being built over two stories high (ground-floor and one upper story), and on the absolute prohibition of pitch-pine in the construction. These regulations have been strictly adhered to. The aspect of the city, as rebuilt, is considerably improved.

Many fresh charitable institutions have been built, including two fine hospitals, one of which cost 6,500*l.* and the other 32,500*l.* to erect; the average yearly expenditure on both establishments is about 8,000*l.*, provided as to 80 per cent. by the municipality and as to 20 per cent. by the Government. The Government has also rebuilt, at a heavy cost, the San Vicente College (now styled the Collegio San Vicente). Regret is expressed that the reconstruction of the city has been restricted to the old districts, thus concentrating all the buildings on the low lands in the vicinity of the river and the savannah, extending towards the Estero Salado (or Salt Creek). It would have been far healthier and better to have left the centre exclusively for business establishments and to have built the residences or private houses on the various hills to the north and west of the city. An American syndicate connected with the railway company has bought the extensive estate known as the Recreo, on the other side of the river from Guayaquil, and proposes to establish there a new residential city, together with docks for the discharge and shipment of cargo for and from the interior.

CENTRAL AFRICA.—The construction is begun of a railway which, starting from Lobito Bay on the west coast, will traverse Portuguese East Africa to effect a junction with the Cape to Cairo line at Katanga at a point south of Lake Tanganyika. Lobito Bay is distant a week's sailing from the Cape, and the liners could stop there for passengers and cargoes. Native labour is largely employed in the laying of the new line, the rate of advance being about 1 mile per diem, and it is anticipated that the work will be completed within the contract time of three years, as 1,000 miles are already laid down. The landlocked bay at Lobito has a water area of about 15 square miles, lying behind a level tongue of sand, from 3 to 4 miles wide, cast up by the action of the sea; the inner waters are deep enough to enable an ocean liner to approach at low tide closely to the sandy shore, which has a precipitous gradient rate.

SOUTH AFRICA.—Only four or five buildings of any note are now under construction in the Cape Peninsula, and it is stated that fewer artisans are engaged than has been the case during any period in the last nine years. A notification of a general reduction of wages by 2*d.* per hour has been posted by the Master Builders' (Cape) Association, to take effect from November 30 in the case of masons, and from October 16 as regards plumbers, plasterers, bricklayers, painters, and joiners. During the period September 1 to 30 thirty-five plans were under consideration by the Cape Town City Council, of which seventeen have been approved, eight returned to the architects for amendment, three withdrawn and seven remain under consideration. The approximate cost of the proposed work is 11,046*l.*—Surface drainage works are still in progress at Woodstock and Salt River, also the paving of the Dock Road and construction of a reservoir at the Kloof Nek. A total of about 320 men are employed in all. At Port Elizabeth the supply of labour is still considerably in excess of the demand in all branches of trade, and there is a tendency towards the reduction of wages. Only six buildings of any note are under construction, about 120 men being employed including coloured labourers. Work in connexion with the new waterworks scheme has been commenced.

Miscellaneous.

SKINNERS' COMPANY.—Mr. Frank Brangwyn, A.R.A., is engaged upon the decoration of the walls of this Company's Hall with a set of eleven panels, five of which are now finished. At a recent banquet in his honour the Speaker was presented with a silver casket, designed and executed by Mr. Nelson Dawson, to contain an illuminated copy of the resolution conferring the freedom of the Company upon Mr. Lowther. The casket is fashioned of hammered silver; it bears Mr. Lowther's and the Company's coats-arms at the ends, and a high relief model of the Speaker's mace upon the lid. The Hall was rebuilt many years ago, after the Italian style, by George Moore, F.R.S.

LILBOURN, NORTHANTS.—A fund of 800*l.* is opened for the reparation of the interior of the parish church of Lilbourn, near Rugby. The village lies on the Watling Street, and has been identified with the Roman Tripontium. The original establishment of the present XIIIth-XIVth century church of All Saints is ascribed to Robert de Mellent, Earl of Leicester, who bestowed it upon the collegiate church of St. Mary, which he refounded within the Castle, at Leicester, in or about 1107. The greater portion of the revenues of St. Mary-the-Less were, with All Saints, Lilbourn, transferred to the Abbey of St. Mary de Praes, Leicester, which some forty years afterwards was founded by Robert le Bossu, Earl of Leicester, for Augustinian canons regular, and at the Suppression possessed a gross revenue of 1,062*l.* 0*s.* 4*d.* per annum. Of All Saints the nave and south arcade lean over, and the tower is cracked on two sides.

THE VICTORIA AND ALBERT MUSEUM.—A committee of the Kensington Borough Council are to consider a letter from Messrs. Elsworth & Knighton calling attention to the block of houses opposite the Victoria and Albert Museum, pointing out that these mar to a considerable extent the appearance of the museum, and asking whether the Borough Council will be prepared to consider the advisability of purchasing, jointly with the London County Council, the Commissioners of the Exhibition of 1851, and His Majesty's Office of Works, the houses in question, demolishing the same, and levelling the site; or failing this, erecting buildings of low elevation on the ground.

ASSOCIATION OF TEACHERS IN TECHNICAL INSTITUTES.—The annual meeting of the Building section of the Teachers in Technical Institutions was held, on Saturday last, at the Regent-street Polytechnic. Mr. Charles F. Mitchell presided. The following officers were elected for the year:—Chairman, Mr. J. Fitzgerald (Brickwork: Paddington); Vice-Chairman, Mr. T. Hobart Pritchard, F.R.A.S. (Geometry, etc.: Regent-street); Secretary, Mr. J. Sannan (Building: Battersea); Committee, Messrs. Arnall, M.R.S.I. (Building: Wandsworth), Bates (Geometry and Brickwork: Chelsea), Borham (Masonry: Northern), Burlington (Masonry: Brixton), Cox (Carpentry: Regent-street), Davey (Carpentry: Wandsworth), Mitchell (Building: Regent-street), Channon (Plastering: Brixton). The next meeting of the Section will be held on Saturday, December 8, when a paper will be read by Mr. Arnall, M.R.S.I., on "Practical Sanitary Science" as a technological subject.

EDINBURGH MERCHANTS AND THE PRINCES-STREET TERRACE.—The seventy-sixth annual meeting of the Edinburgh Merchants' Association was held in Dowell's Rooms, George-street, on the 14th inst., Mr. A. Louis Reis presiding. Bailie Dobie was present and explained his scheme for the proposed widening of Princes-street, and repeated his arguments in favour of the proposal. His idea, he said, had not been to have his model adopted, but only to get people to think about the matter. He had invited the Architectural Association to inspect the model, and he had a reply to the effect that as a general principle the Council was of opinion that the widening of the south pavement of Princes-street would add to the beauty of the city and conduce to the comfort of those using the gardens and greatly improve the pavement as a promenade. The model however showed a treatment quite unadapted to the circumstances, and it would be infinitely better that nothing be done rather than that anything of the proportions, character of building, or design indicated by the model should be carried out. The Council at the same time considered it probable that a modification of the scheme would meet with approval, and they would be glad to give any help towards arriving at a more suitable modification of the scheme. The cost of the scheme was, said Bailie Dobie, estimated at 13,500*l.* A discussion took place, and most of the speakers expressed themselves against the proposal.

THE CAMPANILE OF ST. MARK.—Ever since the restoration of the Campanile at Venice has been going on doubts have been expressed as to the quality of the materials used in its reconstruction. The Syndic of Venice, Count Grimaldi, commis-

sioned Professor Luxardo to make an examination of the bricks and mortar employed, and he reports that they both contain qualities which give no guarantee of their stability, and it is now proposed to level to the ground the work which has been already done, in order to begin again with more satisfactory materials.—*The Standard.*

PROPOSED MUNICIPAL ART SCHOOL IN EDINBURGH.—The Lord Provost's Committee of Edinburgh Town Council gave its general approval, on the 14th inst., of the report prepared on the subject of the proposed Municipal Art School. They agreed to appoint a deputation on the subject to the Secretary for Scotland to press a claim for a satisfactory grant from the funds in the hands of the Scottish Education Department towards the new institution. The promised grant was contingent on the provision of a satisfactory sum towards the erection of such a building. It will be pointed out by the deputation that the estimated cost of the school is 50,000*l.*, and that the site of the old Cattle Market provided by the city is equal to at least 15,000*l.* It is hoped that in connexion with the building a grant may also be obtained from the Board of Manufacturers.

GLASGOW CITY IMPROVEMENT.—Mr. W. C. Menzies, manager of the Glasgow City Improvement Department, has issued notes on the operations of the Department. It states that the revenue for the year ended in May, 1906, was 33,413*l.*, against 28,271*l.* for the previous year. The number of houses erected by the Department during the twelve months was 150, the total number erected now being 2,124. Of these 570 are one-apartment houses and sixteen are houses of larger accommodation. Three tenements of dwelling-houses for the poorest classes at Winning-row, Parkhead, consisting of thirty-six two-apartment houses are at present in course of erection or under consideration. The cost of these is estimated at 3,448*l.*

LIVERPOOL CATHEDRAL.—Two of the windows in the choir will constitute an oratory, respectively, to Sir Thomas and Lady Earle, to be erected by members of their family, and the late W. E. Gladstone, at a cost which will be almost met by a balance in the hands of the committee for the erection of the Gladstone memorial in St. John's gardens. The executive committee find that in terms of the late Mr. William Imrie's testamentary dispositions, a sum of 70,000*l.* will perhaps accrue to the cathedral building fund, but they do not expect that the money will be available for the works now undertaken, as some time will elapse before the sum can become payable into the fund in their hands.

THE "PULIO" DOOR-CLOSER.—We have received from Mr. S. W. Finch, the patentee, a model and description of a simple and inexpensive door-closer. It consists of a horizontal brass pulley fixed to the door-frame, round which is reeved a short chain attached to a hook on the door, and acted on by a spring which rolls up the chain with one turn round the pulley, and pulls the door to. Springs are a weak point in this kind of action, as they deteriorate by use; but the device is simple and inexpensive, and may be useful.

SELBY ABBEY RESTORATION.—The Executive Committee of the Selby Abbey restoration fund met for the first time in the sacristy of the ruined building on Saturday last, under the presidency of Lord Wenlock, who was appointed chairman of the committee. The committee took into consideration the work which should be first proceeded with, and an initial expenditure of 10,000*l.* was agreed upon. The architect, Mr. J. Oldrid Scott, spoke of the necessity of covering in the ruins. He was instructed to prepare plans for the external roofing of the nave, choir, and transept, and to obtain estimates for the work. Mr. Scott stated that the repairing of the columns and arches should be undertaken without delay, and it was agreed that under a schedule of prices this should be proceeded with. The Rev. Benjamin Hensworth was thanked for the gift of stone from his quarry for the abbey restoration.

THE PLUMBERS' COMPANY.—The Lord Mayor was the chief guest at the annual meeting of the Plumbers' Company, held on the 16th inst., at the Haberdashers' Hall. The Master of the Company, replying to the toast of the Worshipful Company of Plumbers, referred specially to the ever-extending work of the Plumbers' Company, whose operations had extended to far cities of the Empire. Important changes have been introduced during the past year in consolidating and making more efficient the Company's system of education and registration. Nearly 2,000 new men had been admitted to the class examinations and the register. He, however, warned all whom it concerned against setting aside the teaching of use and experience. The word "change" did not always spell "reform." He referred to the great traditional craftsmanship of the past which had resulted from a proper system of apprenticeship, and strongly advocated its revival. He concluded with a high tribute to Sir Horace Plunkett's work in Ireland in the cause of the increase of industrial efficiency.

SCOTS GREYS MEMORIAL, EDINBURGH.—On the 16th inst. the memorial erected in Princes-street, Edinburgh, to the fallen heroes of the Royal Scots Greys was unveiled by the Earl of Rosebery. The memorial consists of a representation of a trooper and horse of the Greys set on a rocky pedestal. It is the work of Mr. Birnie Rhind, R.S.A.

BUILDERS' FOREMEN'S ASSOCIATION.—A smoking concert in aid of the Pension Fund of this excellent Association is to be given this evening (Saturday), at the Queen's Room, London Tavern, Fenchurch-street. We wish it every success. Mr. W. S. Shepherd will occupy the chair. Tickets (1*s.* each) can be obtained from the secretary, Mr. G. Thomson, Memorial Hall, E.C.

Capital and Labour.

CONDITION OF THE BUILDING TRADES.—Employment continued dull, and was worse than a month ago in nearly all branches. It was rather better on the whole than a year ago. Returns received from firms employing 71,562 workpeople at the end of October show a decline in the number employed of 3,028, or 4.1 per cent., compared with a month ago. The decrease in the number of workpeople employed amounted to 2,022, or 5.2 per cent., in the case of skilled workmen, and to 974, or 3.3 per cent., in the case of labourers. In London the decrease amounted to 5.7 per cent. with skilled, and 3.8 with unskilled workmen. The percentage of trade union carpenters and joiners unemployed at the end of October was 7.6, as compared with 5.9 a month ago, and 8.2 a year ago. With plumbers 8.0 per cent. were unemployed, as compared with 7.8 per cent. a month ago, and 12.0 per cent. a year ago. Employment with masons, plasterers, and painters was worse than a month ago, but there was a slight improvement in the case of bricklayers. Compared with a year ago some improvement was reported by bricklayers and plasterers, and some decline by painters.—*Labour Gazette.*

Legal.

POINT UNDER LONDON BUILDING ACT.

MR. BODKIN, on the 16th inst., applied *ex parte* to a Divisional Court of King's Bench, consisting of the Lord Chief Justice and Mr. Justice Darling, on behalf of the Palace Theatre Company, Limited, for a rule *nisi* directed to the magistrate at Marlborough-street to state a case.

It appeared that the company, who are the occupiers of the Palace Theatre, a few months ago put up in the front of the theatre an advertisement consisting of a wooden framework with plaster modelling, and which was attached to the building by nails driven between the brick courses. This advertisement was certified to be in certain parts between 14 in. and 22 in. in front of the building line. The company were summoned under sect. 22 of the London Building Act, 1894, for erecting the structure beyond the building line without the consent of the London County Council. The magistrate (Mr. Baskin) decided that the erection was a structure within the meaning of the Act, and the company required the magistrate to state a case upon the question of law involved.

Their lordships granted the application.

PARTY WALL DISPUTE.

THE case of Ratcliff v. Crowther came before a Divisional Court of King's Bench, composed of the Lord Chief Justice and Mr. Justice Darling, last week, on the plaintiff's appeal from a decision of Deputy Judge Stansfield refusing a new trial in a dispute about a party wall.

Mr. Compton, for the appellant, said the ground of the application was that since the trial fresh evidence had been discovered which would be conclusive of the plaintiff's rights against whom judgment was given. The County Court judge did not dispute that fresh evidence had been discovered, but held that it was not in law evidence discovered since the trial, and he refused a new trial. The action was brought to recover 3*l.* 11*s.* as damage for the pulling down of a small portion of the plaintiff's wall. The defendant counterclaimed for 80*l.* for encroachment on his land and the rebuilding of the wall, and a mandatory injunction for its removal. The judgment against the plaintiff was given on the claim and for a mandatory injunction on the counterclaim. There was this serious question, that the learned judge found that the plaintiff's plan upon his title-deed was a forgery, which he ordered to be impounded and forwarded to the public prosecutor with a view to a prosecution. The property of the plaintiff and the defendant in 1896 belonged to a Mr. Lister, the defendant acquiring part of the property in 1905. The defendant took down a wall which the plaintiff

PATENTS.—Continued on page 615.

List of Competitions, Contracts, etc.

For some Contracts still open, but not included in this List, see previous issues. Those with an asterisk (*) are advertised in this Number: Competition, iv.; Contracts, iv. vi. viii. x.; Public Appointments, xviii.; Auction Sales, xxx. Certain conditions, beyond those given in the following information, are imposed in some cases, such as: the advertisers do not bind themselves to accept the lowest or any tender; that a fair wages clause shall be observed; that no allowance will be made for tenders; and that deposits are returned on receipt of a bona-fide tender unless stated to the contrary.

Competition.

* **No DYE. - Grimby.** Church, etc.—Competitive plans are invited for a Congregational church, school, and manse at corner of Hainton-avenue and Welholme-road, Grimsby, at an estimated cost of £2,000. Three premiums of 25, 15, and 10 guineas respectively are offered for plans. Conditions of competition will be sent to applicants on payment of 2/ 2s. For further particulars apply to Mr. E. L. Bridge, Hon. Secretary, Fish Docks, Grimsby.

Contracts.

BUILDING.

NOVEMBER 24. - Dinsdale. PREMISES.—For new premises at Dinsdale for Darlington Co-operative Society. Names to the architects, Messrs. Kitching & Lee, 14, Blackwellgate, Darlington, on or before November 24, together with the trades required. Bills of quantities will be supplied. Sealed tenders to be delivered at the offices of the Darlington Co-operative Society, addressed to the Secretary.

NOVEMBER 24. - Stafford. SHIP.—The erection of a new shop and premises in the Gaol-road, Stafford, for the Stafford Industrial Co-operative Society, Ltd. Names and addresses not later than November 24 to Mr. R. A. Glass, of 104, Wolverhampton-road, Stafford, architect, from whom all particulars may be obtained.

NOVEMBER 25. - Ardsley. WORK AT SCHOOLS.—The Ardsley (E. and W.) District Sub-Committee invite tenders for: (1) Extending the urinal, converting present store-room into w.c.s., and other work at the East Ardsley (Girls and Infant) School; (2) taking out the present lavatory basins and wood framing and fixing new lavatory basins, etc., in place of the old ones at the West Ardsley Blackgate School. Copies of specifications may be obtained from office of Mr. Alexander Angus, West Riding Education Office, 123, Northgate, Wakefield. Separate tenders must be submitted for each school. Sealed tenders, duly endorsed "East Ardsley Tender" or "Blackgate Tender," must be received by Mr. Angus not later than 10 a.m. on November 26.

NOVEMBER 25. - Belfast. ASPHALT FLOORING.—The Belfast Harbour Commissioners invite tenders for the supply and laying down of asphalt flooring in premises at York Branch Dock, Belfast. Particulars of the work may be obtained on application to the Harbour Engineer, Mr. W. Redfern Kelly, M.Inst.C.E. Sealed tenders to be addressed to Mr. W. A. Currie, Secretary, Harbour Office, Belfast, endorsed "Tender for Asphalt Flooring," and sent in on or before November 26.

NOVEMBER 25. - Belfast. SHOPS, ETC.—For the erection of two shops and dwelling-houses, Lisburn-road, Belfast, and specification may be seen at office of Mr. W. D. R. Taggart, architect, 2, Wellington-place, Belfast. Tenders to be lodged not later than 12 o'clock noon on November 26.

NOVEMBER 25. - Cowick. ALTERATIONS TO HOUSE.—For the whole or several trades, viz., bricklayer and mason, carpenter and joiner, and plumber and glazier's work required in the construction of new bay windows and internal alterations to The Grange, Cowick, near Snaith, for Mr. A. Hartley. Applications to Messrs. Thomas Winn & Sons, architects and surveyors, 54, Albion-street, Leeds, not later than November 26, when schedule bills of quantities will be forwarded.

NOVEMBER 25. - Edinburgh. ALTERATIONS.—Edinburgh Magistrates and Council invite tenders for the mason, joiner, plumber, and plaster works of alterations to be made on property, 65-73, Henderson-row, required in the construction of new bay windows and internal alterations to The Grange, Cowick, near Snaith, for Mr. A. Hartley. Applications to Messrs. Thomas Winn & Sons, architects and surveyors, 54, Albion-street, Leeds, not later than November 26, when schedule bills of quantities will be forwarded.

NOVEMBER 25. - Enfield. FEBRUARY.—Edmonton Guardians invite tenders for the erection of an infirmary for fifty beds at the Chase Farm Schools, The Ridgeway, Enfield, N. Drawings and specifications of the alterations may be seen at the offices of the architect, Mr. Stuart Hill, 106, Cannon-street, E.C., and bills of quantities had on payment of 5/ 5s. (cheque). Sealed tenders to be delivered to Mr. P. Shelton, Clerk, Lower Tottenham, on or before 9 a.m. on November 28.

NOVEMBER 25. - Glasgow. ALTERATIONS TO POLICE OFFICES.—Glasgow Corporation invite tenders for the several works required in connection with the proposed alterations on the Northern, Western, and Southern Police Offices. Specifications and forms of tender may be had on application at the Office of Public Works, City-chambers, 54, Cochrane-street. Sealed tenders, marked outside "Tender for Alterations, Police Offices," must be lodged with Mr. A. W. Mylles, Town Clerk, City-chambers, Glasgow, not later than November 28.

NOVEMBER 1. - Tonypany. INSTITUTE.—The Tiberian Band Institute, Tonypany, invite tenders for the erection of additions to their premises, No. 76, Henry-street, Tonypany, where plans and

specifications may be seen. Sealed tenders to be delivered to Mr. James Brooks, Secretary, tobacco-couse, Tonypany, on or before December 1, endorsed "Tender."

DECEMBER 3. - Dundalk. STORES BUILDING.—Great Northern Railway Company (Ireland) Directors invite tenders for a stores building (two stories) in brick, 121 ft. long by 50 ft. wide, with steel principal roof and steel girder supported floor; also offices, 54 ft. long, making a total length of about 215 ft., at their Dundalk Station. Parties wishing to tender may see the drawings and specification at the office of Mr. W. H. Mills, Engineer-in-Chief, Amiens-street, Dublin, or copies of them at the office of the District Engineer, Belfast, and can obtain at the said offices lithographed copies of the eight drawings and specification and form of tender on payment of 2/ 2s. (not returnable) per set. Quantities are not supplied. Tenders for the brickwork, or steelwork, or for the whole of the work, to be made out on the forms supplied by the Company, and endorsed "Tender for Stores Building," should be delivered to Mr. T. Morrison, Secretary, Secretary's Office, Amiens-street Terminus, Dublin, not later than 10 a.m. on December 3.

DECEMBER 3. - Hexham. NEW NAVE TO CHURCH.—The Committee for the restoration and completion of Hexham Abbey Church, Hexham, Northumberland, invite builders willing to compete in limited competition for the building of the new nave to send in their names on or before December 3. Address, with references, etc., to the Rector, Hexham Abbey Church, Hexham.

DECEMBER 3. - Maidstone. ADDITIONS TO SANATORIUM.—Maidstone Borough Council invite tenders for the erection of additions to the administration block at the Sanatorium, Pant-lane. Specifications and plans may be seen at the office of the Borough Surveyor, Farnham-road. Sealed tenders, which will only be received on the form supplied, to be sent to Mr. R. L. Morckton, Town Clerk, Town Clerk's Office, King-street, Maidstone, not later than December 3.

DECEMBER 3. - Woodbury. ALTERATIONS, ETC., TO LODGES.—For alterations and additions to The Lodge, near Woodbury, Devon, for Mr. W. Arnold, of Woodbury. Plans and specifications at offices of Messrs. E. H. Harbottle & Son, architects, County-chambers, Exeter. Tenders to be delivered to architects on or before December 3.

* **DECEMBER 4. - Droitwich.** NEW POST-OFFICE.—The Commissioners of H.M. Works and Public Buildings invite tenders for a new post-office at Droitwich. Drawings, specification, and a copy of the conditions and form of contract may be seen on application to the Postmaster at Droitwich. Bills of quantities and form of tender may also be obtained at the undermentioned address on payment of 1/ 1s. Tenders must be delivered before 12 noon, December 4, addressed to the Secretary, H.M. Office of Works, etc., Storey's-gate, S.W., and endorsed "Tender for Droitwich New Post-office."

* **DECEMBER 4. - Romford.** "NURSES' HOME."—The Guardians of the Romford Union invite tenders for a home for twenty nurses, and connecting corridor to the Infirmary, in accordance with plans and specification prepared by the architect, Mr. James Kennedy, 25, Bedford-row, W.C., from whom bill of quantities and form of tender may be obtained on payment of 1/ 1s. Sealed tenders, endorsed "Tender for Nurses' Home," to be sent to Mr. W. Smith, 15, North-street, Romford, by 4 p.m., December 4.

DECEMBER 4. - Wrexham. CART SHED.—Wrexham T.C. invite tenders for the supply and erection of an iron cart shed at the Willow-road Depot. Drawings and specification may be seen, and forms of tender obtained, at the office of Mr. John England, Borough Engineer and Surveyor. Tenders, endorsed "Wagon Shed," to be delivered to Mr. Lawson Taylor, Town Clerk, Guildhall, not later than 12 noon on December 4.

DECEMBER 5. - Didsbury. SCHOOL.—Manchester Education Committee invite tenders for the erection of the Beaver-road Municipal School, Didsbury, Manchester. Plans may be seen, and a copy of the bills of quantities (including specification) obtained, at the Education Office, Deansgate, Manchester, on a deposit of 2/ 2s. Tenders, on the official forms and enclosed in the envelopes provided, must be delivered not later than December 5 next. Cheques to be made payable to the accountant, Education Office, Deansgate, Manchester.

DECEMBER 5. - Dowlaish. ALTERATIONS, ETC., TO COTTAGES.—For alterations and repairs to six cottages, Nos. 32, 33, 34, 35, 36, and 37, Gas-row, Dowlaish, for the Dowlaish Gas and Coke Company. Plans and specification may be seen at the offices, Gas Works, Dowlaish. Sealed tenders to be sent to the Gas Works Office, on or before December 5, addressed to Mr. J. L. Atkins, Chairman, endorsed "Tender for Alteration to Cottages."

DECEMBER 5. - Rathdown. LABOURERS' COTTAGES.—At their meeting on December 5 the R.D.C. of the Rathdown Local District will consider tenders for building nine single labourers' cottages, two and five double labourers' cottages, and four cottages in one block. Contractor must send in separate and distinct tenders, both (a) masonry and (b) brick work. Plans, specifications, and tender forms for the works can be obtained from Mr. Patrick Cunningham, Clerk of the Council, Loughlinstown, on payment of 2s., and tenders, endorsed "Tender for

Cottages," are to be lodged in his office not later than 10 o'clock on the day above mentioned. The tenders must be made on the official forms, and contain the names and addresses of two solvent persons who are willing to join with him in a bond for the execution of the work of an amount of 50s. for each cottage.

* **DECEMBER 5. - Twickenham.** POST-OFFICE.—The Commissioners of H.M. Works and Public Buildings invite tenders for a new post-office at Twickenham. Drawings, specification, and a copy of the conditions and form of contract may be seen on application to Mr. J. Rutherford, at H.M. Office of Works, etc., Storey's-gate, S.W. Bills of quantities and forms of tenders may be obtained on payment of 1/ 1s. Tenders to be delivered before 12 noon, December 5, addressed to the Secretary, H.M. Office of Works, etc., Storey's-gate, S.W., and endorsed "Tender for Twickenham New Post-office."

DECEMBER 5. - Ullapool. ALTERATIONS, ETC., TO HOTEL.—Additions to and alterations on Caledonian Hotel, Ullapool. Plans and specification to be sent, with Mr. William Mackenzie, architect, Dingwall, until November 26, and afterwards at the Hotel, Ullapool, and offers to be lodged with the architect on or before December 10.

DECEMBER 8. - Albert Village. SCHOOL.—Leicestershire C.C. Education Committee invite tenders for the erection of a Council School at Albert Village, in the Leicestershire District of Wollaton, Leicestershire, with outfalls drainage, and other works connected therewith. Conditions of contract, quantities, and form of tender may be obtained from the architect, Mr. W. H. Simpson, County-chambers, Leicester, on payment of a sum of 2/ 2s. Sealed tenders, upon the forms supplied, to be sent in the envelopes provided, to office of Mr. A. Brooking, Director of Education, County Education Office, 33, Bowling-green-street, Leicester, not later than 10 a.m. on December 8, addressed to "The Chairman of the Buildings and Sites Committee."

DECEMBER 10. - Harborne. FENCING.—The Watch Committee of the City of Birmingham invite tenders for a pre-station at Harborne. Plans and specification may be seen, and quantities and bills of materials may be obtained at the office of the Engineer and Surveyor, Council House, Birmingham, on deposit of 5/ 1s. Tenders, on forms provided, and delivered at the above-mentioned offices (addressed to City Surveyor) on or before December 10.

DECEMBER 10. - North Shields. COMMITTEE ROOMS.—Tyne-mouth Corporation invite tenders for pulling down existing buildings in North-street, North Shields, and erecting and completing new committee-rooms and offices. The drawings, etc., may be seen at the office of Mr. John F. Smilie, Borough Surveyor, Tyne-mouth, where copies of the bills of quantities and the general conditions may also be obtained on depositing the sum of 2/ 2s. Sealed tenders, endorsed "Tender for New Committee-rooms, etc.," are to be left at the office of the City Engineer, not later than December 10.

* **DECEMBER 10. - Swansea.** PAVILION.—The Royal National Eisteddfod of Wales, Swansea, 1907, invite tenders for a temporary pavilion in the Victoria Park, Swansea, to seat 15,000 persons. Contractors are invited to tender for either or both of the following, viz:—(a) The timber work; (b) the canvas roofing. Plans and specifications may be seen, and bills of quantities may be obtained, at the offices of Messrs. A. E. Passingham, Clerk at the Old Town Hall, Hitchen. Sealed tenders, endorsed "Boiler Shaft," to be received not later than 10 a.m. on November 27.

NO DATE. - Lombarstown. BUILDING.—Lombarstown Co-operative Society Lombarstown, Cork, invite tenders for the erection of a three-story, stone-built and slated building. Plans and specification can be inspected at above address.

ENGINEERING, IRON, AND STEEL.

NOVEMBER 26. - Swainsthorpe. PLANT.—For the supplying and fixing a new plant for raising and distributing water, including cast-iron tanks, at the Swainsthorpe, Swainsthorpe, Lincolnshire. Specifications may be inspected on application to the Master. Tenders to be sent in under seal and endorsed "Water Supply," not later than 4 p.m., on November 26, to Mr. J. H. E. Paschall, Clerk at the Old Town Hall, Hitchen. Sealed tenders, endorsed "Boiler Shaft," to be received not later than 10 a.m. on November 27.

NOVEMBER 27. - Hitchen. BOILER SHAFT.—Hitchen Guardians invite tenders for the erection of a new boiler shaft at the Union Workhouse, Hitchen. A plan and specification can be seen at office of Mr. A. E. Passingham, Clerk at the Old Town Hall, Hitchen. Sealed tenders, endorsed "Boiler Shaft," to be received not later than 10 a.m. on November 27.

NOVEMBER 23. - Dublin. RAILS AND CHAIRS.—Dublin, Wicklow, and Wexford Railway Company invite tenders for the supply of 500 tons bulhead steel rails (55lb. per lin. 3d.) with corresponding 5-flanges, half to be delivered in February and half in July; also for the supply of 600 tons bulhead chairs, 300 tons to be delivered in January and 300 tons in June. Specifications and forms of tender can be had on application to Mr. S. J. Shannon, C.E., 1, Westland-row, Dublin. Tenders, marked outside "Tender for Rails and Chairs," addressed to Mr. M. F. Keogh, Secretary, Westland-row Station, Dublin, to be forwarded so as to be received not later than 10 a.m. on November 28.

NOVEMBER 26. — **East Preston.** — SCREEN CHAMBER. — East Preston Guardians invite tenders for the construction of a screening chamber and of works, in connexion with the drainage of the Workhouse at East Preston. Plan and specification can be seen on application to Mr. H. M. Poole.

architect, Worthing. Sealed tenders to be sent to Mr. Arthur Shelley, Littlehampton, not later than November 26.

NOVEMBER 26.—HARROGATE.—STREET WORKS.—Harrogate Corporation invite tenders for private street works required in back road at the site of No. 4, Springfield-avenue. The specification may be seen, and quantities obtained, at the office of Borough Engineer and Surveyor, Mr. P. Bagshaw. Tenders must be submitted not later than 9 a.m. on November 26.

NOVEMBER 27.—BOOTLE.—PAVING.—The Corporation of Bootle invite tenders for the supply of granite paving materials. Forms of tender, and specification, at the office of Mr. B. J. Wolfenden, A.M.Inst.C.E., Borough Engineer, Town Hall. Tenders to be sent to the Town Clerk on or before 10 a.m. on November 27, endorsed "Tender for Granite Paving Materials."

NOVEMBER 27.—POOLE.—ROAD WORKS.—Poole B.C. invite tenders for the following works:—Making-up under the Private Street Works Act, Motcombe-road, Ormonde-road, Eaton-road, and Chester-road. Particulars may be obtained on application to the Borough Surveyor. Tenders to be delivered at the Borough Surveyor's Office before 9.30 a.m. on November 27. Mr. Samuel J. Newman, F.R.I.B.A., Borough Surveyor, King-street, Poole.

NOVEMBER 27.—SEAFORTH.—PRIVATE STREET WORKS.—The U.D.C. of Waterloolow invite tenders for works of sewerage, flagging, kerbing, channeling, paving, etc., in Fort-road, Seaforth. Plans and specifications may be seen, and bills of quantities and forms of tender obtained, on application to Mr. F. Spencer Yates, A.M.Inst.C.E., the Surveyor to the Council, at the Town Hall, Waterloolow. The sum of 10s. 6d. must be deposited for quantities. Sealed tenders on the forms supplied, addressed to the Chairman of the General Purposes Committee, and endorsed "Tender for Private Street Works," are to be delivered at the Town Hall, Waterloolow, not later than 12 o'clock at noon on November 27.

NOVEMBER 27.—SEAFORTH AND WATERLOOLOW.—ROAD, ETC., WORKS.—The U.D.C. of Waterloolow invite tenders for works of sewerage, flagging, kerbing, channeling, paving, etc., in the following streets and passages, viz.:—Tuscan-street, Seaforth; Grecian-street, Seaforth; Hornby-street, Seaforth; Houghton-avenue, Waterloolow. Passages in Waterloolow: passage between Nos. 2 and 4, Sandon-street; passage between Milton and Molyneux roads; passage between Galloway and Winstanley roads; passage between Nos. 17 to 29, Oxford-road and Nos. 1 to 9, Blucher-street; passage at the rear of No. 3, Sandringham-road and Nos. 2 to 6, Sandringham-road and Nos. 1 to 7, Sandringham-avenue; passage at the rear of Nos. 12 to 22, Rockland-road; passage at the rear of Nos. 24 to 32, Rockland-road. Passages in Seaforth:—Passage between Cambridge and Fernlea roads; passage at the rear of Nos. 37 to 55, Seaforth-road and Nos. 10 to 12, Seaforth-avenue; passage between Nos. 40 and 42, Henley-street; passage at the side of No. 72, Granville-road and the rear of "Beaconsfield," Crosby-road South; passage between the Mission-room and No. 5, Caradoc-road; passage at the side of No. 4, Henley-street and the rear of Nos. 41 to 45, Caradoc-road; passage at the side of No. 3, Green lane and the rear of No. 3, Green-lane, passage between Nos. 36 and 38, Granville-road. Plans and specifications may be seen, and bills of quantities and form of tender obtained, on application to Mr. F. Spencer Yates, A.M.Inst.C.E., the Surveyor to the Council, at the Town Hall, Waterloolow. The sum of 10s. 6d. must be deposited for quantities. Sealed tenders on the forms supplied, addressed to the Chairman of the General Purposes Committee, and endorsed "Tender for Private Street Works," are to be delivered at the Town Hall, Waterloolow, not later than 12 o'clock at noon on November 27.

NOVEMBER 28.—BRENTWOOD.—SEWERS.—The U.D.C. of Brentwood invite tenders for the construction of about 150 ft. of 6-in. and 4-in. sewers, about 150 ft. of 4-in. surface water drain, with manholes and inspection chambers, at the rear of a certain Coptford road, Brentwood, according to the plan and specification to be seen by appointment with Mr. A. J. Meeson, Surveyor, Town Hall, Brentwood. Tenders to be sent to Mr. C. Edgar Lewis, Clerk, Brentwood, by November 28.

NOVEMBER 28.—EDINBURGH.—ROADS.—Edinburgh City Council invite estimates for forming new roads and drains at Claremont-road according to plans and specification, which may be seen at office of Mr. R. Morham, City Architect, Public Works Office, City-chambers, Edinburgh, where also schedules of quantities may be obtained, on personal application only. The estimates must be sent to Architect, by 10 a.m. on November 28, sealed and marked, "Tender for Roads and Drains at Claremont-road."

NOVEMBER 28.—ENISKERRY.—SEWERAGE WORKS.—Rathdown No. 2 B.C. will, at their meeting on November 28, receive tenders for the Sewerage Works at Eniskerry, Co. Wicklow, and other works connected therewith, in accordance with the plans, specifications, etc., prepared by the engineers, Mr. J. H. Ryan, A.M.Inst.C.E., and Mr. R. M. Butler, A.M.Inst.C.E. Conditions, specification, and quantities can be inspected, and forms of tender obtained, at the engineers' office, 22, Nassau-street, or at the Clerk's office, Loughinstown. Sealed tenders, upon the form supplied, to be sent in and addressed to the Chairman of the Council, and endorsed "Tender for Eniskerry Main Drainage."

NOVEMBER 28.—KINGSTON.—DRAINAGE.—The War Department invite tenders for the reconstruction of drainage at Kingston Brigade Depot in the Eastern Command. The plans, specification, and conditions of contract may be inspected at the office of Mr. H. B. Measures, Architect, War Office, Aldersbury-street, Grosvenor-road, S.W. 1, on November 26, 27, and 28 only, and bills of quantities and form of tender obtained on those days only on payment of 10s.

NOVEMBER 29.—BATHGATE.—WATERWORKS.—The Bathgate District Committee of the C.C. of the County of Linlithgow invite tenders for

cutting tracks and for laying about six miles of cast iron pipe, 12 in. to 4 in. diameter. Plans may be seen, and copies of the specification and schedule obtained, at the office of the engineer, Mr. W. A. Tait, C.E., 724, George-street, Edinburgh. Tenders, on the form supplied, endorsed "Tenders for Pipe Tracks," must be lodged with Mr. J. G. B. Henderson, Linlithgow, not later than November 29.

NOVEMBER 29.—PONTYPRIDD.—STREET WORKS.—Pontypridd U.D.C. invite tenders for the following works:—Contract No. 1, 376 yds. of stoneware pipe sewers and contingent works; contract No. 2, private street works in Madoc-street; contract No. 3, private street works in Ffynnon-lane; contract No. 4, private street works in Wood-street, Cilyddog. Plans may be seen, and specifications and bills of quantities obtained, at the office of the engineer and surveyor, Mr. P. E. A. Willoughby, A.M.Inst.C.E., Tenders, on the prescribed form, sealed, and endorsed "Contract No. 1," (as the case may be), must be received by Mr. J. Colenso Jones, Clerk to the Council, Municipal Buildings, Pontypridd, on or before November 29.

NOVEMBER 30.—SLOUGH.—MAKING-UP ROAD.—Slough U.D.C. invite tenders for the supply of materials and labour required in making-up, etc., Gray's-road, Slough. Plans and specifications may be seen, and schedules of quantities obtained, from Mr. W. W. Cooper, Town Surveyor, Slough, on payment of a deposit of 10s. 6d. Sealed tenders, endorsed "Private Street Works," addressed to the Chairman of the Committee, 1, Mackenzie-street, Slough, to be sent in on or before November 30.

DECEMBER 1-21.—BISHOP MIDDLEHAM.—SEWERAGE WORKS.—The B.C. of Bishop Middleham invite tenders for the execution of a scheme of main sewerage and sewage disposal for Bishop Middleham. The proposed works in this contract comprise the laying and laying of about 2,200 yds. of 12 in., 9 in., 8 in., 7 in., and 6 in. fireclay and cast-iron pipe sewers with Gaskin and cement joints, with manhole and lampole shafts, storm overflow and screening chambers, large and small, and trenching, fencing, cartroad, etc. Names and addresses, not later than December 1, to the engineers for the works, Messrs. J. Balfour & Son, Civil Engineers, 1, Nicholas-cum-Street, Newcastle-on-Tyne, accompanied by a cheque for 3s. Sealed tenders, endorsed "Tender for Bishop Middleham Sewerage," must be sent to Mr. W. Lodge, Clerk to the said Council, Union Office, Newfield, Ferryhill, not later than 10 a.m. on December 21.

DECEMBER 1.—PADDINGTON.—PAVING.—Paddington B.C. invite tenders for paving with granite setts the passage-way at the rear of Beechcroft street, and the execution of contingent works, all the granite setts and certain other materials being supplied from the Council's stock. General conditions, specifications, schedules of quantities, and forms of tender will be furnished upon application to the Borough Surveyor, Town Hall, Paddington, W., upon payment of 10s. for a set containing one copy of each document. Tenders, endorsed "Paving," must be addressed to the Town Clerk, and delivered at the Town Hall not later than December 1.

DECEMBER 1.—SWANAGE.—ROADS.—The Swanage U.D.C. invite tenders for making-up various roads on the Court Park Estate, Swanage, in accordance with plans, specification, and conditions prepared by the Council's Surveyor, which can be seen at the Town Hall, Swanage. Tenders must be separate for each road, and furnished on forms which can be obtained at the Council's Office, on payment of 10s. 6d. Sealed tenders, on the forms supplied, marked "Roads," must be sent to Mr. Thos. Randall, Clerk, Town Hall, Swanage, not later than 12 o'clock at noon on December 1. "Tender for Making-up Roads on Court Park Estate, before noon, December 1."

DECEMBER 3.—TAUNTON.—STREET WORKS.—The Taunton T.C. invite tenders for the construction and making-up of Gylford-street and Stephen St. Priory. Plans and specification may be seen, and form of tender and bill of quantities obtained, at the office of Mr. David Edwards, A.M.Inst.C.E., Borough Engineer and Surveyor, Municipal Buildings, Taunton. Sealed tenders, endorsed "Private Street Works," to be addressed to the Town Clerk, Municipal Buildings, on or before December 3.

DECEMBER 4.—NEW CROSS.—SANITARY CONVENIENCE.—The Deptford B.C. invite tenders for a sanitary convenience at Amersham-road, New Cross, according to drawings and specification, which can be seen at the Borough Surveyor's Office at the Town Hall. Sealed tenders, on forms to be obtained at the Town Hall, must be sent to Mr. Vivian Orchard, Town Clerk, Town Hall, New Cross-road, S.E. before 4 o'clock on December 4.

DECEMBER 4.—RADYR.—STREET IMPROVEMENTS.—Landaff and Dinas Powis R.D.C. invite tenders for private street improvement works in Railway-terrace, Radyr, in accordance with specification which may be seen, and bills of quantities obtained, on application to the surveyor, Mr. James H. Widen, A.M.I.C.E., Park House, 20, Park place, Cardiff. Sealed tenders, endorsed "Radyr," must be sent to Mr. M. W. Wren, Town Clerk, Radyr, not later than 12 o'clock noon on December 4.

DECEMBER 10.—GLASGOW.—SAND FILTER BEDS.—The District Committee of the Middle Ward of the County of Lanark invite tenders for the construction of an additional sand filter beds at Glasgow. Plans may be seen, and copies of the specification and schedule obtained, at the office of the engineers, Messrs. J. & L. Leslie Weir, C.E., 724, George-street, Edinburgh, on payment of 10s. An assistant engineer will meet intending offerers at Glasgow Station on November 23, at 10.30 a.m., to point out the position of the works. Tenders, endorsed "Filter Beds," on contract No. 77, must be lodged with Mr. W. E. Whyte, District Clerk, Hamilton, not later than December 10.

DECEMBER 11.—WANTAGE.—DRAINS.—The Wantage U.D.C. invite tenders for the construction of drains at Wantage. Plans and specification, which can be inspected on application to Mr. E. B. Ormond, Union Office, Wantage, may be seen, and bills of quantities and form of tender for Workhouse Drainage, to be sent in and addressed before 10 a.m., December 11.

DECEMBER 22.—GORDON.—DRAINAGE WORKS.—Berwickshire C.C. West District invite tenders for

works in connexion with Gordon Drainage scheme. Plans and specification may be seen, and schedule of quantities and form of tender had, on application to the engineer, Mr. T. R. Atkinson, Earlsdon. The engineer will be at Gordon Station on December 11, at 12 noon, to receive tenders. Tenders to be sent in on forms supplied, endorsed "Gordon Drainage," to Mr. George Rankin, W.S., Lanter, not later than December 22.

JANUARY 7.—STOUPPORT.—SEWERAGE WORKS.—Stouport U.D.C. invite tenders for the provision, laying, and jointing of cast-iron and stoneware pipe sewers, together with manholes, lampholes, and inspection chambers, the construction of tank, engine-house, liquefying tanks, distributing carrier, efficient drains, and other incidental works. Drawings and specification may be seen, and bills of quantities obtained, at the offices of the engineers, Messrs. Wilcox & Raikes, of 63, Temple-row, Birmingham, and on after November 26, on payment of a deposit of 5s. 5d. Sealed tenders, in the envelopes supplied, addressed to the Council's Secretary, Contract No. 1, to be delivered at office of Mr. C. Hugh Watson, Clerk to the Council, Stouport, not later than 12 o'clock noon on January 7.

NOVEMBER 25.—STRENSALL.—PIPE SEWER.—Elaston R.D.C. invite tenders for the laying of about 370 lineal yds. of 9-in. sanitary pipe, together with the construction of the various manholes, etc., that may be required. Names and addresses to the Council's Secretary, Mr. E. T. Felgate, 3, Stonegate, York.

STONE, MATERIALS, AND STORES.

NOVEMBER 25.—KINGSTOWN.—ANNUAL SUPPLIES, ETC.—The U.C. of Kingstown invite tenders for the supply, in such quantities as may be required from time to time, of the undermentioned stores, commencing on December 31, 1907, of general stores, broken stone, gravel, cement, etc., according to particular specifications and form of tender may be obtained on application at the Council's Office, Seaside, on any day between the hours of 10 a.m. and 2 p.m. Tenders, sealed and endorsed, should be sent in to Mr. M. A. Manning, Town Clerk, Town Hall, before 10 o'clock a.m. on November 25.

NOVEMBER 25.—LONDON.—STORES.—The Great Northern Railway Company Directors invite tenders for the supply of certain new and the purchase of old stores for twelve months from January 1 next. The stores to be supplied are:—(1) general stores, for each contract, may be obtained upon application to Mr. Weeks, the Stores Superintendent, Doncaster. The stores must be in every case equal in quality to the company's sealed samples and patterns, which will be exhibited in the Stores Department, Doncaster, where they may be inspected, on application to the company's Stores Superintendent between the hours of 10 a.m. and 4 p.m. Tenders, addressed to the Stores Committee, marked on the outside with a description of the stores tendered for, must be sent to the Company's Office, 1, King's Cross, in the envelope specially provided, so as to be received by not later than 9.30 o'clock a.m. on November 25.

DECEMBER 1.—GLASGOW.—STORES.—The Directors of Messrs. G. & J. Burns, Ltd., invite tenders for the supply of the undermentioned stores, in such quantities as may be required from time to time, for a period of twelve months from January 1, 1907:—Section I.—Engine oil, Steintin oil, kerosene, turpentine, white spirit, kerosene, red lead (genuine), stone colour paint, teak colour paint, bottom paint, ground lead, ground paint, bath brick, Section IV.—Ships hose, Tuck's pack, Section V.—White waste, coloured waste, Section VI.—Brushes (assorted), as per list. Section VII.—Gordale, 100 lb. per cwt. of iron wire rope. Printed forms of tender may be had on application at 49, Queen's-square, Belfast, and sealed tenders, marked on the outside "Tender for Burns, Ltd., 30, Jamaica-street, Glasgow," must be sent to Mr. A. M. Kay, Secretary, not later than December 1. Mr. A. M. Kay, Secretary.

DECEMBER 3.—ABERDARE.—STORES.—The Directors of the Powell Duffryn Steam Coal Company, Ltd., invite tenders for the supply of the undermentioned stores from January 1, 1907:—(1) Bar and other iron; (2) bolts, nuts, and rivets, etc.; (3) brass fittings; (4) india-rubber and asbestos; (5) rollers; (6) iron wire goods, etc.; (7) ironmongery; (8) gliders, channels, and rails; (9) nails; (10) steel; (11) steam tubes and fittings; (12) brattice cloth and wire; (13) chains; (14) timber, doys; (15) horse feed; (16) wire ropes; (17) French pit wood; (18) Swedish pitwood; (19) electrical fittings. Forms of tender and all particulars can be obtained on application to the Stores Manager, Aberaman Offices, near Aberdare. Tenders to be addressed to the Directors of the Powell Duffryn Steam Coal Company, Ltd., 10, Lendenhall-street, London, E.C. 4, and posted so as to be received not later than 10 a.m. on December 3.

DECEMBER 3.—ABERDEEN.—STORES.—The Directors of the Great North of Scotland Railway Company invite tenders for the supply of the undermentioned stores, for six or twelve months (in the Company's option), from January 1, 1907:—(1) Brooms, brushes, etc.; (2) canvas, ropes, flax, and twine; (3) carriage bolts, nuts, and rivets; (4) carriage ironmongery (locks, hinges, etc.); (5) cement and lime; (6) canvas cloths and sponges; (7) cotton waste, lamp cloth, sponge cloths, flannel, etc.; (8) crucibles; (9) iron leaders; (10) electric lighting material; (11) files and steel; (12) fireclay bricks; (13) galvanised fencing and signal wire, and steel lathe castings; (14) glass (plate and sheet), lamp chimneys, cloth and triangles; (15) iron bands; (16) iron goods and engine packing; (17) iron bars; (18) iron castings; (19) ironmongery, implements, and tools; (20) hand saws; (21) lead, solder, and tinplate; (22) leather and leather belting; (23) motor spirit; (24) nails, tacks, taper pins, screws, and cotter pins; (25) nails, tallow, and turpentine; (26) paints, colours, and washers; (27) saws and canals; (28) spikes, wood screws, and washers; (29) springs (bearing, buffer, etc.); (30) steel boiler tubes; (31) steel ties for engines, carriages, and waggon; (32) transfers (carriage, etc.); (33) varnishes; (34) Yorkshire iron

and rivets. Forms of tender can be obtained from the Stores Superintendent, 30, Guild-street, Aberdeen, on payment of 1s. for each form. Patterns may be inspected at the Stores Depot, Inverurie, between the hours of 10 a.m. and 4 p.m., from November 23 to 30, inclusive, except on the 24th, when they will not be on view after 12 o'clock noon. Tenders, endorsed "Tender for Stores," must be lodged with Mr. T. Mackintosh, Secretary, Company's Offices, 80, Guild-street, Aberdeen, not later than 10 a.m. on December 5.

DECEMBER 5.—Edinburgh.—**STORES.**—The Edinburgh and District Water Trustees invite offers to supply Greenberg and Spanish tar lead, lead pipe, solder, and rope yarn. Specifications can be obtained at the office of the Works Department, 12, St. Giles-street, Edinburgh. The offers, endorsed "Tender for Lead," must be lodged with Mr. William Boyd, W.S., Clerk to the Trust, Edinburgh and District Water Trust Offices, Edinburgh, on or before December 5.

DECEMBER 5.—Norwich.—**MATERIALS.**—City of Norwich Corporation invite tenders for the supply of the following materials and work during 1907:—Gravel, flints, etc.; paving setts; materials for macadam roads; cement; ironware drainage pipes and fittings; stoneware ditto; British wood; foreign wood; iron; cast-iron manhole covers, gullies, etc.; bricks; tar shingle for bottoms; footpath tar-paving and tarmacadam materials; brushes; engine filter, boiler maker, and founder. The necessary specifications, forms of tender, etc., may be obtained at the office of Engineer. Tenders on the forms supplied, enclosed in envelopes sealed with sealing wax, endorsed "Tender for —," and addressed to the

Chairman of the General Purposes Committee, must be delivered at office of Mr. Arthur E. Collins, M.Inst.C.E., City Engineer, etc., Guildhall, Norwich, not later than 10 a.m. on December 5.

DECEMBER 5.—Wombwell.—**ROAD MATERIALS.**—Wombwell U.D.C. invite tenders for the supply during the year ending December 31, 1907, of the following quantities of road materials—750 tons lump cross, best quality; 750 tons 24-in. machine-broken cross, best quality—the above to be free from honeycomb and stony pieces; also 330 tons 1 1/2-in. hand-broken blue rock or whinstone. Forms of tenders may be obtained from Mr. J. W. Harrison, Surveyor to the Council, Town Hall, Wombwell, to whom all tenders, endorsed "Tenders for Materials," together with samples of the materials tendered for, must be delivered on or before December 3, at 12 o'clock noon.

DECEMBER 5.—Leicester.—**MATERIALS.**—Leicester Corporation invite tenders for the supply of the undermentioned materials, as may be ordered during the year 1907:—(1) iron and steel, (2) ironmongery, etc.; (3) oils, paints, and sundries, (4) timber—English; (4) timber—foreign; (5) hemp, rope, canvas, cotton waste, etc.; (6) sewerage and other ironwork, etc.; (7) bricks. Form of tender, etc., may be obtained on deposit of 10s. Cheques, etc., to be made payable to the Borough Treasurer. Sealed tenders for each contract, in separate envelopes, addressed to the "Chairman of the Highway and Sewerage Committee," and endorsed "Tender for Stores," are to be delivered at office of Mr. E. George Mawbey, M.Inst.C.E., Borough Engineer and Surveyor, Borough Surveyor's Office, Town Hall, Leicester, not later than December 5.

DECEMBER 5.—Leicester.—**ROAD MATERIALS.**—Leicester Corporation invite tenders for the supply of granite kerb setts, randoms, rinesum, ranned, shapings, chippings, gravel, etc.; also for Brecon gravel, etc., as may be ordered during the year 1907. Form of tender, etc., may be obtained on deposit of 10s. Cheques, etc., should be made payable to the Borough Treasurer. Tenders and samples are to be delivered at office of Mr. E. George Mawbey, M.Inst.C.E., Borough Engineer and Surveyor, Borough Surveyor's Office, Town Hall, Leicester, not later than December 5, addressed to the Chairman of the Highway and Sewerage Committee, and endorsed "Tender for Granite."

DECEMBER 5.—Watford.—**SEWER PIPES.**—Watford U.D.C. invite tenders for the supply of about 1,750 lineal yds of earthenware or stoneware sewer pipes 15 in. in diameter, 1,100 lineal yds. of earthenware or stoneware sewer pipes 9 in. in diameter. Specification and form of tender may be obtained at the Engineer's office at No. 14, High-street, Watford. Sealed tenders, on the form supplied, addressed to the Clerk to the Council, and endorsed "Tender for Sewer Pipes," are to be delivered, with samples of the pipes, not later than December 5.

DECEMBER 12.—Dublin.—**SETTS AND STONES.**—The Dublin Port and Docks Board invite tenders for January 1 next to December 31, 1907.—Paving setts and broken stones. Securities will be required. Sealed tenders, addressed to Mr. N. Proud, Secretary, Port and Docks Office, Westmoreland-street, Dublin, and endorsed on the outside "Tenders for Paving Setts and Broken Stones," will be received up to December 12.

Public Appointments.

Nature of Appointment.	By whom Advertised.	Salary.	Applications to be in
*SURVEYOR AND INSPECTOR OF NUISANCES	Hale U.D.C.	180l.	Dec. 3
*GANGER.	Kingston Borough Council	2l.	Dec. 7

Auction Sales.

Nature and Place of Sale.	By whom Offered.	Date of Sale.
*FREEHOLD BUILDING LAND—At the Torrington Hotel, North Finchley	C. Sparrow & Son	Nov. 26
*FREEHOLD RESIDENCE, 27, WOOD-STREET, WOOLWICH—At the Mart	Furbars	Nov. 28
*BUILD, MATERIALS & CONTRACTORS'S PLANT, NEW SOUTHGATE—On the Premises	Gilbert & How	do.
*BUILD, MATERIALS & CONTRACTORS'S PLANT, NEW SOUTHGATE—On the Premises	Churchill & Sims	do.
*BUILDING SITE (TO LET), LOWER THAMES-STREET—At the Mart	S. Walker & Son	Dec. 2
*FREEHOLD BUILDING SITE, KENNINGTON—At the Mart	Perkins & Cresser	Dec. 7

PATENTS.—Continued from page 611.
deposited upon it. This lever-handle may be provided with ratchet-like teeth to regulate the amount of opening of said plate, and two or more plates may be used if necessary. The discharge plate may be arranged in any slanting position relatively to the arched recess of the boiler so that the ashes may slide down the same and be released periodically at the end of the slide by the withdrawal of slide or hinged flap.

7,545 of 1906.—W. J. PITT: Means for Working and Operating Reversible Sliding Windows.
This relates to connecting-rod fastened to vertical operating screws for reversible sliding windows, parallel sliding windows, or reversible sliding windows, connected by cross strips at the back and provided with brackets with inclined slots working on fixed pins.

7,766 of 1906.—A. BROWN and H. C. PROCTOR: Manufacture or Production of a Certain Part of Door Furniture.

This relates to the manufacture of split rings for securing door and other knobs to their spindles, and consists in making each of the halves by cutting off short lengths from solid bar or rod metal of trough-like section which are subsequently machined or milled to the required shape.

18,806 of 1905. DR. W. SCHUMACHER: Manufacture of Artificial Stone from Slag.

This relates to the manufacture of artificial stone from slag wherein the slag is first subjected to a course and disintegrating process, and after being heated by steam with or without a small admixture of lime but without admixture of other silicious material, is subjected to pressure for producing blocks which are ready for use within a short time after their production.

3,779 of 1906.—T. THOMPSON: Iron or Steel Roofing.

This relates to iron or steel roofing, and consists in clipping the purlins or stretchers supported at their ends on the principals or roof supports by means of a T-iron, angle-iron, or equivalent clip, having an integral flange passing under the bottom or back of the principal or roof support, the whole being fixed together by bolts or rivets.

6,185 of 1906.—F. ANDE: Hydraulic Presses.

This relates to a device for regulating the movement of the ram in high-speed hydraulic presses driven direct by slowly-acting pumps, and is

characterised by a suction-valve alone or together with a discharge-valve being opened for a certain time by the driving-pump, after a certain portion of the stroke, or after a given number of strokes.

SOME RECENT SALES OF PROPERTY: ESTATE EXCHANGE REPORT.

November 7.—By E. L. GARDENER
Catterbury.—7, The Parade, and 9 and 9A Mercury-la. (s.), f. y. r. 130l. 53 050
10, Mercury-la. (s.), f. y. r. 60l. 1,250
Old Dover-st., "The Elms" and 3A St. 27 P., f. y. r. 120l. 2,250
By BELAMY & Co. (at Putney).
Putney.—6, Ulva-rd., ut. 65 yrs., g. r. 12l., c. r. 76l. 530
November 8.—By FULLER, MOON, & FULLER at Croydon.
Croydon.—216, London-rd., f. y. r. 60l. 1,100
132, 144, and 146, Brighton-rd., f. y. r. and c. r. 1,200
Ewell, Surrey.—London-rd., "Kilo House," f. y. 25l.; also 4 Kiln-cottages, w. 14, 66, f. y. 102l. 425
November 12.—By WM. ROUGHTON.
Walthamstow.—78, 80, and 82, Waverley-rd., f. y. 62l. 8s. 440
1 to 4, Waverley-av., and 70, Waverley-rd., f. y. 102l. 16s. 660
35 and 43, Northcote-rd., ut. 694 yrs., g. r. 122, 128, w. r. 67l. 12s. 585

By R. W. MANN & SON.
Putney.—80, Felsham-rd., ut. 45 yrs., g. r. 5l., y. r. 36l. 225
By REYNOLDS & SONS (at Bournemouth).
Bournemouth, Hants.—Pool-rd., "Littleburn" and "West Villa," with stabling, area half an acre, l. p. 3,850
West Hill-rd., "Edon Lodge," ut. 644 yrs., g. r. 8l. 3s., y. r. 110l. 1,325

November 13.—By BROWNE & TAYLOR.
Bromley, Kent.—76A and 78, College-rd. (s.), with stabling, ut. 84 yrs., g. r. 20l., y. r. 122l. 1,250
103 and 104, High-st. (s.), with workshop, yard, and stabling, part freehold and part ut. 701 yrs., g. r. 45l., y. r. 150l. 1,420
By DEBENHAM, TAYSON, & CO.
Nighting Hill.—134, Ladbroke-g. (s.), ut. 57 yrs., g. r. 12l., p. 775
St. Leonard's-rd., 35, 37, 39, 41, 43, 45, 47, 49, 51, 53, 55 yrs., g. r. 19l. 7s., y. r. 80l. 300

By DRIVES.
Holloway.—297, Camden-rd., ut. 40 yrs., g. r. 4l., c. r. 60l. 590
By STOKES.
Eltham, Kent.—9, The-g. r., ut. 38 yrs., g. r. nil, c. r. 30l. 306

By HOLCOMBE, BETTS, & WEST.
Fulham.—Cristow-rd., f. s. rents 112l., reversion in 77 yrs. 52,800
Foskett-rd., f. s. rents 80l., reversion in 79 yrs. 1,505
New King's-rd., f. s. 58l., reversion in 78 yrs. 1,400
Ashington-rd., f. s. 11l., reversion in 77 yrs. 245
10, Cristow-rd., f. y. r. 33l. 400
10 to 18 (even), Landridge-rd., ut. 714 yrs., g. r. 10l., y. r. 184l. 1,955

November 14.—By S. LYNE FRAGMAN.
Holloway.—112, Marlborough-rd., ut. 48 yrs., g. r. 5l., w. r. 44l. 230
97 and 109, Sussex-rd., ut. 45 yrs., g. r. 12l. 12s., y. r. 72l. 650
Islington.—188 and 190, Downham-rd., and 20A, Oxford-rd., ut. 33 yrs., g. r. 10l., y. r. 112l. 570
Stoke Newington.—20, Defoe-rd., ut. 68 yrs., g. r. 6l., y. r. 35l. 278
Holloway.—39, Magdala-rd., ut. 654 yrs., g. r. 4l., w. r. 31l. 120

By HAROLD GRIFFIN.
Wimbledon.—173, Queen's-rd., f. y. 45l. 650
Mitcham.—1 and 2, Zion-mount, f. w. r. 52l. 14s. 450

By HOBSON, RICHARDS, & CO.
Stamford-hill.—Egerton-rd., a plot of building land, f. 215
Egerton-rd., a block of building land, 1 a. 3 r. 12 p. f. 2,525

By MILLAR, SON, & CO.
Harpden, Herts.—Tennyson-rd., "Slieve Colours," l. p. 500

November 15.—By H. J. BESS & SONS.
Shoreditch.—103, High-st. (s.), and 24, Anning-st., f. y. r. 150l. 2,800
Mile End.—63 to 69 (odd), Digson-st., ut. 884 yrs., g. r. 14l., w. r. 145l. 12s. 730
10 to 28, Commodore-st., ut. 834 yrs., g. r. 44l., w. r. 371l. 16s. 2,070
Hackney.—20, 23, 45, 48, 50, 55, 60, and 62, Treadaway-st., f. w. r. 215l. 10s. 1,600
42, 44, 46, 48, 54, and 56, Temple-st., f. w. r. 180l. 14s. 1,230

By JOHNSON, DRISCOLL, & CO.
Bow.—6 and 28, Trifegar-rd., ut. 62 yrs., g. r. 12l. 485
120 and 130, Trifegar-rd., ut. 41 yrs., g. r. 5l. 2s. 6d. 440
56, Malmesbury-rd., ut. 654 yrs., g. r. 4l. 250
130, 143, and 145, Malmesbury-rd., ut. 640 yrs., g. r. 11l. 6d. 206
14, Lacey-st., ut. 61 yrs., g. r. 4l. 300
11, St. Stephen's-rd., ut. 47 yrs., g. r. 5l. 6s. 200
y. r. 35l. 325
39, Alfred-st., ut. 40 yrs., g. r. 5l. 215
10, Selwyn-rd., ut. 374 yrs., g. r. 4l. 4s. 225
Finbury Park.—162, Tollington-pk., ut. 37 yrs., g. r. 7l., y. r. 65l. 485

Hackney.—323 and 325, Victoria Park-rd., ut. 32 yrs., g. r. 8l. 8s. 380
24, Brookfield-rd., f. y. r. 32l. 340

By F. J. COLEPEPPER & Co Forest Hill, -23, Shillineau-rd., ut. 901 yrs., g.r. 74, e.r. 341, s.r. 211, g.r. 206,	£340
By HUMPHREYS, SKITT & HUMPHREYS Southend, Essex. -Lydford-rd., l.g. rents 40l., reversion in 80 yrs.	910
By LACEY, SCOTT & SONS Sydenham, -56, Kirkdale (s.d.), l.y.r. 80l.	970
By STIMSON & SONS Bromley-by-Bow, -32, Cobden-st., l.	265
Brixton -7, St. John's-rd., ut. 43 yrs., g.r. 121, e.r. 75l.	565
Battersea, -70, 72, and 74, Battersea Rise, area 6,000 ft., l. p.	1,080
Clapham, -104, Bedford-rd., ut. 55½ yrs., g.r. s.r. 10s., l.y.r. 36l., g.r. 30l.	380
Dulwich, -Underhill-rd., "Honor Oak Man- sions" (flats), l.y.r. 314l. 12s.	1,520
56, Beauval-rd., l.y.r. 82l.	440
Victoria Park, -254 and 256, Wick-rd., and 257, Cassland-rd., s.d. 49 yrs., g.r. St. 10s., y.r. 58l.	610
Hoxton, -10 and 12, Wenlock-st., ut. 36½ yrs., g.r. 10s. 14s. 8d., y.r. 30l.	540
Notting Hill, -11 and 13, Cromwell-st. (with laundry, stabling, etc.), l. p.	730
Tooting, -122 and 124, Upper Tooting-rd. (s.), u.s. 60 yrs., g.r. 30l., y.r. 30l.	2,580
Mottingham, -3 and 4, Hurdall Cottages, u.s. 969 yrs., g.r. St. 5s., w.r. 49l. 8s.	320
November 1d. -HAMPTON & SONS Wimbledon Common, -3 and 10, Paradise-av., also "Oldfield" "The Study," "Leewood," and "Sidmouth," l.y.r. 820l.	18,450
Calonne-rd., "Malling," ut. 99 yrs., g.r. 30l., y.r. 150l.	1,750

By RIDER & SONS.
Notting Hill, -212, Walmer-rd., and 31,
Threshers-pl., ut. 23 yrs., g.r. 2l. w.r.
45l. 10s.

35, 35a, 36a, 37, and 39, Tobolsk-rd., ut. 23 yrs.,
g.r. 7l., w.r. 112l. 9s.

By SALZER, REX & CO.
Camden Town, -71, Albert-st., ut. 35 yrs., g.r.
2l. 10s., y.r. 80l.

Contractions used in these lists. -F.g.r. for freehold
ground-rent; l.g.r. for leasehold ground-rent; l.y.r. for
improved ground-rent; g.r. for ground-rent; r. for rent;
f. for freehold; c. for copyhold; l. for leasehold; p. for
possession; a.r. for estimated rental; w.r. for weekly
rental; q.r. for quarterly rental; y.r. for yearly rental;
u.s. for unexpired term; p.a. for per annum; yrs. for
years; in. for lane; st. for street; rd. for road; sq. for
square; pl. for place; ter. for terrace; cres. for crescent;
av. for avenue; gds. for gardens; yd. for yard; gr. for
grove; b.h. for beerhouse; p.h. for public-house; o. for
office; s. for shops; ct. for court.

TO CORRESPONDENTS.

"Tiler" (reduce the inches to decimals of a foot, and
multiply).

NOTE.—The responsibility of signed articles, letters,
and papers read at meetings rests, of course, with the
authors.

We cannot undertake to return rejected communica-
tions; and the Editor cannot be responsible for
drawings, photographs, manuscripts, or other docu-
ments, or for models or samples sent to or left at this
office, unless he has specially asked for them.

Letters or communications (beyond mere news items,
which have been duplicated for other journals are NOT
DESIRED).

All communications must be authenticated by the
name and address of the sender whether for publica-
tion or not. No notice can be taken of anonymous
communications.

We are compelled to decline pointing out books and
giving addresses.

Any commission to a contributor to write an article,
or to execute or lend a drawing for publication, is given
subject to the approval of the article or drawing, when
received, by the Editor, who retains the right to reject
it if unsatisfactory. The receipt by the author of a
proof of an article in type does not necessarily imply its
acceptance. The Editor cannot undertake to read and
consider articles offered for acceptance unless they are
type-written.

All communications regarding literary and artistic
matters should be addressed to THE EDITOR; those
relating to advertisements and other exclusively busi-
ness matters should be addressed to THE PUBLISHER,
and not to the Editor.

MEETINGS.

FRIDAY, NOVEMBER 23.

Royal Sanitary Institute (Lectures for Sanitary Officers).
—Dr. E. P. Manby on "The Laws, By-Laws, and Regu-
lations Affecting the Inspection and Sale of Meat and
other Articles of Food, including their Preparation and
Adulteration." 7 p.m.

MONDAY, NOVEMBER 26.

University of London (Imperial Institute-road).—Mr.
Banister Fletcher on "The Parthenon," 8 p.m.
Surveyors' Institution.—Paper by Mr. E. H. Blake
entitled "Some Notes on Sanitary Law." 8 p.m.
Incorporated Institute of British Decorators (Painter-
Stainers' Hall, Little Trenchard-st.).—Gold medal of the
Institute to be presented to Sir William B. Richmond,
K.C.B., R.A. 8 p.m.

TUESDAY, NOVEMBER 27.

Northern Architectural Association.—Mr. S. Addison
Smith on "Sanitation." 7.30 p.m.
Institution of Civil Engineers.—(1) "The Talla Water
Supply of the Edinburgh and District Waterworks," by
Mr. W. A. P. Salt, B.Sc.; (2) "Repointing a Limestone
Concrete Aqueduct," by Mr. M. Ratcliff, F.R.S.E.; (3)
"The Field of Catchment Areas," by Mr. E. P. Hill,
M.Inst.C.E. 8 p.m.

WEDNESDAY, NOVEMBER 28.

Edinburgh Architectural Association (Associates'
Meeting).—Mr. Nichol Selkirk on "Building Stones." 8 p.m.
Society of Arts.—Mr. John William Gordon on "Patent
Law Reform." Sir William H. Freese, K.C.B., F.R.S.,
will preside. 8 p.m.

Northern Polytechnic Building Students' Association.

Mr. Hugh Standous on "The Beginnings of Building."
7.30 p.m.
Institution of Civil Engineers (Students' Visit).
Evening Inspection of the Great Northern, Piccadilly,
and Brompton Railway. Assembly at the Piccadilly
Circus Station of the Railway at 8 p.m.

FRIDAY, NOVEMBER 30.

Architectural Association.—Mr. W. Woodward on "The
Difficulties which beset an Architect in London, with
special regard to existing Legislation and other controlling
Authorities." 7.30 p.m.
Glasgow Architectural Craftsmen's Society.—Mr. J.
Bowman on "Modern Buildings with Steel Construction."
8 p.m.

Institution of Mechanical Engineers.—An Extra
Meeting at 8 p.m., when the discussion will be continued
on "Steam as a Motive Power for Public Service
Vehicles," by Mr. Thomas Clarkson.

Institution of Civil Engineers (Students' Meeting).—
Mr. P. A. Spalding, Stud.Inst.C.E., on "Applications of
Electricity in Printing Works." 8 p.m.

PRICES CURRENT OF MATERIALS.

*. Our aim in this list is to give, as far as possible, the
average prices of materials, not necessarily the lowest.
Quality and quantity obviously affect prices—a fact
which should be remembered by those who make use of
this information.

BRICKS, &c.

£ s. d.
1 10 0 per 1000 alongside, in river.

Hard Stocks	1 7 0	"	"	"
Rough Stocks and Grizzlies	1 7 0	"	"	"
Picked Stocks for Facing	2 17 6	"	"	delivered.
Flattons	1 8 0	"	"	at railway depot.
Red Wire Cuts	1 14 0	"	"	"
Best Fareham Red Best Red Pressed Buckton Facing	3 12 0	"	"	"
Best Blue Pressed Staffordshire	5 0 0	"	"	"
Do. Bullnose	3 15 0	"	"	"
Do. Fire Bricks	4 0 0	"	"	"
Fire Bricks	3 14 0	"	"	"

GLAZED BRICKS.
Best White and
Ivory Glazed
Stretchers 12 0 0 | " | " | " || Quoins, Bullnose, and Flats | 11 0 0 | " | " | " |
Double Stretchers	16 0 0	"	"	"
Double Headers	19 0 0	"	"	"
One Side and two Ends	19 0 0	"	"	"
Two Sides and one End	20 0 0	"	"	"
Splays, Cham- fered, Squinted	20 0 0	"	"	"
Best Dipped Salt Glazed Stretch- ers and Headers	12 0 0	"	"	"
Quoins, Bullnose, and Flats	14 0 0	"	"	"
Double Stretchers	15 0 0	"	"	"
Double Headers	14 0 0	"	"	"
One Side and two Ends	15 0 0	"	"	"
Two Sides and one End	15 0 0	"	"	"
Splays, Cham- fered, Squinted	14 0 0	"	"	"

Second Quality
White and
Dipped Salt
Glazed 2 0 0 | " | " | less than best. |

Thames and Pitt Sand 5 6 | " | " | 0 per yard, delivered. |

Thames Ballast 27 0 | " | " | per ton. |

Best Portland Cement 18 0 | " | " | per ton. |

Best Ground Blue Lias Lime 11s. 6d. | " | " | per yard, delivered. |

NOTE.—The cement or lime is exclusive of the
ordinary charge for sacks.

Grey Stone Lime 11s. 6d. | " | " | per yard, delivered. |

Stourbridge Fireclay in sacks 27s. 0d. per ton at rly. dpt.

STONE.

BATH STONE—delivered on road wag. a. d.
gods, Paddington Depot 1 6½ | " | " | per ft. cube |

Do. do. delivered on road wagons,
Nine Elms Depot 1 8½ | " | " | " |

FORSLAND STONE (30 ft. average).
Brown Whitbed, delivered on road
wagons, Paddington Depot, Nine
Elms Depot, or Fimlico Wharf 2 1 | " | " | " |

White Basebed, delivered on road
wagons, Paddington Depot, Nine
Elms Depot, or Fimlico Wharf 2 2½ | " | " | " |

Ancester in blocks 1 10 | " | " | per ft. cube, delivered, rly. depot |

Beers 1 6 | " | " | " |

Greenishill 1 10 | " | " | " |

Darley Dale in blocks 2 4 | " | " | " |

Red Corsehill 2 2 | " | " | " |

Cloeburn Red Freestone 2 0 0 " | " | " | " |

Red Mansfield 2 4 | " | " | " |

YORK STONE—Robin Hood Quality.
Scrapped random blocks. 2 10 " | " | " | " |

6 in. sawn two sides land-
ings to sizes (under
40 ft. super.) 2 3 | " | " | per ft. super. |

6 in. rubbed two sides
ditto, ditto 2 6 | " | " | " |

3 in. sawn two sides slabs
(random sizes) 0 11½ | " | " | " |

2 in. to 2½ in. sawn one
side slabs (random
sizes) 0 7½ | " | " | " |

1½ in. to 2 in. ditto, ditto 6 " " | " | " | " |

HARD YORK—
Scrapped random blocks. 3 0 " | " | " | per ft. cube, |

6 in. sawn two sides land-
ings to sizes (under
40 ft. super.) 2 8 | " | " | per ft. super. |

6 in. rubbed two sides
ditto 3 0 | " | " | " |

STONE (continued).

HARD YORK (continued).
3 in. sawn two sides slabs s. d.
(random sizes) 1 | " | " | per ft. super. delivered, rly. depot. |

2 in. self-faced random
slabs 0 5 | " | " | " |

Hopton Wood (Hard Bed) in blocks 2 0 " | " | " | per ft. cube, deliv. |

" " " 6 in. sawn both
sides landings 2 7 " | " | " | per ft. super. deliv. |

" " " 3 in. sawn both
sides random
slabs 1 0 | " | " | per ft. super. deliv. |

" " " 2 in. do. 0 8½ " | " | " | " |

SLATES.
£ s. d. " | " | " | " |

20 x 10 best blue Bangor 13 2 6 " | " | " | per 1000 of 1200 at r. d. |

20 x 12 " 13 7 6 " | " | " | " |

20 x 10 first quality " 13 0 0 " | " | " | " |

18 x 8 " 13 15 0 " | " | " | " |

20 x 10 best blue Port-
madoc 12 12 6 | " | " | " |

20 x 10 best Euxine
fading green 15 17 6 | " | " | " |

20 x 12 " 13 7 6 " | " | " | " |

18 x 10 " 13 5 0 " | " | " | " |

18 x 8 " 10 5 0 " | " | " | " |

20 x 10 permanent green 11 12 6 " | " | " | " |

18 x 10 " 9 12 6 " | " | " | " |

18 x 8 " 8 12 6 " | " | " | " |

TILES.

Best plain red roofing tiles 42 | " | " | 0 per 1000 at rly. depot. |

Hip and Valley tiles 3 7 | " | " | per doz. |

Best Broseley tiles 50 | " | " | 0 per 1000 |

Do. Ornamental do. 52 | " | " | 0 per doz. |

Hip and Valley tiles 4 | " | " | 0 per doz. |

Best Euxine red, brown, or
brindled do. (Edwards) 37 | " | " | 0 per doz. |

Do. Ornamental do. 47 | " | " | 0 per doz. |

Valley tiles 3 0 | " | " | " |

Best Red or Mottled Stafford-
shire do. (Peckers) 51 | " | " | 0 per 1000 |

Do. Ornamental do. 54 | " | " | 0 per doz. |

Hip tiles 4 | " | " | 1 per doz. |

Valley tiles 3 8 | " | " | " |

Best "Rosemar" 48 | " | " | 0 per 1000 |

Best Ornamental tiles 50 | " | " | 0 per doz. |

Hip tiles 3 | " | " | 1 per doz. |

Valley tiles 3 8 | " | " | " |

Best "Hartshill" brand
plain tiles, and-faced 50 | " | " | 0 per 1000 |

Do. pressed 50 | " | " | " |

Do. Ornamental do. 50 | " | " | " |

Hip tiles 4 | " | " | 0 per doz. |

Valley tiles 3 6 | " | " | " |

WOOD.

BUILDING WOOD. At per standard. " | " | " | " |

Deals: best 3 in. by 11 in. and 4 in. £ s. d. " | " | " | " |

by 9 in. and 11 in. 13 10 0 | " | " | 15 0 0 |

Deals: best 3 by 9 13 0 0 | " | " | 14 0 0 |

Battens: best 24 in. by 7 in. and
8 in., and 3 in. by 7 in. and 8 in. 11 0 0 | " | " | 19 0 0 |

Battens: best 24 by 6 and 3 by 6 0 10 0 | " | " | less than 7 in. and 8 in. |

Deals: seconds 1 0 | " | " | 0 less than best. |

Battens: seconds 9 0 0 | " | " | 10 0 0 |

2 in. by 4 in. and 2 in. by 5 in. 8 10 0 | " | " | 9 10 0 |

Foreign Sawm Boards—
1 in. and 1½ in. by 7 in. 0 10 0 | " | " | more than battens. |

3 in. 1 0 0 | " | " | " |

Fir timber: best middling Danzig
or Memel (average specification) 4 10 0 | " | " | 5 0 0 |

Seconds 4 0 0 | " | " | 4 10 0 |

Small timber (8 in. to 12 in.) 3 12 6 | " | " | 3 15 0 |

Small timber (6 in. to 8 in.) 0 0 0 | " | " | 10 0 0 |

Swedish balks 2 10 0 | " | " | 3 0 0 |

Pitch-pine timber (30 ft. average) 4 0 0 | " | " | 4 15 0 |

JOISTERS' WOOD. At per standard. " | " | " | " |

White Sea: first yellow deals, 24 0 0 | " | " | 25 0 0 |

3 in. by 11 in. 22 0 0 | " | " | 23 0 0 |

Battens, 24 in. and 3 in. by 7 in. 16 10 0 " | " | " | 18 0 0 |

Second yellow deals, 3 in. by 11 in. 15 10 0 " | " | " | 16 0 0 |

3 in. by 9 in. 14 10 0 | " | " | 15 0 0 |

Battens, 24 in. and 3 in. by 7 in. 16 10 0 " | " | " | 18 0 0 |

COLCHESTER.—For the foundation of the main building of the new Second Asylum to be erected at Mile End, for the Essex County Council. Quantities by Messrs. R. L. Curtis & Son, 11 and 12, Finsbury-square, E.C. Messrs. F. Whitmore, County Architect, and W. H. Town, A.R.I.B.A., 4, Duke-street, Chelmsford. —

Foundations.					
S. Redhouse, Sen.,	£20,301 11	0	Foster & Dickers,	£21,823 0	0
St. John's,	2,949 45	4	J. Moffatt,	21,721 13	7
T. & T. Benn	26,349 11	0	W. Canfield	21,675 0	0
G. Double,	26,545 1	8	Johnson & T. Bowth-	21,622 0	0
H. H. Mac-	22,136 0	0	ham—	21,820 0	0
Perry & Co.,	23,989 0	0	Kerridge		
C. G. Hill,	35,600 0	0	St. John,	21,563 0	0
St. James,	25,000 0	0	Facey & Son	21,577 2	4
St. Paul's	25,600 0	0	Parrell & Co.	21,499 0	0
Potter & Co.,	26,062 0	0	Leale & Co.,		
Davies, Ball, & Co.,	25,000 0	0	Wilson & Wilson &	21,326 0	0
St. Peter's			S. B. Jones	21,229 18	4
Kirk & Randall,	24,700 0	0	Santo & Co.	21,230 0	0
B. & W. Wat-			Kingston		
Sons,	21,567 0	0	& Son,	21,000 0	0
S. A. Kenney	24,581 0	0	M. & C.		
Allen & Son	24,590 0	0	Son,	20,965 0	0
St. Anne's			Jawes & Son	20,990 0	0
Higgs & Hill	24,350 0	0	H. & G.		
St. George's	24,124 0	0	Frederick	20,934 0	0
St. Paul & Sons	23,595 0	0	F. O. Minter	20,888 0	0

0	Co,
0	F. G. Minte

Mc Cormick & Sons ...	23,456	0	0	Grinnwood & Sons ...	20,877	0
Wallbrook & Jackson ...	23,378	0	0	Armutage & Hodge ...	20,836	0
Co.	23,168	0	0	F. E. Davey	20,847	0
F. Evans ...	23,000	0	0	Wood & Sons	20,253	0
W. Young & Sons ...	22,910	0	0	Edwards & Moss & Co.	20,154	0
Ferr & Co.	22,783	1	4	Patrick & Co.	19,977	0
H. Saunders & Sons ...	22,750	0	0	Hunt & Co.	19,940	0
Lowell, Ltd.	22,607	0	0	F. Hamilton	19,750	0
W. H. Jones & A. N. Coles	22,581	1	10	Edwards & Sons ...	19,563	0
Blackwell & Co.	22,340	1	0	F. & A. Willmott ...	19,514	0
C. Wallis & Sons ...	22,323	0	0	Oak Building Co.	19,394	0
Harris & Sons ...	22,200	0	0	Murhead & Co.	19,209	0
Godwin & Sons ...	21,200	0	0	King & Son	19,080	0
Grinnwood & Sons ...	21,087	0	0	Thurman & Co.	18,999	0
Chambers & Sons ...	21,850	0	0	Chester & Sons	18,939	0

ERITH.—For the deepening and repair of brick				reclaimed well in Electricity Works yard, High-street, for			
the Urban District Council. Messrs. Hawtayne & Zetser,				consulting engineers, 9, Queen-street-place, E.C. :—			
Eastall & Son	£740	0	0	T. Tilley & Son	£230	0	0
L. D. Batchelor	580	8	5	A. E. Nunn,			
S. Sangwin	362	10	0	F. Insbury,			
W. Brown & Son	305	0	0	House, E.C.	210	0	0

W. ESHAM For stoneware pipe sewars (Bedfordshire), for the Rural District Council, Mears, Wills & Co., Rakes, Engineers, 55, Temple-row, Birmingham.					
Byard & Sons £3,030 0 0	J. H. Mac-				
Sutherland &	Donald				
.....	.....	£2,104			
J. Moffatt	Merrith Bros.				
.....	& Co.,				
J. Roberts	G. J. Jones				
Blackwell &	.....			
.....	Merrith				
Loch & Andrews,	Rovell & Sons				
& Price	Morley & Sons				
T. J. Masou	W. B. Harding				
.....	Cunliffe				
.....	Hewitt & Sons				
Doddard & Co. A.	J. Kinnon				
A. J. Cottle	Bros.				
Currall, Lewis,	.....			
& Co.	Ltd. Stock-				
G. O'Hayner	port				
J. E. White	E. T. Goss &				
H. E. Buckley	Wholesale,				

BAILLISHAM — For sawcrage works, Polegate, for the		
Rural District Council, Mr. W. Dunbar, C.E., 12		
Portsmouth-road, Guildford. Quantities by engineers		
2a, Portsmouth-road, Guildford:—		
C. A. Soan	£615 3 7	Walls & Co. .. £390 0
Miller & Selmes	611 19 3	Peel & Sons - Denials
B. W. Wakker	491 3 5	& Co. 287 10
L. Vine	469 1 5	W. Wood
F. Carley	418 15 9	H. Young 372 10
Rose & Co.	400 13 7	James & Co.,
S. Carey	395 10 8	Guildford* .. 809 0

HIGHWORTH (Wilts).—For alterations, etc., at the Saracen's Head Hotel. Messrs. Drew & Sons, architect
J. Lay £325 0 0 Tydeman Bros.,
H. & C. Spackman 280 0 0 Swindon* £219 7
Chick, Carden &
Co., Ltd. 275 0 0

HORSHAM.—For extending the cloak-room accommodation to Horsham East-parade Council Schools, for the West Sussex Local Education Authority. Mr. C. J. Buratow, architect, 6, West-street, Horsham:—

Cropley & sons ..	£171 0	Potter Bros.	£405
Rowland Bros. ..	434 0	H. Lindfield & Son	396
W. Randall & Sons	430 0	Hillman & Mussell,	
G. Potter.....	408 0	Horsham*	349

HULL.—For erecting three shops in Jameson-street for the Property Committee of the Corporation.			
J. H. Hirst, City Architect, Town Hall, Hull:—			
M e b b l e -			
white &			
Wilson....	£2,853	0	0
W. Sanderson &	2,850	0	0
Simpson &			
Sons.....	2,850	0	0
Jackson &			
Sons.....	2,700	0	0
M. Harper .. £2,768 0			
H. Tarnott... 2,751 11			
Quibell, Son, &			
Greenwood 2,750 0			
G. H. Panton 2,730 0			
G. Houlton &			
Sons..... 2,715 0			
T. Goates* .. 2,695 0			

sey, & Warner†

High Wycombe:	
Goddard, Massey, & Warner:	£3,786 16
Manlove, Alliott, & Co.	3,344 0
Heenan & Froude	2,639 0
Hughes & Sterling	2,611 0
Horsfall & Co.	2,252 0
Meldrum Bros., Manchester*	2,189 0

[Accepted tender amended to include buildings, £3,842
 * Including buildings.

KENDAL.—For excavation and laying of land drains at Sewage Disposal Works, for the Corporation, Mr. F. W. Osberry, Borough Surveyor, Town Hall, Kendal. Quantities by Borough Surveyor, Kendal:—
T. & W. Dirkin £118 17 0 R. Woodburn £324 4 2
W. Carradice .. 380 12 3
(All of Kendal.)

KING'S NORTON.—For making good of part of Franklin-road, for King's Norton and Northfield Urban District Council, Mr. A. W. Cross, Engineer and Surveyor, 23, Valentine-road, King's Heath:—
Curral, Lewis, & Martin, Ltd. £1,243 8 10
J. White, jun. £1,055 5 2
R. Clarke, Sparkbrook 970 0 0

LONDON.—For a new boiler at the Drury-lane Day Industrial School (Holborn), and the execution of the necessary builder's work in connection therewith, for the London County Council:—
C. Kite & Co. 1250 0
Turner & Co. 247 11
J. & F. May 247 0
J. Fraser & Son, Ltd. 246 0
R. H. & J. Pearson, Ltd. 213 0
H. C. Price, Lea, & Co. 1253 0
Comyn, Chipp, & Co., Ltd., 54-58, Castle-street, Long-acre 201 0
[These tenders include a provisional sum of £2, for executing builder's work. The estimate of the Architect (Education), comparable with the tenders, is £180.]

LONDON.—For the erection of a building for the accommodation of girls at Dauce-road Secondary School, Putnam, for the London County Council:—
Lathey Bros. £32,142 W. King & Son .. £25,524
Warne, W. & Co. 30,304 C. J. Kealey 28,315
Building Co., Ltd. 30,304 C. Wall, Ltd. 28,021
McConnell & Sons 30,270 J. Grover & Son .. 27,033
W. Dennis 29,983 L. Whitehead & Co., Ltd. 27,865
Holloway Bros. (London), Ltd. 29,978 E. Lawrence & Sons 27,741
G. Godson & Sons 29,600 Treasure & Son .. 27,312
Spencer, Santo, & Co. 29,507 Ltd. 27,200
Leslie & Co., Ltd. 29,008 J. Garrett & Son .. 26,554
H. Lovatt, Ltd. 28,793 J. & M. Patrick, Putnam & Fotheringham, Ltd. 28,883 Wandsworth * .. 26,130
* * * Recommended for acceptance.
[The estimate of the architect (Education), comparable with the tenders, is £32,006.]

LONDON.—For additional plant for installation of additional electric plant at the Battersea, Brixton, Clapham, Streatham, and Wandsworth Sub-stations, and for the making of the necessary cable connections, etc., for the London County Council:—
Four 500-Kilowatt Motor Generators.
Dick, Kerr & Co., Ltd. £8,677 0 0
British Westinghouse Electric & Manufacturing Co., Ltd., London* 7,588 7 6

LONDON.—For altering and adapting existing temporary building and completing superstructure of Shepherd's Bush Tabernacle, Shepherd's Bush-road, W., for the Building Committee, Mr. P. W. Hawkins, A.R.I.B.A., 28, Victoria-street, Westminster, S.W.:—
Gross Reduced
T. J. J. Feeder
W. Nash £5,001 2,518
L. Whitehead & Co., Ltd. 1,270 1,720
C. Gray, Shepherd's Bush 4,750 4,001
Farris Bros. 4,700 3,850

LONDON.—For the erection of a new police station at Shalwell, Mr. J. Dixon Butler, F.R.I.B.A., Surveyor to the Metropolitan Police, New Scotland Yard, S.W. Quantities by Messrs. Thurgood, Son, & Childrey, Charing-Cross chambers, Duke-street, Adelphi, S.W.:—
C. Ansell 11,750 Holloway Bros. 12,750
H. Lovatt, Ltd. 13,132 Godson & Sons .. 12,632
Mowlem & Co. 13,000 F. & H. F. Higgs 12,501
J. L. 14,000 Grover & Son .. 12,483
Clarke & Bracey 14,000 Patman & Fotheringham 12,433
Lathey Bros. 12,740 Chesham & Sons .. 12,347
Lascelles & Co. 12,715 Lawrence & Sons .. 12,146
Dove Bros. 12,600
Kilby & Gayford, 12,667

LONDON.—For the erection of business premises, Turnham Green-terrace, Chiswick, W., for Mr. A. Royd, Messrs. Palgrave & Co., Architects, 23, Victoria-street, S.W.:—
Thomas & Edge £4,193 R. Ward & Son .. £3,600
McLaughlin & Harvey 4,053 Earl's Court* 3,585

NETHER ALDERLEY.—For alterations to Council school, for Macclesfield and Hayfield Education Sub-Committee, Mr. H. Beasick, County Architect, Chester. Quantities by Architect:—
R. Allen £1,010
J. K. Coates 871 J. Massey & Sons, Alderley Edge* .. 690
G. Roylance & Co., Ltd. 806

OLD CORNFORTH.—For erecting butchering premises, stabling, etc., for Cornforth Co-operative Society, Ltd., Mr. H. T. Gradon, architect, Market-place, Durham:—
Stockton Co-operative Society £1,403 0 0
Bell & Mann 1,400 12 1
T. Sanderson 1,380 10 0
L. W. Rowe 1,388 18 0
W. Hall 1,361 9 10
T. Coates 1,324 0 0
G. T. Manners £1,319 0 0
W. H. Ayton 1,300 0 0
Denby & Co. 1,293 0 0
T. Hilton 1,183 0 0
J. Robinson .. 1,160 0 0
Draper & Son, Leam 1,100 0 0
Chambers 1,261 0 0
Architect's estimate £1,200.

STAVERTON.—For laying a new 6 in. sewer and building eight inspection pits at Laidlaw village, for Totnes Rural District Council. Mr. C. Ellis, surveyor, South Brent:—
W. Atwill, Broadthampton, Totnes £86 12

SWINDON.—For alterations at the Baker Arms Boathouse, Badbury, Swindon, Messrs. Drew & Sons, architects, Regent Circus, Swindon.
J. Lay, Swindon* £117 13 6
[Five Tenders received.]

WEMBLEY.—For making up of Sandbergs and part of Lagg-roads, for the Urban District Council, Mr. Cecil R. W. Chapman, Surveyor, Public Offices, Wembley:—
Swanley-by-road, Engle-road.
J. Mowlem & Co., Ltd. £2,103 0 0 £453 0 0
F. G. Brummel 1,891 1 6 405 15 2
J. C. Trueman 1,867 0 0 400 0 0
F. Powles 1,864 12 8 400 13 4
Davies, Ball, & Co. 1,852 6 1 401 19 9
H. Haynes 1,844 0 0 408 0 0
S. Gibbons 1,833 6 8 404 2 11
Bower Bros. 1,784 12 0 423 7 6
T. Adams 1,780 17 3 396 1 7
F. Tribe & Co. 1,671 9 10 377 8 6
W. & C. French 1,670 14 8 363 11 7
O. T. Gibbons* 1,554 14 8 376 6 0
T. Free & Sons 1,637 11 11 374 2 3

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The Builder.

VOL. XCI.—No. 3,550.

DECEMBER 1, 1906.

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County Hall, Northallerton.....	Mr. Walter H. Brierley, F.S.A., Architect.
Architectural Treatment of Motor Generator Station.....	Mr. C. Stanley Peach, F.R.I.B.A., Architect.
Engineering Works at Queensferry.....	Messrs. Creswell & Maule, Architects.
Pulpit, All Saints, Ealing.....	By Mr. Nelson Dawson.
Window, St. Michael's School, Bognor.....	By Miss Lowndes.

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Ideals in Art.—II.



Now come to the consideration of the special form of art treated of in Mr. Clausen's book,* which, as we have already observed, ought more rightly to have been

entitled "Aims and Ideals in Painting"; since, though painting is the most popular and in a sense the most widely expressive of the arts, it does not in itself sum up art. Painting has a greater range than any other of the arts which appeal to us through the medium of design and drawing; it can treat a greater variety of subjects; it can deal equally with man or nature, with the pathetic or the humorous in life; and in a large picture exhibition there is generally no sort of taste, educated or illiterate, no kind of temperament, grave or gay, but will find something that appeals to it. But this is just where the danger, from the artistic point of view, comes in. If picture exhibitions are to be a mere public amusement, the problem is easy enough; there are plenty of painters capable of furnishing them to that end; and, in fact, to the majority of casual spectators that is what the annual exhibitions in the principal London picture galleries are; they are a form of public amusement. There is nothing in itself reprehensible in providing for

public amusement, especially in so innocent a manner. The mistake is, that exhibitions of painting might have so much higher an influence, and that they are lowered to the platform of mere amusements partly by the action of many of the painters themselves, who are content to paint what will amuse the public, and thus throw away the highest powers of what should be a great intellectual art.

The affected disdain of the Royal Academy exhibitions which one hears from a certain class of people regularly every season is a foolish exaggeration; there are often in those exhibitions pictures that have more in them than the fashionable detractors could even understand; but nevertheless it is the fact that people who look at pictures for the sake of what food for the emotions or the intellect can be got out of them, do often feel an almost angry hopelessness on contemplating the large proportion of pictures at the annual shows which say nothing to the intellect, beyond the mere fact that they represent, with more or less ability, some scene or some historical fact. To adopt the language of Mr. Clausen's title, they seem to have no "ideal."

Now, to say that a picture should have "an ideal" is not by any means to say that it should only deal with what are generally considered as ideal or imaginative subjects. On the contrary, Mr. Clausen points out that in the case of Hogarth, whose painting is so expressive as long as he follows his own temperament, he becomes commonplace and uninteresting

when—as in his "Sigismunda"—he attempts a professedly imaginative subject; and, as he observes elsewhere, the whole history of art gives a warning as to this, in the sterility which has always attended the deliberate adoption of what was thought to be the grand style. That was what poor Haydon ruined himself over.

Then what is the "ideal" element in a picture? It arises from the fact that there is something else in the painter's mind beyond the desire to represent a mere fact; that he wishes to express something. He has to imitate nature in a sense, certainly, for we have only the materials of nature to work upon; we can imagine no beauty, of form at all events, which we have not seen in nature; we might perhaps imagine combinations of colour which are not in nature, but we must have derived the separate colours from nature first; we cannot evolve colour from our inner consciousness.

"The highest praise that we can give to the finest work (such as, for instance, that splendid figure the *Hygeia*, which is perhaps the most beautiful of all the Parthenon marbles), is only to say that it is true to nature; that it represents very truly a fine type of form. But then it may be said that a photograph, or a cast from nature, are the finest things attainable; and if the aim of art were only to present a close copy of a stationary thing. I don't see how this can be gainsaid. However true these things may be, they seem to lack intention*, and the fact of an artist making anything, whatever his material, presupposes some intention on his part. There is something he wishes to say; some measure of action, some kind of expression; and it is in giving this, with the truest expression of form and colour, that the painter's work lies."

The first sentence of this quotation, by the way, seems a little to contradict the rest; if the highest praise that we can give to the *Hygeia* figure is to say that it

* The italics are ours.

* "Aims and Ideals in Art." Eight Lectures delivered to the students of the Royal Academy. By George Clausen, A.R.A. London: Methuen & Co.

is "true to nature," what becomes of the argument following, that there must be something more than mere truth to nature, some "intention" of the artist, which differentiates the work from mere reproduction of nature? We should say that the "intention" in the Ilyssus was, while adhering closely to nature, to show into what fine lines of easy and graceful repose such a figure could be modelled. We always think of that figure in connexion with Tennyson's fine little poem "To E. L., on his Travels in Greece":—

"Here and there alone
The broad-limbed gods at random thrown
By fountain urns."

But the whole passage expresses one of the elements required to give intellectual interest to a picture; that of a distinct intention on the part of the painter to express something, some feeling about the subject that is in his own mind, or some particular view of it which he wishes to emphasise. And this power, to be recognised even when the painter is dealing with what may be called realistic subjects, is a quality of the imagination. Mr. Clausen on another page illustrates this by comparing the Dutch painters Jan Steen or Metsu with such a mere realist as Meris. With the two former we feel that, though the accompaniments of the scene are minutely realised, they are subordinated to the dramatic incident of the subject; "we are made to feel something more than that so many items are comprised in the picture."

"But in the case of Meris there is an utter lack of imagination. It is true everything is painted beautifully and minutely; one could take a lens to examine it; but he paints his hares and cabbages and carrots and things with the eye of a marketing housewife looking for defects, and his people too in the same spirit. So that his work, for all its skill, is poor. It tells us nothing."

For as painting is a means of expression, not of mere imitation, the cultivation of "virtuosity" for its own sake only is mistaking the means for the end. Mr. Clausen is independent enough to point out how this is the case (though he introduces the example in connexion with another part of his subject) even with a great picture about which a great deal of public excitement has been evoked lately—the so-called Venus by Velasquez. We are among those who entirely supported its purchase for the nation, on the ground that it was a remarkable and very unusual example of the work of one of the greatest of painters. But the lady, as Mr. Clausen truly says, is not Venus; there is nothing goddess-like about her; only she is so finely painted that the lack of imagination is out-weighted by the splendid work. "If it were not for this, the picture would be commonplace"; and it is well to have this pointed out.

Now, it is this view of painting; that the object is not to imitate facts but to express either some special quality in the subject of the picture, or some special feeling about it in the mind of the painter, that should give us the clue to the unsatisfactory and disappointing character of much of the work in our annual picture exhibitions; and might enable the average spectator, if he has once grasped the idea, to discriminate better between what makes a really good picture, a true work of art,

as compared with a mere piece of clever imitation.

The Royal Academy numbers, among things which it cannot accept, "no mere transcripts of the objects of natural history"; by which we suppose are meant such things as entomological drawings, etc. But every Academy contains pictures which, in a certain sense, might come under that ban of being "mere transcripts of the objects of a natural history," only taking the words in a rather wider sense. A large painting, for instance, of a crowd of pleasure-boats and their passengers in a Thames lock in the summer, might be very like the scene, but would have no interest except to boating people, frequenters of the Thames, who might wish to have a realistic record of a scene they had often witnessed. A painter who regarded such a subject with an artist's feeling would be struck rather with the colour combination, in contrast with the background of foliage, and would be disposed to avoid minute and realistic details which drew away the attention from that central effect. It is, in fact, this feeling which has induced some of the cleverest of the younger painters of the day to adopt a very broad and sketchy style in landscape and even in figure compositions, with the direct intention to get at the heart and meaning of the scene to them, rather than to weaken the effect with accuracy of detail. Some of them carry this much too far; there should be a balance preserved between detail and total effect; since the details constitute, as it were, the raw material of the picture, they should be sufficiently indicated to give truth of effect. To reduce a famous building, for instance (as we saw not long ago in an exhibition) to a mere sort of mud-pie in texture, in order to concentrate attention on its general mass and colour, is to be untruthful in painting. But nevertheless, this avoidance of disturbing detail for the sake of a total impression, though it may be carried too far, is a fault that springs from a true perception of the object of painting, which is expression and not imitation.

A fuller perception of this truth might enable people also to appreciate better the class of pictures which appear to many of them, we believe, to have what they call "no subject." It is not the object of a picture to tell an anecdote—not the object of the highest class of pictures at all events; its object is to create an impression on the mind. For instance, some years ago Mr. Stanhope Forbes exhibited at the Royal Academy what we have always considered one of his very best works; a picture of a farmboy mounted on a white horse that was drinking in a pool under the shade of some trees; we forget the title, but we are sure that everyone interested in contemporary painting will remember the work. Now, we found people who could see nothing in that. Why? To them there was no incident of any interest in it. But the interest was the picture itself, not what it told. If that scene had been a real one, and we could have had a photograph of it, much more detail would have been shown in what (in a sense) would have been a much more truthful manner. But the interest of the scene as a picture would have gone, or

would have been far inferior. If people ask, what does such a picture mean, the answer would be in the same spirit as that which Mendelssohn gave when asked what some of his "Lieder Ohne Worte" meant. He said "The meaning is the music itself, and it cannot be expressed any other way." So with such a picture as that just referred to; the meaning, or the interest, is the picture itself, and what is in it could not be expressed in words; if it could, it would have been unnecessary to have painted the picture. The meaning of the best and most thoughtful class of pictures cannot be exactly expressed in words; they are the expression of something which the artist felt, and expressed in that way; and until people come to see that, and to feel that each real and earnest picture is its own explanation, it is not much use their looking at pictures, except in the same kind of spirit as children look at a pantomime—as a harmless amusement.

It is the same with landscape painting. If we notice what are the landscapes that find most popular favour, we shall find that they are those of the realistic type, with minutely and hardly-painted trees, and reflections of light in ruts in the road, and so on. It looks, as people say, "so real." If they had a photograph of the same scene they would find that it was not "real" at all, and that the photograph showed an infinity of detail which the picture omitted. The picture, even of this kind, has the advantage over the photograph in that there is some intention behind it and there is a human interest in the work; there is no intention of any kind behind the photograph, except the fact that the photographer may have taken some trouble to select the best point of view and the best condition of light. Beyond that, it is mechanical, and the work of the realistic landscape-painter is not mechanical, and requires a great deal of ability and training to be a success; but unless there is an intention behind it, beyond that of mere realisation of detail, it will be an expressionless picture. A great landscape-painter expresses in a picture not the mere scene, but his own feeling about the scene, the mood of mind which it suggests to him. Mr. Aumonier's fine landscape in the last Academy, "The Top of the Common," was not realistic at all; it did not look as if one could walk into it, and it was not meant to look so. It was evident that the artist had been struck by the effect, both in line and colour, of the dark bare slopes of ground, which aroused a certain impression in his mind, undefinable in so many words, but which he endeavoured to convey in his painting. That is the real object of landscape painting—to express a mood of the mind, suggested by nature, through the medium of painting. If the painter has no poetic impression in his own mind, he will impart none to his picture. And if the spectator has no poetic feeling himself in regard to nature, he extracts none from a landscape; and he only remarks, as so many people do, that it is "like" or "unlike" nature.

But there is, as Mr. Clausen points out, more than one form of truth to nature. It may be truth of mere detail; it may be truth of feeling and impression, which

the more important of the two. "In criticising a painting or a sketch, nothing is more common than to be met, on pointing out some obvious fault, with the answer—'Well, I did it from nature,' or, 'It was just like that in nature'; and one can only say, or think, 'Is that all you see in nature?'" In regard to landscape painting there is one point that the author does not touch upon; that some painters having achieved by careful study and observation a faculty of representing with great success some one particular effect in nature, they confine themselves to repetitions of that; each one very good in itself, if one had not seen all the others! The result is, a sameness in the painter's work which in the end becomes almost mechanical, and which is quite at variance with the infinite variety of nature. It is only a frequent recurrence to nature in all her moods that can enable an artist to escape from this tendency to repetition of effects. A fine lesson in this respect was conveyed when all the late Alfred Hunt's oil landscapes, far less numerous than those of many more popular landscape-painters, were collected in one room in Bond-street. These were the work of a painter who had constantly kept in close contact with the study of nature. The result was, that instead of presenting repetition, they were almost as various as nature herself; each one presented a separate and individual effect; and in comparison with the works of many other landscape-painters, they had almost the appearance of being by so many different artists.

In regard to the public taste in painting, Mr. Clausen gives one very strong reason why painters should make every effort to keep up a high standard in their work; he does not deduce this directly from the remark, but it is a natural deduction. The public taste, he observes, must rest on the standards maintained by painters; it cannot form a standard.

Indeed it is questionable whether, in a broad sense, there is such a thing as public taste. There are a comparatively small number of people, not painters, who really understand and love fine painting; a large number with every wish to, who are very willing to learn and beyond that, I fancy, the great majority of people don't trouble themselves one way or the other. They have other things to do and think about, and the questions which agitate artists are of absolutely no interest to them."

This is too true; and it is almost amusing to hear how people who have never given a thought to the objects, the meaning, and the immense difficulties of painting, will lightly and decisively pass judgment on works which they have not acquired even the faculty to rightly understand. Mr. Clausen's little book of Lectures, if they can be persuaded to read it attentively, might do something to convince them that painting, instead of being a medium for furnishing popular recreation, is a great intellectual art full of deep meanings, and requiring years of thoughtful observation even to rightly understand it.

We have only two small faults to find; one is, that the book has no index, which considerably increases one's difficulty in looking up and comparing different passages and arguments; the other is, that the name of one remarkable artist is persistently spelt wrong—"Rosetti" instead of "Rossetti"; which should not be the case in a book written by a painter.

NOTES.

St. Paul's Cathedral.

No possible objection can be urged against the request made by the Dean of St. Paul's to the effect that time may be given for further investigation to be made into the probable influence of the projected new sewer upon the cathedral foundations. At the same time it is difficult to understand why anxiety in respect of this conduit should be revived at the present juncture. In November, 1901, the Main Drainage Committee of the London County Council agreed that the details of their work should be investigated by an independent engineer to be appointed by the Dean and Chapter. In May, 1905, the cathedral authorities wrote to the chief engineer of the Council saying that after receiving the report of their engineers they did not regard the proposed sewer with apprehension. Mr. Fitzmaurice now states that since that date he has received no further communication on the subject, and adds that although he saw the cathedral architect, Mr. Somers Clarke, several times in September last, no mention was then made to him of any settlement in the cathedral. It would be interesting to learn what are the reasons for the alarm which has suddenly descended upon the Dean and Chapter. We know that the cathedral has settled in the past, but, to use the Dean's recent words, the cracks produced "are comparatively slight for so large a building, and are of long standing." So far as the sewer is concerned we do not believe the least anxiety need be felt. No shafts or other openings from the surface will be made between Ludgate-hill and Queen-street, and the work will be executed 16 ft. below the top of the London clay, by the shield process, with compressed air if necessary. The tunnel will be lined with cast iron, outside which cement grout will be injected under pressure. Construction of this nature in impervious clay cannot give rise to danger, and in the absence of any reasonable basis for its existence we cannot avoid the conclusion that the present scare is simply due to vague and nervous apprehension on the part of the cathedral authorities. If, however, any tangible objection can be urged against the construction of the sewer in the vicinity of St. Paul's, we feel sure it will receive every attention from the County Council.

The Channel Tunnel.

NOW THAT the advocates of the Channel Tunnel are becoming so active in putting forward roscate views in favour of the project, it is worthy of note that M. Sartiaux, the chief engineer of the Chemin de Fer du Nord, has recently admitted the necessity for taking into consideration the possible permeability of the chalk layers between England and France. We have expressed the same view on several occasions, and up to the present have heard no suggestion as to how the tunnel is to be completed in case water should find its way into the workings. At some places the low water depth, as shown by soundings, is fully 180 ft., corresponding with 205 ft. at high water. Without taking into account

the distance of the tunnel below the sea bed, these depths represent pressures of 77 lb. and 87 lb. per square inch, and as no human being can live under a pressure of 60 lb. per square inch it would be out of the question to use compressed air for the purpose of keeping the workings free from water. The only way in which the practicability of the scheme could be definitely ascertained is by driving a trial heading from shore to shore.

The Coal Commission.

SOME members of the Royal Commission on our Coal supplies recently formed a deputation to the Home Secretary to urge the necessity of keeping the work performed by that Commission "noted up." The deputation stated that the records of the Royal Commission of 1866-71 had proved practically useless because they were out-of-date, and no one remained alive capable of explaining them, and it was suggested that the Geological Survey should complete the final survey, and at the same time keep the work of the recent Commission up-to-date. The reply of the Home Secretary was necessarily somewhat indefinite. He deplored the absence of a Mines Department, but expressed sympathy with the views of the deputation. Royal Commissions are only too frequently resorted to as a means of beating time and postponing inconvenient questions; but when the Commission has, as in this case, spent years in undertaking a valuable statistical inquiry on sources of supply, it would be certainly advantageous if the result of their labours could be kept up-to-date, and not allowed to moulder away in the recesses of the official departments.

The London Building Act and Private Acts.

A CURIOUS point has arisen in connexion with a recent fire at the Millwall Dock. A fire occurred in a building on the Dock Company's property. A surveyor of the London County Council, acting on instructions from the Council, surveyed the building and gave the dangerous structure certificate. The Dock Company refused to pay the fees, and was accordingly summoned. The Dock Company have a private Act, The Millwall Dock Act, 1864, sect. 60 of which provides that "the provisions of any Metropolitan Building Act from time to time in force do not extend or apply to any building of the Company"; and the Company contended that the provisions of this Act were not over-ruled or repealed by the London Building Act, 1894. The magistrate read the word "do" in the above section as equivalent to "shall," and held that the London Building Act did not over-rule the private Act of the Dock Company. The question is one of some difficulty, as the London Building Act expressly exempts buildings belonging to dock companies which are constituted by Act of Parliament, but this exemption is limited to compliance with Parts VI. and VII. of the Act, which relate to the "construction of buildings" and "temporary structures," whereas the proceedings above mentioned arose in connexion with Part IX. of the Act, "Dangerous and Neglected Structures." The position of dock companies seems, therefore, to have been present to the mind of

the Legislature when the London Building Act was passed, and the exemptions confined to certain subjects.

Depreciation of Land and Compulsory Powers. A DECISION of very great importance to landowners has been given in the case of *Horton v. Colwyn Bay Urban District Council*. The Council, acting under sects. 16 and 17 of the Public Health Act, 1875, had laid certain sewers, part of a drainage scheme, on the plaintiff's land, and for this compensation was awarded him under sect. 308 of the same Act; but a reservoir pumping-station and an outfall sewer was erected on land belonging to the Council, close to the plaintiff's land, and he claimed further compensation in respect of the depreciation to his land by the contemplated user of these works, this claim being also based on sect. 308 of the Public Health Act, 1875: "Where any person sustains any damage by reason of the exercise of any of the powers of this Act in relation to any matter as to which he is not himself in default, full compensation shall be made to such person by the local authority exercising such powers." The learned judge held that the pumping-station and other works erected on the defendants' own land were not so connected with the sewers laid under compulsory powers on the plaintiff's land as to give rise to a claim for depreciation. This question of law is one of difficulty, and the decisions of the courts show that the line to be drawn is a very fine one; a somewhat similar contention arose in the case of *the King v. Mountford*, which we commented upon in our issue of August 11 last. We may point out that in the case under discussion the claim was for additional compensation for depreciation, and that the decision does not preclude a claim for damages where the working of the undertaking causes a nuisance.

Gas Fires and Health. THE elaborate Report which has recently been issued by the Coal Smoke Abatement Society tends to show that some of the opinions commonly expressed with regard to the use of gas for heating inhabited rooms are fallacious. The Report states that a properly-constructed gas fire, with a flue sufficiently large to carry away the products of combustion, is quite as satisfactory from a hygienic point of view as a coal fire, and does not in any way vitiate the air of the room. Neither does the use of the gas fire result in any abnormal drying of the air of the room, as is commonly supposed. Further, such a gas fire exerts a useful ventilating influence, since it will carry away from 2,000 to 4,000 cubic feet of air per hour. The gas fire tests were made, by permission of Sir Henry Tanner, in a number of rooms, each of about 4,000 cubic feet capacity, in the new Public Offices at Westminster, in May and June last. The technical work was done by Dr. Owens, under the superintendence of Dr. Des Voeux. The Report, which is of great length, has been published in full in the *Lancet*. In spite of this Report most of us will doubtless continue to prefer the air-befouling but grateful open coal fire; but since as a matter of convenience we all use the gas fire in office, study, or elsewhere, it is satisfactory to learn that

in so doing we run no risk of injury to health.

Sanitary State of Elementary Schools. THE enumeration of the several elementary non-provided schools which have been closed by the London County Council, as stated last week in the Report of the Education Committee, has several important aspects. It shows that a number of the voluntary schools, as they were called before the Act of 1902 came into operation, were structurally and sanitariously inefficient. The question immediately arises, why were they not closed before, having regard to the fact that the Government inspectors are supposed to look after both the education and the buildings? The only answer is that this inspection by educational experts, and not by technically-fitted persons, is more or less of a sham. The other aspect of the question is a large one. It is whether all the educational authorities in England are doing their duty properly in regard to the sanitary state of the non-provided schools? We have a shrewd notion that many County Councils are far too lax on the point. They are anxious for the ratepayer, and for the Churchmen who are interested in non-provided schools. That some of the educational authorities are far more alert than others is certain. The question is to what extent is structural and sanitary inefficiency in non-provided schools overlooked?

Steam Omnibuses. As a consequence of the new regulations relative to the licensing of motor omnibuses in London some perturbation has arisen among the proprietors of public conveyances driven by internal-combustion engines. Convenient and economical though such motors may be they necessarily involve noise and vibration (especially when the vehicle has been pulled up), unpleasant odours, and jerky acceleration due to the unavoidable use of change-speed gears. These and other disadvantageous features are minimised in the best types of design, but cannot be entirely eliminated, and we believe omnibus companies would do well to consider the question of turning to steam as an alternative to petrol. In the paper read on Friday the 16th ult. before the Institution of Mechanical Engineers Mr. Thomas Clarkson showed that recent developments in methods of applying steam for public service vehicles have brought within reach the important advantages peculiar to steam as a motive force. That steam can be generated automatically as required without the accompanying drawbacks of sparks, smoke, ashes, and dust incidental to ordinary methods, is demonstrated by some forty omnibuses now running in the metropolis and others which have been regularly in use at Torquay since 1903.

Tilthway Brakes Again. THE accident to an electric tramcar at Bath comes as another reminder that the blame for mishaps must not always be attributed to the stupidity of drivers, as some tramway managers would like to be done. In this case the car was ascending a steep gradient on the way to Weston, the brakes failed to act, and the

car commenced to run backwards down the hill. The driver tried to reach the rear platform for the purpose of applying the other brake, but before he could do so the car ran off the rails and was overturned by coming into contact with a house. Quite apart from any question of responsibility for failure of the ordinary brakes, this mishap shows the necessity for fitting all cars intended to be run on steep slopes with brakes such as those mentioned in our "Notes" of June 30 and July 14 last.

Carshalton Park and the Gates. IN the sale this month of building plots in the Park are comprised the beautiful early XVIIIth-century gates of wrought-iron at the end of the avenue through the grounds, once known as "Scawen's," finely timbered with elm, beech, walnut and horse and Spanish chestnut trees. The gates, damaged by the fall of a tree in the winter of 1893-4, were set up by Thomas Scawen, who, in 1726, employed James Leoni to design, upon a magnificent scale, a mansion which was not built. Picart engraved the drawings for Leoni's edition of Leo Baptista Alberti's treatise upon architecture. The original house, called "Mascalls," was sold in 1696 by Sir Edward Hoskins to Sir William Scawen, uncle of his heir, Thomas Scawen. The gates, with their side railings, extend nearly 120 ft. between the piers, so that the composition has the effect of a screen at the end of the avenue rather than of an entrance into it through the Park wall. The design of the gates is very similar to one which is illustrated in Jean Tijon's rare "New Booke of Drawings," reprinted ten years ago, with letterpress by Mr. Starkie Gardner, and is described as "a design for two panels of the screen at Hampton Court with a pair of gates and pilasters" (compare our illustration of July 28 last of the Lion gates at Hampton Court, where the more massive piers sustain the side-gates, giving an air of strength and concentration to the general design). At Carshalton the panelled and carved piers (which are also attributed to Catalini) carry leaden statues of Diana and Actæon. The Park, lying on the road from Wallington to Sutton, and extending over 100 acres, has lately been sold and cut up for building-plots. In the upper part is, or was, the grotto with a cave underneath in the water-bearing chalk, out of which rose a source of the Wandle, and flowed over two cascades through the Park and near the house; some other springs fed the Hogpit pond. The property formerly belonged to the Aitken family. In the parish church was set up a monument to Sir William Scawen, with an effigy by Rysbrack.

The Leicester Gallery. THE collection at the Leicester Gallery of Mr. Arthur Rackham's designs for "Peter Pan" attracted such a crowd of visitors at the private view last Saturday that it was difficult, on that occasion, to see the drawings at all. Those who had taken note of and understood Mr. Rackham's special gift as an artist would naturally expect that such a subject as "Peter Pan" would exactly suit his powers. By this exhibition, coming after that of

the Rip Van Winkle designs. Mr. Rackham has established his position as an original genius with the most delightful faculty of invention in the region of the fanciful and the grotesque, and also as an artist with a method of his own—so much his own, indeed, that it is difficult to understand how he gets some of his effects. The very surface of the paper is puzzling; it has a vellum appearance; in reality we believe it is a smooth surface paper lightly treated with a wash to give variety of tone. For the designs, in their own way, it is impossible to say too much. Whether the artist is portraying the innocence and naïveté of childhood (which he does as if he loved it—see Nos. 36 and 38 for instance), or the solemnity of commonplace respectability—"grown-up" people in the gardens who puff and blow as if they thought themselves bigger than they really are," or the masses of great trees (No. 10), or "an afternoon when the Gardens were white with snow" (No. 32), a perfect little landscape with figures; or the solemn old crow, "Solomon Caw," who advises Peter, the work is full of beauty and of keen perception of human character. Some of Mr. Rackham's grotesques we thought (and still think) out of place at the Society of Water-Colours, and we are not very fond of grotesque in art anyhow; but some of the grotesques here, such as the Duke being informed by the physician that he is in love (30), are admirable of their kind. But as a whole the exhibition is not one of grotesque, but of beauty and humour and human character. In the adjoining room is a good collection of water-colours by Messrs. Lee Hankey, P. A. Hay, Hugh L. Norris, Graham Petrie, and Terriss Williams, many of which are worth looking at; but they represent the kind of art that is tolerably familiar and that one can see elsewhere. But Mr. Rackham so far stands alone in his own line; he has invented a new *genre* of art and of execution, a thing that is not done every day.

At the Baillie Gallery there is a miscellaneous collection of works of art, among which the most interesting portion is perhaps that of the "Craft" section, containing a case of very good silver-smith's work by Miss Christine Connell, who also contributes enamel pictures in copper mounts, in which the mounts, however, from their large size, rather tend to kill the enamels. Mr. T. R. Way has a small collection of pastels, chiefly landscapes, and Miss Jessie Bayes exhibits a large collection of small enamel and other pictures, in decorative framing, under the title "Tales and Towns of Italy," a kind of reproduction of early Renaissance ideals. The most original part of the exhibition is the collection of drawings by Miss Annie French; very curious decorative subjects of groups of girls and women in fantastic costumes, elaborated most minutely with the pen. It is not a kind of art we very much admire in itself, and Miss French undoubtedly owes something to the suggestions of the late Mr. Beardsley in this kind of work; but the drawings are nevertheless very clever, and worked up with the most conscientious care and finish:

LETTER FROM PARIS.

AS HAS been already mentioned in our "Foreign" column, the Petit Palais is to be the object of an important series of decorations, of which the Municipal Council has just drawn up the programme. In the sculpture gallery which forms the front block, M. Besnard is already at work in the cupola, and M. Cormon is to paint three ceiling pictures and ten wall panels. The first ceiling is to show a vision of primitive Paris; the second, Paris in the feudal period; the third, the Renaissance Paris of the XVIIth and XVIIIth centuries. The panels will be devoted to various subjects in Parisian history—the battle of Lutetia, the Gallo-Roman civilisation, the siege of Paris by the Normans, the Gothic period of art, the first struggles for popular rights, the reign of Charles VII., the Renaissance and its artists, the theatre of Molière, and the epoch of Voltaire and the Encyclopædists. On the opposite side, M. Roll will have the decoration of an equal number of panels illustrative of modern Paris. On the large central ceiling will be symbolised the Revolution, with the vision of Truth shedding light on the city and its inhabitants. The ceiling to the left will symbolise the creations of poetry, that on the right the creations of architecture. The ten panels surrounding these will represent contemporary life as illustrated in Parisian industries, symbolised by female figures. In the semi-dome at the end of M. Cormon's ceilings, M. Chartan is to represent "La Ville Protectrice des Arts," and in the panels under the windows, the Seine and its tributaries. On the opposite side M. Georges Picard is to paint, as a sequel to M. Roll's pictures, in the semi-dome, the city under the shield of Peace, fêted by the world at large. The accompanying panels will represent the subject, "La Beauté triomphe de la Force."

Around the central garden, under the colonnade with its gilt bronze garlands, M. Paul Baudouin is to paint frescoes symbolising the Hours and the Seasons, the groups being connected by festoons and flowers. Such is the scheme just voted by the Council, the execution of which will be spread over four years.

It may be remembered that the Société Internationale (New Salon) was authorised by the City Council to organise at the Château de Bagatelle a retrospective exhibition of painting and sculpture. This has been such a success that the Société has been invited to open next year, in the same building, a retrospective exhibition of portraits of women; this is to be followed, in 1908, by an exhibition of portraits of children, and in 1909 by one of portraits of men eminent in politics.

The Service des Ingénieurs has at length abandoned its intention of removing the four statues on the Pont des Saints Pères, a proposal which encountered the strongest opposition from the "Vieux Paris" Committee as well as from all who were interested in keeping intact the artistic physiognomy of Paris. The statues will only be temporarily displaced during the enlargement of the bridge, and replaced in new positions after the operation. In the matter of public statues, there is shortly to be inaugurated, in a new square in the Fifteenth Arrondissement, a statue of Garibaldi by the Italian sculptor Signor Cocci; and M. Gustave Michel has been commissioned to carry out a monument to Jules Ferry, to be erected in the Tuileries garden. The monument to Victor Hugo in the Sixteenth Arrondissement (of which an illustration appeared in the *Builder* of April 12, 1902) is to be completed by four medallions to be let into the pedestal. These medallions will represent the two sons of the poet, Charles and François, and his two faithful friends, Vacquarie and Paul Meurice. M. Ernest Barrias has completed the two first, and the others are to be carried out by M. Allar.

The Galerie des Machines will soon cease to exist in its present situation. The Municipal Council have again voted its destruction, while on the other hand the Government demands its preservation in order that it may serve as a covered site for agricultural exhibitions, for which no other place is available at present. It is proposed to re-erect it in the Bois de Vincennes, or at La Villette, as an adjunct to the cattle

market. It would be of more use in the Bois de Boulogne, where there are plenty of large spaces available, where it would serve for agricultural exhibitions, or for horse shows, for military displays, or even for a cavalry riding-school. This building, of which the fine construction and immense proportions were much vaunted in 1889 when it was first built, has now ceased to be admired; yet its architect, M. Dutert, had proved that it was possible, in a great steel roof, to combine ability of construction with architectural character.

The new Magasin de la Samaritaine, now in course of construction, furnish another example of how steel can be used constructively with good effect. This establishment, of which the principal façade on the Rue Pont Neuf offers little of interest, presents towards the Rue de la Monnaie, on the other hand, a very original and effective design; the bays are marked out by the structural steel and filled in with decorative panels of flowers, in a kind of enamel, divided up by intermediate steel uprights which terminate in metallic flower finials. The main entrance, at the angle of the Rue de la Monnaie, is formed in a circular tower with a cupola in glazed brick supported by a steel framing, from which arises a lantern. The architect is M. Frantz Jourdain, who has ably planned the building so as to offer the greatest possibility of circulation to the public.

Among the new buildings of Paris may be noted also the Hôtel built from the designs of M. Blauit, to serve as a boarding-house for female employees of the post-office, telegraph, and telephone services, where they are provided with comfortable living-rooms, a salon, a library, and a large dining-room.

At its last meeting, the Société which has been formed to protect the amenities of French landscape was occupied with the subject of the celebrated park of Marly. The Société has demanded that this large park, of such great historic interest, should be classed as a place to be preserved, and that the ruins of the abreuvoir should not be restored but merely preserved intact and consolidated, as an interesting relic of the residence of Louis XIV.

At another point in the environs of Paris, Châtenay, a bust of Voltaire has just been inaugurated, the work of Mme. Syamour, placed on a pedestal designed by M. Soudeé, architect.

An anonymous donor has presented to the city of Paris a landscape by Claude Monet, and a view of Venice by M. Le Sidaner. These two pictures will be placed in the Petit Palais, with other presentation works, among which may be mentioned a portrait by Courbet. These will be placed in the large gallery formerly occupied by the Dutuit collection, which latter is now better placed in a smaller room, where the furniture, jewellery, and small pictures are more in scale with the room.

M. Homolle, the Directeur of the National Museums, is preparing an exhibition of all the works of Rembrandt belonging to the Louvre, which will be collected at the end of the Grand Gallery. To these works of the master, which are tolerably numerous, will be added some by the pupils and followers of his school.

We may mention also two exhibitions at present open. One of these, organised at the Georges Petit Gallery by the Société Internationale des Aquarellistes, includes "Aspects de Londres," by M. André Sureda, which are worth a special mention. The other, in the Pavillon Marsan, has been organised by "Les Artistes Decorateurs," and offers much of interest. Lastly, there will be opened in a few days, at the Ecole des Beaux Arts, an exhibition of the works of art purchased or commissioned by the State in the course of the present year. This is an excellent innovation.

WESLEYAN SUNDAY SCHOOL, BENWELL.—The new school erected in Atkinson-road, South Benwell, by the members of the Paradise Wesleyan Methodist Society, was opened a short time ago. Including the value of the land, the cost of the undertaking now completed has amounted to nearly 3,000*l*. The contractors for the work were Messrs. E. & A. Storey, of Benwell, and the designs were prepared by Mr. F. Marshall Dryden, architect, of Newcastle.

THE SURVEYORS' INSTITUTION : SANITARY LAW.

AN ordinary general meeting of the Surveyors' Institution was held on Monday at No. 12, Great George-street, Westminster, Mr. G. Langridge, President, in the chair.

The minutes were read and confirmed, after which Mr. E. H. Blake read a long paper entitled "Some Notes on Sanitary Law," from which we take the following passages :

Procedure under the various sanitary enactments is not entirely uniform. The Acts affecting the metropolis as a whole do not, generally speaking, extend to the City of London, while the provinces also are not subject to them. On the other hand, the Acts affecting England as a whole do not, generally speaking, include the metropolis.

Briefly, the country generally is subject to a large number of Acts, most of which are by statute included in the general term "The Public Health Acts." The principal of these are the Public Health Act, 1875, a general Act (in force everywhere without being formally adopted), and the Public Health Act (Amendment) Act, 1890. The latter is an adoptive measure divided into several distinct parts, any or all of which come into force on the Act being formally adopted by a local authority. The Act is only in force where so adopted.

The metropolis is subject, principally, to the Metropolis Local Management Act, 1855, and its numerous amending Acts (the chief of which is that of 1862), the Public Health (London) Act, 1891, and the London Building Acts. The City of London has its own "Sewer Acts." Under such Acts "Sanitary Authorities," with very full powers of administration, including the making of by-laws, and the appointment of medical officers of health, surveyors, inspectors, etc., were constituted.

The authorities under the Public Health Acts, as amended by the Local Government Act, 1894, are the Urban and Rural District Councils. The authorities under the Metropolis Management Acts, as amended by the London Government Act, 1899, are the Metropolitan Borough Councils, with the London County Council as the controlling authority.

Sanitary procedure in the City of London used to be regulated by the Commissioners of Sewers, but, by the City of London Sewers Act of 1897, the commission cease to exist, and its powers and duties were vested in the Public Health Department of the Court of Common Council.

In deciding what is necessary for the "effectual" drainage of a new house under the 1875 Act, it has been held in *Matthews v. Strachan*, 1901, that the local authority must consider only what is necessary for the house in question. They cannot take into consideration what is desirable, having regard to the disposal of the sewage of the district, and so require separate drains for sewage and for surface water. A separate system might, however, be provided for by by-laws under sect. 157 of the Act.

A point sometimes called into question is that dealt with by the following provision of the Public Health Act, 1875. If the drains of a building are sufficient and effectual, but not adapted to the general sewerage system of the district, the local authority may close such drains on condition of providing, at their own expense, other drains as sufficient and effectual for the premises in question. Under the same Act it is unlawful, in any urban district, newly to erect a building, or rebuild one which has been pulled down to ground floor or lower, without such drainage as on the report of the surveyor, discharging into a sewer, if one exists within 100 ft., otherwise into a cesspool, etc. This provision is also applicable to the metropolis by sect. 75 of the Act of 1855, with the additional provision that the drain shall be available for the drainage of the lowest floors and that wherever such building is rebuilt as aforesaid, the level of the lowest floor shall be raised sufficiently to allow of the construction of such a drain, and for that purpose the levels shall be taken and determined under the directions of the sanitary authority.

There would appear to be no official recognition of the various forms of sewage-lifting apparatus as applied to buildings, although

such apparatus is very largely used in America for the drainage of deep basements.

The drainage by-laws of sanitary authorities usually stipulate that the work involving disturbance of public roads and footpaths shall be done by them at the owners' or occupiers' expense, but in London this power is definitely given them by statute. Both in London and the provinces the sanitary authority may, on payment of the costs thereof, undertake the connexion of drains to sewers, or do any works of drainage on behalf of owner.

As to sanitary accommodation, the 1875 Act provides (under penalties) that houses newly erected, or being rebuilt, must have a sufficient water-closet, earth-closet, or privy and ashpit with proper coverings. While this section refers only to new buildings, there is a retrospective provision also to the effect that if a house, on the report of the surveyor or inspector to the local authority, appears not to conform with the requirements just stated, the authority shall, by written notice, require such accommodation to be provided within a specified time, failing which the authority can do the work and recover the cost. If there is a proper sewerage system, authorities can implicitly insist on the construction of water-closets, but the Act provides that earth-closets may be constructed instead, if approved by the authority.

The provision applying to London in connexion with this matter is sect. 37 of the Public Health (London) Act, 1891, which is substantially the same in effect, but definitely places water-closets first, providing that earth-closets or privies shall be allowed if sewerage, or sufficient water supply, be not available.

All factories and workshops must have sufficient sanitary accommodation with proper separation of the sexes. In connexion with this the Board of Trade has issued an order under the Factory Act of 1901 defining adequate accommodation as meaning one closet for every twenty-five women employed; for men, one for every twenty-five men employed up to 100, and beyond that figure one for every forty, provision being made for the reduction of this number in large works where more than 500 of either sex are employed. In such cases the number is reduced to one for each sixty hands if a proper system of control is adopted.

The following are brief extracts from the Public Health Act (Amendment) Act, 1890.

No room over a cesspool, privy, or ashpit, to be occupied as a dwelling or sleeping room, or work-place, heavy penalties being enforceable on both owner and occupier in default.

No new building to be erected on land covered with, or impregnated with fecal, animal, or vegetable matters unless and until such matter be removed or rendered innocuous.

Buildings described in deposited plans as other than a dwelling-house must not be used as a dwelling-house unless the structure thereof is approved by the local authority for that purpose, and has the amount of open space at the rear thereof that is required by the by-laws in force in the district.

The Public Health Act, 1875, makes it unlawful to let, or occupy separately as a dwelling, any cellar not so occupied at the time of passing the Act, and specifies very fully the requirements which must be fulfilled by cellars already so used.

In the metropolis, sect. 95 of the 1891 Act provides that underground rooms may be let separately as dwellings, whether so let before the passing of this Act or not, on certain requirements being fulfilled.

One of the weakest points in the 1875 Act has reference to this matter. The Act provides, among other things, that the cellar shall not be occupied as a dwelling unless it is "at least 7 ft. high from floor to ceiling, and there is at least 3 ft. of its height above the surface of the street or ground adjoining, and unless there is, outside of and adjoining the cellar, and extending along the entire frontage thereof, and upwards from 6 in. below the level of the floor up to the surface of the street or ground, an open area of at least 2 ft. 6 in. wide in every part, &c."

There is no alterable relation between width of area and height of ceiling above ground. The area might be 22 ft. 6 in.

wide, but if the ceiling were only 2 ft. 11 in. above ground the cellar would be uninhabitable, whereas a cellar with an area one-ninth of this width, but with the ceiling 1 in. higher above ground would meet the provisions of the Act.

No doubt this was noticed when drawing up the Act of 1891, since the provisions affecting the metropolis are more reasonable. Briefly, the provisions as to existing basements are as follows: To be separately occupied as a dwelling, a cellar must be 7 ft. high from floor to ceiling, 3 ft. of which are to be above ground adjoining; but if the width of the area be not less than the height from floor to surface of ground, the height of room above ground may be less than 3 ft., but not less than 1 ft. Other requirements are:

- Area not less than 4 ft. wide, extending down to 6 in. below floor level, and paved;
- Proper damp courses;
- Area, and soil below room, to be drained;
- Any drain under floor to be gastight;
- Concrete under floor;
- Room to have fireplace and proper flue;
- Use of closet and ashpit;
- Window area one-tenth of floor area, one-half of this area to open.

Where two or more underground rooms are occupied together, and not in connexion with rooms on another floor, each shall comply with the foregoing provisions.

The 1875 Act empowered Urban District Councils to make, among others, by-laws with respect to the structure of new buildings for securing the interests of health; with respect to the sufficiency of air space about buildings, and the ventilation of them; with respect to the drainage of buildings, water-closets, earth-closets, cesspools, etc., and to the closing of buildings unfit for human habitation.

This power is extended, where the Amendment Act of 1890 is in force, to include also by-laws with regard to the flushing of water-closets, the height of rooms intended for habitation, the paving of yards and open spaces about dwelling-houses, and the provision of back ways in connexion with the laying out of new streets to facilitate the removal of rubbish, etc. Such of the above as refer to drainage of buildings, water-closets, earth-closets, etc., and the flushing of water-closets, may be made retrospective. A Rural District Council is also empowered, under the 1890 Act, to make by-laws as to sanitary matters.

By-laws made by a local authority are of no effect unless and until they have been confirmed by the Local Government Board. A good model code of by-laws was prepared by the Board for the guidance of local authorities and has been largely adopted. These were drafted as a guide only, and do not call for criticism, since they have been considerably varied in many localities, resulting in lack of uniformity.

In the metropolis the question of by-laws has been on a less satisfactory footing. The structure of buildings, surrounding air space, erection of buildings on low-lying land, etc., are dealt with by the provisions of the London Building Act, 1894. By-laws as to nuisances are made by the sanitary authorities under powers given by the Public Health (London) Act, 1891.

The regulations as to drainage and sanitary fittings are framed partly under the Public Health Act, 1891, and partly under the Metropolis Management Act of 1855.

Sect. 39 of the former Act provides that the County Council shall make by-laws as to water-closets, earth-closets, privies, ashpits, cesspools, and receptacles for dung, and the proper accessories thereof, whether constructed before or after passing this Act. The sanitary authority shall make by-laws as to keeping water-closets supplied with sufficient water for their effective action. The sanitary authority have to enforce and observe the by-laws under sect. 39, and can only give directions in accordance therewith, other directions being void.

A very complete set of by-laws has been prepared by the London County Council under this section, and if properly enforced would be bound to maintain a high standard of efficiency.

The author then mentioned the main points

of this code, and also the chief points in the London Drainage By-laws.

As to depositing plans for drainage work, he referred to the Metropolis Management Amendment (By-laws) Act, 1899, authorising the London County Council to make by-laws dealing with this branch of the subject. The code was approved by the Local Government Board in 1903. Briefly, their purport is as follows:

Anyone about to construct a drainage system as a whole must deposit plans and sections (in duplicate) with the sanitary authority, together with duplicate copies of a detailed description of the proposed work. The plans and sections must show all floors affected by the proposed work, the general arrangement of the parts of the building, including the roof; the size and position of every waste, ventilating, and drain pipe, manhole, etc., and the position of every sanitary fitting. Such plans shall show the positions of all windows and other openings, and all chimneys within 20 ft. from the open end of any soil or ventilating pipe. These plans are to be to a scale of not less than 16 ft. to 1 in. At the same time a block plan must be deposited to a scale of not less than 22 ft. to 1 in., showing block plan of the building in question and other buildings on the site, together with any adjacent buildings affected by the work; names of streets and description of premises in question, difference in level between lowest floor and pavement adjoining, the level of adjoining yard or open space, lines, depth, size, and inclination of proposed drains, and, so far as can be ascertained without opening the ground, the lines, size, depth, and inclination of any existing drains; means of ventilation, position and form of every existing or proposed manhole, gully, junction, etc., etc., and the points of the compass. Such a block plan will not be required if the information just referred to is shown on the larger scale plans. These drawings and particulars are to be deposited fifteen days at least before it is proposed to commence the work, and in case of a new building before beginning to erect such building.

While the foregoing apply to a scheme as a whole, other by-laws deal with additions to, partial or entire reconstruction of, and alterations to drainage. They provide that in such cases it shall be sufficient if duplicate plans are submitted, showing such particulars as shall enable the sanitary authority to ascertain whether the proposed work is in conformity with the statutory provisions and by-laws formed thereunder. If in any case plans and sections have been previously deposited for construction of the drainage as a whole, it will be sufficient to specify the date of the previous deposit, and to show the new work on the plans about to be deposited, and only so much of the existing work as will be desirable the authority to see the relative positions of the old and the new. There is no necessity to deposit plans and particulars unless the proposed work involves the alteration or entire reconstruction of any pipe, drain, or other means of communicating with sewers, or the traps and apparatus connected therewith.

In cases of urgency it is provided that, if an alteration to the drains must be made at once, a notice must be forthwith sent to the sanitary authority to that effect, and the necessary plans, etc., deposited within two weeks.

Penalties are provided for the breach of these by-laws which, however, have unfortunately not that element of completeness which is desirable to ensure uniformity of procedure, and conflicting regulations for their administration have been prepared by various metropolitan Borough Councils. One incidental difficulty lies in the fact that in some boroughs alterations to drainage work are in the hands of the Surveyor's Department, and in others in the Sanitary Inspector's or Public Health Department. It would be well if the duties of the Public Health Department were restricted to the discovery and investigation of nuisances and the serving of notices, followed by legal proceedings if necessary, the execution and supervision of drainage work (the term drainage being here used in its widest sense) being left to the Surveyor's Department.

As to the question of "Drain" or "Sewer," the author said there had been

much litigation on these points, and he mentioned some of the principal cases, i.e., *Travis v. Uttley*, *Self v. Hove Commissioners*, *Hill v. Hair* (1895), *Bradford v. Mayor, etc.*, of Eastbourne, *Seal v. Merthyr Tydvil Urban District Council*, *Thompson v. Eccles Corporation*, *Haedicke v. Friar Barnet Urban District Council*, *Wood Green Urban District Council v. Joseph*, and *Jackson v. Wimbledon Urban District Council*.

The author dealt at some length with these and other cases, and also with the question of combined drainage.

The surreptitious connexion of drains to others converts them to sewers. A case of this kind is *Geen v. Newington Vestry*, where a drain from a stable was connected to one from an adjoining house, and on a nuisance occurring the surreptitious connexion was disclosed. The pipe was held to be a sewer. In the well-known case of *Bateman v. Poplar Board of Works*, the approval of the defendant was held to be of the same value as an order, though no formal order was drawn up. Another leading case is that of *Kershaw v. Taylor* (Court of Appeal, 1895). A builder was directed to drain some houses in pairs. He drained them in fours. Such drains were held to be sewers. A similar case is *Bullock v. Reeve*. In *Holland v. Lazarus* an order was made for the drainage of four houses by a combined operation. Without the sanction or knowledge of the vestry a drain receiving the discharge of a rain-water pipe from a fifth house was connected to the head of the combined drain and turned it into a sewer.

Two houses were drained together without an order. One house was subsequently become a sewer, and it was held by Mr. Justice Wills, in *Shoreditch Vestry v. Phelan*, that this disconnection could not be held to convert it from a sewer to a drain. "Once a sewer always a sewer." In *Pilbrow v. Shoreditch Vestry*, two blocks of buildings were separated by a causeway. One block had no access to the causeway, and the other block opened only to it. Both blocks were drained by a combined operation without an order of the vestry. It was held by the Court of Appeal (Lord Justice Rigby dissenting) that the blocks were premises with the same curtilage and that the main drain in the causeway was therefore a drain only.

In the case of *Florence v. Paddington Vestry*, an owner received notice to repair a defective drain. He spent £47 on it, and then found it was a sewer. The Court awarded that he be refunded the money spent and given a declaration that the pipe was a sewer.

Under the decision of the Court of Appeal in *Silles v. Fulham Borough Council* a rain-water pipe conveying water from two houses into the drain of one house brings such drain within the category of a sewer, and so repairable by the public.

In this matter of surreptitious connexion a wrongdoer cannot gain advantage by his own wrongdoing, but a man is not liable for the wrongdoing of his predecessors in title.

The burden put upon the ratepayers by this matter is considerable, the sanitary authority having the onus of producing evidence of ordering or sanctioning combined drainage. The London County Council introduced a Bill into Parliament during several successive sessions, with a view to placing the combined drainage question on a better footing, but without success. The failure is rather curious in the face of the fact that the West Ham Corporation secured the passing of an Act in 1898 relieving them from all liability in such cases.

The author then dealt with the matter of nuisances at some length, in the course of which he said:

A point which often gives rise to discussion is the extent to which a sanitary inspector may go in his examination of existing drainage.

There is no express statutory power to test drains, but, both in the metropolis and the provinces, there are provisions to the effect that drains shall be kept so as to be free from nuisance, and the inspectors may enter and see that the provisions of the Acts are being carried out. It is provided that they may examine the drain and may open up the ground for this purpose, the latter provision

no doubt empowering them to uncover the whole system of drains. Even assuming that the whole length of a drain were uncovered, its condition could not be ascertained by merely looking at it, since there might be flaws in the undersides of the pipes or defects in the joints in such position.

Undoubtedly then, the interpretation usually given to the Act is the right one—the authorisation of the testing of the drain in the first instance, and the opening up of the ground when necessary to get access to such drains, or when a bad state of things has been disclosed by the test.

Granted the power to test, let us next consider whether it is fair to test old drains, or whether they should, owing to their age, be allowed to be defective. I would strongly urge that it is fair to test existing drainage. Glazed stoneware socketed pipes have been in general use for the last quarter of a century at least, and, if of only of average quality, they do not decay and so become defective. Cement joints, if of fairly good quality, are practically everlasting. There is, therefore, no allowance to be made on either of those grounds. The drains of a house on clay soil may become fractured by settlements of the soil, but are none the less defective. If the drains of a house are of great age and are not of glazed pipes, or are only clay jointed, then their existence is, in crowded districts, a menace to the health of the community at large and the inhabitants of that house in particular.

There is too much of the feeling "out of sight out of mind" in connexion with drains. Household make the great mistake of not looking on the drains as a part of the dwelling, and a delicate part at that. The drains stand in the same relation to the dwelling as the bowels to the human body. They carry off waste matters which it would be injurious to health to retain in the structure. A leakage of the bowels causes instant injury, whereas the injury due to leakage of the drains is more gradually felt, but that is only because the proportions between the bowels and the body and the drains and the house are different. In time the ground adjacent to the house becomes sewage sodden, giving off noxious emanations, to say nothing of its injurious effect on any water supply pipes there may be in the vicinity of the drain.

In the case of a nuisance arising in connexion with the drainage of some artisans' dwellings in Southwark, where the drainage, when plugged, completely absorbed 15,000 gallons of water in a very short time, making it impossible to fill the system, a well-known public health official gave evidence that it was unfair to apply the water test to old drains, and that he did not regard a leaky drain as necessarily defective. The case was, on this evidence, and the remarkable assertion of counsel that the water test had caused the defects by forcing the joints of the drainage, dismissed.

The Borough Council followed up the matter by serving notice on the occupier that, after twenty-four hours, their inspectors would enter the premises and open up the ground, but on arriving the inspectors found that the owner had forestalled them, opening the ground and disclosing a state of affairs so bad that the company owning the building, without further delay, reconstructed the whole system.

The question of allowable deficiency, if any, is one which ought to be put on a proper basis. The drainage system wants maintaining and cleansing in just the same way as the rest of the building, but, generally speaking, owners of property show a strong tendency to shirk their responsibilities in this matter, failing to recognise that it is a vital one, whereas the decoration of the house is merely a sentimental one.

Expressions of opinion by members of the Institution on the fairness or otherwise of the application of the water test to existing drainage would be of very great value. Almost any drain may get stopped up, and if it becomes blocked at, or near, its lowest point, the water test will be at once naturally applied, with serious results in case of leakage, owing to the foulness of the water. To safeguard health, I would suggest that existing drains should stand pressure by water to the extent of a head of 1 ft. at the uppermost end of the system.

The author also dealt with the question of the condition of drains and unofficial sanitary survey practice.

A hearty vote of thanks was accorded to Mr. Blake for his paper.

THE INCORPORATED INSTITUTE OF BRITISH DECORATORS:

PRESENTATION TO SIR WILLIAM RICHMOND.

A RECEPTION was held by the President of the Incorporated Institute of British Decorators, Mr. J. D. Crace, at Painter-Stainer's Hall, Little Trinity-lane, E.C., on Monday evening, when the gold medal of the Institute was presented to Sir William B. Richmond, K.C.B., M.A., R.A.

The Secretary, Mr. F. W. Englefield, read the following resolution of the Council:—

"That the first gold medal of the Institute be awarded to Sir William B. Richmond, K.C.B., M.A., R.A., in recognition of his great work of the decoration of the choir, St. Paul's Cathedral, the most important decorative work executed in this country in modern times."

The President said that they were met together to do honour to a great artist, who had made it perhaps the main object of his life, and at a time when his artistic power was most fully developed, to devote that power to a great decorative work. They of that Institute did not for a moment profess to be competent judges of all the artistic qualities of that work. Of his great knowledge of design and composition, of the pictorial portions of the whole, it would be almost an impertinence for him to speak—what they might be allowed to express was their satisfaction and respect in finding an English painter of the first rank undertaking and carrying out to a noble conclusion a grand work of decoration in its true sense—that was to say, a work having for its aim the actual beautifying of the building—by painting not a series of independent pictures illustrating a scheme of hagiology, but by so treating the whole as to form one picture. That was a great step in English art, and it was a step not taken without much special preparation and study. For in decorative work there were many difficulties, many problems, and many pitfalls, of which the most able of "easel" painters knew nothing, and in which the most skilled was as likely to fail as the least able.

Mr. Crace then gave a brief sketch of the career of Sir William Richmond. Sir William entered the schools of the Royal Academy in 1857, at which time he had the friendly guidance of John Ruskin, and he painted his first picture in 1859 in the pre-Raphaelite manner under that influence. He sold the picture, and spent the money on a tour in Italy, drawing incessantly from pictures, sculpture, and architecture. The last was to be noticed, because without studying architecture no man could hope to arrive at any worthy result in decorating architecture. The second picture painted was also sold, with the result of a second trip to Italy. In 1861 (being then nineteen) he first exhibited at the Royal Academy, and in the following year exhibited some portraits of children, which brought him many commissions. By the end of 1865 the young painter was again in Italy, this time settled for a long spell at Rome, and there he painted his first large work, the "Procession in Honour of Bacchus," exhibited at the Royal Academy in 1869. Then came illness and six months' suspension of work spent in Algiers, followed by a return to London and renewed activity. When John Ruskin retired from the "Slade" Professorship of Fine Arts at Oxford his former protégé, William Richmond, succeeded him. He had dwelt upon Sir William's earlier years not only because they were the less likely to be generally known, but because it was always useful to be reminded that success in art was not a thing of chance. It came of enthusiastic labour intelligently directed—study persistently continued from year to year without slacking. As to the work of the decoration of the choir of St. Paul's, a few tentative experiments had been made, some artists had been consulted, but failed to convince the trustees, when at last, after twenty years of dispute, the Committee in 1891 called in Sir William Richmond, who apparently knew his own mind, and induced the Committee to agree with him. His stipulation seems to have been that mosaic

should be used rather than painting, as intended, and his advice was accepted and conditions arranged, and controversy ceased. Now clearly the painter was embarking on an undertaking in which he could not have much experience, either as to material, general conditions, or the vast size of the building. At the same time, we knew that he had, as a matter of fact, been studying the problems with which he was now confronted for years. The first step he took should be a lesson to all of them. He decided to visit the best examples of what had been done in the past, and, with the present requirements fixed in his mind, to examine again carefully the artistic and technical methods of the old masters of mosaic decoration. With this object he made a tour in Italy and Greece, taking careful note of how the best effects were produced, and so deciding what methods to follow and what to avoid. The study in such a case, having a definite purpose in view, could necessarily be more minute, more concentrated, more effective in its application. It was just the course which Raphael pursued when engaged on his famous decorations in the Vatican. He and his scholars or assistants constantly visited the antique remains of decoration then recently exposed in Rome, for no artist was so great or so skilful that he could not learn much from those who went before. Those who had the self-confidence to ignore what the past could give them were simply placing themselves at the foot of the ladder instead of starting already half-way up by gathering the experience of those who went before.

The great work once begun, Sir William devoted himself entirely to that. Sir William had in that hall not very long ago,* told how it had been the dream of his life from early youth. He then explained his method of work, his training of those who were to assist in its execution, the enormous scale to which the cartoons had to be drawn with his own hand after much preliminary study of each part to a smaller scale.

To renew his impressions, he (the President) visited St. Paul's a few days ago, and, for the time disregarding all detail, as a man half shuts his eyes to judge of the broad effects of a picture, he simply looked at it as coloured architecture, for all the artist's labour and infinite pains had that as the ultimate result. Had these innumerable studies, those years of arduous labour, all that careful skill, broken up or disturbed the architecture as structure all would have been in vain. The loss would have exceeded the gain. But he found this: all the great structural lines most carefully preserved—not only preserved, but explained; the architectural forms made more, not less, evident, so that even in the gloom of shadow no structural form was lost; the gilding used with a noble breadth, expressing form, and where needful subdued by skilful design, nothing gay or trivial; a rich harmony adding to, not taking from, the repose and solemnity of that great interior. Well, then, he believed that they all would agree that to the man who had accomplished that great decorative result in London's greatest monument, and had done this whilst throwing into the doing of it the most elaborate and beautiful design, colour, and symbolism—had, in fact, poured out on it all the stores and resources of a fertile and trained imagination—to that man they might well offer such honour as lay in their power. They recognised that in thus endeavouring to confer some token of their appreciation they did themselves the greater honour; but they entertained the hope that Sir William Richmond would find some satisfaction in the knowledge that they could recognise some at least of the enormous difficulties over which he had triumphed.

The President then presented the gold medal.

Sir William Richmond, in reply, said that the recipient of an honour or a gift was in a position of uncertainty—his own undesiredness, on the one hand, or the reverse, and his gratitude upon the other. He had to conceal his bashfulness as well as his vanity, remembering only what he had tried to do, and not what he might have done. We all needed help, sympathy, and we all must accept criticisms, even adverse judgments. He would not conceal the satisfaction and pride with which he accepted the high honour

conferred upon him, and this made him feel encouraged to go on and prove worthy of their generous appreciation of his efforts, however short they might have come up to his or their ideals. It could not be other than satisfactory to receive encouragement from a large body of men who were co-workers as well as students in a great and noble enterprise. Their distinguished master came of a celebrated stock, and represented a family of artists, and had he not been called "The King of Decorators"? When he was a boy he well remembered the name of Crace, justly renowned and justly honoured. He had met Mr. Crace on the Continent, witnessed his enthusiasm there, known of his prolonged studies in ancient art, and had talked with him over colour problems, and recognised his minute investigation and admirable sense—his artistic propensities as well as his scientific reasoning; and they were very lucky to have such a guide, counsellor, and friend.

This was not an occasion to engage in technicalities, but he would take the occasion to say a few words upon principles and to encourage them more and more to regard their art as one of the first importance, because the good or bad taste they exhibited therein would either improve or mar the taste of their generation, and hence that of those who come after. Good taste was surely exhibited by the fitness of its employment. By fitness he meant embellishment in exact proportion and adjustment to the thing to be enriched. It was a platitude to say that a cottage demanded different treatment of decoration to a palace, if both were to be harmonious with the objects that they were called upon to fulfil, and he would remind them of the saying of Vitruvius: "Stability, fitness, beauty"—words which convey a sense of relative proportion, without which no work of art was enduring or pleasing.

The first axiom which seemed to force itself from his pen was: In all cases avoid the gaudy—which was equally undesirable in the palace as in the cottage, or, to go much lower down, even in the public-house. The more expensive the material used, the more care was necessary in its selection and adjustment. Wood and thatch, stone and plaster, were the materials best adapted to a cottage. The unadorned and grave simplicity of such a dwelling was the natural aura surrounding a life which called for hard toil and much self-sacrifice.

The profession of the architect was now so complicated, and the demands upon his energy as well as invention being so various and numerous, it was impossible under such a strain as circumstances imposed upon them that they should be master of all the crafts. Failure must result if they attempted to be. It was quite enough for the architect if he was a supreme master of construction either in stone, marble, wood, or iron. Stability must be his first consideration. Proportion came so nearly in touch with stability, and fitness was in so close a league with beauty, that the three dicta were so bound up together that one was evidently the result of another. Where there was perfect stability there was certain to be good proportion, and where there was good proportion there was certain to be beauty. He was thinking of architecture in the abstract—thinking of it, as it were, in black and white, or as an anatomist thinks of the human frame, forgetting the colour of the skin, the eyes, the lips, and the hair. The study of colour was in itself so difficult, so involved, that for its success, he was going to say, a lifetime of experience was demanded. Colour played so many tricks, was such a subject for them, because of the effect produced by light, or its absence, reflected or direct, and the general environment of tone, that no one who was not constantly employed in the use of colour upon buildings could gain sufficient experience to achieve good results. For the attainment of success in colour the architect had no time. When he tried he almost invariably failed. The great architects of the past were not specialists; some of them were painters and sculptors. The times did not ask of them to be business men; but it was otherwise now, and they were severely handicapped. Hence it too often happened that the use of marble—one of the most difficult of all materials, and one demanding an acute colour sense—was often found to be detrimental to what otherwise might be a restrained and

* See the Builder for March 14, 1903.

fine building. As things were now, in the majority of cases an architect had better leave colour alone, unless at the initiation of his design he was supported by the experience of a colourist. The divorce of colour from architecture appeared to be surrendering to a closer bond between the painter and the builder. When it had entirely ceased, and the arts again became one—as they were one, three minds being better than one, those of the architect, sculptor, and painter—there was no reason why the modern building should not be as interesting, as stately, as unique in the perfection of all its parts as it was once, when men collaborated, when each learned from the other, and they worked together in a harmonious concord, desirous for perfection in all the various arts and crafts which a perfect building included. As decorators they must never forget that it was their function to improve the beauty of a building, and they must not forget that, however lavishly colour decoration was employed until comparatively recently by Greeks, Egyptians, Arabs, Normans, even Saxons, that it was never garish. To his thinking, it was, putting good taste for the moment apart, because of the use of oil in the place of tempera, which lend themselves to far greater fairness, delicacy, and refinement, that so much modern decoration was a failure. Certainly this was the case in examples which they had seen both in English and French cathedrals, especially in the former, where the modern work executed in oil was side by side with the ancient work executed in another tempera—notably the work at Norwich, at Salisbury, at Winchester, including the atrocities committed at St. Cross in the latter city; and, journeying for a moment to Paris, the wholly lifeless work of Viollet-le-Duc in Notre-Dame and the mural and architectural decoration in one of the most interesting churches in that city, St. Germain des Prés. We have in England some delightful decorators. Preeminently the names of the brothers Adam occurred to one's mind—artists who, while they were learned in the traditions of the past, successful students of the stucco work of the Romans, were aptly original, and in no sense followers in an academic groove. Nor was their sense of colour without considerable charm, though employed upon a limited scale; and no one could refuse enthusiastic admiration for the manner in which they treated the various colours in woods, marble in their time being little in use. At present marble as veneer was becoming a fashionable material, and many an otherwise good building was injured by its undue application, and the injury which it too often effects upon the scale of a building by the immoderate use of marbles which were too large in their veining.

No people understood the use of marble for decoration as did the Byzantines. Every bit of St. Mark's, Venice, where marble had been employed, was successful, because there was no doubt that it was veneer, and the pieces were laid together in such excellent proportion of scale to the whole building that the result was in no sense worrying or teasing to the eye.

The use of all materials which were in themselves precious demanded the exercise of great restraint. In the desert churches in Venice, where lapis lazuli, onyx, malachite had been applied in large pieces, the effect was atrocious. What was intended to look sumptuous only looked gaudy, and what was intended to appear beautiful only appeared costly. Again, he said, avoid gaudiness. Gold they might use largely if it be pure and well-laid. There were no such masters of the use of gold as the Spaniards. They applied it in masses, not in spots and streaks, and in such quantities of leaf over leaf that the wood that was generally underneath it seemed almost transformed into metal.

Do not attempt to make a sham palace out of a middle-class house. It looks vulgar. Do not expend money upon decoration unless you can make it of the best kind and in perfect harmony with the necessities of the building. There was no reason why a public-house, which had, after all, taken the place among the poor of the old tavern for the rich, should not be beautiful, bright, gay, attractive; it certainly should not be vulgar, because the very people who attended it, alas! for the most part were those who stood

in need of restraint and refinement. Instead of pandering to vulgar tastes, if decorators led rather than followed they would be what they should be—great teachers. Just as good or bad literature had a direct influence upon a country, so had colours and shapes. The eye was not less sensitive than the ear to the moral teachings of aesthetics, which, as they were applied by art, might be more subtle in the quality of the impressions conveyed upon the mind through the eye than were the other senses. It was known of colour from recent scientific experiments that it could produce or induce peaceful or maddening sensations. There was one well-attested instance: he believed the experiment was tried in Italy. People of unsound or intemperate minds were placed alternately in blue or in red rooms. The result was that the blue rooms incited towards tranquillity of the mind, the red rooms the reverse. The lunatic was calmed by the one and excited by the other. Therefore decorators had a moral force which they could employ, plus the aesthetic charm. To carry the principle into practice, a gaudy public-house might incite to drink, whereas a quietly-decorated one might incite to restraint. They were in a distinctly responsible position. Their art was not that of the gamblers. It belonged to the sphere of the Seer and the Prophet. Whatever emotions were theirs would be transmitted. If they sowed vulgarity, vulgarity would be the response. If beauty, the response might not come immediately, but would indefinitely survive on the one great principle of evolution—the survival of the fittest.

He would conclude by saying: "Fit the whole tenour of your mind to your great responsibility, and never forget that bad or good art is like a mirror, which not only reflects your own tendencies, but those of your generation. Study the great past and learn the great lessons from the evolution of history, that the things worth living are invariably regarded with respect by future generations, and that in every sphere of life each man is an iota not only the property of the present, but of the future."

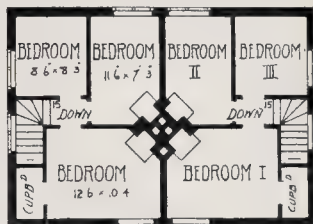
The Chairman thanked Sir William Richmond for his address, and the proceedings shortly afterwards terminated.

A PAIR OF CHEAP COTTAGES.

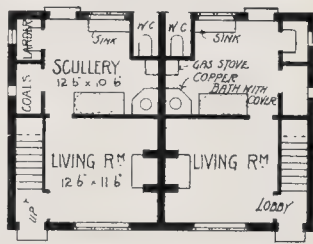
SIR.—In a recent issue you commented on a fact that came to light during an examination in bankruptcy at Luton, viz., that one of the cottages exhibited to the public at Letchworth as having been built for 1807, had

cost actually 2307. As you justly remark, it is much to be regretted that the public should be thus misled, the more so as such disclosures are quite likely to result in exaggerated ideas as to the cost of building.

You suggest that anyone who has succeeded in building sound and useful cottages at a moderate cost will be doing a public benefit by enabling persons to see the plans and know the cost in detail. We are, therefore, sending you a photograph and plans of



First Floor Plan.



Ground Plan.

Plans of Cottages.

a pair of cottages just completed under our supervision in Surrey.

These cottages are built with hollow walls in cement, with local red brick facing (upper story, lime rough-cast), and roofed with old tiles (P.C. 32s. 6d. per square, laid). The



A Pair of Cheap Cottages. Messrs. Gregg & Detmar, Architects.

internal joinery is yellow deal, stained and varnished, walls and ceilings plastered with Sirapite, all partitions being formed in patent slabs in place of usual stud partitions.

The amount of the builders' final account was 379*l.* 19*s.*, including fencing and drainage.

GREGG & DETMAR.

THE ROYAL INSTITUTE OF BRITISH ARCHITECTS.

THE third general meeting (business) of the session will be held on Monday, the 3rd inst., when the election of candidates for membership under by-laws 7, 8, and 9 will take place. The following matters will then be considered:—

1. Revision of charter and by-laws: admission of candidates to Fellowship. The chairman to bring the following proposal before the meeting:—

By-law 3, as amended at the General Meeting of June 6, 1904, not having yet received the sanction of the Privy Council, the old form of by-law is still in operation. The Council suggest, however, that, pending the settlement of the larger questions involved in the revision of the Charter and By-laws (suggested by the Registration Committee and adopted in principle by the General Body, but referred to the Council for a report), they continue to act under the old by-law until such time as all the changes may be made together, the Council undertaking in the meantime to act in accordance with the spirit of the proposed by-law until it comes regularly into force.

A number of nominations to the Fellowship have, however, lately been made from the colonies and elsewhere, some of which had to be referred back for further information. The Council propose to deal with these, in common fairness to the candidates, on the old lines.

2. Rural building by-laws. Mr. Lacy W. Ridge has given notice to move the following resolution:—

"That the Royal Institute of British Architects is of opinion that the provisions of 'The Public Health Acts (Building By-laws) Bill, 1906,' which has already passed the House of Lords and is now sent to the House of Commons, will, when enacted, prove advantageous in facilitating building operations in rural districts."

3. Public officials acting as architects for public buildings. Mr. Herbert W. Willis has given notice to move the following resolutions:—

"1. That the Royal Institute of British Architects considers it undesirable in the interests of architecture that public officials should act as architects for public buildings."

"2. That the Council of the Institute should obtain statistics of the sums paid to official architects, surveyors, and engineers and their staffs, with a view to instituting a comparison between such sums and the fees which would be paid to outside architects for similar work, in order that, if the latter charges compare favourably with the former, they should approach those public bodies who already employ or are contemplating employing, officials, with a view to securing the abandonment of such a system."

Miss Emily Penrose, daughter of the late Mr. Penrose, Past-President of the Institute, has been appointed Principal of Somerville College, Oxford.

Mr. Reginald Blomfield, A.R.A., has been elected Hon. Fellow of Exeter College.

Sir Aston Webb, R.A., has been re-appointed representative of the Royal Institute of British Architects on the Court of Governors of the University of Sheffield.

At the Milan Exhibition a gold medal was awarded Mr. H. Percy Adams for his architectural works. Mr. Alfred East, A.R.A., received a Diplôme d'Honneur in the section of painting, etc.

On the Art Standing Committee Mr. W. A. Forsyth is acting as joint Hon. Secretary with Mr. James S. Gibson in place of Mr. W. D. Caroe, resigned.

BANK PREMISES, NORWICH.—The new premises of the London and Provincial Bank, Limited, at Norwich, are now nearing completion. The structure has been carried out in Portland stone except the two columns to the doorway which are of polished Kenney granite with bronze caps and bases. Mr. J. S. Smith, of Norwich, is the general contractor; Mr. E. W. D. Potter, of Chapel Field-road, has carried out the stone work; the ornamental and other plastering is being carried out by Messrs. W. G. Crotch & Son, of Magdalen-road, and the carving has been entrusted to the hands of Messrs. H. H. Martyn & Co., Ltd., of Cheltenham. The electric light installation has been carried out by Messrs. Pank & Son, and the heating by Messrs. Barnes & Pye, of Norwich. The architects for the building are Messrs. George J. Skipper & F. W. Skipper.

Builders' and Contractors' Column.

NEW METHOD OF MANUFACTURING CONCRETE PRODUCTS.

HE uses to which concrete can be put are ever increasing and fresh developments are taking place almost daily; for example, we have recently seen the successful introduction of various systems of armoured concrete or ferro-concrete constructions, the application of which seems almost unlimited.

There has, however, always been one serious objection to concrete in any form, and that is the uncertainty of its composition owing to the presence of the human factor in its production. That is to say, that, in mixing and placing the concrete in position, however great care may be taken, there is certain to be some variation; the mixing may not be equal, the amount of water may vary, as may also the efficiency of the ramming. All these points materially affect the quality of the resulting concrete, and although some of them have been more or less successfully overcome by the introduction of mechanical measuring and mixing apparatus, still the human element has not been entirely disposed of.

A great development has, however, recently been made by a system introduced by the Improved Construction Company, both as regards the method of manufacturing concrete and the uses to which it can be put. I recently had an opportunity of inspecting and examining the machinery and products of this firm at their works at Strood.

The advantages claimed for the new method of production are many, the chief being:—

1. Great density and entire absence of voids or air bubbles.
2. Great tensile and compressive strength.
3. Uniform strength.
4. No hand mixing, measuring, or moulding.
5. Rapidity of manufacture.
6. Economy.

And the uses to which the new product can be put are practically unlimited, amongst the most interesting being roofing tiles, hollow beams, paving slabs, floor tiles, reinforced railway sleepers, pipes, and architectural work.

The products can be coloured to any tint, the colour being absolutely fast and unaffected by acids. By a simple process and with the use of a cementitious glaze, the materials can readily be glazed without firing. Any form of finish can be given to the face, one particularly interesting example being a very good rock face.

At Strood the demonstrating plant is in operation making paving slabs, building blocks, coloured and indented floor tiles, etc. The working of the plant is very simple, the efficiency of the manufacture depending chiefly upon a new form of vibrating-table, the action of which differs from that of any table previously constructed.

The plant consists of the following parts:—Crusher, elevator and conveyor, screen, washer, storage-bins for various materials, selector and measurer, mixer and vibrating-table, and its operation is as follows:—

The ballast is tipped into the crusher, the crushed material being elevated to the top of the building, whence it passes through a revolving screen of various meshes, the different sizes of material being separated by it and deposited in storage-bins fitted with hoppers and measuring-boxes at the bottom. The cement is also stored in a similar bin.

The selector (a box mounted on a travelling carriage) is passed along under the measuring-boxes, and takes one or more charges from each or any hopper, and deposits them in the hopper of the revolving mixing machine. The exact amount of each material required can therefore be obtained with certainty, and consequently the resulting material is uniform in composition. The mixer in turn discharges into another conveyor, which delivers the material through measuring-boxes into moulds placed on the vibrating-table.

A second mixer is devoted to the mixing of finer material for facing the blocks, etc., this mixture being placed in the moulds immediately before the main body of the

coarser material, so that the two make one homogeneous mass.

The moulds remain on the vibrating-table for about twenty minutes, at the end of which time all air bubbles and superfluous water have been ejected, leaving a material which appears almost dry and which has already commenced to set. No undue strain is put upon the material, as no outside pressure is applied, the solidification of the mass being entirely caused by the action of vibration and gravity.

At the end of twenty minutes the material has so far set that it is extremely difficult to remove a portion of it from the mould, even with a sharp instrument, and the new method certainly appears to fulfil all the claims of the patentees.

HORSE HAULAGE AND MECHANICAL TRACTION.

SIR,—In your article, "Horse Haulage v. Mechanical Traction," you are rather hard on the latter.

For instance, a first-class wagon can now be obtained for 510*l.*, which is 70*l.* less than your estimate of 580*l.* 10*s.* per cent. is ample for depreciation; in fact my firm are willing to enter into guaranteed maintenance contracts on that basis. This brings the cost of working down to 277*l.* per annum, or 1*l.* 2*s.* 2*d.* per day in place of your figure, 1*l.* 8*s.* And as regards the work that can be done, taking your second example, the motor-wagon could easily take 8 tons instead of the 3 tons you give, and assuming the same figures as you give for numbers of loads per day, the ton mileage would be 105 and the cost per ton mile 2*d.* instead of 6*d.*, a very great difference. This compares very favourably with your figure for horse haulage at 4*d.* per ton mile in the same example.

Of course if the contractor has not sufficient work to keep the motor vehicle working with good paying loads he is wise to stick to horses, and no self-respecting manufacturer would advise him to do otherwise.

H. A. NEAL.

*** Your correspondent states that "the motor-wagon could easily take 8 tons," and I presume that it is presupposed that the motor-wagon is supplied with one trailer or more. I do not think, however, that the price mentioned, viz., 510*l.*, includes a trailer, so that this item must be added to the capital charge.

Another point is that if the motor has a trailer the time required for loading and unloading and also for travelling will be greatly increased, and consequently the number of journeys per day will be reduced. This fact is, however, ignored in your correspondent's letter.

The gist of the whole question, however, lies in the last clause of the letter, as it depends entirely upon whether the contractor has sufficient work or no even to obtain the figures I gave in my letter.

I find that as a general rule the manufacturers are over-sanguine. In one pamphlet on the matter, which I recently saw, comparing the costs of the two systems, the motor is assumed to have a full load both ways out and home, whereas the horse is only assumed to have a load one way and to return without a load at all. Naturally on these lines very favourable figures can be shown.

THE WRITER OF THE ARTICLE.

THE LATE MR. TAYLOR AND THE BELLS OF ST. PAUL'S.

MR. JOHN WILLIAM TAYLOR, who died, aged 79 years, on November 20, at his residence, Shelthorpe House, Loughborough, was head of a family who, through four generations, have been in business as bell founders at Loughborough. At the instance of Sir John Stainer the firm were deputed to make the new bell for St. Paul's, and the late Mr. Taylor's chief work was the casting, on November 23, 1881, of "Great Paul." The bell was drawn by Messrs. Coles & Matthews' traction-engines from the foundry to the south-west, or Dean's, tower in May, 1882; the window opening having been enlarged, it was hoisted, under the late J. L. Pearson's superintendence, within the "geometrical" staircase to the position where it now hangs, with its edge just 18 in. below the centres of the clock dials. Weighing about 17½ tons, it is nearly twice as heavy as the largest bell at St. Peter's in Rome, and, whilst exceeding the Bourdon (1680) of Notre-Dame, and the big bell at Erfurt (1497), is about equal in weight of metal to those at Vienna (1711) and Olmütz. Its sweet and solemn note is E flat, the upper partials E flat, E flat, and G being just audible with the sonorous ground tone. The shape of the bell is very elegant, much more so than that of its wider, but less

heavy, rival "St. Stephen" (1858), the successor of "Big Ben"—named after Sir Benjamin Hall, first Lord Llanover—at Westminster. "Great Paul's" extreme height is 8 ft. 10 in., the diameter is 9 ft. 6½ in., and at the middle or sound bow the metal, which consists of tin and copper in the ratio of four to thirteen, is 8½ in. in thickness. Mr. Taylor cast, in 1877, a peal of twelve bells, weighing 272 cwt., presented by the Baroness Burdett-Coutts, and the Corporation and seven of the City Livery Companies to St. Paul's, and added, for use before ordinary week-day services, a set of chiming hammers upon the Ellacombe system. Until that time the cathedral possessed only four bells, namely, two for the quarter-chimes, the "service bell," weighing 1½ tons, cast by Wightman, and Richard Phelps's bell—the former "big bell," weighing 5 tons 4 cwt.—in the Dean's tower, which seems to have been a recasting by Phelps, in 1716, of a defective bell made by Wightman. Phelps's bell is commonly stated to be a recasting of "Great Tom" of Westminster, given by William III. to Wren for St. Paul's; but "Great Tom" was recast, and then broken in experiments with an iron hammer. "Great Paul" bears an inscription—*Va mihi si non Evangelisaveris*—with the coat-arms of the Dean and Chapter.

THE BUILDERS' BENEVOLENT INSTITUTION.

THE fifty-ninth annual dinner of the Builders' Benevolent Institution was held on Thursday evening last week at the Whitehall Rooms, Hôtel Métropole, Charing Cross, W.C., Mr. J. W. Chessum, President, in the chair. There were also present Messrs. H. F. Adams, J. G. Alexander, W. M. Brown, J.P., H. Arthur Bartlett, Deimar Blow, J. T. Bolding, C. M. Brown, P. H. Beveridge, J. M. Beveridge, H. W. Burrows, C. Bussell, F. J. Barnes, C. B. Broad, H. D. Blake, R. B. Chessum, J. Howard Colls, Archie B. H. Colls, W. L. Cloke, B. Carter, J. Clark, Walpole Collins, T. Sturge Cotterell, J.P., W. Downs, F. J. Dixon, L. G. Detman, Basil P. Ellis, J.P., L. R. Ensor, J. G. Evans, C. W. Ferrier, H. P. Fletcher, O. Ford, C. Gregory, T. T. Gething, F. H. Griffiths, C. Gude, F. Higgs, P. Hoffman, Ar. A. Hudson, R. Hill, B. I. Hellyer, E. J. Hill, G. S. Hill, G. Hubbard, W. C. Hunter, H. Horton, W. R. Hood, C. J. Hinsley, A. C. W. Johnson, J. F. King, P. G. Killick, W. Lawrence, J. W. Lorden, B. J. W. Lone, L. J. Maton, F. G. Minter, J. C. Nicholson, W. Nicholson, W. Needham, Hy. Northcroft, S. Neighbour, S. H. Nicholls, W. Pangbourne, A. E. Parker, J. F. Parker, E. Read, F. Ruddle, E. S. Rider, F. Swift, C. Stewart, W. G. Scott, W. J. Styles, A. K. Steven, T. Stirling, T. Stirling, jun., E. H. Selby, A. E. Sabe, H. Stringfield, W. F. Wallis, B. C. Wotton, J. Wright, A. G. Wright, Hy. Wall, J. P. Waddington, Douglas Young, S. M. Young, T. Costigan, Secretary, and others.

The loyal toasts having been proposed by the Chairman and honoured,

Mr. F. Higgs proposed "The Imperial Forces," and in the course of his remarks he reminded them that master builders were often associated with the Imperial forces, and they would call to mind the names of Colonel Trollope and the late Colonel Bird.

Captain Stirling having responded,

The Chairman proposed the toast of the evening, &c., "The Builders' Benevolent Institution." He said that the Institution had been compelled to use some of its reserve funds in order to meet the liabilities of this year, and as this was a very undesirable state of affairs he appealed to them to assist the Institution. The present state of affairs was no doubt due to bad times. In the building trade they had to meet, unfortunately, very keen competition, and this competition obviously affected all those engaged in the industry; and while the times were bad men could not be induced to subscribe so readily to Institutions of this kind. Still, he hoped they would all come to the aid of the Builders' Benevolent Institution. Much useful help was afforded by the allied trades, and but for those trades much of the good work the Institution did would have to be discontinued. But, as a contractor, he

telt ashamed that this was the case and that builders did not support as they should a charity which was for the benefit of unfortunate members of the trade. They actually relied for support upon those from whom they bought their materials, and yet there were 3,000 builders, or so-called builders, in this great metropolis, of whom not 10 per cent. assisted this Institution, and as a trade they should be ashamed of this fact. And he wanted all those who heard him to ask their fellow contractors when they met them to join the Institution, because it was the charity of their trade. He was glad to say that they had the support of the professions—the architects and surveyors, as well as the allied trades, who had assisted the Institution to a large extent. The Institution had also the advantage of the interest derived from the Stanley Bird Fund, which had unfortunately not been able to provide for the bed which the Fund was started to maintain. At the present time there were about sixty-eight pensioners supported by the charity; the men received 40s. per annum and the women 32s., and in order to grant this assistance about 2,500l. per annum had to be found. It was, therefore, very important that the subscription list should be well maintained, and that new subscribers should be found. They would like to get a larger number of the smaller builders to help, because those who came upon the charity were not the large tradesmen, who subscribe, but the man in a small way of business who employed from three or four to fifteen men, and who was more likely to need the help of the Institution than anyone else. Since the incorporation of the Institution sixty years ago they had assisted 346 persons, and he thought that said much for the work that had been done. They had the partial use of the offices and Secretary of the Master Builders' Association, and they had not a large rent to pay or taxes, and the whole of the money subscribed, less 10 per cent., was devoted to the cause for which it was subscribed. He appealed to them to assist a most deserving charity and do something to help those who were unfortunate in the struggle for existence.

The list of donations and subscriptions for 1906-1907 was then read out, the grand total of which was 1,087l. 7s. 9d., and the total of the President's list 764l., including 26d. 10s. from the President and 50l. from the Institute of Builders, 25l. from Mr. C. Morrison, and 15 guineas from Messrs. J. Aird & Son.

Mr. Basil P. Ellis, J.P., proposed the toast of "The President." He said he sympathised with the President in the difficulties he had met with in getting help for the Institution, because there was no doubt that at the present time the building trade in London was in a bad way. There was not only not enough work, but the profits were not enough, and that affected everybody concerned. Why that was so he did not know, for the various trades in the North—cotton, iron, &c.—were doing well. There had been bad times before, but he did not think they had been quite so bad as the present. He hoped that better times would soon come again.

The President replied, and said that there was a great deal of keen competition now, and times were harder than they used to be. He had received from the Committee the greatest kindness during the last few months while he endeavoured to fulfil the duties of his office, and he specially referred to the work of Messrs. Stirling, Bussell, and Bolding, who had rendered very good service to the Institution, and whose places it would be hard to fill. He also referred to the Secretary, Mr. Costigan, from whom he had received the greatest courtesy and assistance.

Mr. Howard Colls, Treasurer, said that, following in the footsteps of his old friend in the office of Treasurer of the Institution, &c., Mr. George Plunkett, he desired to thank the President and all those who had supported the Institution that night. He thought the President had been a little hard upon members of the building trade, for the long list of subscribers read that evening showed that, after all, the builders of London had not been backward in subscribing. The Institution welcomed the kind help which the allied trades rendered, and he believed that help was given because it was felt that the Institution was a good and worthy one.

Mr. J. W. Lorden then proposed "The

Architects and Surveyors," coupled with the names of Mr. H. J. Treadwell and Mr. Hy. Northcroft. He said they should not forget the debt they owed to architects and surveyors. They were under a debt of gratitude to gentlemen belonging to those professions who came to that dinner and supported the Institution. The architects and the surveyors were the brains of the building world, and without brains it was impossible to do or accomplish anything; but architects and surveyors could not do without the builders, and therefore they should go hand in hand together; one was necessary to the other.

Mr. Treadwell, in replying for the architects, said that they felt they could not do other than support a charity which existed for the benefit of those engaged in a trade which they could not do without. The architect was the purveyor of ideas which the builder put into concrete form, and he hoped and believed that the interests of the two were not so divergent as some people thought. It was quite possible for architects to enjoy the friendship of builders and to enter into their social festivities and at the same time to look after the clients' interests, and in dealing with the best class of master builders of London there was no fear as to the way in which the work would be carried out. Architects were grateful to builders for the confidence they put in them, and the courtesy they received at the hands of builders and their assistants was no doubt based on that confidence.

Mr. Northcroft, replying for the surveyors, drew a comparison between the times of his youth, when a quantity surveyor's regular charge was 2½ per cent., and the present time, when that commission was rarely received, and when public authorities were beginning to ask quantity surveyors to tender for their work. He felt that public authorities were making a mistake in asking surveyors to tender on several grounds. For one reason that it most certainly impressed him with a sympathy for contractors that he had never felt before he had been called upon to tender. He had made a public proposal for the standardisation of bills of quantities, but he had been told by other quantity surveyors that no desire had been expressed by the leading authorities among the London builders for the uniformity of bills of quantities. He believed that it was not the case, and if the London builders who took an interest in the subject would write to the Surveyors' Institution and express their views, he would be glad to have their assistance in getting something done in the matter. He could not deny that he had an axe to grind, although he was unable to see what he should personally make by it; but he would be very glad, if there were any feeling in the minds of the builders on the subject, for it to be expressed in an unmistakable fashion, either to the Quantity Surveyors' Committee of the Surveyors' Institution, or to himself. He believed it would be a good thing to get this uniformity, and he looked forward to the time when such an improvement could be effected.

The last toast was "The Vice-Presidents, Committee, and Stewards," suitably proposed by Mr. W. Downs, and responded to by Mr. J. T. Bolding, who said that what the Committee did was a labour of love, and as long as they had life and strength their services would be available.

FREE LIBRARY, CLEATOR MOOR.—A red freestone building was opened at Cleator Moor recently as a reading-room and library for Cleator Moor. The windows are stone mullioned, and the apex above the main entrance is supported by four pillars of Shap granite. There are two entrances. The internal accommodation includes a general reading-room, a lending department, a reference or ladies' room, hall, library, office, and lavatory. The building is heated by an American radiator in a cellar underneath. The erection and furnishing of the building has cost between 1,900l. and 2,000l. Mr. E. M. Martindale, Workington, was the architect, and the contractor was Mr. R. Pearson, Cleator Moor, by whom the mason work was undertaken, the sub-contractors being:—Mr. J. Martindale, Cleator Moor, for the joiner work; Mr. J. Sumpton, Cleator Moor, for the plumbing; Mr. R. Gammon, Whitehaven, for the plastering; Mr. T. Mandie, Maryport, for the slating; Mr. Douglas, Egremont, for the painting and decorating; and Mr. H. Skidmore, Workington, for the heating.

THE LONDON COUNTY COUNCIL.

The usual weekly meeting of the London County Council was held on Tuesday in the County Hall, Spring-gardens, S.W., Alderman Spicer, Chairman, presiding.

Loans.—On the recommendation of the Finance Committee, it was agreed to lend Woolwich Borough Council 1,950*l.* for electric lighting; and St. Pancras Borough Council 2,500*l.* for street improvement.

Avery Hill: Nursery for Trees.—The Parks and Open Spaces Committee recommended:—

(a) That the special estimate of expenditure on maintenance account of 350*l.* submitted by the Finance Committee on account of the cost of the establishment of a nursery for trees and shrubs at Avery-hill be approved.

(b) That about six acres of land adjoining the present nursery at Avery-hill be appropriated for the purposes of a nursery for trees and shrubs; that expenditure not exceeding 350*l.* be sanctioned in connection with the trenching and preparation of the ground; and that the Parks and Open Spaces Committee be authorised to execute the work by the direct employment of labour under standing order No. A 167.

An amendment to refer the matter back was carried after discussion.

Tenders, and the Works Committee.—On the reception of the report of the Education Committee, Mr. R. A. Robinson asked a question as to the tenders for Dawes-road secondary school, Fulham.* He wished to know whether the work for the erection of the school had been offered to the Works Department, and whether the Committee had declined the work? The amount of Messrs. Patrick's tender was 26,139*l.*, and the amount of the architect's estimate was 32,006*l.*, and if the Works Committee had been offered the work and had accepted it at the architect's estimate, they would perhaps have been able to show a profit of a couple of thousand pounds; as it was the contractor was going to do the work for nearly 6,000*l.* less than the estimate.

Mr. Shephard, Chairman of the Committee, said the work had not been offered to the Works Committee, and he thought a mistake had been made, as no doubt that Committee would have made as large a profit as the contractor.

St. Paul's Cathedral.—Sir M. Beachcroft called the attention of the Chairman of the Main Drainage Committee to the reports which had appeared respecting the interference with the foundations of St. Paul's Cathedral by the proposed sewer.

Mr. Gaskill said that eighteen months ago there were communications going on between the Dean and Chapter of St. Paul's and the Chief Engineer. The Engineer was responsible for the consequences of the proposed sewer, and the architect to the cathedral was satisfied. Later on, the Dean and Chapter called in independent engineers who examined the plans, and they put forward certain requirements, and every one of those requirements were agreed to. As regards the sewer itself, it appeared from the Engineer's report that the top of the sewer was 50 ft. below the roadway, and 40 ft. below the lowest possible point of the foundations, so far as they were known. Of that 50 ft., 16 ft. was London clay, and above the clay was a certain layer of gravel which no doubt contained a certain amount of water. The foundations of the cathedral were in the loamy strata which existed above the gravel, and there was a distance, vertically, of 40 ft. between the foundations of the cathedral and the top of the sewer. The Engineer was perfectly satisfied that there was no chance whatever of any water coming through the 16 ft. of clay which would be over the sewer. It was going to be constructed under compressed air in ironwork. He was quite certain that the Main Drainage Committee and the Chief Engineer would do everything that was requisite to ensure the safety of the cathedral, and it had been stated that new circumstances had arisen since the negotiations went on between the authorities of the cathedral and the Engineer, but he knew of none. The sewer had not been commenced, and therefore, if there had been any loss to the perpendicular of the cathedral, it could not have arisen from the sewer.

Answering further questions, Mr. Gaskill said he could not say when the sewer would be commenced, as the Finance Committee advised them that they had no money to go on with.

* For full list of tenders, see our last issue, p. 618.

School Sites.—The Education Committee recommended, and it was agreed:—

(a) That estimates of expenditure on capital account amounting to 13,000*l.* submitted by the Finance Committee in respect of the acquisition of (i.) additional property adjoining the Barrow-hill road site (Marylebone, E.), as shown by tinted pink colour upon the plan, for the purpose of providing for 500 children; and (ii.) property known as the Cloudeley-road site (Islington, S.), for the purpose of erecting thereon special schools for mentally and physically defective children, be approved.

(b) That expenditure on capital account not exceeding 13,000*l.* for the purposes referred to in resolution (a), be sanctioned.

Closing Schools.—The Education Committee recommended:—

(a) That the undermentioned non-provided schools be maintained by the Council after January 6, 1907; and that the managers and the Board of Education be informed accordingly:—(i.) St. Mark's N. (E.) School, Bolton-street, East Kennington (Brixton); (ii.) Wandsworth-road (Commercial School, St. Paul's-place, Wandsworth-road (Clapham); (iii.) St. Matthew's C.E. (Mixed) School, High Hill Ferry, Upper Lupton (Hackney, N.); (iv.) Benevolent Society of St. Patrick's School, 61, Stamford-street (Lambeth, N.); (v.) St. Thomas's N. (C.E.) (Infants) School, Orchard-street, Fortnam-square (Marylebone, W.); (vi.) Our Lady R.C. School, Fortness-road, Kentish Town (St. Pancras, N.); (vii.) St. Peter's and St. Edward's R.C. School, Palace-street, Buckingham-gate (Westminster).

(b) That the St. Mary Magdalen's C.E. (Infants) School, Cirencester-street (Paddington, N.), be not maintained by the Council after February 28, 1907, and that the managers and the Board of Education be informed accordingly.

(c) That the managers of the (Clapham P. (C.E.) (Boys) School, Macanay-road (Clapham), be informed (without prejudice to the acquisition of Merton 1905, or regard to the school as unsuitable) that the work of remodelling the premises of the school shall not have been commenced by January 31, 1907, the Council will consider whether it shall not cease to maintain the school as from that date.

The recommendations were carried, after discussion.

Flood Relief Works: Erection of Pumping-station in Shad Thames, Bermondsey.—The Main Drainage Committee recommended:—

(a) That the estimate of expenditure on capital account of 21,500*l.* submitted by the Finance Committee in respect of the construction of section No. 1 of the Shad Thames pumping-station, be approved.

(b) That expenditure on capital account not exceeding 21,500*l.* be sanctioned in connection with the construction of section No. 1 of the Shad Thames pumping-station, including the cost of supervision, general incidentals, etc.; that the work be done without the intervention of a contractor; and that the drawings, specifications, quantities, and estimates of 21,500*l.* be referred to the Works Committee for that purpose.

Tramways.—The Highways Committee recommended:—

(a) That the estimate of expenditure on capital account of 190,670*l.* submitted by the Finance Committee, be approved in respect of the reconstruction, on the underground conduit system, of the electric traction of the tramways in (i.) Holloway-road, (ii.) Hackney-road, and (iii.) City-road, namely:—
Trackwork, etc. (exclusive of rails) ... £128,700
Cables, cable-ducks, overhead equipment, etc. ... 59,710
Substation machinery, plant, etc. ... 22,260
Total ... £190,670

(b) That the estimate of expenditure on capital account of 15,930*l.* submitted by the Finance Committee, be approved in respect of the reconstruction, on the overhead trolley system, of the tramways in Bow-road, from near Coburn road to Bow Bridge, namely:—
Trackwork, etc. (exclusive of rails) ... £10,800
Cables, cable-ducks, overhead equipment, etc. ... 5,130
Total ... £15,930

(c) That the estimates of expenditure on capital account of 15,000*l.* and 6,000*l.*, submitted by the Finance Committee, be approved in respect of the reconstruction of the bridges (i.) along the route of the tramways in Holloway-road, and (ii.) over Regent's Canal in City-road.

That the estimate of expenditure on capital account of 45,000*l.* submitted by the Finance Committee, be approved in respect of the provision of rails and other track materials, required in connection with the reconstruction of the electric traction of certain existing or authorised tramways proposed to be undertaken in the near future.

That the estimate of expenditure on capital account of 7,523*l.* submitted by the Finance Committee, be approved in respect of the rebuilding of the bridge carrying Hampsstead-road over the London and North-Western Railway, in connection with the reconstruction of the tramways along that thoroughfare.

That the Highways Committee be authorised to communicate with the Board of Trade and the several road authorities concerned with a view to the adoption of the undermentioned tramways of the systems of electric traction indicated below:—(i.) New lines authorised by the London County Council (Tramways and Improvements) Act, 1901, from the existing tramways in Tooting High-street, via Merton-road, to a point opposite Longley-road (conduit system); (ii.) New lines authorised by the London County Council (Tramways and Improvements) Act, 1906, from the existing tramways in Tooting High-street, via Mitcham-road, to county boundary at Tooting Junction Railway Station (conduit system); (iii.) Existing lines in South-street and Lewisham-

road, between Greenwich-road and the Obelisk, Lewisham (conduit system); (iv.) Existing lines in Pentonville-road between "The Angel" and Islington, and Gray's Inn-road from Theobald's-road to Pentonville-road (both conduit systems); (v.) Existing lines in Gray's Inn-road from Theobald's-road to Pancras-road (conduit system); (vi.) Existing lines in Pentonville-road between the Coway-road and the Caledonian-road (overhead system).

That the offer of the Battersea Metropolitan Borough Council to make the trial trenches, situated in connection with the proposed reconstruction, required in connection with the electric traction of the portion of the Nine Elms-lane, East-hill, Wandsworth, tramways, affixed in the Metropolitan Borough of Battersea, be accepted, and that the Council be authorised to execute to any necessary documents in connection with the matter.

Theatres, etc.—On the recommendation of the Theatres and Music-halls Committee, the following proposals were agreed to:—

"Electric heaters at the Comedy Theatre, Paton-street (Charing Cross, West End, and City Electricity Supply Company).

Additional floor to the dressing-room block at the new theatre in course of erection in Shaftesbury-avenue and Rupert-street (Mr. W. G. B. Sprague). An additional dressing-room to be constructed at the new theatre in course of erection in Shaftesbury-avenue and Wardour-street (Mr. W. G. B. Sprague).

Reconstruction of the stage at the Playhouse, Newmarket-road (Messrs. Bow & Billery).

Additions at the rear of St. Luke's Parochial Hall, Ramden-road, Balham (Messrs. Bow & Billery). The isolation of the main electric supplies, fuses, etc., fixed to the walls of the pit lavatory at the Tivoli Music-hall, Strand (Mr. G. H. Dyball).

Fatal Fire at No. 134, Bermondsey-street.—The Building Act Committee reported as follows:—

A disastrous fire, which resulted in three persons losing their lives and another being injured, took place at No. 134, Bermondsey-street, on the night of November 16, 1906. The building was of the ordinary type, and consisted of a ground floor, used as a shop, and two upper floors. The means of escape from the building were as follows:—The ground floor, delivering into the shop, and external stone stairs from the first floor to the yard at the back of the building. There was, in addition, a trap door leading from the shop, giving access to a trap door leading to the roof. The fire originated in the shop and travelled up the interior staircase, which quickly became smoke-logged, and was ultimately entirely destroyed, together with the ladder leading to the trap door. The four inmates slept on the second floor. Near the three women who occupied it. Unfortunately, he appears to have left the door of the room open, thus allowing the smoke from the burning staircase to fill the room. The only person who escaped, together with the women, jumped from the window, and was injured. The man was taken out of the window by a fireman, but was so seriously injured that he died shortly after his admission into a hospital. The two remaining women were found dead in the room. No attempt appears to have been made to utilise the means of escape provided over the roof, but this was no doubt due to the smoke-logged condition of the landing and the awkward position of the trap door.

Perhaps, having regard to the fact that, though the staircase was entirely destroyed, the floors of the rooms were comparatively little damaged, the most important lesson taught by the fire is the absolute necessity for some means of preventing the escape of smoke through all parts of a burning building. Experience has shown very clearly that such means of escape and methods of restricting the dangerous area to narrow limits are required for thought or manipulation at the crucial moment by those in danger, are rarely of material use, and it is therefore necessary that the means of escape, etc., provided, shall as far as possible be such as to be available at all times, and cannot be dismantled or lost sight of. In the present instance it is probable that, had the second floor landing been separated from the staircase by a screen and a self-closing door, the landing would have been practically free from smoke and, had the trap door and ladder been arranged as required by sect. 12 of the London Building Acts (Amendment) Act, 1905, it would then have been possible for all the inmates to have escaped through the roof without difficulty.

The case is a strong proof of the necessity for the provision in buildings of this class of, at the least, such means of escape in case of fire as can now be required under the London Building Acts (Amendment) Act, 1905.

New County Hall: Designs.—The Establishment Committee reported:—

"On July 31, 1906, the Council agreed to our suggestion that there should be a competition for designs for the new county hall, and that the competition should be divided into two stages:—(a) the preliminary; (b) the final; the preliminary stage to be open to architects of any nationality, and that designs shall be selected in private by assessors. The final stage to be open to (i.) the authors of the designs selected by the assessors in the preliminary stage, and (ii.) not exceeding eight leading architects to be invited by the Council to send in designs before the expiry of the period within which designs must be sent in for the preliminary competition. With regard to the requirement mentioned in (ii.) that the eight selected architects shall send in their designs before the expiry of the period within which designs must be sent in for the preliminary competition, it has been represented to us that it will be hardly practicable for the architects in question, having regard to other calls on their time, to do justice to their designs if they are required to lodge them within the period fixed for the preliminary stage of the competition. We accordingly recommend that the outlines of the competition for designs for the new county hall do provide that the eight selected architects invited by the Council

to send in designs in the final stage of the competition be not required to lodge their designs with the Council until the date fixed for the delivery of the designs in the final stage of the competition."

The consideration of the matter was adjourned.

Electric Lighting in Oxford-street: Position of Lamp Standards.—The Highways Committee recommended:—

"That the Council do, having regard to the powers residing in it under sect. 144 of the Metropolitan Management Act, 1855, protest against the action of the St. Marylebone Metropolitan Borough Council in placing lamp standards in the centre of Oxford-street; and that it be referred to the Highways Committee to consider and report as to the advisability of the Council promoting legislation in the session of Parliament of 1908 to confer powers upon the Council to deal with cases of obstruction to traffic by the erection of obstacles in the carriageway."

Housing.—The Housing of the Working Classes Committee recommended:—

"That the Council do acquiesce in the proposal of the Local Government Board to dispense with the obligation under the London (Providence-Place, Poplar) Improvement Scheme, 1901, to erect new dwellings for the accommodation of 400 persons; and to allow the Council to demolish forthwith the buildings now standing on the area."

The Council, having transacted other business, adjourned.

APPLICATIONS UNDER THE 1894 BUILDING ACT.

The London County Council at their meeting on Tuesday dealt with the following applications under the London Building Act, 1894. The names of applicants are given between parentheses:—

Lines of Frontage and Projections.

Bow and Bromley.—The re-erection of St. Michael's Hall, Ullin-street, Bromley (Messrs. J. E. K. and J. P. Cutts for the Rev. G. R. P. Preston).—Consent.

Brixton.—Buildings on the site of Nos. 166 to 174, Acre-lane, Brixton (Messrs. F. J. Eedle & Meyers for Mr. A. T. Jones).—Consent.

City of London.—A projecting pilaster in front of No. 93, Great Tower-street, City (Messrs. Lyne & Son for Messrs. Manfield & Sons).—Consent.

Wandsworth.—Bay windows to three houses on the southern side of Upper Richmond-road, Putney (Mr. E. J. Partridge).—Consent.

Battersea.—A one-story shop in front of No. 399, Battersea-park-road, Battersea, to abut also upon Culvert-road (Messrs. J. A. J. Woodward & Sons for Mr. E. H. Disney).—Refused.

Width of Way.

Hackney, North.—Water closets and the retention of a forecourt fence wall at the Kingsland secondary school for girls, Colvestone-crescent, Hackney, at less than the prescribed distance from the centre of the roadway of Birkbeck-road (Mr. T. J. Bailey for the Education Committee of the Council).—Consent.

Hammermith.—That the Council do accede to the request of Mr. A. Blackford for permission to retain a boundary fence on the northern side of a footway leading from Bridge-avenue to Malabar, Hammermith, at less than the prescribed distance from the centre of the footway.—Consent.

Width of Way and Lines of Frontage.

Levisham.—The retention of a one-story addition at the rear of No. 231, High-road, Lee (Mr. A. Young for the Improvements Committee of the Council).—Consent.

Islington, East.—A one-story shop in front of No. 1, Hamilton-road, Highbury (Messrs. H. A. Geyor & Co.).—Refused.

Lines of Frontage and Space at Rear.

Wandsworth.—Buildings on the western side of Allfarthing-lane, Wandsworth, southward of St. Ann's-hill (Mr. J. C. Radford for Mr. C. S. Merrett).—Consent.

Conversion of Buildings.

Wandsworth.—The conversion of premises on the north-eastern side of Shrubbery-lane, Wandsworth, eastward of No. 99, Streatham High-road, into shops and dwelling-houses, and a modification of the provisions of section 41 of the Act, so far as relates to the open space at the rear of the said premises (Mr. E. L. Schneider for Mr. W. Wallis).—Consent.

Open Spaces about Buildings.

Hammermith.—Re-erection of stabling with a working-class dwelling over upon a site approached from the southern side of Gayford-road, Hammermith (Mr. J. J. Kelf for Mr. D. Blackwell).—Consent.

Height of Buildings.

Clapham.—Additions to the Bolingbroke Hospital, Bolingbroke-grove, Wandsworth common, with portion of the administration block to exceed in height the width of Wakehurst-road upon which it abuts (Messrs. Young & Hall for the Committee of the Hospital).—Consent.

Formation of Streets.

Woolwich.—A deviation from the plan approved for the formation or laying out of a street for carriage traffic to lead from Clay-lane to Ennis-road, Plumstead-common-road, so far as relates to an alteration in the position of the widening of Clay-lane southward of the said new street (Mr. J. O. Cook).—Consent.

Architectural Societies.

ARCHITECTURAL ASSOCIATION DISCUSSION SECTION.—At the last meeting, on the 22nd ult., two papers were read on the question, "Do Architects Justify Their Existence?" by Mr. Ibberson and Mr. Hadaway, the latter representing the Junior Art Workers' Guild. Mr. Ibberson read an amusing paper, including an imaginary letter from a client of the typical kind, intended to show that his architect knew nothing at all and had let him in for a formidable bill of extras. Mr. Ibberson's conclusion was that Registration had become a necessity; that other professions saw that those who entered them were properly qualified. Mr. Hadaway's paper was the old story, that an architect did not make the building with his own hands, and therefore it could not be a work of art, and the architect could not be an artist. Naturally this kind of view received pretty sharp criticism from some of the members, Mr. F. S. Murray and Mr. Theodore Fyfe among others.

LEEDS AND YORKSHIRE ARCHITECTURAL SOCIETY.—The annual social gathering of the Leeds and Yorkshire Architectural Society was held at the Queen's Hotel, Leeds, on the 22nd ult. The evening was largely given over to a musical entertainment, which followed the address of the President (Mr. H. S. Chorley, of Leeds). It also fell to Mr. Chorley's lot to distribute prizes awarded to students of the Society during the past twelve months. One of the most successful was Mr. W. P. Rylatt, who won prizes (1) for a measured drawing of Methley Church, (2) for sketching, and (3) for construction. To Mr. Carnely were awarded a special prize for a measured drawing of Methley Church, and the first prize for designs; while Mr. W. Whitehead won the second prize for designs, the essay prize, and the Halden prize. Mr. H. S. Chorley, in his Presidential address, touched upon the Selby Abbey fire, expressing gratification at the prospect of the fine old building being restored to its original beauty. He hoped that Mr. Oldrid Scott, who had the work of restoration in hand, would be able not only to rebuild the burned out portions, but also to carry out the other works contemplated in connexion with the tower and south transept. The fire, proceeded the President, had demonstrated the danger of timber roofs, and raised the question whether it was possible to put fire-proof vaulted roofs in Gothic churches. The stability of such places as the Pantheon and the Basilica of Constantine at Rome was due to the fact that their roofs were made of imperishable materials, which could not be destroyed by fire or ruined by man's neglect. Another question worthy of discussion was the proper preservation of our ancient monuments. Mr. Chorley mentioned in this connexion that almost everywhere on the Continent the initiative had been taken by the State, while in this country the work had been carried out largely by private enterprise. Continental Governments had established State Commissions to look after their national treasures. In England it must be said, of course, that so far as the work of actual restoration was concerned, the care of old buildings compared favourably with the work done elsewhere. In Europe many buildings had not been restored so much as rebuilt, and the State in its desire to preserve had ruined many fine monuments. The same complaint had been made occasionally in regard to this country, but, generally speaking, he believed that restoration of buildings had been carried out with greater love and care than was shown on the Continent. But in other matters connected with the preservation of ancient monuments

* It was in fact waste of time to discuss it at all. This kind of claim on the part of craftsmen who can see nothing but detail, and most of whom do not even know what the requirements of a great building are, has been answered, and its absurdity exposed, over and over again.—Ed.

this country lagged behind. It was necessary, proceeded the speaker, that there should be a system of surveying and cataloguing to obtain a complete knowledge of all the architectural treasures the country possessed. Full insurance against fire should be insisted upon in every case, and an inspector of ancient monuments should be appointed. He also added that advertisement hoardings in close proximity to these architectural gems should be prohibited. It was indeed evident, he concluded, that there was a real necessity for Government action in many directions. The President also referred to the garden-city movement, and urged architects to interest themselves in the housing question and take their proper place in any reforming movement, so as not to allow the matter to drift into the hands of the builder alone. He said there was a growing necessity for the registration of architects, and in regard to the work of the Society, he hoped next year to revive the sketching club, which had been a useful section of their organisation in the past. He was cordially thanked for his address, on the motion of Mr. Sydney Kitson, seconded by Mr. Butler Wilson, and supported by Mr. F. E. P. Edwards.

Archæological Societies.

BRITISH ARCHÆOLOGICAL ASSOCIATION.—The opening meeting of the session 1906-07 was held on Wednesday, November 21, at 32, Sackville-street, at 8.30, Mr. C. J. Williams in the chair. There were exhibited by Mr. R. H. Forster numerous photographs of the excavations recently conducted at Corstopitum, the most noteworthy being of the remains of the heating arrangements of a house in the south-west corner of the city, and of two large arch stones built into a wall of late Roman date. Some fragments of earthenware, exhibited by Mr. Bush, from the Bath neighbourhood, were examined with care, as it was hoped that there might be fragments of Roman origin among them, but Mr. Gould, after examining the whole of the pieces, pronounced them to be of late Norman or early mediæval date. A collection of Neolithic flint implements, chiefly from Sussex, gathered during the summer, was exhibited by Mr. Clift, who explained that, while there was nothing particularly noteworthy among the specimens, yet several of them came from sites that had not been noted before, and which it was his intention carefully to investigate as the opportunities occurred. Mr. Clift pointed out the chief characteristics of the specimens, and briefly described the features by which an artificial flake could be distinguished from a purely natural one, illustrating his remarks by actual examples. The chief items in the collection were a series of nine scrapers, neatly chipped to a semicircular cutting edge; a small knife, the cutting edge of which had every appearance of grinding; an adze-shaped implement from Cissbury; and two or three partly-worked spear and arrow heads; one especially being interesting as there was no apparent reason for its being discarded, the "wasters" usually found having developed some defect during the process of manufacture. Mr. R. H. Forster then read an account of the Roman wall pilgrimage, undertaken this year by the Society of Antiquaries, Newcastle-on-Tyne, in conjunction with the Cumberland and Westmorland Antiquarian and Archæological Society, communicated by Mr. R. Oliver Heslop, M.A., F.S.A., of Newcastle-on-Tyne. The pilgrimage began on June 23, at Wallsend, where a bronze plate marks the spot at which the extremity of the wall touched the river. On Monday, June 25, the party travelled westward from Newcastle, visiting Benwell (Condercum), where the foundations of a *sacellum* are to be seen; Ruthchester (Vindobala), Halton Chesters (Hunnum), and St. Oswalds, the traditional site of the battle of Heavenfield, the journey terminating at the eastern abutment of the Roman bridge over the North Tyne. On the following day the museum and camp at Walwick Chesters (*Uxunum*) were inspected, under the guidance of Dr. Hodgkin, and the westward journey was resumed in unfavourable weather. At Limestone Bank the fosses of murus and vallum, cut through the hard basalt, were seen, and the route was continued to Housesteads (Borovicus), where

the camp was described by Mr. J. P. Gibson, who advanced the theory that it was planned during an advance of the Roman forces from west to east, since the prætorium faces the street leading to the eastern gate. On the fourth day the "pilgrims" traversed the long stretch of crags from Hotbank to Greenstead, passing over Winshields, 1,230 ft. above the sea, the highest point of the wall, and the Nine Nicks of Thirlwell. Cawfields milecastle was visited, and also the neighbouring turret, recently laid bare by Mr. Percival Ross; the large unexplored camp on the Stanegate to the south of Cawfields was also noticed. Great Chesters (Æsica) was then reached, and particular attention was paid to the west gate, where the traces of catastrophe and subsequent reoccupation are plainly seen. Caerboran (*Vogon*) was next visited, and the party then descended to Thirlwell Castle, a mediæval hold built entirely of Roman stones, the journey ending at Gilsland, where a considerable length of the wall is to be seen in the vicarage garden. On the fifth day Birdoswald (Amboglanna) was visited, and a careful examination was made of the extra line of defence which appears between the wall and vallum at this point only. At Appletree, a little to the west, a fresh cutting was made through this extra mound, and the section was found to be practically identical with typical sections of the Antonine turf wall, except that the footing course of stones does not appear here. Mr. and Mrs. T. H. Hodgson have proved that the fosse in front of this turf wall originally ran through Amboglanna, and there is little doubt that here are the relics of a caespitius wall earlier than the stone murus, the builders of the latter having used the ditch of the turf wall everywhere except at this point, where it was found necessary to carry the stone wall further to the north. It is possible that the turf wall is the work of Hadrian, and the murus may be ascribed to Severus. This examination was the most remarkable feature of the pilgrimage, as it is only from a fresh cutting that the marks of caespitius building can be clearly seen. Further to the west a piece of the wall was seen at Hare Hill, in which thirteen courses of facing stones have been replaced on the original core. The day concluded with visits to Lanercost Priory and Naworth Castle. On the sixth day the journey was continued to Carlisle, Mr. and Mrs. Hodgson acting as guides, and pointing out the results of the careful excavations they have made in this section of the wall. The stations at Castlesteads and Stanwix were visited, and in the afternoon the Roman collection at Tullie House Museum, Carlisle, was examined. The seventh and last day was devoted to the journey from Carlisle to Bowness-on-Solway, the western terminus of the wall, the entire length of which, 72½ miles, was thus traversed in the course of the "pilgrimage." A fine series of photographs, showing points of interest along the wall, was shown by Mr. R. H. Forster, and the meeting terminated with a vote of thanks to Mr. Bush, Mr. Forster, and Mr. Clift for their exhibits, and to Mr. Heslop for his notes on the "Pilgrimage."

Books.

Party-walls and the Rights and Liabilities of Adjoining Owners in Relation Thereto at Common Law and Under the London Building Act, 1894. By A. R. RUDALL, Barrister-at-Law. (London: Jordan & Sons, Ltd. 1907.)

A HANDY and well-printed book on the subject of party-walls was unquestionably needed, and we think that this work by Mr. Rudall will prove useful, not only to lawyers, but also to architects and surveyors. It may be desirable to state shortly the subject of the book, because the word party-wall is often used in a peculiar and rather loose sense. There are four kinds:—One when the adjoining owners are tenants in common—and this is, strictly speaking, a true party-wall. Next is a wall of which two owners own a separate half. Then comes a hybrid party-wall which belongs to the owner, but which is subject to an easement to have it maintained as a dividing wall. Lastly, there is a wall divided into two halves, each moiety being subject to a cross easement.

As regards the treatment of the subject, it is clear and sensible, though the law might have been more scientifically and precisely stated. A primary principle, for example, is sometimes given a secondary position, as in this sentence:—"The proprietor paring away or pulling down his moiety of the party-wall is not bound, it seems, to shore up his neighbour's moiety, but he must, however, use reasonable and ordinary care so as not to cause needless damage to his neighbour's moiety, and should, before commencing his work, give notice of his intention." Here the main proposition is that the owner of a moiety must use reasonable care in doing work to such moiety only, therefore he is not bound to shore up his neighbour's half, but he should give notice, etc. Anyone who reads the above quotation will see that, though the law is stated accurately, it is stated unscientifically. This fault, however, does not materially lessen the value of the book, and it is one which can be remedied by revision in future editions.

Modern Suburban Houses. By C. H. B. QUENNEL. (London: B. T. Batsford. 1906.)

THE subject of speculative domestic design in its relation to the art of architecture has of late occupied the more than usual attention of architects and the public, compared with other spheres of current building activity. But London cannot be said to present anything new of widespread importance in what may be considered good estate development. The London County Council has produced admirable work in artisan's cottages, and there is much private enterprise in large houses; but little has been accomplished in the nature of progress with the smaller house since Bedford Park first aroused so much interest.

Signs of a revival are here and there present. The book before us is a collection of plans and photographic views of small, middle-class houses, erected chiefly on a newly developed estate at Hampstead, from Mr. C. H. B. Quennell's designs, and should prove a timely work in directing similar prospective enterprises, not to mention the educating of public taste.

There is a commendable simplicity and directness of design and a practical regard to comfort in the arrangement of these houses, lending to the whole aspect of the work an air of distinction; and the fact that the dwellings have all been sold to individual purchasers proves that the public is ready to recognise work in good taste, well built. We can only hope that the good seed will spring up in other places.

The book, however, lacks force in having no estate plan, so that the subjects of illustration are presented for isolated consideration. The compass points are omitted from the plans of the houses, and somewhat discounts a critical study of the designs, each of which appears to have been schemed for its particular surroundings. We cannot imagine, therefore, that the plans are intended to be reversed to suit corresponding positions on the opposite side of the roads.

The houses are, generally speaking, "semi-detached" and uniform in size. Lighting and ventilation are well considered and much attention has been given to interior effects. The only blemishes, so far as the plans indicate, are the unusually prominent positions given to the doors of most of the ground floor sanitary arrangements. Chances of screening these approaches are missed, and undue publicity results in placing them in important parts of halls. Another, but less serious, matter is the questionable position of kitchen fireplaces in relation to the sources of light. The lack of interest in most of the side and back elevations is also a matter of some concern. A few discrepancies in plans and views lend to the work an air of haste, but the book resolves itself into a useful record of a welcome advance in estate development.

Crematoria in Great Britain and Abroad. By ALBERT C. FREEMAN. (London: St. Bride's Press, Ltd.)

THIS work, dealing with the design of crematoria, is probably the first of its kind, and, although the practice of cremation is yet in its infancy, the book will be of considerable

value in assisting what is in every way a desirable change in human customs.

The subject is introduced in the opening chapters in an interesting review of the general processes of cremation existing in various nations, and with it is combined a discourse upon the sentiments involved. The dangers arising from the old system of burial are emphasised by numerous instances of air and water pollution, and the author points out the imperative necessity of subjecting all deaths from disease to the new process. The history of modern cremation is next considered, and the progress of the movement in face of much official opposition and popular prejudice is well presented.

The system of incineration is described, and many interesting facts are stated upon the chemical changes which take place in the cremating process. Practical hints are given upon the planning, together with general dimensions applicable to particular types of furnaces employed.

Many illustrations of British and foreign crematoria, together with plans and sections, are dispersed throughout the work, while the author contributes some of his own designs. Here is a distinctly new purpose, necessitating a fresh type of building; but it is curious to see familiar forms utilised in the same way that the early railway carriage resembled the stage coach. Thus, in England, the favourite idea is to reproduce a Gothic chapel, whereof the bell-tower does service for the chimney shaft. Tradition, however, is less observed in Continental and American designs, where a classic form appears the only desirable treatment for a solemn yet beautiful ceremony.

Symmetrical Masonry Arches. By MALVERD A. HOWE, M.Am.Soc.C.E., Professor of Civil Engineering, Rose Polytechnic Institute. (New York: John Wiley & Sons. London: Chapman & Hall. 1906.)

PROFESSOR HOWE has already written a complete and excellent treatise on "Arches," in which numerous formulae are given suitable for the design of masonry and other arches in accordance with the elastic theory. In the present volume formulae and methods are presented of more simple and less precise character, but sufficiently exact for arches built of materials such as stone, concrete, and reinforced concrete. Chapter III., which occupies the greater portion of the book, is devoted to examples illustrating the application of the formulae to two arches (1) a railway bridge, with a granite arch ring, having a span of 60 ft. and the rise of 3 ft.; and (2) a reinforced concrete arch rib, with the span of 50 ft. and the rise of 10 ft. A third example in the same chapter contains a simple solution of the formulae for the horizontal thrusts and bending moments at the supports for the rib selected as the second example. Up to the end of Chapter III. the treatment is chiefly mathematical, and specially addressed to engineers and others having to deal with arch design in a rigorously scientific manner. Practical details receive very little attention, except in Chapter IV., where particulars of a few typical arches are given, and in the Appendix, which includes a table of data for about 500 arch bridges, ranging from 26-ft. to 295-ft. span. This table is of considerable value to designers who desire to be guided by precedent, as well as for preliminary calculations and estimates.

Commercial Dry Docks. By J. MITCHELL MONCRIEFF, M.Inst.C.E. (Andrew Reid & Co., Newcastle-on-Tyne. 1906.)

THIS is a pamphlet containing a paper read by Mr. Moncrieff before the North-East Coast Institute of Engineers and Shipbuilders, and the ensuing discussion of the subject by engineers and others interested in the construction of docks as owners and shipbuilders. In one important respect is far more useful to practical men than papers simply describing in general terms individual work executed. Mr. Moncrieff is an engineer who has had particularly valuable experience in the department of work with which he deals in this paper, and by setting forth his views on the essential points to be considered before and during the design and building of dry docks he has provided a very useful and interesting little treatise.

As the author remarks, it is the fact that the character of the subsoil has great influence upon the design and cost of a dock. The point is well illustrated by general cross-sections of four among numerous other docks in the construction of which Mr. Moncrieff has been concerned. In all these the methods of carrying out the work were essentially different, and it should be noted that the mode of construction adopted for the first three would have led to disaster if applied to the fourth. Having dealt with the main features of design, the author discusses and illustrates various details, such as sluices, gates, and culverts.

Some remarks upon concrete are of special interest, although they only apply in limited measure to the employment of that material to building work. During the last twenty years the action of sea-water upon Portland cement has been made very evident to marine engineers. Recognising the fact that its influence is to cause "the gradual swelling of the mortar and consequent disintegration of the concrete," Mr. Moncrieff is nevertheless convinced that if the concrete is proportioned so as to prevent percolation and made with really reliable cement there is no reason for fearing injury from salt-water. It is also necessary, as he points out, that the work should be carried out on regular horizontal and vertical lines, all beds being quite level and flat, and care taken to insure the monolithic connexion of the courses one with another. If these points had been duly appreciated in former days we should have been spared many instances of disastrous failure in marine works largely composed of concrete.

In view of the numerous drawings reproduced as illustrations, and the consensus of opinion to be found in the paper and the discussion thereon, this pamphlet possesses much technical value, which will doubtless be recognised by professional men, as well as by students of civil engineering.

The Law relating to the Compulsory Taking of Land by Public Companies and Local Authorities. By THOMAS WAGBORN, Barrister-at-Law. Second Edition. (London: Effingham Wilson. 1906.)

THE first edition of this little handbook appeared in 1904, therefore the appearance of a second edition at so short an interval of time shows that it has been appreciated by the public. In the preface to the present edition the author explains that no change has taken place in the principles which govern the law of compensation, and he has appended a digest containing the recent cases, arranged under alphabetical headings according to subject-matter. This is not wholly convenient, as the reader would prefer the incorporation of these cases in the text, and an alphabetical list of the cases cited throughout the work would also, we think, be useful in future editions. To deal with a subject of such complexity for laymen and in such small compass is not an easy task, and too much cannot be expected in a handbook of some 122 pages; but, in some cases, the text is a little obscure. An instance of this occurs at p. 8, where quotation is made from a judgment of Lord Westbury, but it is not clear in what case the judgment was delivered; nor does it appear very relevant to the heading under which it is inserted.

The layman, however, is very ill-advised who attempts to rely on his own knowledge when confronted with questions relating to the compulsory acquisition of his property, and this handbook will readily inform him of sufficient first principles until he has recourse to expert advice.

The Encyclopedia of Practical Engineering and Allied Trades. Edited by JOSEPH G. HORNER, A.M.I.Mech.E. Vol. IV. (London: Virtue & Co.)

IN this volume a good many subjects are included of direct interest to architects and civil engineers, in addition to those which appeal more particularly to mechanical and electrical engineers. For instance, under the titles of "Clark's Process" and "Feed Waters," the principles of water softening are briefly stated, and a large amount of useful information is conveyed under other headings relative to patterns for cast-iron columns,

concrete blocks, and concrete mixers, cranes of various types, dams, refuse destructors, diving plant, dock caissons and gates, appliances for making drawings, dredging and excavating plant, fuel economisers, numerous applications of electricity in connexion with structural work, expanded steel manufacture, factory design, ventilating fans, and other apparatus and branches of work too numerous for specific mention. The present issue fully justifies the promise of the earlier volumes already noticed in our columns; the subject-matter is well selected and judiciously treated, and the illustrations are excellent, especially those reproduced from mechanical drawings.

Elementary Science Applied to Sanitation and Plumbers' Work. By A. HERRING-SHAW, R.P.C. (The Artistic Printing Company, Manchester. 1906.)

IN compiling this book the author had in view the needs of students preparing for sanitary examinations. He has collected a series of facts concerning geometry, physics, and chemistry, and demonstrated their application in a helpful manner. Those who simply wish to acquire a smattering of elementary science will certainly find the book a useful aid. On page 16, in the first paragraph relating to "Diagonal Scales," there are two evident errors in the description of Fig. 9, and we look in vain for the index—a detail that ought never to be omitted from any book that can be used for the purpose of reference.

Hetting House, now used as the Abbey Church House. By J. F. MEEHAN. (Bath: B. & J. F. Meehan. 1906.)

IN this little book the author of "Famous Houses of Bath and District" gives the interesting history, with illustrations, of the XVIIth century house in Westgate-buildings which, latterly named after one Hetting, its owner, was acquired in 1888 by the Rector of Bath, and, having been repaired, was adapted as the Abbey Church House for parish and school purposes. John Wood described Hetting House, which boasts of many famous occupants, as being "the second best house in the city." It retains many of its original features, comprising the large hall with the richly-carved stone fire-place, bearing the coat-arms of Clarke (about 1570). The foundations exhibit fragments of the Norman period, and, it appears, belong to the leper hospital founded in 1138 by Robert, Bishop of Bath. The discovery many years ago in the adjacent city ditch of early smoking-pipes stamped "E. HUNT" has, we may mention, its close parallel in London. That maker's name (and "John Hunt") marked some out of the remarkably large quantity of seemingly unused pipes found in a bricked up chamber 15 ft. below ground in the garden of a house in Took's-court taken for an extension of H.M.'s Patent Office in 1891.

BOOKS RECEIVED.

THE OLD CASTLE VENNAL OF STIRLING. By J. S. Fleming, F.S.A. (Scot.). With Introductory Chapter by John Honeyman, R.S.A. (Observer Office, Stirling.)

SCHOOL HYGIENE AND THE LAWS OF HEALTH. By Charles Porter, M.D. (Longmans, Green & Co. 3s. 6d.)

METROPOLITAN ASYLUMS BOARD.

THE usual fortnightly meeting of the Metropolitan Asylums Board was held on Saturday, North-Western Hospital.—A letter was received from the Local Government Board sanctioning the proposal to enter into a contract with Messrs. Simpson & Co. for the execution of works for the utilisation of exhaust steam at the North-Western Hospital at an estimated cost of £84. Without first advertising for tenders, but stating that the Board do not gather whether the contract for that 84. per annum will be saved by the scheme will form one of the provisions of the contract or for what period such guarantee will operate.

White Oak School.—It was agreed to sanction the execution of repairs and tar paving work at White Oak School at an estimated cost of £30.

Central Stores, etc., Peckham Rye.—The Works Committee reported upon the letter of the Local Government Board in which they stated that they

were prepared to approve the plans relating to the new central stores and needle-room which it is proposed to erect at Peckham Rye, at an estimated cost of £6,500. (exclusive of architects' commission, quantity surveyor's charges, and contingencies), but report that the managers should consider whether an appreciable saving might not be effected by putting the committee-room and clerks' office, etc., on the first floor over the mess-rooms, gate-keeper's office, and sanitary conveniences—to be approached by an outside staircase—and by omitting altogether the wing containing the committee-rooms, office, and basement. The architects reported that if the Local Government Board's suggestions were carried out, there would be a saving of about £360. The Contract Committee, who had also considered the matter, were of opinion that no alteration was desirable, as any such alteration would result in the diminished efficiency in the working of the new central stores. The Works Committee concurred in this view, and having recommended a comparatively small saving which would be effected, recommended that the Local Government Board be asked to approve of the plans as submitted to them.—The report stood over till the next meeting.

Joyce Green Hospital.—The Works Committee also reported on the letter of the Local Government Board in which they made certain suggestions in regard to the plans relating to the goods reception station, porter's lodge, and staff cottages, proposed to be erected at Joyce Green Hospital at a cost of £6,500. The Committee felt that the plans carried out what was necessary, and had directed the application to be made again to the Local Government Board for approval.

Southern Hospital.—Messrs. Treadwell & Martin, the architects, had written a letter, in which they certify that the work of erecting the several buildings forming the Southern Hospital, in accordance with the contract of September 8, 1902, had now been completed by the contractors, Messrs. W. Johnson & Co., Wandsworth Common, to their (the architects') satisfaction, and they were now prepared to hand over the buildings.

METROPOLITAN WATER BOARD.

SIR M. BEACROFT presided last week over a meeting of the Metropolitan Water Board.

Loans.—It was agreed that application be made to the Local Government Board for sanction to loans of £500,000, in respect of the construction of a storage reservoir in the Lee Valley, and of £250,000, for the construction of a reservoir at Island Barn, Molesey.

Tenders.—The Works Committee reported on the question of the publication of any tenders received for any work, and expressed the opinion that although perhaps this course was desirable from some points of view, yet they had nevertheless found it in practice very detrimental to the interests of the Board that these particulars should be published. It was agreed that in future only the tender recommended for acceptance should be reported upon.

Reconstruction of King's Arms Bridge, Southgate.—The Board confirmed the action taken by the Works Committee in arranging with Messrs. T. Dowers & Sons to reconstruct the abutments and wing walls of the King's Arms Bridge, Southgate, for 1908. £2, this sum subsequently to be repaid to the Board by the Middlesex County Council.

Honor Oak Reservoir.—Last year the tender of Messrs. Moran & Co., of £134,000, was accepted for the construction of a reservoir at Honor Oak, and the engineer now reported that at the southern end of the reservoir the outer walls approach within 30 ft. of the South-Eastern and Chatham Railway, the level of the bottom of the wall being about 57 ft. below the rail level, one side of the wall rising steeply beyond the railway to an elevation of about 150 ft. above the top of the reservoir. The whole of the surrounding subsoil is composed of light yellow clay, with sandy partings, the bottom only of the foundations of the reservoir being in the blue clay. This upper clay shows a strong tendency to slide to the southward. It was manifestly impossible to anticipate with absolute accuracy the nature of the subsoil from 20 ft. to 40 ft. below the surface, and it was only as the excavations progressed and the ground was opened up that its character was fully revealed. The engineer suggested that the reservoir should be strengthened at the southern ends by thickening the outside wall and counter forts, and carrying the latter back to the second instead of the first bay, and by adding 9 in. of brickwork to the roof, as it may be necessary to load the roof in order to hold the water down. The estimated cost of this was £5,000. The matter being serious, the Works Committee recommended that all possible steps should be taken to strengthen the reservoir, and recommended accordingly.—Replying to questions, Mr. Bernard said that trial holes and borings were made before the work was commenced, and every possible precaution was taken, but the sandy streaks ran irregularly, and

it was impossible to foresee their exact position.—The recommendation was agreed to.

Water Supplies for Building.—The Appeal Committee reported upon the judgment in the case of "Paine v. the Metropolitan Water Board," in which the High Court held that the supply of water for building purposes could not be demanded by meter. The Committee pointed out that the decision is of great importance to the Board, inasmuch as provisions similar to those of sect. 79 of the East London Act of 1853 are contained in the Acts relating to the Grand Junction, Southwark and Vauxhall, and West Middlesex Companies.

Fifty Years Ago.

FROM THE *Builder* OF NOVEMBER 29, 1856.

PROPOSED OFFICES FOR THE METROPOLITAN BOARD OF WORKS.

At a meeting of the Metropolitan Board, held on Tuesday, the 25th instant, a report was brought up from a Committee on the Site of Offices, which recommended, "That a proposal be made by the Board to the Corporation of the City of London, for taking a portion of the site of the former Fleet Prison, in Farringdon street, having a frontage of 100 ft., on a building lease, for a term of eighty years, at a rent of four guineas per foot."

Mr. Leslie objected that the report only referred to the frontage, and that there was no plan of the ground; and Mr. Hows said that to give four guineas per foot for a freehold in the City was absurd, especially while they had ground of their own, well adapted for the purpose, in Greek-street, Soho.

Various other members spoke and objected to the site, and at length the further discussion of the subject was adjourned till Friday.

Illustrations.

DESIGN FOR ST. MARTIN'S CHURCH, EPSOM

It was at first intended to build the new church a little to the east of the existing building, a poor specimen of churchwarden Gothic. The design illustrated was selected in a limited competition. Mr. Fellowes Pryme having been the assessor.

For certain reasons it has since been decided to rebuild the old church on its original site, commencing at the east end and doing the work in sections. The scheme is to be upon the general lines of the accepted design, but the arrangement of the tower will have to be modified. The church is to be vaulted throughout, the external wall faces to be of rubble masonry, with bands of thin bricks, the other dressings and traceries of freestone. The estimated cost of the

design illustrated was 14,500*l.*, exclusive of the tower and spire.

CHARLES A. NICHOLSON.

COUNTY HALL, NORTHALERTON.

This view represents the interior of the Council-chamber in the County Hall, North-alerton.

The walls and domed ceiling are covered with fibrous plaster. The dado and other woodwork is of Cuban mahogany.

Mr. Walter H. Brierley is the architect.

ITALIAN GARDEN AND ELECTRICITY SUB-STATION, DUKE-STREET, MAYFAIR.

We publish this week an illustration of the electricity sub-station, with an Italian garden on the roof, which has been erected at Duke-street, Mayfair, for the Westminster Electric Supply Corporation, Ltd.

The drawing illustrated was exhibited at the Royal Academy. The building provides accommodation for machinery of upwards of 9,000 kw. output. It was erected upon a site which was formerly covered by buildings, but which, within recent years, had been formed into a private garden by the Duke of Westminster. The Westminster Electric Supply Corporation, Ltd., had undertaken as a condition of their lease, to erect a building on the site of ornamental character, and construct the garden above the building about 9 ft. above the street. It is laid out in a formal manner, having a fountain in the centre, with seats at the back of the end pavilions, and ornamental stone seats forming part of the balustrade in the centre of each side, opposite the fountain. The interior of the building is faced with Farnley white glazed and blue Staffordshire bricks, and whole of the exterior above the ground line being faced with Portland stone.

The large entrance doors to the pavilions which give access to staircases and lifts communicating with the station itself, are of wrought iron, and of massive appearance. The semicircular openings in the side walls of the pavilions and over the doors are fitted with wrought-iron grilles. The pavement of the garden is composed of buff, red, and black tiles, laid to a simple pattern on patent asphalt sheet-lead damp course.

The engine-room is served by two hydraulic lifts, one in each pavilion, each capable of carrying a load of 20 tons. Light is obtained in the engine-room by means of semicircular openings in a clearstory all round, the stall-board lights of which are being made by the St. Pancras Ironwork Company. The motor generators are placed in the centre of the engine-room, the high tension switchboard on two galleries one above the other on one side. The high-tension supply mains bringing electrical energy from the power-station will enter at intervals on the opposite side, and the low-tension switchboard on the corre-

sponding galleries on the other. There is a subway for low-tension mains running the whole length of the building on one side. The plant is arranged in sections, and the switchboard arrangements are such that, if a breakdown should occur in any section, it will be confined to that section, and will not affect other parts of the station. An overhead travelling crane is provided to convey machinery from the lifts to any part of the engine-room. The engineers are Messrs. Kennedy & Jenkin, of Victoria-street, Westminster, who have designed the whole of the mechanical and electrical engineering arrangements.

Fresh air is introduced to the engine-room at the garden level, and the pavilions at each end serve as extract-shafts for this part of the building, as well as entrances to the station. Inlet-shafts for the lavatories and water-closets are at the pavement level, and the extract-shaft from these rooms terminates at the garden, but well away from the terrace part, which is open to persons using the garden. A public urinal is also incorporated in the scheme, the entrance to it being through the side wall, the steps descending in the pylon at the western end.

The building contractors were Messrs. Geo. Trollope & Sons, of Grosvenor-road, S.W. The architect is Mr. C. Stanley Peach.

ENGINEERING WORKS AT QUEENSFERRY.

THESE buildings have been erected for Messrs. Willans & Robinson, Ltd., at Queensferry, Flintshire. They comprise various machine, erecting, and fitting shops, steel works, power-house, metallurgists' laboratory, mess-rooms, and residence for officials. The perspective view shows the main front, towards the London and North-Western main line, of the more important workshops and the power-house. The latter contains the heavy plant necessary to supply power to the electrically-driven tools and to the hydraulic presses used in the manufacture of steel. The tower encloses the hydraulic accumulators, and supports an open cast iron water tank.

The buildings are faced with Buckley purple brindle bricks, made from the fire-clay measures of local coalfields, with dressings of hard vitrified brick specially made for the purpose from the same clay. The lintels over door and window openings are of cast-iron, designed with shaped feathers between flanges. The roof of the power-house is of steel, boarded, and slated, the other roofs are the well-known Belfast or Bowstring type. All roofs have louvred lantern lights, glazed with steel bars and patent glazing.

The piers carry the weight of roof and travelling gantries, the brick filling between is a screen wall. The form of battered piers was suggested by a consideration of the possible lateral pressure on walls due to a large area of light roofing floating on cast-iron stanchions, and by the nature of the ground, which called for shallow foundations. The spread of the piers at their base obviated the use of several courses of footings.

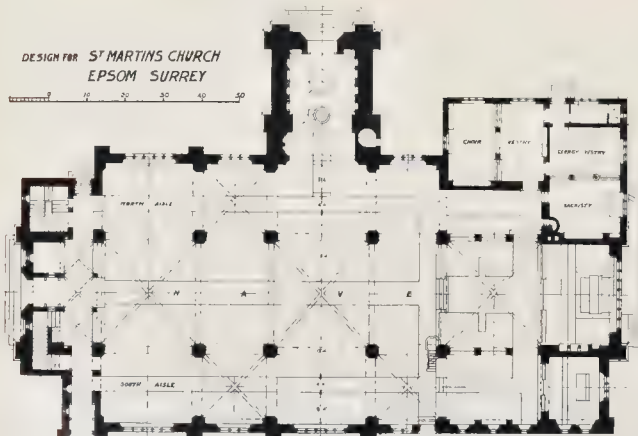
The general contractors were Messrs. Foster & Dicksee, of London and Rugby, and the architects are Messrs. Creswell & Maule, of London and Rugby.

This, and the design above it on the same plate, are interesting and rather unusual examples of the architectural treatment of erections made for practical engineering purposes.

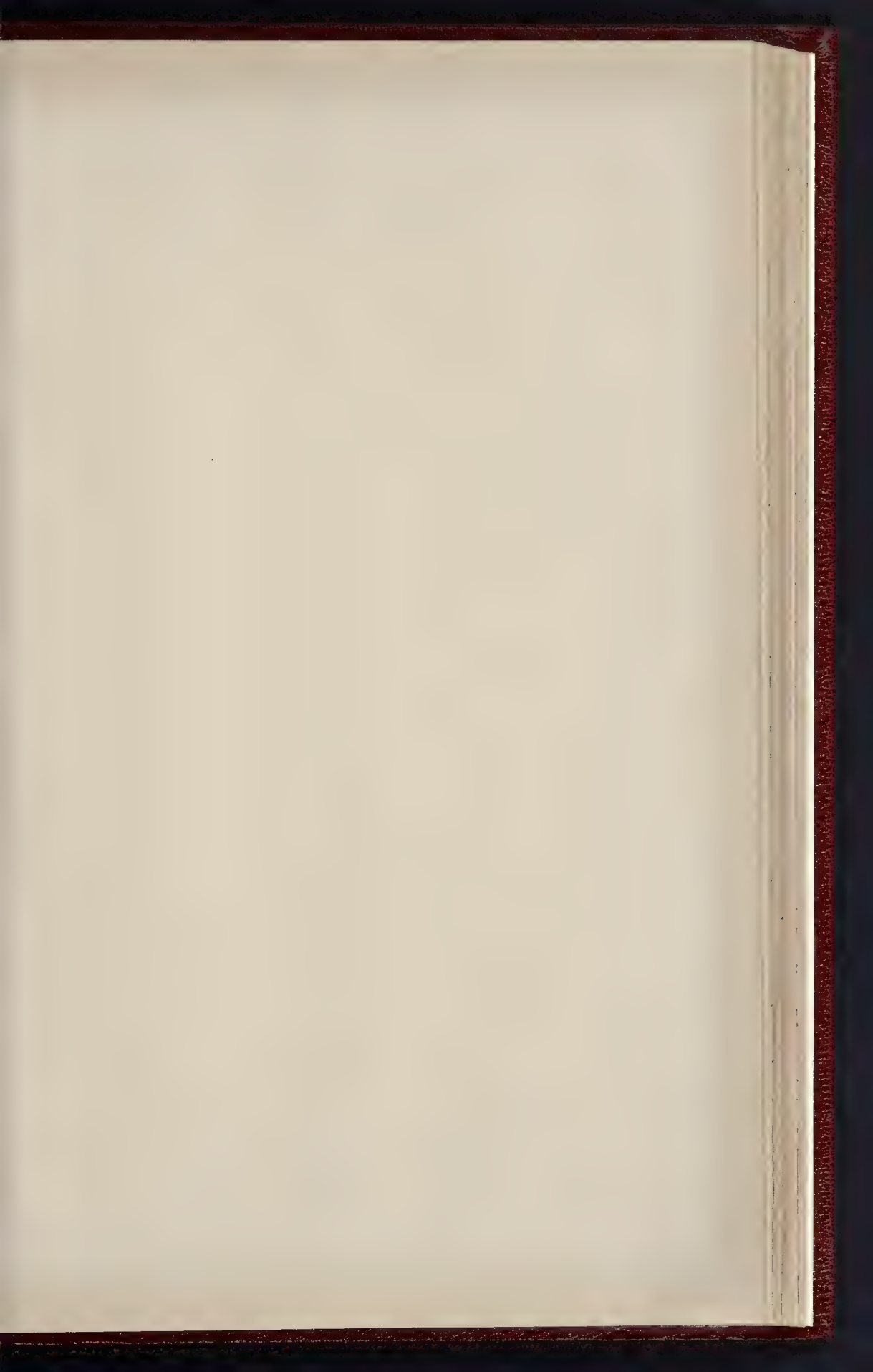
PULPIT, ALL SAINTS' CHURCH, EALING.

This pulpit, in forged iron, bronze, etc., by Mr. Nelson Dawson, stands in All Saints' Church, Ealing. It was made for Mr. W. A. Pite, the architect, and, as arranged by him, stands on a base of alabaster of different shades, the plain surface of which offers a good contrast to the detail of the pulpit itself. The iron is left grey, the bronze being dark in colour, the general character of the design being in accord with that of the building.

In the centre panel, and coming immediately under the reading-desk, is a figure of Christ, the Light of the World, in a recessed and canopied niche. The "human" side of

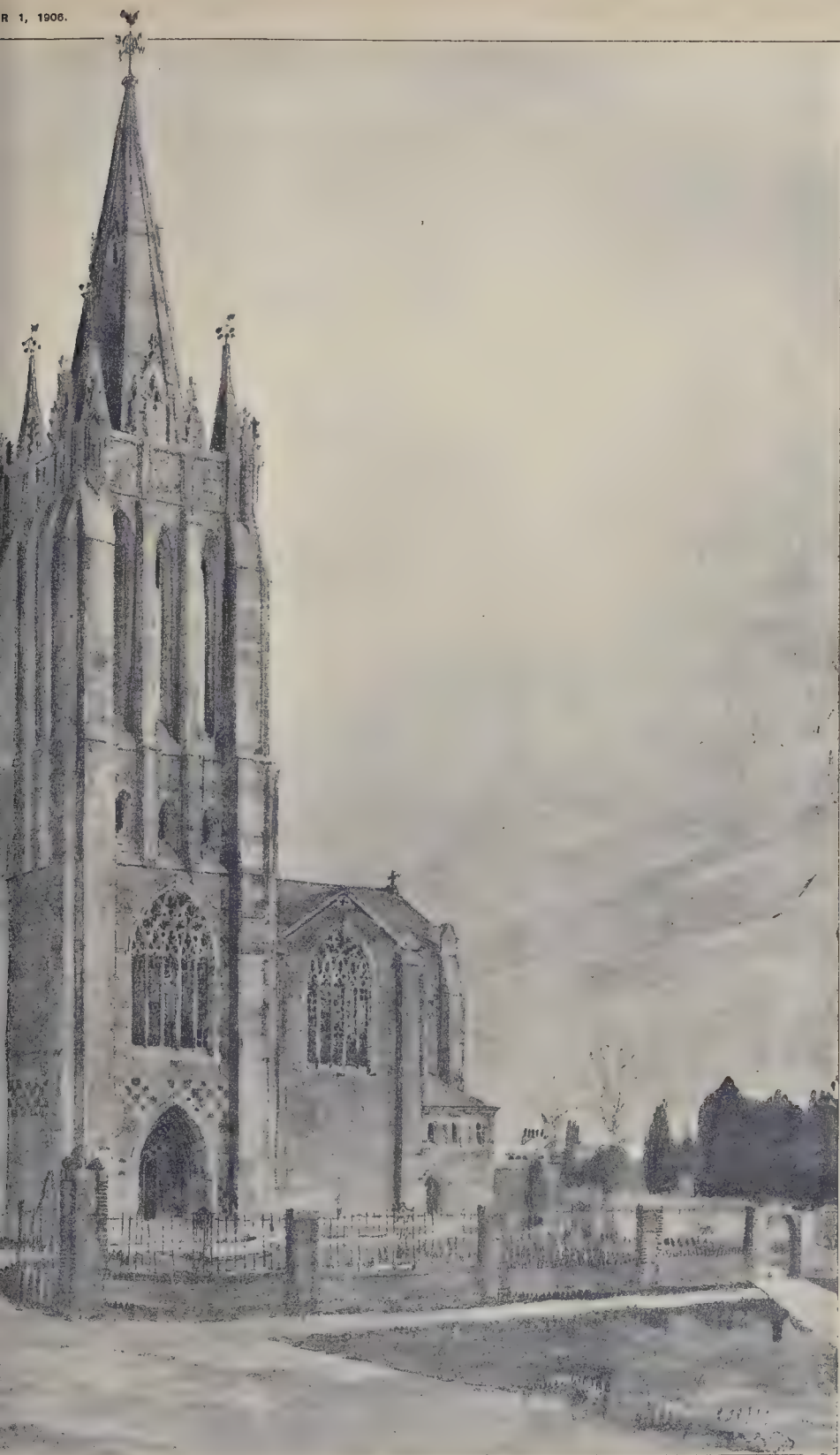


Proposed Church, Epsom. Plan.

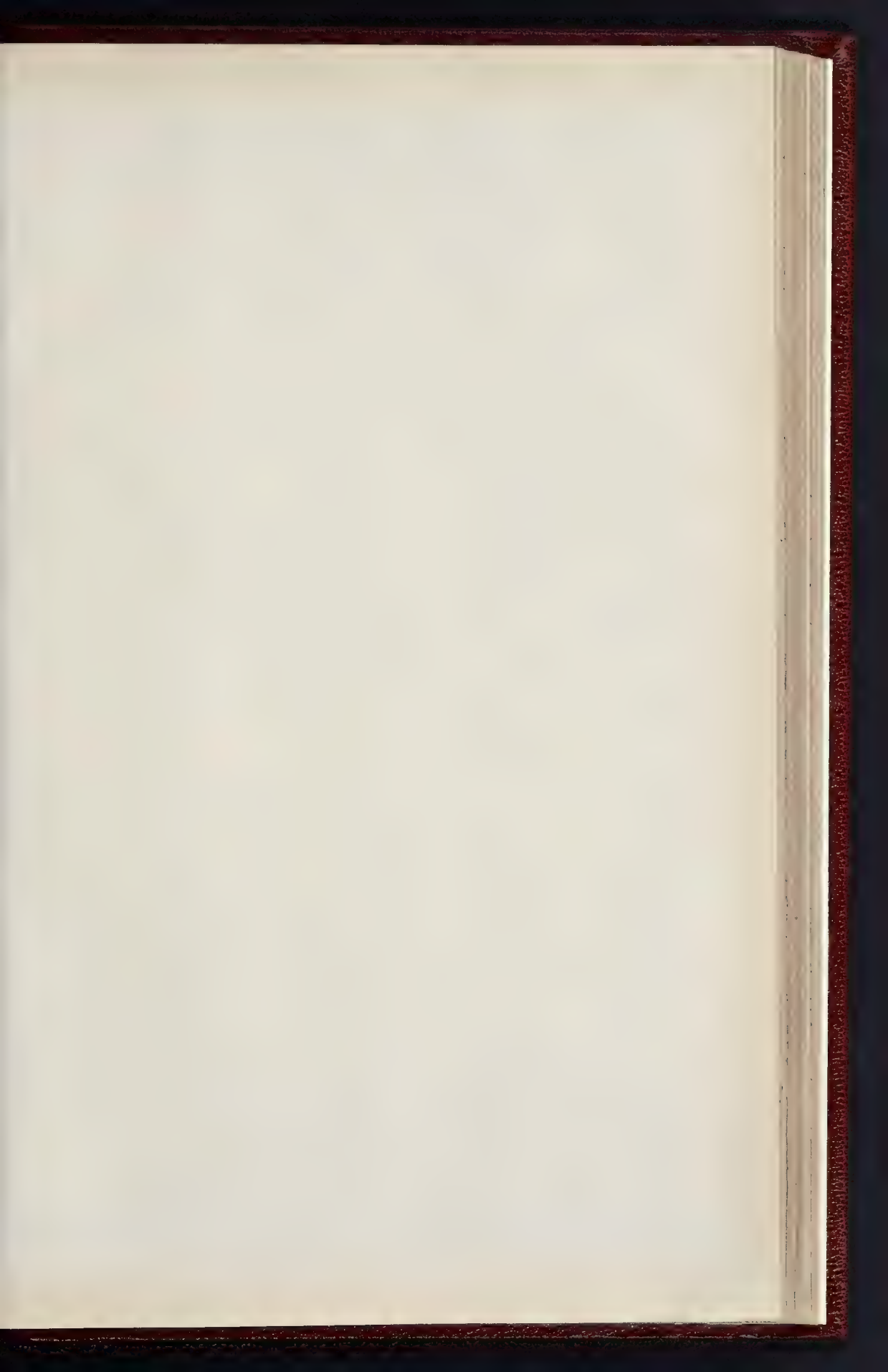


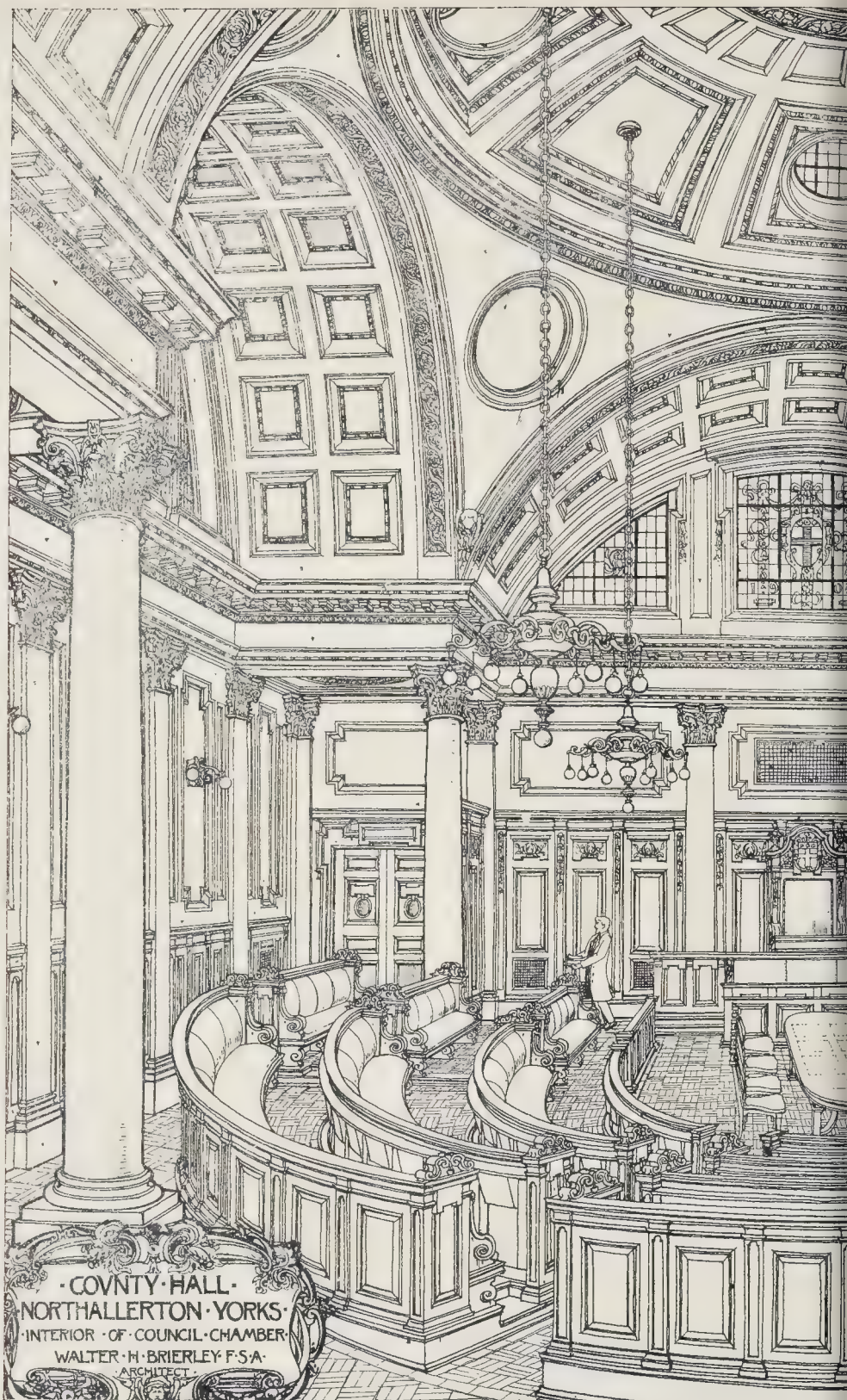


Design for ST. MARTIN'S CHURCH
EPSOM, SURREY. Sir C. A. Nicholson Bart, Architect



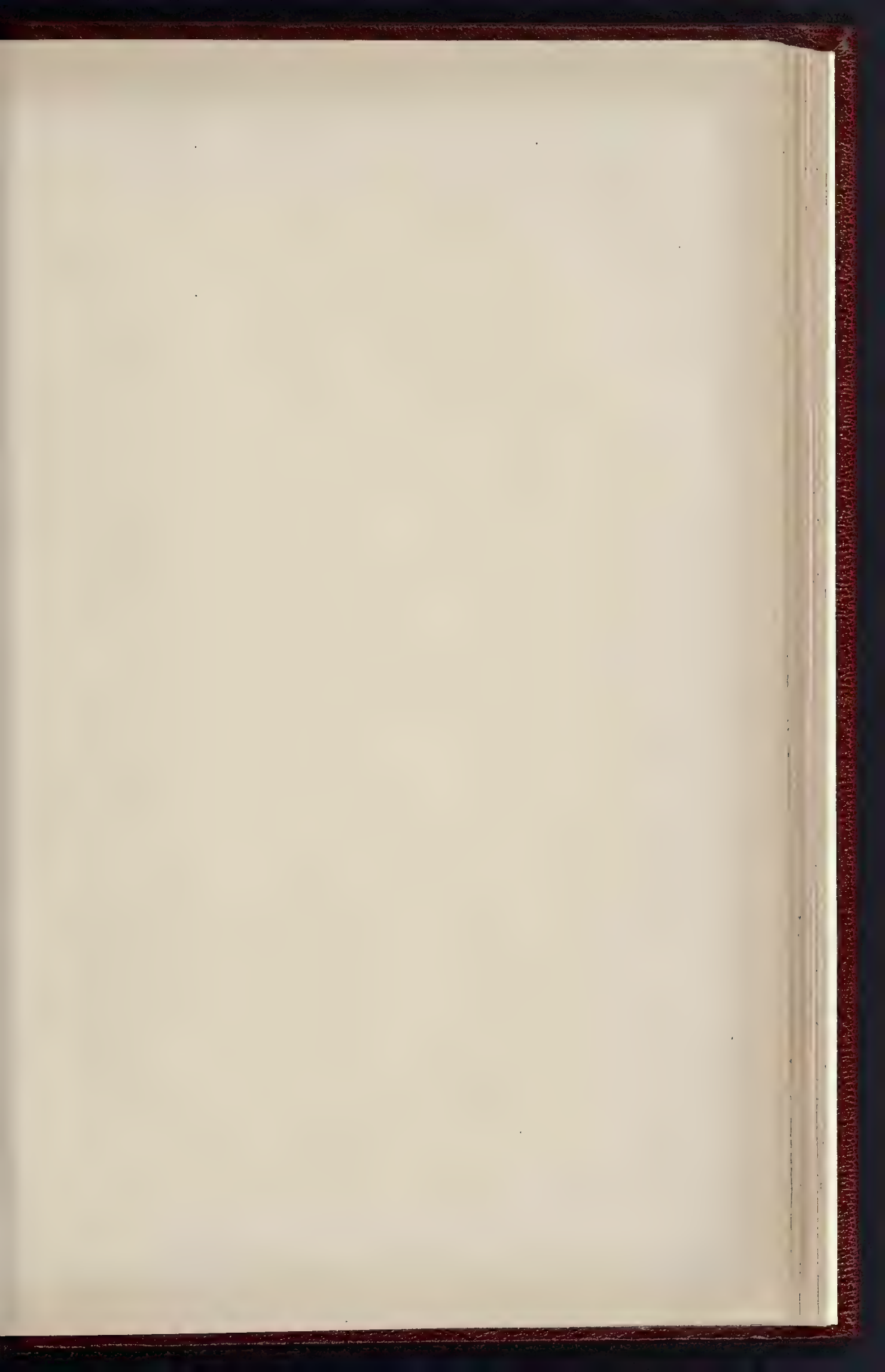
N. P. DOD. FRANKLIN ST. E. EAST WARRINGTON STREET. LITTLE LANE.



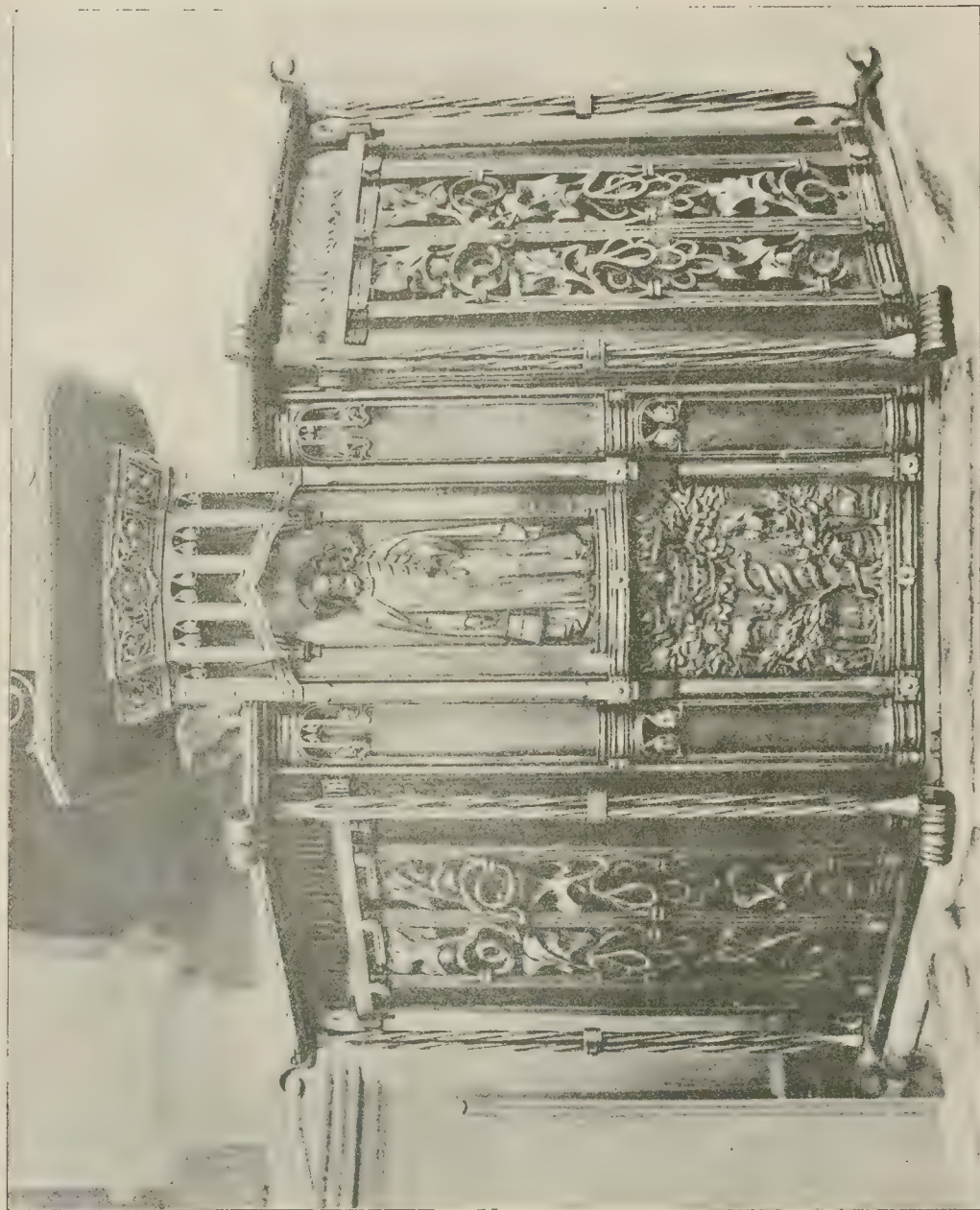


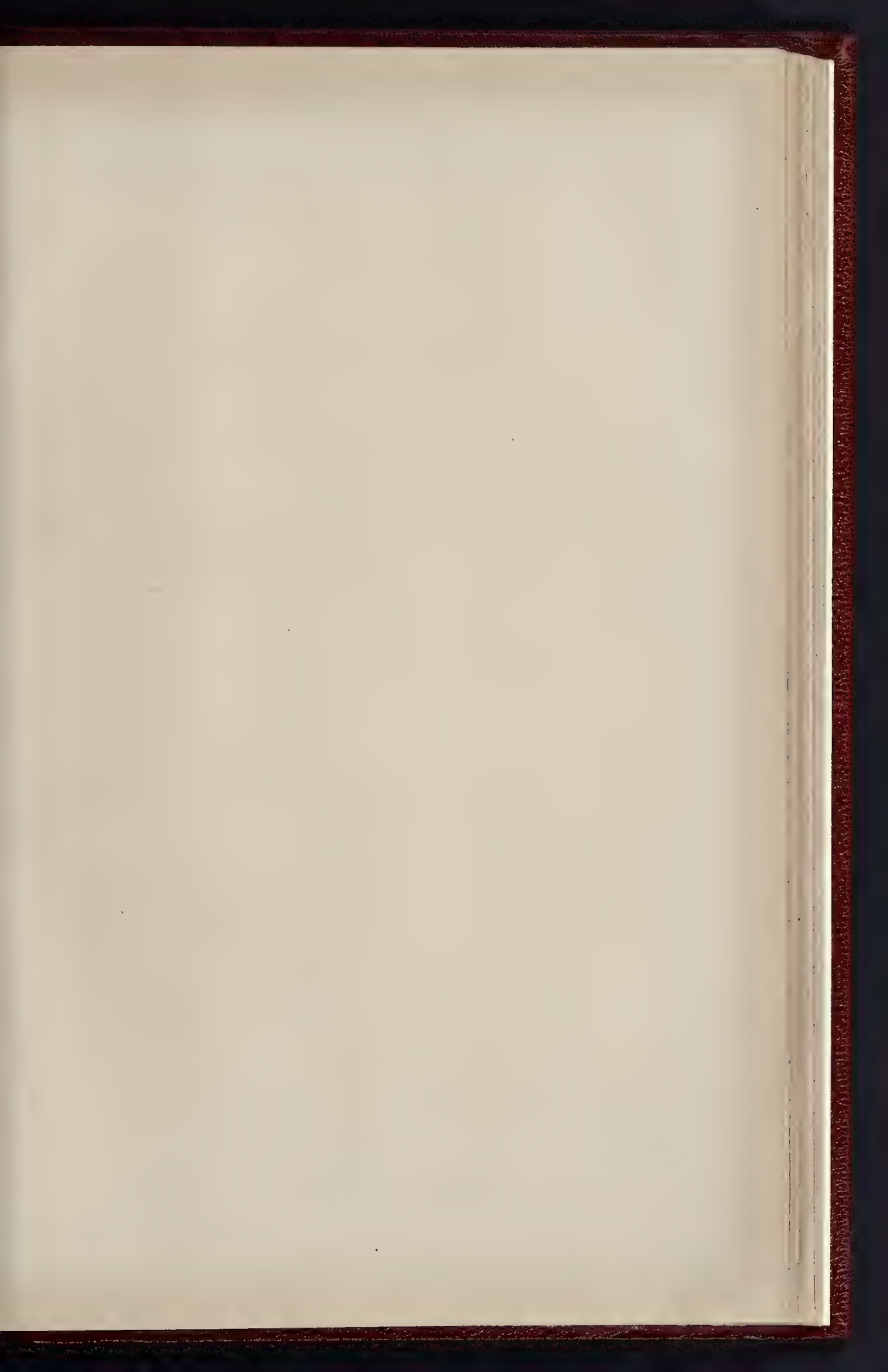
· COUNTY HALL ·
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· INTERIOR · OF · COUNCIL · CHAMBER ·
WALTER · H · BRIERLEY · F.S.A. ·
ARCHITECT ·





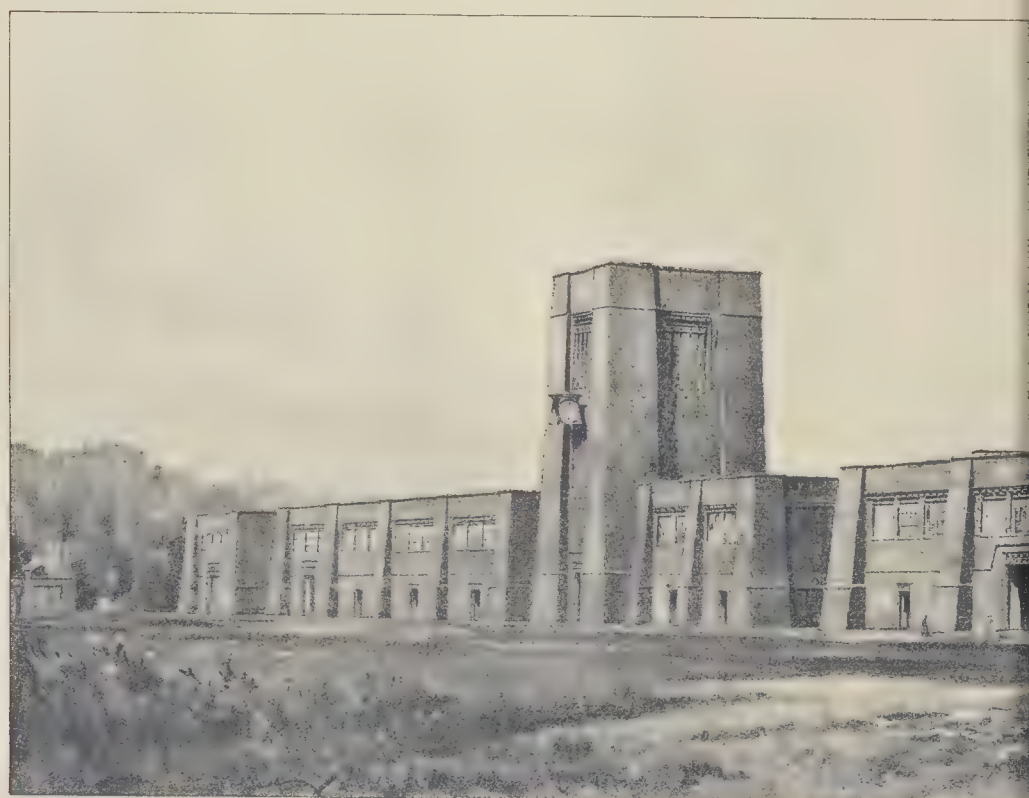
THE BUILDER, DECEMBER 1, 1906







ARCHITECTURAL TREATMENT OF MOTOR GENERATOR STATION OF THE WESTMINSTER EL



ENGINEERING WORKS AT QUEENSFERRY, NE



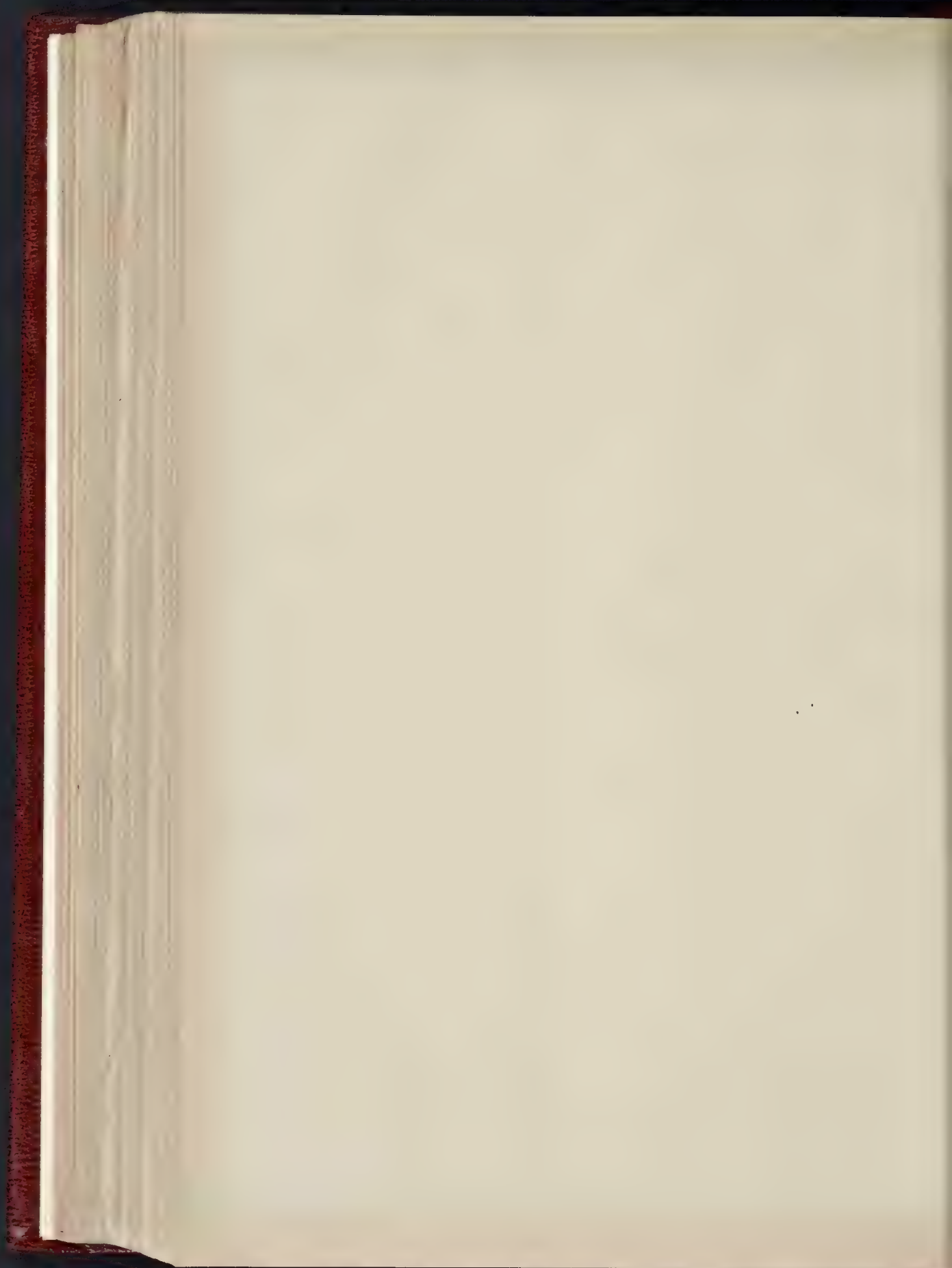
PLY CORPORATION, DUKE STREET, MAYFAIR.—MR. C. STANLEY PEACH, F.R.I.B.A., ARCHITECT



ER.—MESSRS. CRESSWELL & MAULE, ARCHITECTS.



WEST WINDOW, PRIVATE CHAPEL OF S. MICHAEL'S SCHOOL, BOGNOR.—DESIGNED BY MISS M. LOWNDES



humanity is shown in the panel below, representing Adam and Eve in the garden, with the traditional entwined serpent offering the apple. Emerging from the foliage of the tree is an angel. Near Eve is represented a peacock, and near Adam a monkey.

The other panels are filled with ornamental forged ironwork of vine treatment, etc., while around the top of the pulpit and under the book-board comes a band of Gothic lettering in bronze. The book-board is furnished with an arrangement of electric light, by which a good light is thrown on the book or MS., but not elsewhere.

The illustration is taken from a photographic enlargement by Mr. E. J. Bennett, A.R.I.B.A., who has been doing some special work in photographing in this manner—enlarging from a smaller photograph, the object being to get rid of the hardness of a direct photograph on a larger scale. This system has its uses; in the present case it gives a softer and more agreeable effect than a direct photograph would have given: whether it represents the original quite so truly is another question. In the case of a wide building we should certainly object to the enlarging system, as it deprives the illustration of the precise and brightly out effect which a new building in sunlight always has.

WINDOW, ST. MICHAEL'S SCHOOL, BOGNOR.

This window, representing in its two lights the subject of the Annunciation, is a design carried out by Miss Lowndes for the private chapel of St. Michael's School, Bognor.

Competition.

PUBLIC BATHS, SHEFFIELD.—The Sheffield City Council decided some months back to erect new public baths at Primrose Meadows, and invited architects practising within the city boundaries to submit schemes. They also invited and appointed Mr. J. Lane Fox, architect, of Oxford-place, Leeds, as their expert advisor to conduct the competition and act as assessor. As a result, seventeen schemes have been sent in and been adjudicated upon by Mr. Fox, who has placed scheme No. 8, submitted by Mr. A. Nun week, first in order of merit; No. 14, by Messrs. Charles Hadfield & Son, second; and No. 9, by Messrs. Potter & Sandford, third, in order of merit.

Correspondence.

THE CROESUS TEMPLE OF ARTEMIS.

SIR,—It pleased me greatly to see Mr. Phene Spiers's letter in your last week's issue with reference to my suggested restoration of the Croesus Temple of Artemis at Ephesus, as shown at the meeting of the Royal Institute of British Architects on the 19th inst.; but as the work of which this will form a part is not yet published, I cannot enter into a discussion.

This subject evidently has aroused interest, therefore I shall be delighted to receive private correspondence, which I hope may facilitate me in my somewhat difficult undertaking.

ARTHUR E. HENDERSON.

The Laurels, Dulwich Village, S.E.

ZODIACS IN ITALIAN CHURCHES.

SIR,—The zodiacs in the churches in Italy have very distinctive features as compared with those in England or France. As to date the oldest I know of was at San Giulio, of 14th or 15th century, compared with the English font at Brookland and the French font at St. Evroult, both of the Norman period. They are more artistic and are executed in much more costly materials; but for real interest and study they hardly come up to Gothic zodiacs, such as that at Notre-Dame, Paris, etc. The following are all that I know of:—

Outside.—1. Doorways: San Marco, Venice, A.D. 1111 (*Archæologia*, xlix.; Ruskin: "Stones of Venice"). A Taurus porch and an Aries porch, duomo, Borgo San Donnino (Murray, 363), 13th century. On separate square stones, with symbols, around the great doorway, duomo,

Piacenza, 1132 (Murray, 1843, 378). Over the arch of the central doorway, Cremona Cathedral, used by Purgatelli in his "Treatise of Mythraic Symbols" (*Archæologia*, xlv.; Murray, 219; "Diet. Arch."), 12th century. Around the portico della facciata, Verona Cathedral, Lombard, 13th century (carte photograph of it, Vierbühner, Milan, No. 6306). Either round the doorway or on the pavement, Palermo Cathedral, 179; "Diet. Arch."). On a stone globe, on a tablet to an astronomer, over the chief doorway of S. Zulian, Campo S. Zulian, Venice.

Inside.—3. Pavements: Formerly in San Giulio, Lake Orta, 14th or 15th century (Stuart: "Riviera," etc.). Duomo, Aosta, mediæval (*Archæologia*, xlv.). Tessellated, in the crypt, San Severino, Piacenza, 13th century (Murray: "Descrizioni di Monumenti di Piacenza": *Archæologia*, xlv.). San Miniato, near Florence (*Archæologia*, xlv.). Baptistery, Florence Cathedral, 13th century (*Archæologia*, xlv.). With the papal arms and quadrant of the chapel of Nicholas V., or Deacon's SS. Stefano e Laureno, built by Nicholas V. (Vatican), 15th century. S. Petronius, Bologna, 1655 (Morgan, "Italy," ii, 8). Messina Cathedral. San Nicola Catania, 1841.

4. Ceilings.—Remains of one painted on the plaster of the dome, in a small round chapel, out of the Pazzi chapel, Santa Croce, Florence. Duomo baptistery, Lucca, 1233. Painted in the dome of the Chigi chapel, planets as deities, constructed by Chigi, under Raphael (Baedeker, photograph of it, Rome).

5. Clocks.—Beautifully carved in walnut around the dial, with representations of man's life outside, signs wrongly placed, on a tall 17th century clock, in the sacristy, S. Maria, Domenico Frari, Venice. Round the face of a clock, on the campanile of a church in Cremona. Astronomical clock, S. Antonio, Padua. On a large, and a small drawing in S. Antonio, 1598.

6. Lampstand.—On the bronze feet of the great seven-branched lampstand in Milan duomo, German school, 1562 (engraved by Didron; *Arch.*, xii.; *Archæologia*, xlix. Cast of it in the V. and A. Museum, No. 167).

7. Walls.—Triforium, duomo baptistery, Parma, 1216-1281 (*Archæologia*, xlix.). Under a corbel-table, in a series of arched pillared recesses, under the west aisle roof of the duomo, Florence, with many emblems outside. Exquisitely sculptured on six white marble panels in bas-relief, Scorpio to Cancer, and planets, in the chapel of the Sacrament, Emilii S. Francis, Rimini. Ascribed to Duccio, 1471 ("Life of M. Angelo," i, 91; *Archæologia*, liii, 200; photograph of it by Alinari, No. 17638). XVth century.

8. Window.—Zodiacal arc, with creation of sun, moon, stars, in the second window, side aisle, Milan Cathedral.

The zodiac is also found in the baptistery. Pisa: in S. Maria Overro, Naples (Montorio: "Zodiaco di S. Maria Overro," Napoli, 1716. "Genesis of Mythology," i, 444). In the Siena duomo, XIVth century (Waring, xxiv.). In the duomo baptistery, Lucca. In white marble inlay, along a moulded line, in a chamber beyond the choir, in the Capuchin Church, Piazza Barberini, Rome (by Casani, fl. 1622). In black along a meridian line, in the pavement, Milan Cathedral.

The Florence baptistery zodiac is engraved in the "Architectural Illustrations Society," Series 2, 379, and photographed by Alinari, No. 3369. The Chigi zodiac is photographed. The San Marco zodiac is described and illustrated by Ruskin in "Ongania." [E.A.D. J.]

TEST OF KLEINE FLOORS.

SIR,—We have seen Mr. Max Clarke's letter in your last issue, and with regard to his comment, "that in floors of this type the efficacy of the structure depends altogether upon the manner in which the iron bars are embedded in the joints and the manner in which the ends are screwed so as to avoid the bars being drawn out," Mr. Max Clarke has as to the necessity of properly embedding the tension bands, which is a most simple operation, it is not necessary with our construction to in any way secure the ends of the iron tension bands, the section of which affords the maximum, and ample, surface for adhesion.

It is a fact, that the ends of the iron bands in the floor tested were roughly bent round, but this was merely because the bars were cut longer than necessary.

You will see from the enclosed report by Mr. Corbett, of the Manchester Technical School, that at a test held in Manchester on July 23 of a precisely similar floor, but the ends of tension bands not bent or secured in any way, the breaking load was 9.29 cwt. per foot, and that, although the floor was then broken, the load remained suspended until it was taken down two weeks later.

In both these tests the ends and sides of the floors were absolutely free, whereas in an ordinary building the floors are constructed between steel joists, which very considerably increases their strength.

THE "KLEINE" PATENT FIRE RESISTING FLOORING SYNDICATE, LTD. (E.H.)

The Student's Column.

ROOFS: STRUCTURALLY CONSIDERED.—XIX.

21. The Complete Design of a Timber Truss (continued).



UR next business is to ascertain whether adequate resistance is provided for the horizontal component of the force of 25,800 lb. transmitted to the tie-beam from the bolts. By Fig. 156 we find the component is 14,300 lb., a force that must not cause a compressive stress against the bolts of greater intensity than 2,500 lb. per square inch, this being the permissible bearing stress given in *par. (a)*, p. 513, for the application of bolts and pins in cases where the fibres are compressed transversely as well as longitudinally.

Directly any forward movement of the rafter takes place the timber will push against the bolts, and we have to see whether the bearing surface provided by these is sufficient to keep the stress within the permissible limit.

The effective bearing surface of the bolts is computed by using as factors the dimensions that are normal to the horizontal component 14,300 lb. One dimension will be the bolt diameter and the other the depth of the tie-beam.

Then, taking the permissible stress along the grain of the tie-beam at 2,500 lb. per square inch, we obtain

For six $\frac{3}{4}$ -in. bolts

$$6 \times (0.75 \times 8) \times 2,500 = 90,000 \text{ lb.}$$

For four $\frac{1}{2}$ -in. bolts

$$4 \times (0.875 \times 8) \times 2,500 = 70,000 \text{ lb.}$$

For three $\frac{1}{2}$ -in. bolts

$$3 \times (1.00 \times 8) \times 2,500 = 60,000 \text{ lb.}$$

Therefore, as the force to be resisted is only 14,300 lb., there is not the slightest risk that the bolts will crush the fibres of the tie-beam.

We have now found that, so far as the calculated stresses are concerned, any of the suggested sets of bolts would be adequate. But, as shrinkage of the timbers and sudden gusts of wind may throw unexpected strain upon the bolts themselves, it will be better to increase their area somewhat.

To use more than six $\frac{3}{4}$ -in. bolts would be undesirable, and we have to choose between five $\frac{3}{4}$ -in. or four $\frac{1}{2}$ -in. bolts. By applying the former, as shown at the right-hand of Fig. 157, the stress is distributed more equally than by any arrangement of four bolts in the available width.

Consequently for the joint in question we provide five $\frac{3}{4}$ -in. bolts.

It will be observed in Fig. 157 that the angle between the principal rafter and the tie-beam is filled by a block secured by a key. These details should be of hard wood, their object being to stiffen the foot of the rafter and to give an increased bearing surface for the vertical component of 34,500 lb.

Another detail adding considerably to the resistance of the tie-beam against horizontal shear is the introduction of a $\frac{3}{4}$ -in. bolt through the pole-plate, as represented in Fig. 157. This bolt brings compression upon the fibres in shear, and, in addition to preventing incipient cracks from spreading, serves to hold the pole-plate in position.

Fig. 124, p. 402, represents a joint with double abutments, a form of connexion which, as we have before pointed out, is difficult to fit accurately, and in which the theoretical division of the stress between the two abutments is likely to be disturbed by shrinkage of the timber.

Assuming the double abutment to be formed as in Fig. 158 and to be in perfect adjustment, there would be two planes of shear, a b measuring 16 in. long by 6 in. wide, and a_1 b_1 measuring 21 in. long by 6 in. wide.

Taking the safe shearing stress of the timber at 150 lb. per square inch. (*par. a*,

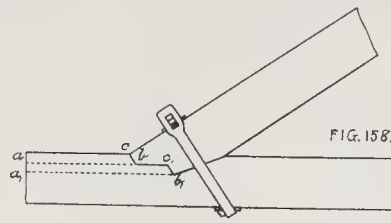


FIG. 158.

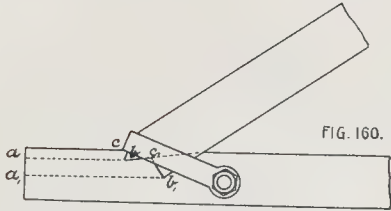


FIG. 160.

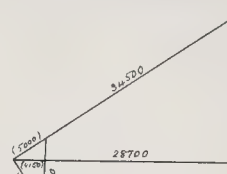


FIG. 159.

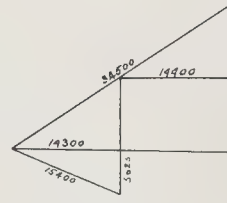


FIG. 161.

p. 513), the safe resistance of the two planes will be

$$16 \times 6 \times 150 = 14,400 \text{ lb.}$$

$$21 \times 6 \times 150 = 18,900 \text{ lb.}$$

Then $14,400 + 18,900 = 33,300 \text{ lb.}$ is rather more than the horizontal component of $34,500 \text{ lb.}$, which is $34,500 \cos 33^\circ 40' = 28,700 \text{ lb.}$ (see Fig. 159).

Conversely, the shearing stress along the two planes, assuming the force of $28,700 \text{ lb.}$ to be uniformly distributed over them, is

$$28,700 \div 6 (16 + 21) = 129 \text{ lb. per square inch.}$$

The effective area of the two surfaces of the rafter toe, 6 in. wide, with abutments c and b , each 2 in. deep, is $6 (2 + 2) = 24 \text{ sq. in.}$ Hence the safe resistance of the rafter against crushing is

$$1,600 \times 24 = 38,400 \text{ lb.}$$

Conversely, the compression on the rafter toe, assuming the force of $34,500 \text{ lb.}$ to be equally divided over the two bearing surfaces, is

$$34,500 \div 24 = 1,437.5 \text{ lb. per square inch.}$$

Therefore the joint is theoretically capable of resisting the given stresses without assistance from the strap, which is chiefly intended to keep the rafter from "kicking."

Let us take the dimensions of the strap at $1\frac{1}{2} \text{ in.}$ wide by $\frac{3}{4} \text{ in.}$ thick, and the permissible stress in steel, taking the breadth of the bridge at 1 in. and the span at 6 in. as before.

Then, with a bridge-plate of ample area, it will be capable of resisting tension to the extent of

$$16,000 \times 0.3125 \times 1.5 = 7,500 \text{ lb.}$$

Consequently the strap will relieve the tie-beam of shear to the extent of $4,150 \text{ lb.}$ and the rafter of compression to the extent of $5,000 \text{ lb.}$, as shown in Fig. 159.

The bridge-bar, considered as a beam, should be capable of withstanding the uniformly-distributed load of $7,500 \text{ lb.}$

By formula (18), using the value of $16,000 \text{ lb.}$ for the factor (f), the permissible stress in steel, taking the breadth of the bridge at 1 in. and the span at 6 in.

$$d = \sqrt{\frac{7,500 \times 6}{16,000 \times 1}}$$

$$= \sqrt{2.1} = 1.45 \text{ in.}$$

This is the depth or thickness necessary at the middle of the bridge, where the bending moment attains maximum value. The bar can be reduced in thickness towards each end, where the cross-section of metal is governed chiefly by the shearing stresses developed close to the supports.

The shearing force at each end of the bridge is $7,500 \div 2 = 3,750 \text{ lb.}$, and to withstand this the bar must have the sectional area of $3,750 \div 16,000 = 0.235 \text{ sq. in.}$, which is given by the dimensions of 1 in. by $\frac{1}{4} \text{ in.}$, but the bar would be better proportioned if made $\frac{1}{2} \text{ in.}$ or $\frac{3}{4} \text{ in.}$ thick at the ends.

To avoid undue compression across the grain of the timber in the principal rafter, a

* On p. 806, Col. II., line 16 below table read c instead of d .

plate must be applied beneath the bridge capable of keeping stress within the permissible limit of 350 lb. per square inch.

Hence the required area of the plate will be $7,500 \div 350 = 21.4 \text{ sq. in.}$ The length being already settled at 6 in. by the width of the rafter, the breadth will be $21.4 \div 6 = 3.56$, say, 4 in. , making the dimensions of the plate 6 in. by 4 in. , and reducing the compression across the fibres of the rafter to

$$7,500 \div 24 = 312.5 \text{ lb. per square inch.}$$

To find the necessary thickness of the plate, the part projecting $1\frac{1}{2} \text{ in.}$ at each side of the bridge can be considered as a cantilever having to carry three-eighths of the uniformly-distributed load.

Then

$$W = 7,500 \times \frac{3}{8} = 2,812 \text{ lb.}$$

By the usual rule the bending moment due to this load is

$$M = \frac{W l}{2}$$

$$= \frac{2,812 \times 1.5}{2} = 2,109 \text{ in.-lbs.}$$

By formula (29) the resistance of the sections is

$$R = \frac{f b d^2}{6}$$

$$= \frac{16,000 \times 6 \times d^2}{6} = 16,000 d^2 \text{ in.-lbs.}$$

and, as in all cases, $M = R$,

$$16,000 d^2 = 2,109.$$

Whence

$$d^2 = \frac{2,109}{16,000} = 0.1318,$$

and

$$d = \sqrt{0.1318} = 0.363 \text{ in.}$$

Therefore the plate should be $\frac{3}{8} \text{ in.}$ thick.

A similar bearing-plate should be applied beneath the tie-beam to guard against crushing action, and the plate ought to be notched into the timber or otherwise secured to prevent slipping. If fitted as shown in Fig. 158, a wedge should be inserted between the plate and the heel strap.

As the vertical component of $7,500 \text{ lb.}$ is only $7,500 \times \sin 56^\circ 20' = 6,420 \text{ lb.}$, a plate measuring 6 in. by 4 in. will reduce compression to $6,420 \div 24 = 260 \text{ lb.}$ per square inch, which is well below the permissible limit.

The remaining details of the joint require no special comment, but we may mention that a $\frac{1}{2} \text{ in.}$ bolt through the pole-plate and tie-beam, as in Fig. 157, will be a valuable aid in resisting shear along the planes a and b .

Fig. 125 (p. 402) shows a bridge joint supplemented by a heel strap disposed at an angle providing greater resistance to horizontal thrust than the strap in Fig. 124. Fig. 160 represents a joint of the kind applied to the roof now in question.

By adopting adequate proportions for the bridge the joint could be made capable of withstanding nearly the entire horizontal component of $34,500 \text{ lb.}$ with any assistance from the strap.

For instance, making the bridge $1\frac{1}{2} \text{ in.}$ wide, the two cheeks will have the collective width of $4\frac{1}{2} \text{ in.}$, and the planes of shear will measure

$$a b : 16 \text{ in. by } 6 \text{ in.} = 96 \text{ sq. in.}$$

$$a_1 b_1 : 20 \text{ in. by } 4\frac{1}{2} \text{ in.} = 95 \text{ sq. in.}$$

Taking the safe shearing stress of the timber at 150 lb. per square inch (par. a, p. 513), the safe resistance of the two planes will be

$$150 \times 96 = 14,250 \text{ lb.}$$

$$150 \times 95 = 14,250 \text{ lb.}$$

Then $14,400 + 14,250 = 28,650 \text{ lb.}$ is very nearly equal to the horizontal component of $34,500 \text{ lb.}$, which is $34,500 \cos 33^\circ 40' = 28,700 \text{ lb.}$

Even if not otherwise reduced, the shear along the planes would only be

$$28,700 \div (96 + 95) = 150.4 \text{ lb. per square inch.}$$

We have next to see whether the rafter toe will be safe against crushing. The areas of the bearing surfaces are

$$c b : 6 \times 1 = 6 \text{ sq. in.}$$

$$c_1 b_1 : 4.75 \times 3.75 = 17.8 \text{ sq. in.}$$

Therefore the resistance of the rafter toe is

$$1,600 (6 + 17.8) = 38,080 \text{ lb.}$$

As the total thrust of the rafter is only $34,500 \text{ lb.}$, we have the surplus of

$$38,080 - 34,500 = 3,580 \text{ lb.,}$$

or, stating the case in another way, the compression on the rafter toe is reduced to

$$34,500$$

$$6 + 17.8 = 1,450 \text{ lb. per square inch.}$$

Taking the resistance of the timber on the foregoing basis, the heel strap would only be required to hold the parts together, a duty for which ample provision would be made by the dimensions of $1\frac{1}{2} \text{ in.}$ wide by $\frac{1}{4} \text{ in.}$ thick.

But, as already remarked, it is not desirable to rely upon the action of a double abutment, and a safer manner of applying the joint would be to increase the depth of the front notch to $1\frac{1}{2} \text{ in.}$ normal to the axis of the rafter, and to disregard the resistance of the bridge altogether.

Let us take the resistance of the tie beam against shear at

$$16 \times 6 \times 150 = 14,400 \text{ lb.}$$

and, by increasing the depth of the front abutment, make the resistance of the rafter toe against crushing

$$6 \times 1\frac{1}{2} \times 1,600 = 14,400 \text{ lb.}$$

Then, as shown in Fig. 161, there remains the horizontal component

$$(34,500 \cos 33^\circ 40') - 14,400$$

$$= 28,700 - 14,400 = 14,300 \text{ lb.}$$

the angular component of which in the direction of the strap is

$$14,300 \text{ lb.} \times \cos 21^\circ 30' = 15,400 \text{ lb.}$$

This means that the sectional area of steel in each loop must be 1 sq. in. , which can be provided by making the strap 2 in. wide by $\frac{1}{2} \text{ in.}$ thick, but to reduce pressure against the fibres of the rafter the strap should be 3 in. wide. Even with this increase the component of $15,400 \text{ lb.}$, normal to the top surface of the rafter, involves a greater stress per square inch than that defined in par. (a), p. 513.

Sufficient metal must be provided in the eyes of the strap to withstand the stress of $15,400 \text{ lb.}$ per square inch. The bolt through the tie-beam must be capable of resisting the bending moment due to the uniformly-distributed load of $15,400 \text{ lb.}$ and the shearing stress of $15,400 \div 2 = 7,700 \text{ lb.}$ close to each support. It must also be of such dimensions as to guard against excessive compression in the fibres of the tie-beam.

By the usual rule the bending moment is

$$M = \frac{W l}{8}$$

$$= \frac{15,400 \times 6}{8} = 11,550 \text{ in.-lb.}$$

The moment of resistance for a cylindrical bar is

$$R = f r^3 0.7854 \dots \dots \dots (31)$$

where r is radius in inches.

Taking the value of f from the table in par. (a), p. 513, we get

$$R = 25,000 \times r^3 \times 0.7854$$

$$= 19,635 r^3 \text{ in.-lb.}$$

Then as $M = R$

we have

$$19,635 r^3 = 11,550.$$

Whence

$$r^2 = \frac{11,550}{19,635} = 0.59$$

and

$$r = \sqrt{0.59} = 0.84 \text{ in.}$$

Therefore the diameter of the bolt will be $0.84 \times 2 = 1.68$, say, $1\frac{1}{2}$ in.

The maximum shearing stress at each end of the bolt is 7,700 lb., and, as by *par.* (a), p. 513, the permissible shearing stress for steel is 10,000 lb., the diameter $1\frac{1}{2}$ in. gives the safe resistance of

$$10,000 \times (1.75^2 \times 0.7854) = 24,053 \text{ lb.}$$

With regard to crushing action against the fibres of the tie-beam, the horizontal component to be resisted is $28,700 - 14,400 = 14,300$ lb.

The effective bearing surface of the bolt against the timber is $6 \times 1.75 = 10.5$ sq. in., and, as by *par.* (a), p. 513, the permissible compressive stress against bolts is 2,500 lb. per square inch, the safe resistance of the timber is

$$2,500 \times 10.5 = 26,250 \text{ lb.}$$

Otherwise expressed, the compression along the fibres is

$$14,300 \div 10.5 = 1,362 \text{ lb. per square inch.}$$

Therefore the diameter of $1\frac{1}{2}$ in. is adequate so far as concerns compressive stress along the fibres, but we have also to see whether the material is safe against crushing across the fibres.

The vertical component of 15,400 lb., the tension in the heel strap, is

$$15,400 \times \sin 21^\circ 30' = 5,625 \text{ lb.}$$

By *par.* (a) the permissible stress across the grain is 350 lb. per square inch, or for the bolt now in question

$$350 \times 10.5 = 3,650 \text{ lb.}$$

To relieve the timber of more than the permissible strain stated in *par.* (a), p. 513, it is necessary to increase the diameter of the bolt to

$$1.75 \times \frac{5,625}{3,670} = 2.68, \text{ say, } 2\frac{1}{2} \text{ in.}$$

Practical experience indicates, however, that in joints of this character, where the fibres of the timber are confined, and where the timber is in other respects safe against failure, the permissible stress can be increased beyond the limit defined in *par.* (a).

Consequently for the case in question the diameter of the bolt might be made $2\frac{1}{2}$ in. without endangering the safety of the tie beam.

Obituary.

MR. PROTHERO.—We regret to announce the death, on November 26, of Mr. Henry Allen Prothero, aged 68 years, of No. 13, Promenade, Cheltenham. Mr. Prothero was a son of the Rev. T. Prothero, of Malpas Court, Newport, Mon. On leaving Cheltenham College he entered Balliol College, Oxford, whence he proceeded M.A. He was then articled to the late Professor J. H. Middleton, and subsequently became member of the firm of Messrs. Middleton, Prothero, & Phillott, now, since Professor Middleton's death, Prothero & Phillott. He was elected a Fellow of the Royal Institute of British Architects in 1896; he was a member of the Council of Architects of the Incorporated Church Building Society, and a leading member of the Bristol and Gloucestershire Archaeological Society, for whom he prepared many papers dealing more especially with the archaeological history of the Cotswolds. He enjoyed a wide reputation as an ecclesiastical architect, and was largely employed in restoration work in both England and Wales. Mr. Prothero made the plans and designs for the Cheltenham College Chapel, the sedilia, and the oaken organ-case, of which we published illustrations on August 5, 1893, June 1, 1895 (interior and exterior of the chapel); February 5, 1898 (sedilia); and September 22, 1898 (organ-case). On April 30, 1904, we illustrated his designs, and gave a key-plan to the carved figures, etc., for the large stone recumbent effigies erected in the College Chapel in memory of fifty-four Old Cheltonians who fell in the South African War, 1899-1902. He designed also, we understand, the memorial "Eleanor" cross set up in front of the College in 1902. In 1895 he carried out, in part, Professor Middleton's scheme for the remodelling of Christ Church, Cheltenham (illustrated in the *Builder* of April 20, 1895), upon the lines of a Basilica, with an apse and reredos. He was the architect of the new chapel on the south side of the sanctuary of All Saints, Cheltenham (1898); he restored St.

Oswald's Church, Shipton, Gloucestershire, two years ago; and in 1902 carried out for the graduates of Yale University the porch of Wrexham Parish Church, having, in 1899, made a report upon the proposed restoration, at an estimated cost of 9,000*l.*, of the church, of which he took in hand the repair of the turrets, pinnacles, and parapets of the tower. Mr. Prothero was architect of the Ladies' College, Cheltenham, 1886-95, of the Delaney Fever Hospital, and many other buildings in and near the town; he made additions to, and designed the railings and wrought-iron gates of, Goodrich Court for Mr. H. C. Moffatt. He was one of the ninety-nine competitors for Liverpool Cathedral, and in 1904-5 prepared the drawings for twelve wrought-iron arches as part of a proposed scheme for lighting by electricity the Villiers-street section of Victoria Embankment-gardens for the Old Spas Company, London County Council. Of works by the firm of Messrs. Prothero & Phillott we may mention the Victoria Hall (Queen Victoria's Diamond Jubilee memorial) at Bourton-on-the-Water, co. Oxford; the restoration, 1888-1900, of the parish church, Bishop's Cleeve; the fever and diphtheria blocks and other works, Delaney Hospital, Leckhampton, 1893-1900; the Church of the Holy Spirit, Beeston-hill, Leeds, in the Late Perpendicular style, for 800 sittings, at a cost of about 11,000*l.*, for which their designs were selected in a limited competition; the restoration, with new flooring, organ choir stalls, etc., and re-building of the spire of St. Oswald's Church, Methley, Leeds; the extensive repairs of the Church of the Holy Rood, Packington, Leicestershire; the restoration of Haxley parish church, Lincolnshire; and, five years ago, the Home for Sick Children at Batten-down, Nantunton, Gloucestershire, with administrative block, laundry, and two wards. The funeral took place at Malpas on Friday last, a memorial service having been held on Wednesday in Cheltenham Church Chapel.

MR. RICHARD DAVIES.—The death occurred on the 26th ult. of Mr. Richard Davies, architect, of Bangor. He was born at Llanfarcaban some sixty-five years ago. He designed or altered a large number of Nonconformist chapels in Carnarvonshire, Anglesey, Denbighshire, and Merionethshire. Mr. Davies was at one time Deputy Mayor of Bangor.

General Building News.

ST. THOMAS'S CHURCH, WINCHESTER.—The improvements and alterations which have just been completed at this church have been carried out in accordance with a plan submitted by Mr. Thomas Stopher, architect, of Winchester. All the old paving of the church has been taken up and replaced with best Quality Londonshire tiles, supplied by Messrs. Dunhill, & Co. The old hot-air apparatus has been replaced by a hot-water apparatus, a large boiler having been fixed in a stove-hole built at the west end. Ventilation is provided for by three of Honeyman's Ventilators fixed in the roof. The system of heating and ventilation was designed by Mr. T. Stopher, in conjunction with Messrs. R. Crittall, of London. Messrs. J. Fielder & Son, of Winchester, were the general contractors, with Messrs. Crittall as sub-contractors. The cost of this portion of the work was 670*l.*, but other work has been carried out by direction of the church wardens. The side chapel has been paved with oak blocks and furnished with stained and varnished chairs, while the whole of the seating of the church has been lowered 4½ in., and the woodwork retained and varnished. The walls have been coloured a straw yellow, with a dado of dark red, and a quiet border, and each arch has been outlined with a similar border. New gas fittings have been provided. The brass chancel rails have been re-lacquered, all the hassocks and cushions have been re-covered, and the vestry has been renovated, and the organ overhauled, bringing the total expenditure up to about 820*l.* Mr. E. Knight did the upholstering work.

NEW CHURCH, SOUTHFIELDS.—The dedication-stone of the new church of St. Barnabas, Southfields, was laid recently. The architect of the building is Mr. C. Ford Whitcombe, and the builder, Mr. George Huxley. The church is intended to seat 800, and for its proper completion it is estimated that over 10,000*l.* will be required.

WESLEYAN CHURCH, BRITON FERRY.—The new church erected by the Wesleyans of Briton Ferry was recently opened. The building is situated on the hill-side overlooking the town, and has cost 2,400*l.* It has seating accommodation for 500 worshippers, and it is fitted with hot-water heating apparatus and the aisles are paved with wood blocks. The architects were Messrs. Crouch & Butler, Birmingham, the contractor being Mr. Morgan Cox, Aberavon.

ROMAN CATHOLIC CHURCH, Tooting.—On the 17th ult. the foundation-stone was laid of a new Roman Catholic church which is being erected on a site in the Mitcham-road. Mr. Benedict

Williamson is responsible for the plans, and Mr. E. B. Tucker is the builder.

PERSTOPE CHURCH TOWER.—The tower of the fine old parish church of Perstope, near Marshfield (Mon.), is about to be restored and strengthened. Serious signs of decay have lately been apparent, and last summer one of the angle pinnacles fell down with a portion of a corner buttress. The work will be carried out under the direction of Mr. W. H. D. Caple, architect, of Cardiff, with orders for nothing of the old work to be disturbed unless absolutely essential. The restoration is expected to occupy at least six months.

CHURCH TOWER RESTORATION, PETERCHURCH, HEREFORD.—The work of restoring Peterchurch Church Tower, has been completed. The tower has been pointed from the base to nearly the top of the spire, the perished stones being replaced where necessary. As in very rainy weather the stonework of the spire is unable to keep out the rain, a light roof has been constructed in the interior of the spire, and the water is carried away by pipes through the spire lights. The work has been executed by the contractors, Messrs. Heaven & Hodges, Hereford, under the supervision of Mr. R. Paul, F.S.A.

CHURCH ENLARGEMENT, NEWBURY.—The church of St. John the Evangelist in the Newtown road, has been enlarged and improved. Two new aisles have been turned, one at the east end and the nave, in line with the main chancel arch, and the other to divide off the sanctuary of the lady-chapel. The old side altar has been re-fixed on a raised space of grey marble kerb, with white marble paving. The floors of the lady-chapel and of both vestries are of pitch-pine blocks. A few vestries have been built on the north side of the church, parallel with the enlarged chapel. The exterior construction is of brick and stone, with solid oak doors. The work, which it is estimated has cost about 1,200*l.*, has been carried out by Messrs. Adey & Co., Builders, and the stonework portion by Mr. T. Thomas, the plans were prepared by Mr. J. Oldrid Scott, the Diocesan Architect.

THE RESTORATION OF CULROSS ABBEY.—The dedication service in Culross Abbey Church took place on the 22nd ult. The Abbey was founded in 1217 by Malcolm, Thane of Fife, and, according to tradition, St. Mungo was born near by, and was reared there by St. Serf. Authentic records of the original churches of Culross are lacking, but tradition has it that the church built by St. Serf was a primitive wattle and mud structure, which could not long remain in existence. The second church, said to have been built of oak, was destroyed by fire. Then came the monastery founded by Malcolm, of which eloquent traces are still extant. Although the restoration which has now been accomplished is the result of a movement which began three years ago, several schemes proposed during the last twenty years furnish evidence of a long-cherished desire that one of the most interesting ecclesiastical buildings in Scotland should no longer hasten towards decay. The building was obviously in a bad condition, but the urgency of the matter was brought home to those responsible by the discovery of dry rot when a new heating apparatus was being installed some years ago. As the result of an examination conducted by Mr. P. M. McGregor Chalmers, architect, Glasgow, the restoration was undertaken in a serious spirit, and with the hearty good wishes of many friends it has now been carried to a successful completion. Mr. John L. Anderson acted as inspector of works for Messrs. James Stewart & Sons, the contractors for the masonry. The work, which was begun in May last year, under the direction of Sir Rowland Anderson, has been marked by many interesting discoveries. Two recumbent stone figures now shown are believed to be effigies of members of the Argyll family. The archways have been partly restored, but their full beauty cannot be brought out until more funds are available. The base of an ancient Celtic Cross of large size, and fragments of other crosses, with characteristic carving, have been rescued from the accumulated rubbish of centuries. From some of these fragments, it has been found possible to learn the original design of some of the details of the building, and of these have been carefully reproduced. One of the most important results was the unearthing of a somewhat elaborate building outside the south side of the chancel, and at a considerably lower level. It is presumed to have been a crypt, but the examination of it has not yet been exhaustive enough to determine such facts as its exact character. In 1824 the Abbey underwent alterations at the hands of persons who appear to have had little or no sense of the beautiful, and who ruthlessly destroyed some of the finer features. They covered the walls with the lath and plaster, destroyed the beauty of the windows, and erected galleries, which, while accommodating a larger congregation, were altogether out of harmony with the interior. The lath and plaster have been stripped from the walls, the galleries removed, and the great east window has been restored to its former beautiful outlines and proportions. At present filled with plain glass, there is in preparation for the east window a stained-glass design, which is at once

the gift and a memorial of the late Mr. James Arnott. An oak communion table has been gifted by a friend as a further memorial of Mr. Arnott's interest in the building. The window in the north transept will also be filled in with stained glass. The south transept, which has been entirely rebuilt, is lighted by a rose window, but as yet it contains plain glass. It is contemplated introducing an organ loft at the west end of the church. The present Abbey Church was probably the choir of the church when the monastery was in existence. The foundations and portions of the pillars of the original nave are plainly visible, while remains of the cloisters, where the monks of the monastery thoughtfully perambulated, are still in existence.—*Scotsman*.

BAPTIST CHAPEL, BRIDGEND.—The memorial-stone of the new Hope Baptist Chapel, Bridgend, which is being erected at a cost of £6,000, was laid recently. The site of the chapel is in Coity-street, and the new buildings will comprise a chapel to seat 700, with a hall, infants' school-room, vestries, and institutional rooms. The work is being carried out by Mr. William Francis, contractor, Bridgend, from the designs of Mr. R. J. Thomas.

WESLEYAN CHAPEL, MIDDLESBROUGH.—A new Wesleyan chapel is in course of erection at the corner of Woodlands and Waterloo-roads, Middlesbrough. The cost of the building is estimated at £4,700, and Mr. G. F. Danby is the architect of the work.

CHAPEL IMPROVEMENTS, TYWARDREATH.—The Tywardreath Wesleyan Chapel, which had undergone restoration, was re-opened on the 15th ult. The roof of the building has been raised, and the work in the interior of the building is almost entirely new. The old gallery has been replaced by a more modern one, and a new recess has been provided for the orchestra. The old windows have been substituted by improved ones with coloured glass, while for evening lighting new lamps have been furnished. The architect was Mr. Jury, of St. Austell, and the builder Mr. Truscott, of Plymouth.

NEW CHAPEL AND SCHOOLS, HUCKNALL TORWARD.—The members of the Wesleyan Reform body at Hucknall Torward have opened a new chapel and schools. The chapel stands in Annesley-road, and is of red Istock bricks and Pilgrimage stone. The schools adjoin, and have a frontage to Ogle-street. The premises cover an area of 112 ft. by 43 ft. The entrance to the chapel leads into a vestibule, from which staircases ascend, giving access to the galleries, which extend on either side and at the end. The total seating accommodation is nearly 600. The schools are on the central hall plan, with galleries, with a number of classrooms divided by folding partitions. Various other rooms are provided, and the whole premises are heated by hot water on the low-pressure system. The building is from the designs of Mr. Harry Spencer, architect, of Hucknall, and has been built by Mr. J. A. Munks, of Hucknall, the contract being £2,650.

TECHNICAL INSTITUTE, BALLYMONEY.—A new technical institute has been erected in this town. The dimensions of the building are 72 ft. by 60 ft. There are two entrances to the hall, adjoining which are cloakrooms and a private room for the head master. On the ground floor there have been provided for manual instruction and domestic economy classes. A couple of stairways, one on either side, lead to the upper story, where are located the laboratory, drawing-room, and other special apartments. The contractor was Mr. Albert M'Massey, who acted on the plans of Mr. J. A. Hanna, Belfast.

HOME FOR SEAMEN'S WIDOWS, LIVERPOOL.—The Andrew Gibson Home for Seamen's Widows, in Muddock-road, Egremont, has now been completed. Built of brick with stone dressings the home has two wings, with a turret-surmounted tower in the centre, over the main entrance. The basement has been arranged for the accommodation of the matron, and here is situated also a kitchen, washhouse, laundry, and the heating apparatus. On the ground floor are thirteen residential quarters for the inmates. Each consists of a living-room, with a bedroom partitioned off. A concrete corridor runs between the sets of apartments. There is also on the ground floor a common-room for the use of the inmates, and a kitchen, bathroom, etc. The next two floors each hold fifteen suites of rooms of similar design. The staff of servants will occupy the top floor. The builder is Mr. Isaac Dilworth, of Wavertree, and Mr. Arthur P. Fry, of Liverpool, is the architect. The building has cost £30,000.

PROPOSED NEW DRILL HALL, NOTTINGHAM.—Plans have been prepared by Messrs. Brewell & Bailey, architects, of Nottingham, for a new drill hall for the Robin Hood Rifles, which it is proposed to erect in this city. The hall, 170 ft. long and 95 ft. in width, will be capable of seating 3,000 persons on the ground floor. The roof is to be of glass. In addition to the large hall, accommodation is provided on the ground floor, in the frontage to Derby-road, for the headquarters staff, consisting of rooms for the commanding officer, adjutants, and sergeant-majors and sergeant-instructors. There will also be storage

room for ambulances, machine guns, and the impedimenta necessary for camp. Two miniature ranges are to be provided. Adjoining the hall will be two recreation-rooms, and above them will be the quartermasters' stores, band practice room, and armoury. At the front of the building will be provision for the officers and non-commissioned officers, while the top story will be devoted to quarters for a sergeant-instructor or caretaker, and possibly a suite of rooms for the use of an adjutant. The main entrance will be through a vestibule, with ladies' and gentlemen's cloak-rooms on either side, and at the farther end will be a platform, with two retiring-rooms on either side.

PROPOSED NEW BATHS, SHEFFIELD.—New baths are to be erected in Primrose Meadows, in the Heeley-Ecclesall district of Sheffield. The plans have been prepared by Mr. A. Nunweel, of Sheffield, and were accepted in open competition. The swimming-bath will be 75 ft. long, and Russian and slipper baths will be provided.

ST. DENIOL'S LIBRARY, HAWARDEN.—The new wing of St. Deniol's Library, Hawarden, is now completed. The wing is to form a residence for the two wardens of the library and for students, and has been added by the Gladstone family as a memorial to the late Mr. Gladstone. It is of red sandstone, and the work is chiefly of oak. There will be accommodation for two wardens, twenty students, and a house staff, with, probably, a librarian. There is a large dining-room on the northern side, and on the opposite side the end of the wing is taken up by the common-room. Next to it is a small chapel. The bedrooms are on the first floor at the eastern end, and a corridor connects them with the upper story of the library. On the ground floor is a room in which Mr. Gladstone's papers will be stored. The architects are Messrs. Douglas & Minshull, of Chester.

ST. STEPHEN'S VICARAGE, SOUTHWARK.—A parsonage has just been completed in St. Stephen's-square, close to the church and school buildings. The building has been erected from plans prepared by and under the supervision of the architect, Mr. J. W. Rhodes, Temple, E.C.; the builders being Messrs. Spiers & Son, of St. John's-wood, N.W.

NEW MUNICIPAL BUILDINGS, ACTON.—Working drawings, submitted by Mr. W. G. Hunt, architect, of the new municipal buildings scheme, estimated to cost £5,600, have been adopted by the Acton District Council. This proposal takes the place of the scheme which was rejected by the Local Government Board without inquiry, on the ground of its being unnecessarily elaborate, the total cost working out at over £60,000.

NEW ASSURANCE OFFICES IN THE CITY.—The offices of the Northern Assurance Company, opposite the Bank of England, with frontages to Lothbury, Moorgate-street, and Coleman-street, are being demolished, and on the site will be erected new premises, which will be occupied by the same company. The exterior will be built entirely in Aberdeen granite. The architects are Mr. E. A. Gruning and Mr. E. W. Gower, and the work has been entrusted to Messrs. George Trollope & Sons and Colls & Sons, Ltd.

NEW POST-OFFICE, CRIEFF.—The new Post-office at Crieff was opened on the 26th ult. The new premises are situated in High Street. On entering the main door by a flight of steps there is a vestibule, paved with Mr. E. W. Gower, and the walls are lined with similar material, the ceiling being of wood panelling. The public office has walls panelled 3 ft. 6 in. high with selected Cypress wood. The counter is of the same material, with a mahogany top. The sorting-room is a square apartment, lighted from an open canopied roof and three side windows. The retiring rooms for the male clerks and postmen are at the rear of the building, under which are the battery-rooms and hot-water heating chamber. The postmaster's room is on the ground floor, and is reached by a door opening off the vestibule. Accommodation on the first floor comprises instrument and telephone rooms, women's retiring-room and lavatory, and a room for the telegraph messengers. The building throughout is heated with hot-water, radiators being placed at convenient and suitable distances. Incandescent lights will be used. The whole building has been carried out from plans prepared by His Majesty's Office of Works, and superintended by Mr. George Hinch, of His Majesty's Office of Works, Edinburgh. The contractor for the entire work was Mr. Robert McRobbie, builder, Crieff, and the sub-contractors were:—Joiner, Mr. J. Barnes, Blackford; plumber, Mr. C. Anderson, Crieff; slater, Mr. G. Phillips, Crieff; plasterer, Mr. J. Gorrin, Crieff; painter, Mr. H. Arnott, Crieff; glaziers, Messrs. C. & H. Malloch, Glasgow; smith and ironfounder, Mr. G. Barker, Perth; gasfitters, Messrs. Scott & Son, Crieff.

PROPOSED ALTERATIONS TO THE TOWN HALL, NEWCASTLE.—A report by Mr. F. H. Holford, the Newcastle City Property Surveyor, on the concert hall exits (Town Hall), drainage, etc., has been issued. The Property Surveyor submits two schemes for dealing with the concert hall exits, etc. The first suggests alterations at the south end, and would cost approximately £2,650.

The second scheme deals with the north end, and the estimated cost is £3,580. The report also recommends that all the drains should be carried outside the building, and suggests means of improving the lift. The total cost of the alterations to improve the exits of the concert hall, the drainage system, and the lift, would amount to about £7,095.

ENLARGEMENT OF THE CENTRAL LONDON THROAT AND EAR HOSPITAL.—H.R.H. Prince Louise recently opened a new wing at the Central London Throat and Ear Hospital in Gray's Inn-road. At present only one section of the entire scheme of enlargement has been entered upon, this involving an outlay of between £6,000 and £7,000. The new wing has been designed and erected under the personal supervision of Mr. Frederick W. Marks, and comprises operating theatre, electric lift, three single bed wards, a larger ward for five beds, and another ward for the temporary reception of children undergoing minor operations.

HOSPITAL LAUNDRY, CHESTER.—A new laundry has been opened at the Chester Infirmary. Mr. W. T. Lockwood prepared plans, and the work was carried out by Messrs. Parker Bros. at a cost of between £1,600 and £1,700.

NEW BUSINESS PREMISES IN SOHO.—New premises have been erected in Vardour-street for Messrs. Novello, the music publishers. The work has been carried out from the designs of Mr. Frank Loughborough Pearson, architect.

Appointment.

WALSALL.—Mr. John Taylor has been appointed Borough Surveyor of Walsall, in succession to the late Mr. R. H. Middleton. Mr. Taylor is an Associate of the Municipal and County Engineers, and also a member of the Royal Sanitary Institute. At present he holds the position of chief assistant to the Surveyor of Bradford.

Foreign.

GERMANY.—The new Government offices, Frankfurt-on-the-Oder, were built from the designs of Herr von Saltsvedel, who elaborated sketches supplied by the Public Works Department. Only the basement, the window dressings and columns are of yellow sandstone, the wall surface being cement coloured a yellowish red. The style followed is German Baroque, which is indigenous to this locality, for Frankfurt is full of such domestic architecture, and the new scheme charms one by its artistically handled simplicity. These dwelling-houses, dating from the first part of the XVIIIth century, are chiefly the work of Bohme, who successively filled the offices of Secretary for War, Minister for Agriculture and Minister for Public Works to the Berlin Chamber. The new Government buildings cost 1,457,723.23 marks, or 19.4 marks the cubic metre, as against 20.3 marks, the estimated figure.

SWITZERLAND.—On November 3 Rumine Palace, Lausanne, was inaugurated. It was built by the town as a library, university institute, and cantonal museum. It is named after the architect, Rumine, who in 1870 bequeathed 1,550,000 francs towards defraying the costs of such a building.

CHURCH OF S. CLEMENTE, ROME.—Under the presidency of the British Ambassador a committee has been formed in Rome to collect funds for the preservation of the 1st-century basilica of S. Clemente. The necessary outlay is computed at about £1,600, of which the greater part would be devoted to drainage works, inasmuch as during many years past the third or lowest church has been rendered inaccessible by an accumulation of water.

INDIA.—Plans for the new Secretariat Offices at Simla are under preparation, and the building operations will extend over two years. The Railway Board, the headquarters of the post office, and minor departments will be accommodated in the new offices.—The Calcutta Industrial Exhibition, which opens in January next, promises to be of some importance.—Various British manufacturers have of late been prosecuting native firms for infringement of trade marks.—The Karachi Port Trust, spent Rs. 20,65,406 during the past year in improving and enlarging the port to cope with increased trade. One shed for storage of sugar cost Rs. 160,000, and the new export yard will cover 150 acres. Before the enlargements are completed the outlay will run into Rs. 75,00,000.—The new Police Station at Port Blair will cost Rs. 40,660, and the Burma Divisional Buildings at Maymyo Rs. 144, 900.—At Lucknow a new market is to be built costing Rs. 100,000.—In addition to the statue of the late Sir John Woodburn, to be erected at Lucknow at a cost of 1,300, a statue of Sir Antony MacDonnell, at a cost of 1,800, will be put up in the same town.—The municipality of Rangoon are about to form a new establishment to improve the milk

ade. The present sheds are ill-ventilated, lthy, and the sanitary arrangements bad. Last year was remarkable for the amount of imports into India of building materials, and the present year bids fair to eclipse it; the values during the last three years being—1903, Rs. 28,70,853; 1904, Rs. 35,30,727; and 1905, Rs. 45,99,140. Sixty-six per cent. of the imports came from the United Kingdom. (Note.—The rupee is worth 1s. 4d., and Rs. 15 equal 11s.)

MALTA.—Two new dry docks, 120 ft. wide and having a depth for 35 ft. of water on the sill, have been completed at the top of French Creek, by Messrs. S. Pearson & Son, who employed 1,000 labourers, including Italian and Spanish as well as native workmen. The docks are respectively 790 ft. and 550 ft. long, and can be lengthened by 40 ft. by the shifting of the caissons. The constructional works were hindered by the large quantities of water, and during many months more than 40,000,000 gallons were pumped per diem. The masonry comprises 1,000,000 cubic ft. of granite, nearly all being brought from Sardinia and the Alps. Two breakwaters, 1,400 ft. and 400 ft. long, are being built at the entrance into the Grand Harbour. Mr. Ernest Harrison has superintended the operations; Mr. Cartwright Reid acted as superintending civil engineer during the later stages; and Colonel Sir E. Raban represented the Admiralty as general director of the works.

SOUTH AFRICA.—A meeting of the Master Builders' Association was recently held in Durban in connection with the Compulsory Arbitration Bill, which Mr. McLarty intends to introduce into Parliament. The chairman of the association gave a résumé of the proposed bill, which, he said, would lead to endless serious disputes, and employers would be dragged to court constantly on imaginary grievances. They accordingly had a Conciliation Board working voluntarily in the building trade, and he maintained that there was nothing to warrant such a bill in the colony. In the result a resolution was unanimously adopted protesting against compulsory arbitration or interference between employers and workmen. A letter was read from the Cape Town Master Builders' Association supporting the protest against compulsory arbitration.

Sanitary and Engineering News.

DERWENT VALLEY WATER SCHEME.—The Cleveland Bridge and Engineering Company, of Darlington, are building a bridge across the Trent for the waterworks system of the Leicester Corporation. The bridge piers are composed of cast-iron cylinders having a diameter of 10 ft. 8 in.; a single-span lattice-arch bridge, 230 ft. long, will carry three mains across the river.

AYRHO EXTENSION, GREAT WESTERN RAILWAY COMPANY.—A railway is about to be constructed at a cost of nearly 500,000*l.* for a length of 20 miles, to connect, at Ayrho, the main line of the Great Western and the Great Central joint line from Grendon Underwood to Princes Risborough, Co. Bucks. The contract has been taken by Messrs. Walter Scott & Middleton, Ltd., of Newcastle, who will finish the work in three years.

COVENTRY WATER SCHEME.—The Coventry City Council will promote a Bill in the course of next session to enable them, by arrangement with the Corporation of Birmingham, to lay down a line of pipes from their existing reservoirs to the main delivery line of the Birmingham system at Whitacre, some 15 miles distant, and to enlarge their reservoir system at Coventry for an additional maximum supply of 2,000,000 gallons, at a yearly cost of nearly 15,000*l.*, and an estimated outlay of 65,000*l.*

OUSEBURN VALLEY.—The works now in progress for the construction of a tunnel (of Hennebique ferro-concrete) through the valley between Newcastle and Heaton, for provision against floods, will eventually supply a site for drainage purposes when the ravine has been filled, to a depth of 85 or more feet above the crown of the tunnel, with some 3,000,000 cubic yds. of soil and material. Mr. W. T. Weir, of Howdon, is contractor for the tunnel, 28 tons to 32 tons. Of the total estimated outlay, nearly 101,000*l.*, about one-fifth will be expended upon the tunnel and the diversion of the stream. The work is being executed under the superintendence of Mr. J. C. Midgley, of the City Engineer's offices, Newcastle-on-Tyne, and will, it is anticipated, be completed for the tunnel at the close of next year.

Miscellaneous.

PROFESSIONAL AND BUSINESS ANNOUNCEMENTS.—Mr. James Melling, Darshwood House, New Broad-street, E.C., has been appointed London agent for Messrs. John Wood & Sons, of Wigan, manufacturers of pumping and winding engines and coal mining plant generally.

GRAMMAR SCHOOL, ASHBURNE.—The ancient Grammar School of Ashburne has been saved from vandalism through the intervention of the County Archaeological Society and the action of the Board of Education. The old school was established by royal charter by Queen Elizabeth in July, 1586, but there is no doubt that it existed long before this. One of the first names in those parts, and the crest of the Cockayne or Cockaigne family is still the badge of the school. Greatly increased revenues have in recent years accrued to the school through the working of coal mines under land owned by it at Shirebrook, in Nottinghamshire, near the Dukeries. It was proposed to pull down or re-arrange the fine old building to increase the accommodation, but, after strong opposition locally, the Board of Education have consented to the erection of new school premises altogether.—*Standard.*

LYCEUM THEATRE.—In pursuance of an Order of the Court this property, together with Nos. 33-7, Exeter-street, and part of No. 21, Wellington-street, is offered for sale. It covers an area of 23,500 sq. ft., and has a total frontage of 423 ft. The present building is a reconstruction for a music-hall, carried out two years ago by Mr. Bertie Crewe, of the theatre erected in 1831-4, after Samuel Beazley's designs, and enlarged on the sides of the theatre in 1891. On April 22 ("Shakespeare's day"), 1903, the directors of Lyceum, Ltd., offered the freehold property for sale and bought it in at 260,000*l.* Some extensive structural alterations had been required by the London County Council, which the directors were not willing to undertake. The effects and materials having been sold in March of the following year, the rebuilding for a seated audience of 2,800 persons was at once begun by Messrs. J. Parkinson & Sons, of Newcastle and Blackpool, and the new house was opened on December 26, 1904.

QUINTIN HOGG MEMORIAL.—On Saturday, November 24, the Duke of Argyll unveiled a memorial to the late Mr. Quintin Hogg, which has been erected in the roadway, Langham-place, W., at a distance of about 100 yds. from the Polytechnic Schools with which his life-labour was so closely associated. In the bronze group he is represented as seated between two Polytechnic boys whom he is instructing. The group, mounted upon a stone pedestal, was sculptured by Mr. Frampton, R.A.

ROYAL SCOTTISH ACADEMY.—At their last annual meeting the Royal Scottish Academy of Painting, Sculpture, and Architecture, elected as council for 1906-7, Sir James Guthrie, President; Messrs. E. A. Walton, W. Birnie Rhind, John Kinross, C. Martin Hardie, W. Grant Stevenson, and Hippolyte J. Blanc. Mr. James Miller, of Glasgow, architect, has been elected an Associate member.

BRITISH WEIGHTS AND MEASURES ASSOCIATION.—At a meeting on November 21 of the Committee of Control a resolution, moved by Mr. J. Hartley Wicksteed, ex-president Inst.M.E., of Leeds, was carried unanimously, declaring that with a view of bringing the physical science units into harmony with the British industrial and commercial units, it is desirable that they be based upon the inch at a standard temperature, the square inch, cubic inch, and the weight of a cubic inch of pure water at the standard temperature under a barometric pressure of 30 in. of pure mercury, instead of upon derivatives of the metre units. The association represent that besides other advantages for scientific purposes and for working decimally, the inch units possess the valuable property of being commensurable with the manufacturing and trade units used wholly by every English-speaking country and largely by all other countries in the world; thus providing a base to which these can be easily and economically adjusted. It was also agreed to take steps to obtain from the Government an enactment to legalise the weight of a cubic inch of pure water at a given temperature and pressure.

RESTORATION OF CARNARVON CASTLE.—Mr. Charles A. Jones, Deputy Constable of Carnarvon Castle, has received definite information from His Majesty's Office of Works that the sum to be applied to the scheme for restoring the Castle would be 7,000*l.* There is no intention of making any part of the building habitable, but merely to maintain the existing state of the fabric. It will be a continuation on a larger scale of the scheme which has been in progress for some years under the directions of the late Constable, Lord Carnarvon, and latterly of Sir John Puleston.

MEMORIAL TO JOHN KNOX, BURNHAM.—The memorial to John Knox, erected in the Albany aisle of St. Giles' Cathedral, was unveiled on the 21st ult., by Lord Balfour of Burleigh. The

form the monument has taken is a bronze statue of the Reformer, set in a decorative Gothic niche placed against the east wall of the aisle. It is the work of Mr. Pittendrigh Macgillivray, R.S.A.; and the cost was about 1,400*l.*

THE COLLAPSE OF HOUSES IN MARYLEBONE.—At the Marylebone Coroner's Court, on the 26th ult., Mr. Schroder held an inquest on the body of Mrs. Loomes, who was crushed to death on Thursday last week in the collapse of houses in Molyneux-street, Marylebone. She was the caretaker of one of the houses. The building, which was a tenement house, was in the course of repair. The inquiry was adjourned. The owners of the two houses that fell, Nos. 10 and 11, Molyneux-street, and of the houses on either side, Nos. 9 and 12, were summoned on the 26th ult. by the London County Council before the Magistrate at the Marylebone Police-court for failing to comply with the notices of the Council to carry out certain work which was rendered necessary by reason of the dangerous state of the different premises. Mr. Arthur Ashbridge, the District Surveyor, said he surveyed the premises on the day of the accident and found them in a dangerous condition. In respect of No. 9 he required that the party wall with No. 10 should be taken down where giving way, and that any other work rendered necessary in consequence should be done. So far, however, nothing had been done, and, having regard to the urgency of the matter, he asked for the order of the Court to have the work carried out forthwith. Only that day, he added, a piece of the adjoining wall fell down. The evidences with regard to the other houses were similar. The owner of No. 12 said it was impossible for him to do anything until he could get inside the house to shore up the rooms, but he was told that under no conditions was he to enter the house or take anyone else there. Mr. Cluer replied that he certainly could enter the house for the purpose of doing what was necessary to secure the premises, otherwise the only course open to him would be to shoot them down with cannon. The Magistrate made orders for the work to be carried out immediately.

THE INTERNATIONAL ART GALLERY.—It is announced that the first exhibition at the International Art gallery, consisting of works by modern British, French, and Dutch artists, will be held at 14, King William-street, Trafalgar-square, from December 12 till January 5.

MESSRS. W. H. SMITH'S NEW BUILDING.—Messrs. W. H. Smith & Son on Wednesday threw open their new building, No. 95, Fetter Lane, E.C., to the public to inspect the studios, print gallery, and factory of this branch of their business. A large staff of clever designers are kept constantly at work on the premises; business men requiring advertisements can either have them specially designed for them under their own supervision, or they can choose a design all ready executed from the portfolio on the spot. The ground-floor of the premises is a "poster" gallery, in which many clever drawings are shown from designs by Messrs. Hassall, Chas. Pears, Popini, and others. The factory is over the way; here the latest types of printing and colour printing machines were seen actively at work throwing off every size and description of printing from posters to book illustrations in the three-colour process. The processes were interesting to watch, and so long as advertising and posters are necessary to successful commerce, an establishment such as this of Messrs. W. H. Smith & Son should raise the standard of the work done and find congenial work for clever designers.

WHEATLEY'S "CRISPS OF LONDON."—Mr. Thomas G. Appleton has undertaken to engrave in mezzotint the series of thirteen pictures after F. Wheatley, R.A. Late XVIIIth-century sets engraved by L. Schiavonetti and others, are highly prized by collectors and connoisseurs, chiefly in virtue of the intrinsic merits of the prints. For whilst interesting in themselves for a portrayal of scenes and incidents of street-traffic, more than one hundred years ago, the figures and groups are somewhat idealised, lacking the force and character which later artists—Leech and Charles Keene, for instance—so truthfully depicted.

TECHNICAL CHEMISTRY AND INDUSTRIES.—The Institute of Chemistry have issued a report upon their recent examination, being the first, in chemical technology. The examinations are open to Fellows and registered Associates, and relate to chemistry in its application to manufacturing industries. The subjects comprise the properties of materials used in the construction of plant and apparatus in chemical works; the development, control, and transmission of heat and power; the treatment and handling of materials; a working knowledge of plant and operations in general industrial use, and some practical skill in interpreting drawings and preparing sketches to scale. Of the three candidates who entered upon this occasion, Mr. James McLeod, F.I.C., chief chemist to the Glasgow Corporation Gas Trust, satisfied the examiners. Dr. Ludwig Mond, F.R.S., is Chairman of the Examination Board; other examiners were Dr. H. G. Colman, M.Sc., for gas manufacture; and for steel manufacture, Mr. F. W. Harbord, A.R.S.M., and Mr. John E. Stead, F.R.S., F.F.I.C.

BURGLARY.—The Arrolthie, Ltd., inform us that their letter box was tampered with some time between Saturday afternoon and Monday morning last. Would any correspondents who may have written on Saturday last kindly write again?

Legal.

ACTION AGAINST THE SOUTH STONEHAM RURAL DISTRICT COUNCIL.

THE case of the Northam Bridge and Roads Company of proprietors v. the South Stoneham Rural District Council came before Mr. Justice Joyce in the Chancery Division on the 26th ult.

Mr. Bousfield, K.C., said the plaintiffs were the proprietors of a road and bridge leading from Southampton in an easterly direction, which they were empowered to make under an Act at the end of the XVIIIth century. They were entitled also to charge tolls, which they did at the present date. The defendants were the Rural District Council of a parish through which this road passed, and they had, in pursuance of their powers under the Public Health Act, made a sewer along a portion of the road. The question of plaintiffs' compensation was submitted to arbitration, and they were awarded 30l. odd in respect of the damage to the surface of the road. The question was then raised as to whether plaintiffs were the owners of the freehold, and were entitled to be compensated in a discontinuance of the surface. The arbitrator held that if the Court of plaintiffs' jurisdiction decided that the plaintiffs were the freeholders, they should have a further sum of 134l. for what was done below the surface, and the point to be determined by his lordship now was whether they were entitled to that sum.

His lordship: Who is entitled if you are not? The subsoil must belong to someone.

Mr. Bousfield said it was not suggested that there was any other owner. The defendants merely said that plaintiffs were not entitled.

His lordship thought that the owner of the adjacent land ought to have had notice of this action. If that had been done and nobody appeared, the plaintiffs' case would have been clear. He was being asked to determine the point in the absence of the only possible other owners.

Mr. Bousfield said that the matter had been one of notoriety in the district for a long time.

Mr. Hughes, K.C., for the defendant Council, said he would submit that the sole question he had to meet was whether the plaintiffs were entitled or not. He had nothing to do with anybody else.

Mr. Bousfield said he would show numerous acts of ownership during the past hundred years. The plaintiffs were exactly in the same position as a railway company. They had a compulsory right of purchase after giving notice to treat; they entered upon the road and exercised all the acts of ownership and everything one could possibly exercise.

Mr. Hughes contended that as regarded the portion now in dispute plaintiffs did nothing beyond what any highway authority would do.

Mr. Bousfield submitted that no distinction could be drawn between this and any other part of the road. It must be regarded as one estate. They were receiving rent at the present moment from a telephone company in respect of part of this road. He admitted that the conveyance could not be found.

Mr. Hughes said this was a much more serious matter than the mere amount in dispute. It was a question of the future. It might be necessary to disturb the road again for other matters. There was no conveyance, and at the time in question the Bishop of Winchester was Lord of the Manor.

His lordship said he was not going to listen to this case for perhaps a day and a half and then find his decision was not binding. If there was any serious possibility of the Bishop of Winchester being entitled, he would require him to be served with notice.

Mr. Hughes did not think there was any chance of the Bishop now claiming.

His lordship: But you must pay somebody.

Mr. Hughes: No, we performed a statutory duty. It did not hurt anybody.

His lordship: I beg your pardon. I have a very different opinion upon it. How could you build upon your land if somebody came and put a sewer under it?

Mr. Hughes thought it would be a positive advantage to most private owners.

His lordship: Do you admit that the Bishop of Winchester has no title?

Mr. Hughes said he could not go so far as to say that.

His lordship: Then the case must stand over, and the Bishop must be served. My present opinion is that the plaintiffs who are in possession of this land must be presumed to be entitled to it, but I will not decide the question in the absence of the Bishop.

Mr. Hughes said it would be a great misfortune if the matter had to go over and come up again. After consulting with his clients he made the

admission his lordship required, observing that he could not see the use of it, as it would not bind the Bishop or the Ecclesiastical Commissioners. If this part of the common had been purchased from the Bishop, it was a strange coincidence that while all the other conveyances had been carefully preserved, this one was missing, and there was no record whatever of it. The burden of proof was upon the plaintiffs to show that they did purchase.

His lordship said it appeared to him that the property in this land must either be in the plaintiffs or in the Ecclesiastical Commissioners. He had no hesitation in saying that the scheme of the Act was that the plaintiffs were to make actual purchases of the land and fee simple thereof out and out, and he had no doubt whatever that the plaintiffs were in possession of this land, and had been in possession from the early date when the road was made. If they had not acquired it by purchase, they had a perfectly clear title to it under the Statute of Limitations, and were, therefore, entitled to the amount of the award with 4 per cent. interest.

Patents of the Week.

APPLICATIONS PUBLISHED.*

21,970 Of 1905.—C. T. OLVER: *Gas Fittings for Domestic Fire Places.*

This relates to the construction and adaptation without and within the fire place of a receiver or burner for the storage therein of a supply of gas and air suitably arranged for the consecutive discharges of the mixture inwards therefrom through a series of nozzles or outlets situated at the outside extremity of said receiver, in conjunction with a second series thereof along the inner side or margin and at desired angles in the direction of the fuel within the grate. The invention also consists of an arrangement for the combustion or atomisation of the blended gas and air for combustion by the use of a loosely fitted metallic gauge of approved mesh and in the shape of a double apron or saddle for insertion within the approach of the receiver or burner, the flaps thereof extending outwards for a depth of 1 in. or upwards and gradually expanding in each direction of the walls of the tube.

22,240 of 1905.—A. J. BOULT (H. LAMARRE): *Hot-Water Heating Systems.*

This relates to a hot-water heating system, and consists of one or more radiators and an expansion vessel, all placed in a close tubular circuit, of which a portion is exposed to the direct action of a furnace, the expansion vessel being at a higher level than the radiators of said heated portion, a pipe connecting the lower portion of the chamber with the tube circuit adjacent to its heated portion, and valves controlling the circulation of water in said circuit.

22,451 of 1905. D. M. NESBIT: *Systems of Heating Buildings and the like.*

This relates to systems of heating buildings and the like, and consists in converting a hot-water heating installation into a steam heating installation by substituting a steam generator for the hot-water boiler and providing the supply-pipe of each section with an automatic controlling device adapted to the steam or vapour automatically to each section or separate range of piping only as required, thereby preventing overheating or insufficient heating of any of the sections of radiators.

22,521 of 1905.—BRUCE & STILL, LTD., and W. T. C. BRUCE: *Supports for Gutters or Launder in Buildings, Mining, Machinery, and the like.*

This relates to supports for gutters and the like, and consists in the combination of a wall-plate fixed to the structure having vertically slotted holes with a saddle for carrying the gutter or launder having two arms, one at least of which is bolted through a slot to the said wall-plate, and the other arm is either bolted or can freely slide vertically while rigid horizontally in the other slot of the wall-plate.

25,719 of 1905.—J. E. SHELDON (HARRIS & SHELDON, LTD.): *Fasteners or Catches to be used in Connection with Double Doors and Windows.*

This relates to a fastener or catch for double or folding doors, windows, or the like, consisting of a bar axis having at its end lugs or arms disposed at an angle to each other, and so arranged that when one door has been closed the closing of the other door causes the latter to strike one of the lugs or arms and partially rotate the bar axis and take the other lug into engagement with a recess in the closed door, whilst by the opening of the said second door the unfastening of the first door is effected by the parts resuming their normal positions through the agency of a spring or equivalent.

* All these applications are in the stage in which opposition to the grant of Patents upon them can be made.

26,311 of 1905.—W. R. HOLBROOK and L. G. BARBER: *Unpickable Night Latch or Lock.*

This relates to a latch or lock and consists in the insertion of a single or double sliding plate or bar inside the case capable of closing the keyhole or keyholes, said plate or bar being operated by means of an eccentric cam or disc, furnished with hooks at its extended end and operated by the squared part of the spindle of an external knob, provided outside the case but inside the door to be locked, said spindle sliding forward and backwards in a slot of the latch-case, and also passing through the latch-bolt and being fixed to it by means of a screw or its equivalent, in such a manner that when the knob is given a half turn, it operates the cam, the latter pushing the sliding-plate forward so that the latter effectually covers the keyhole or keyholes, the cam and plate being firmly held in position by engaging with a pin or stop which immovably locks the bolt at the same time.

2,564 of 1906.—A. F. MORRISON and M. INGRAM: *Discharger and Overflow for Lavatories and the like.*

This relates to a discharger and overflow for lavatories and the like, and consists in making the overflow and waste pipe of brass or any other suitable metal or metals together with an annular ring of india-rubber or other suitable material held in position within the waste pipe. The overflow is formed of a length of pipe suitably tapered, lipped, and indented round so as to fit within the annular ring, and serve to close the overflow waste and also act as the overflow. The overflow pipe may be actuated by the hand direct or by means of a treadle arm, lever, or other mechanical apparatus. In emptying the lavatory or the sink and the like, the invention provides for pushing down the said overflow pipe into the metal waste instead of lifting it up. Stops are provided around the upper outer edge of the overflow pipe to keep it raised above the bottom of the vessel, so as to prevent soap and other articles floating down the waste pipe. When it is desired to fill the vessel, the overflow pipe is simply pulled up until it is held in position by the said annular ring.

5,740 of 1906.—R. S. MAY: *Safety Skylights.*

This relates to a method of automatically releasing the means which normally retain in the closed position a skylight adapted to raise itself when released, and consists in interposing between said retaining means and the upper end of the ladder or steps leading to said skylight a movable device which will be displaced or moved by the weight of a person ascending said ladder or steps in such wise as to release the aforesaid retaining means and thereby cause or permit the skylight to open.

7,470 of 1906.—W. MEURER: *Room Ventilator.*

This relates to a room ventilator into which the end of the chimney pipe is led, and is characterised in that the ventilator can, together with the chimney pipe, be eventually closed towards the flue by a ring plate which is pivotally arranged at the rear end of the ventilator and is adapted to be moved aside from inside the room by a lever.

11,413 of 1906.—E. RIDER: *Fastener for Windows and the like.*

This relates to a fastener for windows and the like, and consists in the combination with a metal casing secured on the meeting rail of the upper and outer sliding window sash and containing a spring locking catch or bolt having a bevelled off or chamfered end, of a striking plate suitably secured to the meeting rail of the lower and inner window sash, and having a recess formed to receive the end of the spring locking catch after the striking plate has passed below it.

12,480 of 1906.—A. R. POOL and W. ELLIOTT: *Door Latch and Bell Mechanism.*

This relates to a door latch and bell mechanism comprising a slidable and non-rotatable knob stem, and a latch, and consists in the arrangement whereby the knob stem is provided with a rack adapted to operate a segment with which the latch is loosely connected and wherein the stem and latch are each provided with springs for restoring said parts to their normal positions. The invention also comprises a gong and a clapper, the clapper of which is operated by an adjustable pin secured to the knob stem, thus affording means for regulating the stroke of the clapper.

12,805 of 1906.—G. S. PACKER: *Sash Locks.*

This relates to a window sash lock, the integral casing comprising a horizontal plate, a downwardly extending flange adapted to be secured to the side of the lower window sash, downwardly extending flanges which overhang the edge of the lower window sash and rest in a recessed portion, dovetail pins carried by said last-named flanges and entering the body of the window sash, and bolt casings formed upon the horizontal plate and lying at right angles to each other and having slots in their walls, one of said slots having a short slot at right angles thereto and bolts slidable in the casings and having headed pins moving in the slots of the casings.

PATENTS.—Continued on page 644

List of Competitions, Contracts, etc.

For some Contracts still open, but not included in this List, see previous issues. Those with an asterisk (*) are advertised in this Number: Competition, iv.; Contracts, iv. vii. x.; Public Appointments, xvi.; Auction Sales, xxviii.

Certain conditions, beyond those given in the following information, are imposed in some cases, such as: the advertisers do not bind themselves to accept the lowest or any tender; that a fair wages clause shall be observed; that no allowance will be made for tenders; and that deposits are returned on receipt of a bona-fide tender unless stated to the contrary.

Competitions.

DECEMBER 5.—Birmingham.—BATHS.—Birmingham Baths and Parks Committee invite applications from local architects who desire to prepare and to submit competitive drawings for the proposed new public baths at Nechells. Such applications must be sent in on or before 10 o'clock on December 5, addressed to Mr. J. Cox, Superintendent, Engineer, and Secretary, Office Baths and Parks Department, Kestrel-street, from whom any further information can be obtained relative to the conditions of competition.

JANUARY 12.—Glasgow.—RIDDIE ESTATE.—The date for sending in competitive designs for laying out this estate has been extended from December 12 till January 12, 1907. Mr. A. W. Myles, Town Clerk, City Chambers, Glasgow.

FEBRUARY 14.—Kendal.—LIBRARY.—Kendal Corporation invite architects practicing in Kendal, or born in Kendal and following their profession elsewhere, to submit competitive designs, together with written descriptions and estimates, for the erection of a public library in the said borough. A premium of 25*l.* is offered for the design considered by the Corporation first in order of merit, and further premiums of 15*l.* and 10*l.* respectively for those which are, in their opinion, second and third in order of merit. If the author be employed, the premium will be paid to him, and if not, to the author, and will be treated as paid on account of the same. Particulars and conditions of competition, together with plan of site, showing levels, etc., may be obtained free on application to Mr. John Bolton, Town Clerk, Kendal. Complete designs, descriptions, and estimates, marked with a motto, sealed, and endorsed "Public Library," are to be delivered at the office of the Town Clerk, Kendal, on or before February 14.

NO DATE.—Grimsby.—CHURCH, etc.—Competitive plans are invited for a Congregational church, school, and manse at corner of Hainton-avenue and Wellholme-road, Grimsby, at an estimated cost of £2,000. Three premiums of 25*l.*, 15*l.*, and 10*l.* guineas respectively are offered for plans. Conditions of competition will be sent to applicants on payment of 2*l.* 2*s.* For further particulars apply Mr. E. L. Aridge, Hon. Secretary, Fish Docks, Grimsby.

Contracts.

BUILDING.

DECEMBER 1.—Carlisle.—LAUNDRY BLOCK.—The Committee of the Carlisle Fever Hospital or House of Recovery invite tenders from contractors for enlarging and improving the laundry block. Plans and specifications may be seen at the office of Mr. John Little, Civil and Sanitary Engineer, Eaglesfield Abbey Rooms, Castle-street, Carlisle. Tenders are to be sent to Mr. Little, not later than noon on December 1, endorsed "Tenders, Laundry Block."

DECEMBER 3.—Glasgow.—HOME.—A new Home in connection with the Orphanage of St. Vincent de Paul, Glasgow. Bills of quantities may be had on application to Messrs. Mummy and O'Rourke, surveyors, 15, College-green, on deposit of 2*l.* Tenders, sealed, and marked "Orphanage, Glasgow," to reach office of Mr. J. P. Wrenn, M.R.I.A.I., architect, 189, Great Brunswick-street, Dublin, not later than 12 o'clock, December 1.

DECEMBER 3.—Golcar.—WORK AT STORES.—For mason's and joiner's works required to be done at Bolster Moor Store, Golcar, for the Southwaite Industrial Society, Ltd. Plans may be seen, and bills of quantities obtained, at office of Mr. J. Berry, architect and surveyor, 3, Nail-top-place, Huddersfield. Tenders to be forwarded to architect not later than December 3.

DECEMBER 3.—Grange-over-Sands.—HOUSES.—For the erection of a pair of semi-detached houses at the corner of Fell-road and Charney-road, Grange-over-Sands. Plans may be seen, and quantities obtained, at the office of Messrs. Mummy and O'Rourke, R.E.A. architects, Ulverston, and Barrow-in-Furness. Sealed tenders, endorsed "Tender for Houses, Grange-over-Sands," to be delivered at the architects' offices not later than noon on December 3.

DECEMBER 3.—Matlock Bank.—BOARDING-ROUSE.—For the erection of a proposed boarding-house, to be called the Matlock Bank. Application should be made to Mr. D. M. Wildgoose, architect, Edge-road, Matlock, on or before December 3, when it will be necessary to call on architect and supply and date when tenders should be sent in.

DECEMBER 3.—Fengam.—CHAPEL SCHOOLDROOM.—For the erection of a Chapel Schoolroom at Pengam, Glam., for the Calvinistic Methodist, Rhymney District. Plans and specifications may be seen at office of Mr. Wm. Harris, architect and surveyor, 4, Guilford, Bargoed. Sealed and endorsed tenders to be sent in before 12 o'clock noon on December 3 to the Secretary, the Rev. John Williams, The Manse, Glyn.

DECEMBER 3.—York.—WORKSHOP.—The City of York Education Committee invite tenders for erec-

tion of a workshop for manual instruction at the Huxley-road Council School, York, and request tenders to be sent to Mr. Walter H. Brierley, architect, 13, Lendal, York, on or before December 3. Sole tenders only will be entertained.

DECEMBER 4.—Dublin.—TEMPORARY OFFICE.—Dublin Corporation Estates and Finance Committee invite tenders for the erection of temporary office (wood and iron), Lord Edward-street. Particulars to be obtained at office of Mr. Edmund W. Byrne, City Treasurer, Municipal Buildings, Dublin. Tenders to be sent in on or before December 4.

DECEMBER 4.—Manchester.—ALTERATIONS TO OFFICES.—For alterations to the Chorlton Union Offices, for alterations to the Chorlton Union Offices, Chorlton Union. Plans, etc., may be seen, and bills of quantities obtained, from Messrs. Charles Clerk & Son, architects, of 2, Spring-garden, Manchester, upon payment of 1*l.* Sealed tenders, enclosed in the official envelopes, must be delivered to Mr. David S. Bloomfield, Clerk to the Guardians, Union Offices, All Saints, Manchester, not later than 5 p.m. on December 4.

DECEMBER 4-13.—Tusley, Birmingham.—FACTORY.—For builders work, exclusive of constructional steelwork, in erection of warehouses and shopping at Tusley, near Birmingham. Applications for quantities must reach the surveyor, Mr. C. Silk, at Newhall-street, Birmingham, not later than December 13. Tenders to be in on December 13. A deposit of 1*l.* is to be required. Plans may be seen at the offices of the architect, Mr. G. A. Cox, 33, Newhall-street, Birmingham.

DECEMBER 5.—Fyvie.—MANSE.—The mason, carpenter, slater, plaster, plumber, and painter works of alterations and repairs on Manse of Fyvie. Plans and specifications may be seen with Messrs. James Duncan & Son, architects, Turfhill, and attendance will be given at the Manse on December 1, from 10 o'clock a.m. to 12 noon, to show the alterations and repairs to be made, and to be lodged with the architects on or before December 5.

DECEMBER 6.—Glasgow.—PARK BUILDINGS.—Glasgow Corporation invite tenders for the following classes of work: (1) mason and brick; (2) carpenter, joiner, glazier, and ironmongery; (3) plumber and gas-fitter; (4) slater and rough cast; and (5) painter and plaster, required for the erection of a new house and an addition to the caretaker's house at Bellahouston Park. Plans may be seen, and copies of the schedule of quantities and form of tender obtained, at the office of Public Works, No. 64, Cochrane-street, and sealed offers, marked "Bellahouston Park, Tender for a Work," must be lodged with Mr. A. W. May, Town Clerk, City Chambers, Glasgow, not later than December 6.

DECEMBER 7.—Huddersfield.—ADDITIONS TO WORKS.—The excavators and masons, carpenters and joiners, plumbers and glaziers, blue slaters, painters, and ironfounders work required in the erection of additions to cleaning works at Seed Hill, Huddersfield. The plans and specifications may be seen at the office of Messrs. Stocks & Sykes, architects, St. Peter's-street, Huddersfield, from November 30 until December 7, on which later date sealed and endorsed tenders must be delivered to architects not later than 12 o'clock noon.

DECEMBER 7.—Sneinton.—BATHS.—Nottingham Public Baths Committee invite tenders for alterations to the boys' swimming bath, at the Victoria Baths, Sneinton. Plans may be seen, and copies of the specification, quantities, and form of tender obtained, from Mr. Frank B. Lewis, City Architect, Guildhall, on payment of a deposit of 1*l.* Sealed tenders, properly endorsed, to be delivered to Mr. Samuel G. Johnson, Town Clerk, The Guildhall, Nottingham, not later than 10 a.m. on December 7.

DECEMBER 8-28.—Carmarthen.—WORKHOUSE.—Carmarthen Guardians invite tenders for the erection of the new workhouse at Carmarthen. Names and addresses to the Board's Architect, Mr. Arthur I. Jones, 2, Spilman-street, Carmarthen, before December 8, together with a cheque for 2*l.* 2*s.* for bill of quantities. Sealed tenders (marked "New Workhouse") must be delivered to Mr. John Saer, Clerk to the Guardians, 7, Hall-street, Carmarthen, not later than December 28.

DECEMBER 8.—Maesteg.—CHAPEL.—For rebuilding of Bethania Welsh Baptist Chapel, Maesteg. Plans and specifications may be seen with Rev. J. J. Jones, Bethania Vale, Maesteg, and at the office of the architect, Mr. W. Beddoe Rees, architect, 3, Dunfriis-place, Cardiff, from whom bill of quantities may be obtained on deposit of 1*l.* Tenders to be sent to Mr. Thomas Rees, Secretary, 16, Bank-street, Maesteg, on or before December 12.

DECEMBER 10.—Harborne, Birmingham.—FIRE STATION.—Birmingham Watch Committee invite tenders for the erection of a fire station at Harborne. Plans and specification may be seen, and quantities and form of tender obtained, at the office of Mr. Henry E. Sturge, M.Inst.C.E., City Engineer and Surveyor, Council House, Birmingham, on deposit of 5*l.* Tenders must be delivered at the office of the Engineer on or before December 10, endorsed "Tender for Fire Station," and addressed to the City Surveyor.

DECEMBER 10.—Kingsussie.—SCHOOL CLASS-ROOMS.—The mason, carpenter, slater, plasterer, painter, glazier, plumber, and water-heating works of new class-rooms, to be erected at the Public School,

Kingsussie. Plans and specifications to be seen with Mr. Alexander Cattanach, architect, The Laurels, Kingsussie, and offers will be received by Mr. L. Mackintosh, Clerk to the School Board, till December 10 first.

DECEMBER 10.—North Shields.—COMMITTEE ROOMS.—Tynemouth Corporation invite tenders for pulling down existing buildings in Norfolk-street, North Shields, and erecting and completing new committee-rooms and offices. The drawings, etc., may be seen at the office of Mr. John F. Smilie, Borough Surveyor, Tynemouth, where copies of the bills of quantities and the general conditions may also be obtained on depositing the sum of 2*l.* 2*s.* Sealed tenders, endorsed "Tender for New Committee-rooms, etc.," will be left at the office of the Surveyor not later than 10 a.m. on December 10.

★ DECEMBER 10.—Swansea.—PAVILION.—The Royal National Eisteddfod of Wales, Swansea, 1897, invite tenders for a temporary pavilion at Victoria Park, Swansea, to seat 18,000 persons. Contractors are invited to tender for either or both of the following, viz.:—(a) The timber work; (b) the canvas roofing. Plans and specifications may be seen, and bills of quantities obtained, on payment of 1*l.* 10*s.* on and after December 3, at the offices of the Joint Architects (see advt. in this issue). Tenders, endorsed "Tender for Pavilion," on or before December 10, to Mr. A. B. Davies, General Secretary, 58, Wind-street, Swansea.

DECEMBER 12.—Edinburgh, Glasgow, and Aberdeen.—H.M. WORKS AND REPAIRS.—The Commissioners of H.M. Works and Public Buildings invite separate tenders for the execution of:—(1) Excavator's, mason's, and bricklayers' work; (2) joiner's and carpenter's and joiner's works; (3) ironfounder's, smith's, and ironmonger's work; (4) slater's work; (5) plasterer's work; (6) plumber's and gasfitter's work; (7) painter's, paperhanger's, and glazier's work; (8) glazier's work; (9) blindmaker's and bell-hanger's work, in connection with ordinary works and repairs to buildings in their charge in (1) Edinburgh, (2) Glasgow, (3) Aberdeen, for three years from January 1 next. The printed schedule, with form of tender, may be obtained on application to Mr. W. T. Oldrieve, H.M. Offices at Edinburgh, between the hours of 11 a.m. and 3 p.m., upon payment of 10*s.* for each schedule. Tenders must be delivered on or before December 12, addressed to the Secretary, H.M. Office of Works, Storey's Gate, London, S.W., and endorsed "Tender for Ordinary Works and Repairs." (1) Edinburgh, (2) Glasgow, (3) Aberdeen, as the case may be.

★ DECEMBER 12.—Edmonton.—LAUNDRY.—The Edmonton Guardians invite tenders for extension and additional story to the laundry at Edmonton Workhouse, Upper Edmonton. Drawings and specifications of the proposed work may be seen at the architect's office, Mr. Stuart Hill, 10, Cannon-street, E.C. Sealed tenders to be delivered to the Clerk to the Guardians, Lower Tottenham, before 9 a.m. on December 12.

DECEMBER 12.—Leochore.—BUSINESS PREMISES.—The brick, joiner, plumber, plaster, slater, and painter works of proposed new branch business premises, Leochore, for the Lochelly Equitable Co-operative Society, Ltd. Plans and specifications may be seen, and all further information obtained, on application to Mr. James T. Scobie, architect, Dunfermline and Lochelly, and sealed tenders to be lodged with the Secretary, Mr. John Mitchell, at the Society's Offices, on or before December 12, by 5 o'clock p.m.

DECEMBER 15.—Bargoed.—COTTAGE HOMES.—Merthyr Tydfil Guardians invite tenders for the erection of two cottage houses at Bargoed, in the parish of Gelligarr. Plans and specification may be seen, and bills of quantities obtained, at the office of the architect, Mr. Thomas Roderick, Clifton-street, Aberdare. Sealed tenders, endorsed "Tender for Cottage Homes," must reach Mr. Frank T. James, Clerk to the Guardians, 134, High-street, Merthyr Tydfil, by December 15.

DECEMBER 15.—Fareham.—SCHOOL, etc.—The Governors of Price's Charity invite tenders for the erection of a school building and offices, master's house, drainage, road making, fencing, etc., at Fareham, Hants. The drawings and specifications and conditions of contract may be seen, and bills of quantities and form of tender obtained, at the offices of the architect, Mr. Wilberforce Cobbett, Fareham, Hants, on payment of a 5*l.* Bank of England note. Sealed tenders, endorsed "Tender for Price's Schools," to be delivered at offices of Mr. Leonard Warner, Clerk to the Governors, Town Hall Chambers, Fareham, not later than 12 o'clock on December 15.

★ DECEMBER 14.—Lewisham.—SORTING HOUSE.—The Commissioners of H.M. Office of Works invite tenders for the enlargement of a sorting office at Lewisham. Drawings, specifications, etc., may be seen on application to Mr. J. Wager, H.M. Office of Works. Bills of quantities and form of tender may be obtained from the Secretary, Storey's Gate, S.W., to whom tenders must be delivered, endorsed "Tender for Enlargement of Sorting Office," not later than December 14.

DECEMBER 15.—Saffron Walden.—MANUAL INSTRUCTION BUILDING.—The Governors of King Edward the VI. Grammar School, Saffron Walden, invite tenders for the erection of a manual instruction building at this school. Drawings and specifications can be seen, and information obtained, at the office of Messrs. Ackland, Son, & Baily, Saffron

Walden. Tenders should be addressed to Mr. W. F. Ackland, Clerk to the Governors, at the above office, in a cover, endorsed "Grammar School Tenders," and should be delivered not later than 6 p.m. on December 15.

DECEMBER 15.—Sleaford.—SCHOOL.—Kesteven C.C. Education Committee invite tenders for the various works required in the erection of a Council school in Sleaford for 630 children. Applications to tender should be made to Mr. W. B. Purser, County Surveyor's Office, Grantham, on or before December 5, where plans and specifications, and copies of bills of quantities and forms of tender obtained, on payment of 1l. 1s. Tenders, endorsed "Tender for Sleaford School," to be delivered at office of Mr. Hudson Donalson, Secretary, County Education Office, 64, London-road, Grantham, not later than December 15.

DECEMBER 17.—Hedon.—SCHOOL. ADDITIONS, ETC.—East Riding of Yorkshire C.C. Education Committee invite tenders for additions and alterations to the Council School, Hedon. Plans and specifications may be seen, and forms of tender and copies and quantities obtained, on application to the Building Surveyor, County Hall, Beverley, upon depositing 1l. 1s. A copy of the plans and specification will be deposited at the Council School, Hedon, for the convenience of persons tendering. Tenders, endorsed "Hedon Council School Extension," must reach Mr. John Bickersteth, Clerk to the East Riding Education Committee, County Hall, Beverley, on or before 10 a.m. on December 17.

DECEMBER 17.—New Shoreham.—SCHOOL. ALTERATIONS AND ADDITIONS.—West Sussex and Chichester Local Education Authority invite tenders for executing alterations and additions to New Shoreham Council Schools. Plans, specifications, and conditions of contract may be seen, and forms of tender obtained, at the offices of Mr. A. V. Nye, 2, Duke-street, Brighton. Tenders, sealed and endorsed "Tender for Alterations and Additions to the New Shoreham Council Schools," to be addressed and delivered to Mr. Edwin Thompson, Secretary, Education Office, Horsham, not later than first post, December 17.

DECEMBER 25.—Worcester.—WAREHOUSE AND OFFICES. Builders desirous of tendering for erection of new warehouse and offices at Worcester for Messrs. Kay's, Ltd., should apply to Messrs. Simpson & Ayton, architects, 3, Verulam-buildings, Gray's-inn, W.C., on or before December 25. Quantities will be supplied on deposit of 2l. 2s.

JANUARY 17.—Rotherhithe.—ADDITIONS, ETC.—The Guardians of the parish of Rotherhithe invite tenders for certain alterations and additions to the Infirmary, Lower-road, Rotherhithe, S.E., according to plans and specification prepared by Mr. A. H. Newman, architect, and quantities by Messrs. W. Farthing & Son. Names and addresses before December 6 to Mr. E. Pitts Fenton, Clerk to the Guardians, 283, Tooley-street, S.E., with deposit of 50l. Sealed tenders, endorsed "Tender for Alterations and Additions, Infirmary," to be delivered to the Clerk, personally, at 6 p.m., January 17.

NO DATE.—Cardiff.—ADDITIONS TO BREWERY.—For the erection of additions to the Brewery, Cardiff, for Messrs. William Hancock & Co., Ltd. Names to Mr. Henry Budgen, 95, St. Mary-street, Cardiff, with deposit of 2l. 2s.

NO DATE.—Landport.—LABORATORY, ETC.—Messrs. Timothy White Company invite tenders for the erection of a laboratory, etc., in Chandos-street, Landport. Copies of the bills of quantities may be obtained from Messrs. Cook & White, architects and surveyors, 394, Commercial-road, Portsmouth.

NO DATE.—London.—REPAIRS. For repairing a house and shop. Specification can be seen at Mr. H. Wolfson, 3, Hounds-ditch, E.C.

ENGINEERING, IRON, AND STEEL.

DECEMBER 2.—Kilmarnock.—ELECTRIC LIGHTING.—The Managers of Henderson U.F. Church, London-road, Kilmarnock, invite tenders for the electric lighting of their new church. Specification and form of tender can be obtained from the engineer Mr. W. Arnot, 163, Hope-street. A deposit of 1l. is required. Sealed tenders to be returned to engineer not later than December 2.

DECEMBER 4.—London.—METALS.—The Southern Mahatma Railway Company, Ltd., invite tenders for:—(1) Metals; (2) steel material, as per the specifications, which may be seen at the offices of the Company. The charge for each specification is 1l. 1s., which will not be returned. Tenders must be sent in, addressed to the Secretary, marked "Tender for Metals," or as the case may be, not later than 12 o'clock noon on December 4. Mr. Edw. J. Thornton, Secretary, 46, Queen Anne-gate, S.W.

DECEMBER 4.—London.—RAILS, ETC.—The Secretary of State for India in Council invites tenders from such persons as may be willing to supply rails and fishplates, fishbolts, dog spikes. The conditions of contract may be obtained on application to the Director-General of Stores, India Office, Whitehall, S.W., and tenders are to be delivered at that office by 2 o'clock p.m. on December 4.

DECEMBER 4.—Middleton.—SPRINKLERS.—Corporation of Middleton invite tenders for the providing and erecting at their Sewage Works, Land's End, of two 52 ft. diameter automatic sprinklers. Plan of bacteria beds can be seen, and further information obtained, on application to Mr. Wm. Welburn, Borough Surveyor, Town Hall. Tenders to be delivered at the Town Clerk's Office, addressed to the Chairman of the Surveyors' Committee, not later than December 4, endorsed "Sprinklers."

DECEMBER 5.—Norwich.—MAINS AND FITTINGS.—Norwich Guardians invite tenders for supplying and fixing steam mains and fittings at the Norwich Workhouse. Copy of plan and specification and tender form can be obtained at the offices of Messrs. Morgan & Buckingham, architects and surveyors, 5, Redwell-street, Norwich, on payment of 1l. 1s. Sealed tenders, endorsed "Steam Mains," must reach Mr. Henry Stone, Clerk to the Guardians, St. Andrew-street, Norwich, on or before December 5, at 12 o'clock noon.

DECEMBER 6.—Blackrock.—PUMPS AND EJECTORS.—Blackrock and Kingstown Drainage Board invite tenders for the supply and erection at Blackrock,

Co. Dublin, of a pumping plant on the patent Sisson Pneumatic Ejector System. Plans, specifications, and conditions of payment, etc., can be obtained from Messrs. Kaye-Perry & Ross, consulting engineers, 63, Dawson-street, Dublin. Tenders, sealed and endorsed "Tenders for Pneumatic Pumps and Ejector," on the outside, and lodged with Mr. J. C. Doyle, Secretary of the Board, Town Hall, Blackrock, at or before 12 o'clock noon on December 6.

DECEMBER 7.—Bradford.—IRONWORK.—Bradford Corporation invite tenders for the supply and erection of constructional ironwork for the works in progress at the Electricity Works, Valley-road, Bradford. Drawings may be seen, and printed copies of specification, general conditions, quantities, and form of tender may be obtained at the Electricity Offices, Whitaker-buildings, Bradford, on December 1, between the hours of 10 a.m. and 1 p.m., and from December 3 to December 6, between the hours of 10 a.m. and 5 p.m., on payment of the sum of 1l. 1s. Sealed tenders, on the form supplied, must be sent, fully filled up, to Mr. Frederick Stevens, Town Clerk, Town Hall, Bradford, not later than first post on December 7, endorsed "Tender for Electricity Works—Contract U."

DECEMBER 8.—Leicester.—CAST-IRON PIPES.—Leicester Gas and Electric Lighting Committee invite tenders for the supply and delivery of the necessary cast-iron pipes and connections, from 2 to 36 in. in diameter, required during the twelve months ending December 31, 1906. Plans and specifications of tender can be obtained upon application to the Engineer, Tenders, addressed to Mr. Councillor Roberts, Chairman, and endorsed "Tender for Cast-iron Pipes," to be delivered at the offices of Mr. Alfred Colson, M.Just.C.E., Engineer and Manager, Millstone-lane, Leicester, not later than 11 o'clock a.m. on December 8.

DECEMBER 8.—Swinton.—PUMP.—Swinton and Pendlebury U.D.C. invite tenders for a sludge pump at Swinton Sewage Works. Particulars and form of tender sent to the Engineer, Swinton, on or before December 8. Tenders, sealed and endorsed "Tender for Pump," to Mr. W. T. Postlethwaite, Clerk to the Council Offices, Swinton, not later than December 8.

DECEMBER 10.—Hitchin.—BOILER SHAFT.—Hitchin Guardians invite tenders for the erection of a new boiler shaft at the Union Workhouse, Hitchin. A plan and specification can be seen at the office of Mr. A. E. Pashingham, Clerk, Union Offices, Old Town Hall, Hitchin. Sealed tenders, endorsed "Boiler Shaft," to be received at office of Clerk not later than 10 a.m. on December 10.

DECEMBER 12.—Durban.—IRON WINDOW FRAMES.—The Corporation of Durban, Natal, invite tenders for the supply and delivery free on board, of 18 iron window frames, size 10 ft. by 5 ft., for the railway car shed. Specifications and drawings can be obtained from Mr. W. E. W. W. (Consulting and Representative Engineer to the Corporation), Albion-chambers, Nottingham. Sealed tenders must be delivered to Messrs. Webster, Steel & Co., Agents to the Corporation, 5, East India-avenue, Leadenhall-street, London, E.C., on or before December 12.

DECEMBER 15.—Handsworth.—ELECTRIC LIGHT WORKS.—The U.D.C. of Handsworth invite tenders for the supply, delivery, and erection of the following plant at their Electric Power Station:—Contract No. 15.—Extension water-tube boilers (two). Contract No. 16.—Horizontal engine (500 h.p.) and dynamo (one 315 k.w. and two 45 k.w.). Tenders will only be considered for the whole of the work covered by each specification, and not for any part thereof. Copies of the specifications, with the conditions of contract, etc., can be obtained from Mr. H. Ward, Clerk, The Council House, Handsworth, near Birmingham, on or before December 15. Plans, specifications, and drawings can be seen at (but not obtained from) the offices of the consulting engineers, Messrs. Kennedy & Jenkin, 10, Victoria-street, Westminster, London, S.W. Tenders, on the prescribed form in sealed envelopes, and endorsed on the outside "Electric Light and Power Supply Tender—Contract No. 15," must be delivered at office of Clerk before noon on December 15.

DECEMBER 15.—Wemmergill.—BRIDGE WORKS.—North Riding of Yorkshire C.C. invite tenders for additions to and strengthening of Wemmergill Bridge (stone), at Wemmergill, on the Middleton-Teesdale and Brough main road. Plans and specification and bills of quantities at the County Surveyor's Office, County Hall, Northallerton. From December 3 to 15 inclusive, between the hours of 9.30 a.m. and 4 p.m. (Saturdays until 12 noon). Mr. W. C. Bryning, County Surveyor, County Hall, Northallerton.

DECEMBER 19.—Watford.—IRON PIPES.—Watford U.D.C. invite tenders for a quantity of vertically cast iron pipes of various diameters for water mains, together with all the necessary fittings, in accordance with printed specification and tender forms, which can be obtained at the Engineer's Office. Sealed tenders to be sent to the offices of the Council, 14, High-street, Watford, addressed to the Clerk to the Urban Council, and endorsed "Tender for Water Mains," on or before December 19.

JANUARY 19.—Bradington.—MACHINERY.—Bradington Corporation invite tenders for the supply and erection of two sets of deep-well pumping machinery, to be driven by steam, suction gas, or electricity. Copies of specifications, forms of tender, and particulars to view the site may be obtained from Mr. A. E. Mathewman, Town Clerk, Town Hall, Bradington, on payment of 2l. Tenders, endorsed "Tender for Pumping Machinery," are to be addressed to the Chairman of the Waterworks Committee, delivered at the Town Clerk's Office not later than January 19.

NO DATE.—London.—GAS PLANT.—For re-erection of small gas plant now on site near London. Application for specification to the Waterworks Lighting Corporation, 99, Cannon-street, E.C.

MISCELLANEOUS.

DECEMBER 1.—Bridlington.—PULLING DOWN, ETC.—Bridlington Corporation invite tenders for the pull-

ing down and clearing away of: (1) the three remaining houses in Lizard-terrace, being numbers 45, 47, and 49, St. John-street; and (2) the three houses in St. John-street, immediately to the north of the above three houses, and numbered 51, 53, and 55; the materials to be taken from the property of the person whose tender is accepted, and to be removed from the site within three weeks. Any further particulars may be obtained from the office of Mr. E. R. Matthews, A.M.Inst.C.E., Borough Surveyor, Town Hall, Tenders, endorsed "Tender for Demolition of 45, 47, and 49, St. John-street," or "Tender for Demolition of 51, 53, and 55, St. John-street," to be sent to Mr. A. E. Mathewman, Town Clerk, Town Hall, Bridlington, not later than December 1.

DECEMBER 1.—Hindley.—CUPBOARDS.—Hindley U.D.C. Education Committee invite tenders for the supply of cupboards, etc., for the new Council school in Argyle-street, Hindley. Form of tender, specifications, and other particulars may be obtained on application to the Surveyor, Mr. Oswald P. Abbott, Council Offices, Hindley, on payment of 1l. 1s. Tenders, endorsed "School Cupboards, etc.," to be sent to Mr. James R. Booth, Secretary, Education Department, Council Offices, Hindley, not later than December 1.

DECEMBER 1.—Manchester.—HOSE.—Manchester Corporation invite tenders for the supply of 3,000 yds. of the best canvas in diameter, 2½ in. diameter, Tenders, with samples not less than 3 ft. in length, without maker's name or mark, to be delivered not later than December 1, addressed to the Chairman of the Fire Brigade U.D.C. Committee, Headquarters, Fire Department, London-road, Manchester, and endorsed "Tenders for Hose."

DECEMBER 1.—Blore Heath.—HAULAGE.—The R.D.C. of Blore Heath invite tenders for the carriage of road material, in the districts of Tiryly, Ashley, and Marclestone. Particulars can be obtained from Mr. J. J. Cooper, Clerk to the Council, Wood-seaves, Market, Drayton, Tenders, marked "Haulage," to be received not later than December 3.

DECEMBER 1.—Sheffield.—GENERAL REPAIRS.—Sheffield Education Committee invite tenders for plumbers and glaziers work required for general repairs during the year 1907. Specifications and forms of tender, together with cover for same, may be had on application at the office of the Education Committee, Leopold-street, up to December 5, and sealed tenders, which will only be received on forms supplied, should be sent to Mr. John F. Moss, Secretary, not later than December 7.

DECEMBER 6.—Provid.—SLOPING IN OF QUARRY.—Iskeard D.C. invite tenders for the sloping in of a quarry at Fursneth, in the Parish of St. Cleer. The surveyor, Mr. J. J. Cooper, will be at the quarry, on or before 11.30 a.m. on the 1st, on December 3, and on or before 11.30 a.m. on the 2nd, on December 4, proposed to be done. Tenders to be sent (addressed, the Clerk's Office, Market-street, Iskeard, or to the Clerk's Office, West-street, Iskeard, on or before December 6.

DECEMBER 6.—Salford.—SULPHURIC ACID.—Salford U.D.C. invite tenders for the supply of about 1,800 tons of sulphuric acid to be delivered during the year 1907. Full particulars may be obtained on application to Mr. William W. Woodward, engineer and chemist, 10, Market-street, Salford. Sealed tenders, endorsed "Tender for Sulphuric Acid," to the Chairman of the Gas Committee, Town Hall, Salford, to be delivered to Mr. L. C. Evans, Town Clerk, Town Hall, Salford, not later than 3 p.m. on December 6.

DECEMBER 7.—Cosham.—LIGHTING.—The Cosham P.C. invite tenders for lighting Cosham streets, etc., for the year 1907. Particulars may be obtained from the Clerk. Tenders to be sent to the Clerk, Mr. J. R. Cooper, Clerk to the Council, High-street, Cosham, not later than noon, December 7.

DECEMBER 8.—Glasgow.—PILGRIMAGE.—Glasgow City Council invite offers for (1) excavation, etc., of the site of the former Glasgow City Hall, and (2) the construction of a new building, to be erected on the site of the former Glasgow City Hall, and (3) the construction of a new building, to be erected on the site of the former Glasgow City Hall, and (4) the construction of a new building, to be erected on the site of the former Glasgow City Hall, and (5) the construction of a new building, to be erected on the site of the former Glasgow City Hall, and (6) the construction of a new building, to be erected on the site of the former Glasgow City Hall, and (7) the construction of a new building, to be erected on the site of the former Glasgow City Hall, and (8) the construction of a new building, to be erected on the site of the former Glasgow City Hall, and (9) the construction of a new building, to be erected on the site of the former Glasgow City Hall, and (10) the construction of a new 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own Hall, Bradford, so as to arrive on or before December 13.

DECEMBER 13.—Manchester.—FIREWORKS.—Manchester Corporation Gas Committee invite tenders for the supply and delivery of the fireworks required during next season at their several works. Full particulars and forms of tender may be obtained from Mr. N. S. Jones, Superintendent, at the Gas Offices, Town Hall, Manchester, on payment of a deposit of 2l. 2s. Sealed tenders, endorsed "Tender for Fireworks," addressed to the Chairman of the Gas Committee, must be delivered at the Gas Offices, Town Hall, Manchester, on or before December 15.

DECEMBER 17.—Southsea.—OVERFLOW WEIR. HANMER.—The Portsmouth B.C. invite tenders for the construction and maintenance of an overflow weir chamber on the existing main low-level sewer, on underground pumping stations and other works. Specification, form of tender, and bill of quantities may be obtained of Mr. Alex. Hillard, Town Clerk, Town Hall, Portsmouth, on or after December 5. No date. **Yewell.**—The drawings can be seen, and further information obtained, at the offices of Messrs. Bramwell & Harris, 5, Great George-street, Westminster, S.W. Tenders, endorsed "Tender for Works for the Prevention of Storm Water Flooding in the Low-lying Area of Southsea, Contract No. 3," to be delivered to Mr. Alex. Hillard, Town Clerk, on or before December 17.

NO DATE.—Hindley.—DESKS.—Hindley U.D.C. Education Committee invite tenders for the supply of 100 desks for the new school, Argyle-street, Hindley. Further particulars may be had from Mr. James R. Booth, Secretary, Education Department, Council Offices, Hindley.

NO DATE.—Preston.—DOCK.—Demolition of Castle and Falcon Hotel, Aldersgate-street, E.C., including the purchase of the old materials. Plan, specification, and form of tender can be obtained of Messrs. Alfred, apply to the County Surveyor, Liverpool, Newcastle-on-Tyne.

NO DATE.—Rawmarsh and Swinton. LIGHT RAILWAY.—District Board of the Mexborough and Swinton Tramways Company invite tenders from contractors for carrying out eight freight installations in premises to be approved in Rawmarsh on the Great Eastern Railway, of 2,551 super yds. or more of artificial stone paving for footways. Forms of tender and full particulars can be had on application to Mr. C. E. Eschus, Engineer, to the Council, Town Hall, Edmonton. Sealed tenders, marked "Tender for Paving" (which must be on the form supplied by the Council), must be delivered at office of Mr. Wm. Francis Payne, Clerk of the Council, Town Hall, Edmonton, not later than 12 o'clock noon on December 4.

NO DATE.—Newcastle-on-Tyne. WINNING, CARRYING, OR SPREADING STONE.—Tenders for the maintenance of main roads during the year ending March 31, 1909. For forms of tender, conditions, specification, apply to the County Surveyor, Liverpool, Newcastle-on-Tyne.

NO DATE.—Rawmarsh and Swinton. LIGHT RAILWAY.—District Board of the Mexborough and Swinton Tramways Company invite tenders from contractors for carrying out eight freight installations in premises to be approved in Rawmarsh on the Great Eastern Railway, of 2,551 super yds. or more of artificial stone paving for footways. Forms of tender and full particulars can be had on application to Mr. C. E. Eschus, Engineer, to the Council, Town Hall, Edmonton. Sealed tenders, marked "Tender for Paving" (which must be on the form supplied by the Council), must be delivered at office of Mr. Wm. Francis Payne, Clerk of the Council, Town Hall, Edmonton, not later than 12 o'clock noon on December 4.

NO DATE.—Kingston Hill.—SEWER.—Malden and Coube E.D.C. invite tenders for the construction of about 900 ft. of 9-in. sewer in Coombe-lane, Kingston Hill. Plans and specification to be seen at the office of Mr. Thomas B. Edmundson, C.E. Engineer and Surveyor to the Council, Council Offices, New Malden, Surrey. Tenders to be sent to Mr. C. T. Lewis, Clerk to the Council, New Malden, Coube-lane, on or before December 12. Sealed tenders, so as to reach him not later than 12 o'clock noon on December 4.

NO DATE.—Llandaff.—SEWERS.—Llandaff and Dinas Powis R.D.C. invite tenders for providing and laying about 850 yds. of 9-in. surface-water sewers, with manholes, street gullies, etc., in accordance with the specification, which may be seen, and bills of quantities obtained, on application to the engineer, Mr. James Holden, A.M.Inst.C.E., Park House, 20, Park-place, Cardiff. Tenders, sealed, must be sent to Mr. M. Warren, Clerk, Park House, Cardiff, not later than 12 o'clock noon on December 4.

NO DATE.—Malvern.—DRAINAGE AND WATER SUPPLY.—The Malvern D.C. invite tenders for the excavation and laying of about 24 miles of 3-in. and 4-in. water main supplied by the Council, and other works in connection with the water supply. Specification and plans may be seen at the Waterworks Engineer's Office, during office hours, on payment of a deposit of 1l. 2s. Tenders on forms to be supplied and endorsed "Colwall Water" must reach Mr. H. L. Whitley, Clerk to the Council, Council Offices, Malvern, not later than 10 a.m. of the morning of December 11.

NO DATE.—New Windsor.—MIXING-UP ROAD.—New Windsor T.C. invite tenders for making up, etc., Beaumont-road. Plans, specification, and general conditions may be seen, and forms of tender obtained, upon application at the Borough Surveyor's Office, Alma-road, Windsor. Sealed tenders to be sent to Mr. E. Cecil Durant, Town Clerk, 5, Park-street, Windsor, on the forms supplied, endorsed "Beaumont-road," not later than 5 o'clock p.m. on December 4.

NO DATE.—Rilles, Middleton.—CONCRETS.—Middleton Corporation invite tenders for the construction of brick conduits, chambers, wood divisions, and other works at the Sewage Works at Rilles. Plans can be seen, and specifications, quantities, and form of tender obtained, on application to Mr. W. Belburn, Borough Surveyor, at his residence, 10, Marlborough-street, Rilles. Tenders to be delivered at office of Mr. Frederick Entwistle, Town Clerk, Town Hall, Middleton, not later than December 4, addressed to the Chairman of the Surveyor's Committee, and endorsed "Conduits."

NO DATE.—King's Norton.—SEWERING.—King's Norton and Northfield U.D.C. invite tenders for the construction of about one mile of 12-in. sanitary pipe sewers (chiefly in tunnel) between a point near the Midland Railway at Lifford and Monyhull Hall, in the parish of King's Norton, with the pipe and the necessary manholes, lamp-holes, flushing chambers, and other works in connection therewith. Plans may be seen, and copies of the conditions of contract, etc., obtained at the office of the Engineer, Mr. H. Ambrose W. Cross, A.M.Inst.C.E., 23 and 25, Valentine-road, King's Heath, near Birmingham, on payment of the sum of 5l. Sealed tenders, endorsed "Sewering

in accordance with plans and specifications, which may be seen at the board-room of the Asylum between the hours of 10 a.m. and 5 p.m. on any day, to be forwarded by registered post, endorsed "Tender for Plumbing Work, etc." Mr. R. L. Donaldson, Acting R.M.S.

ROADS, SANITARY, AND WATER WORKS.

DECEMBER 3.—Handsworth.—ROADWORKS.—Handsworth U.D.C. invite tenders for making up, etc., Holiday-street. Sealed tenders, endorsed "Holiday-street," to be delivered at the office of the Surveyor, Council House, Handsworth, Birmingham, on or before December 3. Particulars from Mr. H. Richardson, A.M.Inst.C.E., Surveyor to the Council.

DECEMBER 3.—Warrington.—ROADWORKS.—Warrington Paving and Sewerage Committee invite tenders for the forming and paving of twelve streets. Drawings, specifications, etc., may be seen, and forms of tender, bills of quantities, and all further information obtained, at the office of the Borough Surveyor, Town Hall, at which place tenders must be delivered before 12 o'clock on December 3.

DECEMBER 4.—Blackpool.—SEWERS.—Blackpool Highway Committee invite tenders for the following work.—Contract No. 1.—The supply and delivery of about 150 lin. yds. of 3-ft. diameter steel tubes for the extension to the main sewer outfall; contract No. 2.—Taking up and relaying about 150 lin. yds. of North Cliff Main Sewer. Particulars may be obtained from Mr. John H. Biddle, Borough Engineer and Surveyor, Town Hall, Blackpool, on a deposit being made of 1l. 2s. Sealed tenders, endorsed "Contract No. 1" or "Contract No. 2," addressed to the Engineer, must be delivered not later than 10 a.m. on December 4.

DECEMBER 4.—Cowersley.—NEW STREET.—New Street U.D.C. invite tenders for the construction of new street at Cowersley. Specifications, plans may be seen, and quantities obtained, at Millsbridge offices of architects, from November 27 to December 4, on which dates sealed and endorsed tenders must be delivered to Messrs. Lunn & Kaye, architects and surveyors, Millsbridge and Huddersfield, not later than 3 p.m. on December 4.

DECEMBER 4.—Edmonton.—ARTIFICIAL STONE PAVING.—Edmonton U.D.C. invite tenders for the supply and delivery at Lower Edmonton Station, on the Great Eastern Railway, of 2,551 super yds. or more of artificial stone paving for footways. Forms of tender and full particulars can be had on application to Mr. C. E. Eschus, Engineer, to the Council, Town Hall, Edmonton. Sealed tenders, marked "Tender for Paving" (which must be on the form supplied by the Council), must be delivered at office of Mr. Wm. Francis Payne, Clerk of the Council, Town Hall, Edmonton, not later than 12 o'clock noon on December 4.

DECEMBER 4.—Kingston Hill.—SEWER.—Malden and Coube E.D.C. invite tenders for the construction of about 900 ft. of 9-in. sewer in Coombe-lane, Kingston Hill. Plans and specification to be seen at the office of Mr. Thomas B. Edmundson, C.E. Engineer and Surveyor to the Council, Council Offices, New Malden, Surrey. Tenders to be sent to Mr. C. T. Lewis, Clerk to the Council, New Malden, Coube-lane, on or before December 12. Sealed tenders, so as to reach him not later than 12 o'clock noon on December 4.

DECEMBER 4.—Llandaff.—SEWERS.—Llandaff and Dinas Powis R.D.C. invite tenders for providing and laying about 850 yds. of 9-in. surface-water sewers, with manholes, street gullies, etc., in accordance with the specification, which may be seen, and bills of quantities obtained, on application to the engineer, Mr. James Holden, A.M.Inst.C.E., Park House, 20, Park-place, Cardiff. Tenders, sealed, must be sent to Mr. M. Warren, Clerk, Park House, Cardiff, not later than 12 o'clock noon on December 4.

DECEMBER 4.—Malvern.—DRAINAGE AND WATER SUPPLY.—The Malvern D.C. invite tenders for the excavation and laying of about 24 miles of 3-in. and 4-in. water main supplied by the Council, and other works in connection with the water supply. Specification and plans may be seen at the Waterworks Engineer's Office, during office hours, on payment of a deposit of 1l. 2s. Tenders on forms to be supplied and endorsed "Colwall Water" must reach Mr. H. L. Whitley, Clerk to the Council, Council Offices, Malvern, not later than 10 a.m. of the morning of December 11.

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DECEMBER 4.—Rilles, Middleton.—CONCRETS.—Middleton Corporation invite tenders for the construction of brick conduits, chambers, wood divisions, and other works at the Sewage Works at Rilles. Plans can be seen, and specifications, quantities, and form of tender obtained, on application to Mr. W. Belburn, Borough Surveyor, at his residence, 10, Marlborough-street, Rilles. Tenders to be delivered at office of Mr. Frederick Entwistle, Town Clerk, Town Hall, Middleton, not later than December 4, addressed to the Chairman of the Surveyor's Committee, and endorsed "Conduits."

DECEMBER 5.—King's Norton.—SEWERING.—King's Norton and Northfield U.D.C. invite tenders for the construction of about one mile of 12-in. sanitary pipe sewers (chiefly in tunnel) between a point near the Midland Railway at Lifford and Monyhull Hall, in the parish of King's Norton, with the pipe and the necessary manholes, lamp-holes, flushing chambers, and other works in connection therewith. Plans may be seen, and copies of the conditions of contract, etc., obtained at the office of the Engineer, Mr. H. Ambrose W. Cross, A.M.Inst.C.E., 23 and 25, Valentine-road, King's Heath, near Birmingham, on payment of the sum of 5l. Sealed tenders, endorsed "Sewering

of Monyhull Hall Estate," must be delivered at the office of Mr. Edwin Docker, Clerk to the Council, 10, Newhall-street, Birmingham, not later than 12 noon on December 5.

DECEMBER 5.—Markington.—SEWERAGE.—Ripon R.D.C. invite tenders for about 1,800 lin. yds. of earthenware pipe sewers, 4 in. and 6 in. diameter, with manholes, etc., also for the necessary works in the construction of settling tanks and laying out 13 acres of land for filtration. Drawings and specifications may be seen, and forms of tender, with quantities, obtained, at the office of Mr. Chas. R. P. Edmundson, solicitor (Clerk to the Council), Ripon, or at the office of the engineer, Mr. H. A. Johnson, M.Inst.C.E., 15, Exchange, Bradford, on payment of a deposit of 2l. 2s. Sealed tenders, endorsed "Tenders for Markington Sewerage," to be sent to Mr. Chas. R. P. Edmundson, Clerk, Ripon, not later than December 5.

DECEMBER 5.—Rathdown.—ROADS, ETC.—Rathdown No. 1 R.D.C. will, at their meeting on December 5, receive tenders for the making of a new road and footpaths, with 9-in. main sewer, manholes, gully traps, etc., through the field adjacent to Deau's Grange from Mrs. Doran, in accordance with the plans and specification prepared by Mr. R. M. Butler, M.Inst.C.E., Architect to the Council, and can be seen at the Clerk's Office, Rathdown, between the hours of 11 and 3 o'clock. Sealed tenders, addressed to the Chairman of the Council, and marked on the outside "Tender for Making Road," will be received by Mr. Patrick Cunniam, Clerk of the Council, Clerk's Office, Loughlinstown, on 10 o'clock on the morning of December 5.

DECEMBER 5.—Wood Green.—PRIVATE STREETS.—The Wood Green U.D.C. invite tenders for the making-up of the following streets, namely:—(1) Braemar-avenue; (2) Eldon-road (section 2); (3) Homcroft-road; (4) Wood Green-road; (5) Norman-avenue (east of Eldon-road); and (6) Grainger-road, all within the said Urban District. The plans, sections, and specifications may be seen, and bills of quantities obtained, on application to Mr. C. J. Ganyon, A.M.Inst.C.E., the Surveyor, at the offices of the Council, Town Hall, Wood Green, on payment of a deposit of 1l. 2s. Sealed tenders, upon the forms supplied, only, to be delivered to Mr. Wm. P. Harding, Clerk of the Council, Town Hall, Wood Green, N., not later than 5 o'clock p.m. on December 5.

DECEMBER 6.—Blackrock, Cork. SEWERS.—Cork R.D.C. will on December 6, up to the hour of 12 o'clock noon, receive tenders for laying sewers at Cal-lane, etc. Blackrock, including a plan and specification, which may be inspected at office of Mr. John Cotter, Clerk of Council, Board-room, Wexham, Cork.

DECEMBER 6.—Newport, Salop. ROADWORKS.—Newport, Salop, U.D.C. invite tenders for the execution of kerbing, channelling, flagging, etc., on the following roads: Wellington-road, Station-road, (Chetwynd End taking down and rebuilding wall). Specifications may be seen at the office of the U.D.C. and further information obtained from the surveyor. Tenders, endorsed "Tender for Paving, etc.," to be sent in by 4 o'clock p.m. on December 6. Mr. J. S. Underhill, Clerk to the Council, Council Offices, Newport, Salop.

DECEMBER 6.—Wandswoth. TAR PAVING.—Wandswoth Guardians invite tenders for the repairing and dressing the tar paving in the streets of the Infirmaries, St. John's Hall, S.W. Form of tender and specification may be obtained upon application at office of Mr. F. W. Piper, Clerk, Union Offices, St. John's Hall, S.W., and the tenders must be returned not later than 10 a.m. on December 6.

DECEMBER 7.—Mallow, Ireland.—SANITARY WORKS.—Mallow Guardians, at their meeting on December 7, will receive tenders for sanitary works at the Workhouse, in accordance with the specification of the Clerk of Works.

DECEMBER 7.—Richmond.—SEWER.—The Richmond (Surrey) U.D.C. invite tenders for the construction of about 55 lin. yds. of 12-in. surface-water sewer under the railway embankment at Kew. Drawings and conditions of contract may be seen, and particulars obtained, on application to Mr. J. H. Brierley, Borough Surveyor, Town Hall, Richmond, Surrey, where a form of tender, together with copy of the specification and bill of quantities, may be obtained on payment of a deposit of 1l. 2s. Sealed tenders, properly endorsed, must be delivered to Mr. Fredk. B. Senior, Town Clerk, Town Hall, Richmond, Surrey, at the Town Hall, Richmond, Surrey, on or before 4 o'clock on December 7.

DECEMBER 8.—Emsworth.—STREET IMPROVEMENT.—The U.D.C. of Warlington invite tenders for the works in connection with forming, sewerage, leveling, paving, metalling, channelling, and making road part of Westbourne-avenue (viz. 259 yds. or thereabouts in length from the junction of the New Brighton-road, at Emsworth, within the U.D. of Warlington. Plans and specifications can be seen and forms of tender obtained, on application to Mr. H. W. Stringfellow, E. Surveyor to the Council, North-street, Emsworth. Sealed tenders, endorsed with the name of the street, and marked "Tender for Street Improvement Works," must be delivered at office of Mr. J. W. Loader Cooper, Clerk to the Council, Queen-street, Emsworth, not later than 12 noon on December 8.

DECEMBER 10.—Alnwick.—SEWER.—The R.D.C. of Alnwick invite tenders for providing and laying a new main sewer along the east side of Alnmouth, consisting of 82 yds. of 12-in. and 21 yds. of 18-in. and 42 yds. of 6-in. sanitary pipes and accessories. The plan, section, and specification may be seen upon application to the Clerk, Mr. H. W. Wallon, Alnwick, to whom sealed tenders, endorsed "Alnmouth Sewer," are to be delivered before 1.30 p.m. on December 10.

DECEMBER 10.—Horne Hall.—NEW STREET.—The Camberwell B.C. invite tenders for kerbing, channelling, foundations for asphaltic paving and road work in new street, viz. Ellfield-road, Horne Hall. Specification and form of tender can be obtained from Mr. William Oxtoby, Borough Engineer, Town Hall, and tenders must be delivered on or before 6.30 p.m., December 10.

DECEMBER 10.—Monkseaton.—ROADWORKS.—Whitley and Monkseaton U.D.C. invite tenders by schedule of prices for paving, cementing, kerbing, and channelling the Fold, back street of Roseberry.

terrace, and the back street south-east of Front-street, Monkseaton, within the said district. Forms of tender and schedules may be obtained on application to Mr. John Moore, Surveyor, at his office, Council Buildings, Whitley Bay, R.N.O., between the hours of 9 and 10 a.m. and 4 and 5 p.m. (Saturdays excepted). Tenders to be sent in to Mr. Augustus Whitehead, Clerk to the Council, 60, Saville street, North Shields, not later than December 10, at noon.

DECEMBER 12.—Cheddington.—WATER SUPPLY.—Tenders are invited for supplying, carting, excavating for laying and jointing of about 2,500 yds. of 4-in. and 3-in. cast-iron pipes and specials, including fixing valves, hydrants, etc., and constructing brick service reservoir and all works in relation thereto. Plans and specifications may be seen, and copies of the quantities and forms of tender obtained from the engineers, Messrs. Sands & Walker, Milson Chambers, Nottingham, on payment of 2s. 2s. (by cheque). Sealed and endorsed tenders to be sent to Messrs. Sands & Walker on or before December 12.

★ DECEMBER 12.—Hammersmith.—ROAD-MAKING.—The Hammersmith B.C. invite tenders for making-up and paving Larden-road (part of). Plans and specification may be seen, and forms of tender obtained on application to Mr. H. Mair, Borough Surveyor. Sealed tenders, endorsed "Tender for Paving Work," to be delivered to Mr. H. Thompson, Town Clerk, Town Hall, Hammersmith, not later than 6 p.m. December 12.

DECEMBER 14.—Cannock.—SEWERAGE WORKS.—Cannock U.D.C. invite tenders for the supply and laying of about 1,150 yds. of 12-in., 2,000 yds. of 9-in., and 650 yds. of 6-in. stoneware pipe sewers, together with the construction of all manholes, lamp-holes, and flushing chambers required, also for the construction of sewage-disposal works, including detritus and septic tanks and three circular filters and appurtenances, Bushbury (Oxley District) Sewerage and Sewage Disposal. Plans may be seen, and specifications, bill of quantities, and form of tender may be obtained on application to the Engineer to the Council, Mr. Herbert M. Whithead, Engineer's Office, Penkridge, Stafford, upon payment of a 5s. Bank of England note. Sealed tenders, on the forms supplied, endorsed "Bushbury Sewerage," must be delivered at office of Mr. A. W. Carver, Clerk to the Council, Union Offices, Cannock, not later than 10 o'clock on December 14.

DECEMBER 19.—Ware.—STORM-WATER DRAINS.—Ware U.D.C. invite tenders for providing and laying about 150 yds. of 24-in. concrete tube storm-water drain and sundry other works in Star-street, Ware. The drawings and specification, with bill of quantities and form of contract, can be seen at the office of the Council's Surveyor, Mr. H. F. Hill, New-road, Ware, and copies of the specification and forms of tender can be obtained on payment of 1s. Sealed tenders, endorsed "Star-street Drains," are to be delivered at office of Mr. Geo. H. Gishy, Clerk to the Council, Council Offices, Ware, not later than December 19.

DECEMBER 31.—Chew, Friezland.—RESERVOIR, etc.—Ashton-under-Lyne, Stalybridge, and Dukinfield (District) Waterworks Joint Committee invite tenders for the construction of an embankment, etc., for the formation of a reservoir, and for other works on and about the Chew Brook, three and a half miles or thereabouts from the Friezland Station of the London and North-Western Railway. Drawings can be seen, and copies of the specification, etc., may be obtained at the offices of Messrs. G. H. Hill & Sons, civil engineers, Albert Chambers, Albert square, Manchester, and 3, Victoria-street, Westminster, upon receipt of cheque for 5s. Sealed tenders, endorsed "Tender for Chew Reservoir and Works," must be addressed to and forwarded to the Secretary to the Joint Committee, Mr. W. H. Rothwell, Town Hall Chambers, Ashton-under-Lyne, on or before December 31.

No DUTY.—Milton.—ROADS.—South Coast Land Society, Ltd., invite tender for making new roads in the South Milton Estate, close to New Milton Station. Apply to Messrs. Alex. J. Abbott & Son, surveyors and estate agents, 180-182, Christchurch-road, Boscombe, Bournemouth.

STONE, MATERIALS, AND STORES.

DECEMBER 3.—Edinburgh.—LEAD.—The Edinburgh and District Water Trustees invite offers to supply Queensberry and Spanish bar lead, lead pipe solder, and rope yarn. Specifications can be obtained at the office of the Works Department, 12, St. Giles-street, Edinburgh. The offers, endorsed "Tender for Lead," must be lodged with Mr. William Boyd, W.S. Clerk to the Trustees, Edinburgh, and District Water Trust Offices, Edinburgh, on or before December 3.

DECEMBER 3.—Warrington.—BRICKS.—Warrington Sanitary Works Committee invite tenders for the supply of 32,000 Greengate bricks, similar to sample, and 350 York stone flags, 1 ft. 4 in. by 6 in. by 1½ in., the materials to be delivered at Long-ford Depot. Tenders, securely fastened, must be addressed "The Chairman, Sanitary Works Committee, Town Hall, Warrington," endorsed "Tender for Bricks and Stone Flags," and delivered not later than December 3.

DECEMBER 3.—Warrington.—CEMENT.—Warrington Paving and Sewerage Committee invite tenders for 250 tons Portland cement, 200 tons 5 in. by 4 in. Newry or Dalbeattie granite setts, and 500 tons of broken 2-in. copper or iron slag. Any further information required may be obtained at the office of the Borough Surveyor, Town Hall, at which place tenders must be delivered before 12 o'clock on December 3.

DECEMBER 3.—Wombwell.—MATERIALS.—Wombwell U.D.C. invite tenders for the supply during the year ending March 31, 1907, of—(1) Bricks, time and cement, 200 yds. of 12-in., 2,000 yds. of 9-in., and 650 yds. of 6-in. machine-broken dress, best quality; the above to be free from honeycomb and sponge pieces. Also 320 tons 3-in. hand-broken blue rock or whinstone. Forms of tenders may be obtained from Mr. J. W. Harrison, Surveyor to the Council, Town Hall, Wombwell, to whom all tenders, endorsed "Tenders for Materials," together with samples of the materials tendered for, must be delivered on or before December 3, at 12 o'clock noon.

DECEMBER 5.—Chepping Wycombe.—STORES.—The Corporation invite tenders for storeware pipes. Tenders, endorsed "Stores," to be addressed to the Chairman of the Public Works Committee, and delivered at office of Mr. P. J. Rushbrooke, Borough Surveyor, 77, Easton-street, High Wycombe, where further particulars and forms of tender may be obtained, not later than noon on December 5.

DECEMBER 5.—Hove.—GRAVITY KARBING.—The Town Council invite tenders from persons willing to supply 4,000 ft. lineal flat granite kerbing to be delivered free on the wharf at Aldington Basin, Shoreham Harbour, or in trucks at Hove Railway Station. Further particulars may be obtained at the office of the Borough Surveyor, Mr. H. H. Scott, Tenders, on forms supplied, addressed to Mr. H. Endcott, Town Clerk, Town Hall, Hove, and endorsed "Tender for Kerbing," will be received up to 6 o'clock on December 5.

DECEMBER 5.—London.—MATERIALS.—The East Indian Railway Company is prepared to receive tenders for the supply and delivery of—(1) Fittings for carriage and wagon underframes; (2) backplates for laminated bearing springs; (3) brass boiler tubes; (4) rolled steel material for waggon; (5) electric cranes, etc., as per specifications to be sent at the Company's Office. Tenders are to be sent to Mr. C. W. Young, Secretary, Nicholson-lane, London, E.C., not later than 12 o'clock noon, marked "Tender for Underframe Fittings," or as the case may be, for Nos. 1 to 4, on December 5, and for No. 5 on December 12. For each specification a fee of 1s. is charged, which cannot under any circumstances be returned.

DECEMBER 6.—Dover.—MATERIALS.—The Dover Harbour Board invite tenders for the supply of materials during the year commencing January 1, comprising—Timber, etc.; bricks, lime, etc.; iron and steel ironmongery, asbestos packing, etc.; electrical requisites; paint, glass, oil, etc.; miscellaneous stores; Portland cement. Schedules and conditions of contract may be had on application at office of Mr. Martyn Mowll, Register of

Dover Harbour, Castle-street, Dover, on payment of 2s. 6d. for each complete set of the schedules. Sealed tenders, marked "Tender for Materials," to be sent to office of Mr. Mowll on or before December 6.

DECEMBER 7.—Bolton.—STORES.—Bolton Scavenging and Sewerage Committee invite tenders for the supply during the twelve months commencing January 1, 1907, of the articles undermentioned, viz.:—Timber for wheelwrights; iron for blacksmiths; lime for mortar making, scavenging brooms and handles; spades, shovels, and forks. Sample specifications may be seen on application to the Town's Yard, Falcon-street, Bolton. Tender under seal, endorsed "Scavenging Supplies Tender," to be addressed to Mr. Alderman Tong (Mayor), Chairman of the Scavenging Department, Falcon-street, Bolton, and delivered not later than December 7.

DECEMBER 7.—Kesteven.—GRANITE AND SLAG.—Kesteven C.C. invite tenders for the supply of broken granite, slag, and slag dust for the main roads for the year 1907-1908. Forms of tender may be obtained from Mr. C. Fisher, A.S. Engineer, County Surveyor's Office, Grantham, to whom tenders, endorsed "Tenders for Materials," together with samples, must be delivered on or before December 7.

★ DECEMBER 8.—London.—SUPPLIES.—The House Committee of Guy's Hospital, S.E., invite tenders for the following supplies for twelve months from January 3, 1907:—(1) Bricks, time, and cement, 120 yds. of 12-in., 2,000 yds. of 9-in., and 650 yds. of 6-in. machine-broken dress, best quality; the above to be free from honeycomb and sponge pieces. Also 320 tons 3-in. hand-broken blue rock or whinstone. Forms of tenders may be obtained from Mr. J. W. Harrison, Surveyor to the Council, Town Hall, Wombwell, to whom all tenders, endorsed "Tenders for Materials," together with samples of the materials tendered for, must be delivered on or before December 3, at 12 o'clock noon.

DECEMBER 10.—Finchley.—SANDING MATERIAL.—The U.D.C. of Finchley invite tenders for the supply of 1-in. crushed granite for road gritting for the period ending March 31, 1907. The estimated amount required is from 250 to 600 tons. Sealed tenders, endorsed "Shingle," to be delivered at offices of E. H. Lister, Clerk to the Council, by 5 p.m. on December 10.

DECEMBER 10.—Trindon Grange.—STORES.—For next year's supply of iron, castings, wire ropes, oils, explosives, electric fittings, and colliery stores, except timber. Forms of tender and specification may be obtained from the Storekeeper, Trindon Grange Colliery. Applicants must state the kind of stores they wish to tender for. Tenders to be addressed to Messrs. Walter Scott, Ltd., Trindon Grange Colliery, Co. Durham, and are received up to December 10.

DECEMBER 11.—Perry Barr.—ROAD MATERIAL.—The U.D.C. of Perry Barr invite tenders for the supply and delivery of Rowley rag and blast furnace cinder. Specification and conditions and form of tender may be obtained on application to Mr. Ernest Bailey, Surveyor to the Council, at the Council House, Green-lane, Hamstead, near Birmingham, between November 28 and December 7, both days inclusive. Tenders on the prescribed form, together with the annexed specification, must be sent to Mr. H. Ward, Clerk to the Council, 1, Church-street, West Bromwich, on or before December 11.

DECEMBER 12.—Macclesfield.—MATERIALS.—Macclesfield Corporation invite tenders for the supply of drain pipes, castings, cement, bricks, ironmongery, iron and steel, timber, hardwood, paints and oils, and disinfectants during the year ending December 31, 1907. Forms of tender can be obtained at the Borough Surveyor's Office. Tenders to be sent, addressed to the Chairman of the Highway Committee, Town Hall, not later than December 12, marked outside "Tender for—"

DECEMBER 12.—Middlesbrough.—STORES.—Tees Conservancy Commissioners invite tenders for the supply of stores and materials for the year ending December 31, 1907, as under:—Timber, castings (steel and iron), bolts and nuts, brass and copper work, cement, oils and paints, ropes, ironmongery, and general stores. Forms of tender and any other information can be obtained on application. Sealed tenders, endorsed "Tender for Stores," addressed to Mr. John H. Ames, Secretary, Board-room, Middlesbrough, to be sent not later than December 12.

Public Appointment.

Nature of Appointment.	By whom Advertised.	Salary.	Applications to be in
*TEMPORARY CLERK OF WORKS.....	Ilford Urban District Council	£ 4.	Dec. 3

Auction Sales.

Nature and Place of Sale.	By whom Offered.	Date of Sale.
*BUILDING SITE (TO LET), LOWER THAMES STREET—At the Mart	S. Walker & Son	Dec. 2
*STOCK, ETC., OF TIMBER MERCHANT, ST. JOHN'S ST., CHICHESTER, On the Premises	H. W. Smith	Dec. 4
*CONTRACTOR'S PLANT AND STOCK—At 155, St. Thomas'-road, Finsbury Park, N.	Gulley, Horey, Son, & Cassell	Dec. 8
*STOCKS AND SHARES—At the Mart	Edwin Fox & Bousfield	Dec. 12

PATENTS.—Continued from page 640.

17,433 of 1906.—G. H. REYNOLDS: Pipe Bending Machines.

This relates to a pipe bending machine, the fixed upright conical forms and the movable bending cone co-operating therewith, and each having grooves of different diameters arranged in the same order combined with geared power devices

for rocking a cone about the conical form, and a fixed oblique guide for the pipe having a series of grooves or notches of different diameters corresponding to those in the conical form and cone.

18,089 of 1906.—J. LILLY and J. H. CARTLAND: Casement Opening and Closing Mechanism. This relates to a casement opening and closing mechanism and consists of a screw pulley adapted

to a screw rod and having a boss on the one side adapted to receive a trunnion box with the end riveted over to secure same.

4,603 of 1906.—J. Y. JOHNSON (R. KOEFF & Co.): Manufacture of Stucco.

This relates to the manufacture of stucco of chemically precipitated and burnt gypsum, by first converting by aggregation the fine particles

BRICKS, &c. (continued).	
GLAZED BRICKS (continued)—	
One Side and two &c. d.	
Ends	15 0 0 per 1000 at railway depôt.
Two Sides and one	
End	15 0 0 " " "
Displays, Cham-	
ferred, Squints. 14 0 0	" " "
Second Quality	
White and	
Dipped Salt	
Glazed	2 0 0 " less than best.
Thames and Pit Sand	7 0 per yard, delivered.
Thames Ballast	5 6 " " "
Best Portland Cement	27 0 per ton, " "
Best Ground Blue Lime	19 0 " " "
NOTE.—The cement or lime is exclusive of the ordinary charge for sacks.	
Grey Stone Lime	11s. 6d. per yard, delivered.
Stourbridge Fireclay in sacks	27s. 0d. per ton at rly. depôt.

STONE.	
Barn Stone—delivered on road wag-	
gons, Paddington Depôt	1 6d. per ft. cube.
Do. do. delivered on road wag-	
gons, Nine Elms Depôt	1 8d. " "
PORTLAND STONE (20 ft. average)—	
Brown Whittled, delivered on road	
wagons, Paddington Depôt, Nine	
Elms Depôt, or Fimlico Wharf	2 1 " "
White Bashed, delivered on road	
wagons, Paddington Depôt, Nine	
Elms Depôt, or Fimlico Wharf	2 2½ " "
Ancaster in blocks	
10 per ft. cube, deld. rly. depôt.	
Beor	1 6 " "
Greenhall	1 10 " "
Darley Dale in blocks	2 4 " "
Bed Corsnall	2 2 " "
Cloesburn Bed Freestone	3 0 " "
Bed Mansfield	2 4 " "

YORK STONE—Robin Hood Quality.	
Scrapped random blocks, 2 10	" "
6 in. sawn two sides land-	
ings to sizes (under	
40 ft. super.)	2 8 per ft. super., "
6 in. rubbed two sides	
ditto, ditto	2 6 " "
3 in. sawn two sides slabs	
(random sizes)	0 11½ " "
2 in. to 2½ in. sawn one	
side slabs (random	
sizes)	0 7½ " "
1½ in. to 2 in. ditto, ditto	0 6 " "

HARD YORK—	
Scrapped random blocks, 3 0	per ft. cube, "
6 in. sawn two sides land-	
ings to sizes (under	
40 ft. super.)	2 8 per ft. super., "
6 in. rubbed two sides	
ditto	3 0 " "
3 in. sawn two sides slabs	
(random sizes)	1 2 " "
2 in. self-faced random	
slabs	0 5 " "
Tags	5 d. " "
Hopton Wood (Hard Bed) in blocks	2 0 per ft. cube, deld.
ry. depôt.	
" " " 6 in. sawn both	
sides landings 2 7	per ft. super. deld.
ry. depôt.	
" " " 3 in. sawn both	
sides random	
slabs	1 0 " "
" " " 2 in. do.	0 8½ " "

SLATES.	
In. In.	£ s. d.
20 x 10 best blue Bangor	13 2 6 per 1000 of 1200 at r. d.
20 x 12 " "	13 17 6 " "
20 x 10 first quality	13 0 0 " "
20 x 12 " "	13 15 0 " "
20 x 8 " "	7 5 0 " "
20 x 10 best blue Port-	
madoc	12 12 6 " "
16 x 8 best Buroks un-	
fading green	15 17 6 " "
20 x 12 " "	13 7 6 " "
18 x 10 " "	13 5 0 " "
16 x 8 " "	10 5 0 " "
20 x 10 permanent green	11 12 6 " "
18 x 10 " "	9 12 6 " "
16 x 8 " "	6 12 6 " "

TILES.	
Best plain red roofing tiles	42 0 per 1000 at rly. depôt.
Hip and Valley tiles	3 7 per doz. " "
Best Broseley tiles	50 0 per 1000 " "
Do. Ornamental tiles	52 6 " "
Hip and Valley tiles	4 0 per doz. " "
Best Rhubon red, brown, or	
brindled do. (Edwards)	57 6 " "
Do. Ornamental do.	60 0 " "
Hip tiles	4 0 per doz. " "
Valley tiles	3 0 " "
Best Bed or Mottled Stafford-	
shire do. (Peakes)	51 9 per 1000 " "
Do. Ornamental do.	54 6 " "
Hip tiles	4 1 per doz. " "
Valley tiles	3 8 " "
Best " Rosemary brand	
plain tiles	48 0 per 1000 " "
Best Ornamental tiles	50 0 " "
Hip tiles	4 0 per doz. " "
Valley tiles	3 8 " "
Best " Hartshill brand	
plain tiles, sand-faced	50 0 per 1000 " "
Do. pressed	47 6 " "
Do. Ornamental do.	50 0 " "
Hip tiles	4 0 per doz. " "
Valley tiles	3 6 " "

WOOD.	
BUILDING WOOD (continued).	
Deals: best 3 in. by 11 in. and 4 in.	£ s. d. £ s. d.
by 9 in. and 11 in.	13 10 0 .. 15 0 0
Deals: best 3 by 9	13 0 0 .. 15 0 0

WOOD (continued).	
BUILDING WOOD (continued).	
Battens: best 2½ in. by 7 in. and	£ s. d. £ s. d.
8 in., and 3 in. by 7 in. and 8 in.	11 0 0 .. 12 0 0
Battens: best 2½ by 6 and 3 by 6	10 0 0 .. less than
	7 in. and 8 in.
Deals: seconds	1 0 0 less than best.
Battens: seconds	1 0 0 " "
2 in. by 4 in. and 2 in. by 6 in.	9 0 0 .. 10 0 0
3 in. by 4 in. and 3 in. by 5 in.	8 10 0 .. 9 10 0
Foreign Sawed Boards—	
1 in. and 1½ in. by 7 in.	0 10 0 more than
	battens.
3 in.	1 0 0 " "
At per load of 50 ft.	
Fir timber: best middling Danzig	4 10 0 .. 5 0 0
or Mowbray (average specification)	4 0 0 .. 5 0 0
Seconds	3 12 6 .. 3 15 0
Small timber (8 in. to 10 in.)	3 0 0 .. 3 10 0
Small timber (6 in. to 8 in.)	3 0 0 .. 3 10 0
Swedish balks	2 10 0 .. 3 0 0
Pitch-pine timber (30 ft. average)	4 0 0 .. 4 15 0

JOINERS' WOOD.	
At per standard.	
White Sea: first yellow deals,	
3 in. by 11 in.	24 0 0 .. 25 0 0
3 in. by 9 in.	22 0 0 .. 23 0 0
Battens, 2½ in. and 3 in. by 7 in.	16 10 0 .. 18 0 0
Second yellow deals, 3 in. by 11 in.	18 10 0 .. 20 0 0
Battens, 2½ in. and 3 in. by 7 in.	13 10 0 .. 14 10 0
Third yellow deals, 3 in. by 11 in.	13 10 0 .. 15 0 0
Battens, 2½ in. and 3 in. by 7 in.	11 0 0 .. 12 0 0
Petersburg: first yellow deals,	
3 in. by 11 in.	21 0 0 .. 22 10 0
Do., 3 in. by 9 in.	18 10 0 .. 19 10 0
Battens	13 10 0 .. 15 0 0
Do., 3 in. by 9 in.	14 10 0 .. 16 0 0
Battens	11 0 0 .. 12 10 0
Third yellow deals, 3 in. by 11 in.	12 10 0 .. 14 0 0
Do., 3 in. by 9 in.	12 10 0 .. 14 0 0
Battens	10 0 0 .. 11 0 0

White Sea and Petersburg—	
First white deals, 3 in. by 11 in.	14 10 0 .. 15 10 0
3 in. by 9 in.	13 10 0 .. 14 10 0
Battens	11 0 0 .. 12 0 0
Second white deals, 3 in. by 11 in.	13 10 0 .. 14 10 0
3 in. by 9 in.	12 10 0 .. 13 10 0
Battens	10 0 0 .. 11 0 0
Pitch-pine: deals	18 0 0 .. 21 0 0
Under 2 in. thick extra	0 10 0 .. 1 0 0
Yellow Pine—First, regular sizes	44 0 0 upwards.
Oddments	32 0 0 " "
Seconds, regular sizes	33 0 0 " "
Yellow Pine oddments	28 0 0 " "
Kauri Pine—Planks, per ft. cube.	0 5 6 .. 0 5 0
Danzig and Stettin Oak Logs—	
Large, per ft. cube	0 8 0 .. 0 8 6
Small	0 2 6 .. 0 2 6
Wainscot Oak Logs, per ft. cube.	0 5 6 .. 0 5 0
Dry Wainscot Oak, per ft. sup. as	
inch	0 0 8½ .. 0 0 9½
3 in. do. do.	0 0 7 " "
Dry Mahogany—Honduras, Ta-	
basco, per ft. super. as inch ..	0 0 9 .. 0 1 0
Selected, Figury, per ft. super.	
as inch	0 1 6 .. 0 2 6
Dry Walnut, American, per ft.	
super. as inch	0 0 10 .. 0 1 0
Teak, per load	17 0 0 .. 22 0 0
American Whitewood Planks,	
per ft. cube	0 4 0 .. 0 5 0

Prepared Flooring, etc.—	
1 in. by 7 in. yellow, planed and	Per square.
shot	0 13 6 .. 0 17 6
matched	0 14 0 .. 0 18 0
1½ in. by 7 in. yellow, planed and	
matched	0 16 0 .. 1 0 0
1 in. by 7 in. white, planed and	
shot	0 12 0 .. 0 14 6
1 in. by 7 in. white, planed and	
matched	0 12 6 .. 0 15 0
1½ in. by 7 in. white, planed and	
matched	0 15 0 .. 0 16 6
¾ in. by 7 in. yellow, matched	
and beaded or V-jointed brds.	0 11 0 .. 0 13 6
1 in. by 7 in.	0 14 0 .. 0 18 0
¾ in. by 7 in. white	0 10 0 .. 0 11 6
1 in. by 7 in.	0 12 9 .. 0 15 0
6 in. at ed. to 8d. per square	less than 7 in.

JOISTS, GIRDERS, &c.	
In London, or delivered	
Railway Vans, per ton.	
Bolled Steel Joists, ordinary	£ s. d. £ s. d.
sections	7 5 0 .. 7 15 0
Compound Girders, ordinary	
sections	9 10 0 .. 10 10 0
Steel Compound Stanchions	12 5 0 .. 13 5 0
Angles, Tees, and Channels, ordi-	
nary section	9 5 0 .. 10 5 0
Fillock Plates	9 5 0 .. 10 5 0
Cast Iron Columns and Stanchions	
including ordinary patterns ..	8 0 0 .. 9 0 0

METALS.	
Per ton, in London.	
£ s. d. £ s. d.	
Iron—	
Common Bars	8 10 0 .. 9 0 0
Staffordshire Crown Bars, good	
merchant quality	9 0 0 .. 9 10 0
Staffordshire "Marked Bars" ..	11 0 0 .. 11 10 0
Mild Steel Bars	9 5 0 .. 9 10 0
Hoop Iron, best quality	9 10 0 .. 9 15 0
Galvanised	17 10 0 .. "
(*And upwards, according to size and gauge.)	
Sheet Iron Black—	
Ordinary sizes to 24 g.	10 0 0 .. "
" 24 g.	11 0 0 .. "
" 26 g.	12 10 0 .. "
Sheet Iron, Galvanised, flat, ordinary quality—	
Ordinary sizes, 6 ft. by 2 ft. to	
3 ft. to 20 g.	14 10 0 .. "
Ordinary sizes to 22 g. and 24 g.	15 0 0 .. "
28 g.	15 10 0 .. "
Sheet Iron, Galvanised, flat, best quality—	
Ordinary sizes, 6 ft. by 2 ft. to	
22 g. and 24 g.	17 10 0 .. "
" 26 g.	18 0 0 .. "
" 28 g.	19 10 0 .. "

METALS (continued).	
For ton, in London.	
£ s. d. £ s. d.	
Iron (continued)—	
Galvanised Corrugated Sheets—	
Ordinary sizes 6 ft. to 8 ft. 20 g.	14 10 0 .. "
" 22 g. and 24 g.	14 15 0 .. "
" 26 g.	16 0 0 .. "
Best Soft Steel Sheets 22 g. and 24 g.	12 0 0 .. "
to 3 ft. by 20 g. and thicker	12 0 0 .. "
Best Soft Steel Sheets 22 g. and 24 g.	13 0 0 .. "
to 3 ft. by 20 g. and thicker	15 0 0 .. "
Cut Nails, 3 in. to 6 in.	10 0 0 .. 10 10 0
(Under 3 in., usual trade extras.)	

LEAD, &c.	
Per ton, in London.	
£ s. d. £ s. d.	
LEAD—Sheet, English, 3lb. and up.	22 0 0 .. "
Pipe in coils	22 10 0 .. "
Soft pipe	25 0 0 .. "
Zinc—Sheet	34 0 0 .. "
Vieille Montagne	34 0 0 .. "
Silesian	33 15 0 .. "
Copper—	
Strong Sheet	per lb. 0 1 4 .. "
Thin	0 1 5 .. "
Copper nails	0 1 3 .. "
Brass—	
Strong Sheet	per lb. 0 1 2 .. "
Thin	0 1 3 .. "
Tin—Each and Ingots	0 1 11 .. "
Solders—Plumbers'	0 0 9 .. "
Timmer's	0 0 11½ .. "
Blowpipe	0 1 1 .. "

ENGLISH SHEET GLASS IN CRATES OF STOCK SIZES.	
15 oz. thirds	24d. per ft. delivered.
" fourths	34d. " "
21 oz. thirds	34d. " "
" fourths	24d. " "
26 oz. thirds	44d. " "
" fourths	44d. " "
32 oz. thirds	54d. " "
" fourths	44d. " "
Fluted Sheet, 15 oz.	34d. " "
" 21 oz.	34d. " "

ENGLISH BOLLED PLATE IN CRATES OF STOCK SIZES.	
Hartley's	24d. per ft. delivered.
"	24d. " "
"	34d. " "
Figures and Oxford Bolled	
" Oceanic Glass, white	44d. " "
Do. tinted	54d. " "

OILS, &c.	
£ s. d. £ s. d.	
Raw Lined Oil in pipes	per gallon 0 1 10
" " in barrels	0 1 11
Bolled " in drums	0 2 1
" " in pipes	0 2 0
" " in barrels	0 2 0
" " in drums	0 2 0
Turpentine in barrels	0 4 0
" in drums	0 4 0
Genuine Ground English White Lead	per ton 24 0
Red Lead, Dry	24 0 0
Best Lined Oil Putty	per cwt. 0 10 0
Stockholm Tar	per barrel 1 12 0

VARNISHES, &c.	
Per gallon.	
£ s. d. £ s. d.	
Fine Pale Oak Varnish	0 10 0
Pale Copal Oak	0 10 6
Superfine Pale Elastic Oak	0 12 6
Fine Extra Hard Church Oak ..	0 10 0
Superfine Hard-drying Oak, for seats of	
Churches	0 14 0
Fine Elastic Carriage	0 12 6
Superfine Pale Elastic Carriage ..	0 18 0
Fine Pale Maple	0 18 0
Fine Pale Durable Copal	0 18 0
Extra Pale French Oil	1 1 0
Exquisite Flaxing Varnish	0 18 0
White Copal Enamel	1 4 0
Extra Pale Paper	0 12 0
Best Japan Gold Size	0 10 6
Best Black Japan	0 16 0
Oak and Mahogany Stain	0 9 0
Brunswick Black	0 8 6
Berlin Black	0 16 0
Knott's	0 10 0
French and Brush Polish	0 10 0

TERMS OF SUBSCRIPTION.	
"THE BUILDER" (Published Weekly) is supplied DIRECT from the Office to residents in any part of the United Kingdom at the rate of 15s. per annum (52 numbers) PREPAID. To all parts of Europe, America, Australia, New Zealand, India, China, Ceylon, etc., 20s. per annum.	
Remittances payable to J. MORGAN should be addressed to The Publisher, "The Builder," 4, Catherine-street, W.C.	
SUBSCRIBERS IN LONDON and the SUBURBS, by prepaying at the Publishing Office 15s. per annum (52 numbers) or 10s. per quarter (13 numbers), can ensure receiving "The Builder" by Friday Morning's Post.	

TENDERS.	
Communications for insertion under this heading should be addressed to "The Editor," and must reach us not later than 10 a.m. on Thursdays. (N.B.—We cannot publish Tenders unless authenticated either by the architect or the building-owner; and we cannot publish announcements of Tenders accepted unless the amount of the tender is stated, nor any list in which the lowest Tender is under 100l., unless in some exceptional cases and for special reasons.)	
* Denotes accepted. † Denotes provisionally accepted.	
BLAIRMAUD (Scotland).—For erecting new school, for Boyds School Board. Messrs. McMillan, architects, 108, Crown-street, Aberdeen:—	
Master: W. A. Donohoe, Portray, Banff	
Carpenter: W. Levenick, Banff	
Slater: J. Wilson, Whitehill, Banff	
Plasterer: J. Rae, Portray, Banff	£542 10
Plumber: F. J. Watson, Banff	
Iron Work: H. W. Dey, Whitehill, Banff ..	
Painter and Glazier: F. Watt, Banff	

BARNESLEY.—For new sewage works for the Corporation. Contracts Nos. 2 and 3—

	Contract No. 2.		Contract No. 3.	
	For the Sewage Distributors for the Circular Filters.	For the alternative Scheme for Sewage Distribution for the Rectangular Filters.	For the Septic Tanks, etc., and Circular Filters.	For the alternative Scheme for Septic Tanks and Rectangular Filters.
	£ s. d.	£ s. d.	£ s. d.	£ s. d.
G. Jennings, Ltd.	888 0 0			
Ames Cresta Sanitary Co.	1,070 0 0	1,550 0 0		
Adams' Hydraulics, Ltd.	1,285 0 0			
Boulton & Paul, Ltd.	1,510 0 0			
Mather & Platt	1,610 0 0			
Ham, Baker, & Co., Ltd.	1,700 0 0			
Burch, Killean, and Co.	1,800 0 0	2,750 0 0		
Whitehead & Poole	1,985 0 0			
Septic Tank Co.	2,100 0 0	1,985 0 0		
W. Tullitt			15,000 3 9	17,390 7 3
W. Waring & Sons			15,241 7 11	17,168 1 5
A. Braithwaite & Co.			16,360 4 6	17,278 8 6
J. Bentley			15,981 5 6	18,071 10 8
J. Moffatt			16,221 14 11	18,292 14 6
H. E. Buckley			16,435 17 10	18,610 18 6
A. J. Cottell			16,888 12 10	18,995 17 1
G. H. Mellor			17,062 8 9	19,297 5 2
J. Mackay			17,070 0 6	19,370 15 8
G. Mackay & Son			17,190 16 7	19,142 4 10
Jack, Andrews & Erco.			17,355 2 5	19,270 1 8
Ward & Tetlow			17,511 19 8	19,630 18 5
J. Byrom, Ltd.			18,071 0 0	20,684 0 0
Parker & Sharpe			18,390 11 0	20,170 0 0
J. K. Taylor & Sons			18,684 16 10	21,168 7 1
G. Lowson			19,355 0 0	22,013 4 10
W. Craig			19,873 5 11	22,218 3 0
E. Taylor			20,108 18 10	24,023 7 10
G. & T. Bell			20,333 2 5	24,064 0 6
Johnson & Langley			20,856 7 8	23,828 5 6
W. R. Owen			20,914 10 6	24,850 9 6
C. R. Crawford			22,130 0 0	22,747 17 6
R. H. B. Neal, Ltd.			22,245 4 4	25,108 7 1
James Bros.			23,458 18 10	26,120 4 2
R. Holmes & Sons			23,822 1 0	27,068 8 0
W. Scott & Sons			26,629 5 0	35,437 15 0

BRIGHTON.—For erecting a greenhouse at the Waterside on Levee-road, for the Corporation. Mr. A. Weller, Borough Surveyor, Town Hall, Brighton:—
Robert J. Lee £185 0 0
Gates & Sons £187 10 0
R. J. Pinfold 228 0 0
W. & T. Garrett, Ltd. 184 0 0
J. Longley & Co. 175 0 0
Sunderland Bros. 216 0 0
J. B. Bates & Sons 99 and 100, North-
St. E. Nye 198 17 street, Brighton* 175 0
J. & W. Simmonds 189 0 Lously & Salmon 146 0

CARDIFF.—For alterations and additions to No. 4, St. John's-square, to convert the same into club premises. Mr. W. R. D. Cople, architect, 2, Church-street, Cardiff. Quantities by architect:—
F. Reed £1,815
Denby & Co. £1,495
S. Shipston & Son 1,798
D. Davies 1,449
Beard & Sons 1,546
Gough Bros. 1,446
F. Turner & Sons 1,822
F. C. Williams 1,400
G. Hallitt 1,690
F. Small, Cardiff* 1,330
E. Bevan 1,400

DEVIZES.—For laying a sewer, etc., through the street at Littleton Panel, Devizes, for the Rural District Council. Mr. J. M. Butcher, Inspector:—
Wendle & Sons £231 15 0
Chick, Cardon & J. Sansbury 225 0 0
Co. £184 19 0
Wilcox 204 0 0
H. Andrews 183 3 8
W. Harding 203 0 0
H. Ash, Devizes* 162 8 8

DEVONPORT.—For the erection of No. 5 Terrace Houses on the Weston Mill Estate for Sir J. Jackson, Bart., Mr. Edgar M. Lees, architect. Quantities by Messrs. Leest & Adams, 14, St. Aubyn-street, Devonport:—
J. J. Jenkins & Son £1,730 0
Pearce Bros.* £1,495 0
F. Watts 1,730 0
T. May 1,432 0
G. H. Smith & Son 1,619 15

DEVONPORT.—For the erection of No. 2 small houses, Hamozia-avenue, Camels Head, for Mr. C. Ansell. Mr. Edgar M. Lees, architect. Quantities by Messrs. Leest & Adams, 14, St. Aubyn-street, Devonport:—
T. Sohey £570
F. Watts £425
R. Perkins 438
Pearce Bros.* 409
F. De Donno 430

DEVONPORT.—For alterations at rear of Camels Head Hotel, Camels Head, Devonport, for Mr. A. E. Davies. Mr. Edgar M. Lees, architect. Quantities by Messrs. Leest & Adams, 14, St. Aubyn-street, Devonport:—
S. Perkins £342 14 2
F. Watts £280 12 6
Pearce Bros.* 277 0 0
T. Sohey 230 0 0

GLoucester.—For extensions to second County Asylum, Barnwood, Messrs. Giles Gough & Trollope, architects, 28, Craven-street, Charing-cross, London:—
Simmonds £27,341
Lewis & Co. £20,900
King & Sons 27,000
Pethick Bros. 20,944
Paine & Sons 29,000
Kings & Sons 22,854
Pattinson & Sons 20,659
Walters & Son 22,782
Hughes & Strirling 20,340
Jones 22,400
Lowe & Sons 19,910
22,260
Coles 19,847
Whitehouse & Sons 22,233
Fish & Sons 19,546
Stephens, Bastow 19,500
Hopkins 19,500
C. & Co. 22,166
Moss & Co. 19,450
Pye, Parkson, & Co. 21,640
Williams 19,380
Rivham 21,616
Colborne 19,109
Sunderland & Sons 21,630
Innes & Sons 19,045
Bursley & Sons 21,888
Norman 18,925
Edcutt & Sons 21,175
Davies 18,931
Nicholls 21,061
Bowers & Co. 18,931
Griffiths 21,063
Hereford* 15,520

GREENWICH.—For the erection of a new sorting-office.

	£ s. d.	Credit.
Dolman & Mathews	24,292	£31
J. J. Quarterman	3,617	10
Teslie & Co., Ltd.	3,470	18
E. Stretcher	3,339	109
T. G. Sharpton	3,248	10
J. Smith & Sons, Ltd.	3,230	50
J. McKay	3,228	81
Martin, Wells, & Co., Ltd.	3,200	39
Thomas & Edgo	3,185	30
H. L. Holloway	3,162	15
E. Wallis	3,154	21
F. & T. Thorne	3,127	30
J. Hollingsworth	3,153	80
McLaughlin & Harvey	3,146	135
P. Webster & Son	3,141	59
F. & T. Thorne	3,127	30
W. Mills	3,126	175
J. Barker & Co., Ltd.	3,057	25
Johnson & Co.	3,045	10
H. J. Williams, Ltd.	3,025	15
H. Graves	3,000	50
J. Garrett & Son	2,999	18
H. E. Nightingale	2,998	27
Calbraith Bros.	2,968	45
W. H. Hyde	2,906	20
Edwards & Medway	2,769	20
J. Loundal*	2,559	80

HAILE.—For 532 super. yds. of annealed concrete paving, for the Urban District Council. Mr. F. E. Boaz, Surveyor, Council Offices, Hale, Cheshire:

Plastomont				Pennygent			
Asbestos				Stone Co.	£117	0	0
Flooring Co.	£225	0	0	S. F. Marshall	115	10	0
Atlas Stone Co.	151	2	0	Premier Stone			
J. Edge & Co.	145	0	0	Co.	113	3	0
G. Beeson....	140	0	0	Croft Granite			
Excelsior Stone				Co. Leicester*	108	12	1
Co.	135	0	0	Bethell & Sons	101	0	0
Empire Stone				Wigan Coal and			
Co.	132	7	6	Iron Co....	102	18	0
J. Johnson....	128	8	0				

HULL.—For erecting offices and store, St. Andrew's Dock, Messrs. Freeman, Son, & Gaskell, architects, Carr-lane, Hull:—

D. R. Robinson	£550	10 0	Quibell, Son, & G. Jackson	£724	5 6
Son	822	7 0	J. Train Exors	722	14 0
Royce & Oliver	807	0 0	Hebbelwhite & Co.		
G. Houlton & Son	793	0 0	W. Wilson	715	7 0
A. Lison	773	4 5	G. H. Scorrer ..	711	6 0
J. Simpson & Son	760	0 0	T. Coates	709	0 0
F. Southen	760	0 0	J. Atwell & Sons		
H. Kaze	740	0 0	44 and 45, Coltman - st.*	707	17 0
W. Knowles	740	0 0	P. J. Kottelwell	651	10 0
M. Harper	734	10 0			
* Not complete.					

LINCOLN.—For additions to the Municipal Technical School, for the Education Authority, Messrs. W. Watkins & Son, architects, Silver-street, Lincoln:—
C. Bales £4,375 0
H. S. & W. Close £5,834 0
Barlow & Co. £2,800 0
Brown & Son £5,497 10
J. Hutchison & Co. £2,000 0
C. Wright £5,220 0
W. Wright & Son £2,000 0
Leicester* £5,220 0

LIANRHOS.—For widening of Conway main road, for the Special Joint Committee. Mr. E. P. Stephenson, engineer, Town Hall, Llandudno, Quantities by Engineer:—
G. Reed & Sons, Ltd., Clifton-street, Burley £1,237 5 5

LIANELLY.—For erecting a villa, stables, and piggeries at Forydd, for Mr. G. A. Phillips, Mr. J. Billet, architect and surveyor, 33, Prospect-place, Llanelli.
Brown, Thomas, J. Evans £965
and John £1,247
John Bros., Car-
H. Thomas 1,020
marthen* 913
Young Bros. 971

LONDON.—For rebuilding Hampstead-road bridge, over the London and North-Western Railway, in connexion with the proposed electrification of the tramways in Hampstead-road, for the London County Council:—

	£ s. d.
J. A. Ewart	£9,773 2 10
Perry & Co.	8,800 0 0
G. Wall, Ltd.	8,811 12 6
J. Dickson	8,500 3 0
Podreite & Co.	8,519 8 6
E. Bentley & Son	8,494 8 9
J. Cochran & Sons	8,458 17 8
A. Handy-side & Co., Ltd.	8,274 13 9
Hennan & Froude, Ltd.	8,249 11 4
Gregg & Matthews	8,013 8 0
J. Strachan	7,980 0 0
R. E. Nightingale	7,915 0 0
A. Facey & Son	7,845 6 6
W. Muirhead & Co.	7,834 4 6
M. & A. Linnis	7,833 13 10
G. Hay & Co., London*	7,506 9 8

(The Chief Engineer's estimate comparable with the tenders is £7,690 4s.)

(Messrs. G. Hay & Co., to submit to the undermentioned firms for to such other persons or firms as may be approved by the chief engineer under the contract the following portions of the work referred to, namely:—
(i) to the Improved Wood Pavement Co., Ltd., the wood paving, and (ii) to Joseph Westwood & Co., Ltd., the supply of the steelwork.)

LONDON.—For installation of additional plant, Elephant and Castle sub-station, for the London County Council:—

	£ s. d.
British Westinghouse Electric Co., Ltd.	£2,493 0
General Electric Co., Ltd.	2,489 13
Ferranti, Ltd., Hollinwood*	1,954 18

LONDON.—For the erection of a school for 1,110 children on the site in Mitcham-lane, Wandsworth, for the London County Council:—

	£ s. d.
J. Appleby & Sons	£21,695 0 0
L. H. & R. Roberts	21,247 0 0
W. Smith & Son	21,134 0 0
F. & H. F. Higgs	21,058 0 0
J. Smith & Sons, Ltd.	20,833 10 0
E. Lawrence & Sons	20,126 0 0
J. Longley & Co.	19,978 2 10
J. Greenwood, Ltd.	19,820 0 0
H. L. Holloway	19,724 0 0
Holliday & Greenwood, Ltd.	19,691 0 0
J. & C. Bowyer	19,640 0 0
Kirk & Randall	19,402 0 0
J. Garrett & Son	19,309 0 0
Martin, Wells, & Co., Ltd.	19,302 0 0
L. Whitehead & Co., Ltd.	19,285 0 0
W. Lawrence & Son	19,284 0 0
W. Johnson & Co., Ltd.	19,590 0 0
J. & M. Patrick	18,899 0 0
E. & W. Walls	18,894 0 0
Broadnax, Works, Maidstone*	18,887 0 0

(The estimate of the architect (Education) comparable with these tenders is £19,443.)

LONDON.—For heating Kingsland secondary school, Hackney, C., for the London County Council:—

J. Bond & Sons ..	815 0	Palowkar & Sons..	529 0
G. & E. Bradley ..	597 0	Brightside Foundry	
H. C. Price, Lea		& Engineering	
& Co.,	596 0	(Co., Ltd., 28,	
Purcell & Nobbs..	567 10	Victoria - street,	
Strode & Co., ...	563 0	Westminster*..	525 0
W. G. Cannon &			
Sons Ltd.....	530 0		

(The estimate of the architect (Education) comparable with these tenders is £566.)

LONDON.—For building additional classroom, for Clayton Park Congregational Church, Glyn-road Mission, Mr. E. B. Whitaker, architect, Gresham-buildings, E.C.:—

	£ s. d.
G. S. S. Williams & Son	£292
W. Suk & Son, High-street, Homerton*	273

LONDON.—For repair of roads at Gore Farm Hospital, for the Metropolitan Asylums Board:—

	£ s. d.
Trueman & Co.	£109 0
Road Maintenance & Stone Supply Co.	114 19
F. Fiskin, Ltd., Gravesend*	100 0

LONDON.—For electric light installations, Hornsey-rise and Plumstead fire-stations, for the London County Council:—

	£ s. d.
Hornsey-rise sub-station,	
J. Delfries & Sons, Ltd.	£234 0
Blackburn, Starling & Co., Ltd.	233 0
Barlow & Young	208 0
E. W. Sunderland & Co.	194 0
R. Dawson, Ltd.	192 5
G. E. Taylor & Co.	186 12
J. Barker & Co., Ltd.	177 0
F. Butler & Co., Ltd.	175 0
O. Clark & Co.	171 0
Durell & Co.	165 0
F. O. Grant & Taylor, 68, Queen	161 0
F. J. Coleby & Co., 6, Princess-street,	
Canvassers-square, W*	160 0

Plumstead sub-station.

	£ s. d.
Blackburn, Starling & Co., Ltd.	223 0
J. Delfries & Sons, Ltd.	216 0
Barlow & Young	198 0
R. Dawson, Ltd.	194 0
E. W. Sunderland & Co.	181 0
G. E. Taylor & Co.	174 7
F. Butler & Co.	165 0
J. Barker & Co.	164 11
O. Clark & Co.	159 0
Durell & Co.	159 0
F. J. Coleby & Co.	147 0
J. O. Grant & Taylor, 68, Queen	
Victoria-street, E.C.*	141 0

LONDON.—For roads and sewers on section B Kew-road extension, White Hart-lane estate, for the London County Council:—
T. Adams £712 19 2 | O. T. Gibbons £819 0 0
E. T. Bloomfield 659 19 10 | E. J. Coxhead,
E. J. Knifton 659 19 0 | Leytonstone* 598 0 0
[The estimate of the Architect comparable with these tenders is £650.]

LONDON.—For new garage at corner of Lots-road and Tadema-road, Chelsea, S.W., for the Metropolitan Motor Cab and Carriage Company, Ltd. Mr. H. Radcliffe Langton, architect and surveyor, 4, John-street, Bedford-row, London. Quantities by Mr. C. F. A. Poland:—
Harris & Wardrop £2,567 | Jarvis & Sons £2,408
Bjvalden & Sons, J. Parsons 2,388
Ltd. 2,544 | J. Greenwood, Ltd. 2,381
Webster & Cannon 2,528 | Lole & Co. 2,875
Ford & Walton, Ltd. 2,482 | Mattock & Parsons 2,367
W. Wallis 2,476 | H. Young* 2,313
Leslie & Co., Ltd. 2,459

LONDON.—For heating two dining-halls and the chapel at the Workhouse, Renfrew-road, Lower Kennington-lane, for Lambeth Guardians. Mr. G. E. Arnold, engineer, 105, Kennington-road, S.E.:—
Brightside Foundry and Engineering Co.,
Sheffield £170

MACCLESFIELD.—For erecting new strong-room at the Union Office, for the Guardians. Messrs. Whitaker & Bradburn, architects, King Edward-street, Macclesfield:—
Gorton & Wilson, Elizabeth-street, Macclesfield .. 1114

MITCHAM.—For Goringo Park new school, for Surrey Education Committee. Messrs. A. W. Jarvis and F. A. Richards, Architects to the Committee, 36, Victoria-street, S.W.:—
Wood & Son £8,797 | Rice & Sons £3,883
Stuart & Sons 8,764 | Wakeham Bros. .. 8,295
G. Kemp 8,741 | J. & M. Patrick ... 8,049
M. Patrick 8,585 | Martin, Wells, & Co. 8,010
Waller, 8,585 | T. J. Hawkins & Co. 7,888
Dove Bros. 8,452 | J. Burges & Sons* 7,803

NORWICH.—For alterations to premises, Exchange-street, Norwich, for the Mutual Loan Society. Messrs. Morgan & Duckington, architects, Norwich:—
J. S. Smith £555 0 | S. Utting £497 10
T. Gill 549 0 | Scarles Bros.* 494 0
J. Young & Son 547 0
[All of Norwich.]

NUNEATON.—For 1,410 lineal yds. of 9-in. earthenware and cast-iron pipe sewers in Heath-end-road, for Nuneaton and Chichester Urban District Council. Mr. F. C. Cook, Engineer and Surveyor, Council Offices Nuneaton:—
Wallerman G. Holloway 1,177 0 0
Bros. 1,616 6 10 | J. Brown 1,156 17 2
H. H. Barry 1,299 17 8 | T. H. Harper
T. H. Macdonald 1,181 16 0 | Carlton 1,128 14 6
[Thirteen tenders received.]

ORMESBY.—For enlargement of school, for Norfolk Education Committee. Messrs. Olley & Howard, architects, 4, Queen-street, Great Yarmouth:—
R. Leath, Great Ormesby* £587 18 4
[Thirteen tenders received.]

ORSETT (Essex).—For alterations and additions to Workhouse, for the Guardians of the Orsett Union. Mr. C. M. Shiner, A.R.I.B.A., 110, Hamilton-house, Bishopsgate-street Without, E.C. Quantities by Mr. G. Silvester, 46, Strand, W.C., and at Gray:—
T. Robotham £5,537 0 0 | C. Wall, Ltd. £5,230 0 0
Sabey & Sons 5,914 0 0 | G. Brown 5,098 6 0
W. Potter 5,852 0 0 | F. Davey 5,076 0 6
F. J. Coxhead 5,892 0 0 | R. J. Mead 5,068 18 3
O. Bruty 5,290 0 0 | H. J. Carter 5,041 9 9
Sheffield Bros. 5,283 0 0 | J. Brown 5,236 0 0
L. Davey 5,236 0 0 | Grays, Essex 4,830 0 0
[Recommended for acceptance.]

QUEENSBURY.—For the erection of a house at Scarlet Heights. Mr. H. F. Sharp, architect, 1, Brugs-villas, Queensbury. Quantities by architect:—
Erectors and Masons: Jones & Wilcock,
Queensbury £555 0 0
Carpenter and Joiner: J. Briggs, Queensbury. 255 0 0
Sinter: J. Smithies, Great Horton 49 17 6
Plasterer and Concretor: T. Greenwood,
Queensbury 54 0 0
Plumber and Glazier: W. Hodgson, Queensbury 155 0 0
Painter: S. Hodgson, Queensbury 21 10 0

ROSS (Herefordshire).—For painting and decorating at new residence at Lowrop, near Ross, for Mr. J. M. Newton, Messrs. Groom & Bellington, architects and surveyors, Palace-chambers, Hereford. Quantities by architects:—
Third Contract.
Greenlands, Ltd. £89 5 0 | J. C. M. Vaughan,
E. W. Wilks 68 0 0 | Hereford* £84 1 10

TREFOREST.—For the erection of Park school, etc., for Pontypridd Urban District Council Education Committee. Mr. P. R. A. Willoughby, Surveyor, Municipal-buildings, Pontypridd:—
Knox & Wells, Bangor-street, Cardiff. £11,730 13 7

WINOCHOMB.—For Cleave Hill sewerage works, for the Rural District Council. Mr. J. Villar, Engineer, 5, Essex-place, Cheltenham:—
Chick, Carson & Co., Ltd., Highworth,
Wills £2,857 17 8
[Nineteen other Tenders.]

WOOD GREEN.—For erecting Baptist church. Messrs. G. Balas & Son, architects, 5, Clements-inn, Strand, London, W.C.

	Estimate "A."	Estimate "B."	Estimate "C."	Estimate "D."
H. J. Carter	£ 5,123	£ 272	£ 480	£ 353 0
C. North	5,087	256	470	378 0
Co-operative Builders Ltd.	4,030	283	520	345 0
Holliday & Green- wood	4,927	251	493	342 0
J. Smith & Sons ..	4,866	234	540	354 0
W. Lawrence & Sons	4,784	227	529	353 0
Bywaters & Sons ..	4,617	242	499	368 0
Matlock Bros.	4,617	213	483	340 0
Kerridge & Shaw ..	4,536	233	456	361 0
Battley, Sons, & Holmes	4,470	227	466	345 0
A. Parthead & Son ..	4,415	225	427	337 0
F. J. Coxhead	4,300	211	437	331 17
Mattock & Parsons ..	4,275	221	445	363 0
H. Knight & Sons ..	4,275	221	440	345 0

* Accepted as regards estimates A and D, with option of the other estimates.

WOOTTON.—For drainage works, for Bedford Rural District Council:—
Jackson £148 18 | R. Brace £95 0
Ray 133 15 | Langhton 74 0
Sparrow 118 10 | Bedford*
Jacobs & Burton 110 16

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ILLUSTRATIONS.

Church of St. Simon, Plymouth.....	Mr. Harbottle Reed, F.R.I.B.A., Architect.
New Buildings for the British Medical Association.....	Mr. H. Percy Adams, F.R.I.B.A., Architect.
1. Elevations and Sections.	
2. Plans.	
Old Houses, Burford and Shepton Mallet.....	Drawn by Mr. W. Eaton, A.R.I.B.A.
Old House, Lechlade.....	

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The Canals and Waterways Commission.



DIFFICULT and tangled as the canal problem may be, the evidence presented in the first Report of the Royal Commission on Canals and Waterways is

not less so. Since March 21 twenty-two meetings have been held and fifty-four witnesses have been examined, whose evidence, together with twenty-seven appendices, fill 447 closely-printed pages. These records contain much valuable information and many useful opinions from public officials, canal engineers and managers, canal carriers, manufacturers, merchants, agriculturists, landowners, and others.

Unfortunately no attempt was made to classify the witnesses called in by the Commission, and thus to deal in regular succession with the different aspects of the whole question. For this reason the Report is a mere flood of evidence, into which the average man may dive and in which he may swim, but from which only the strong and expert swimmer can hope to derive benefit. In dealing with this chaotic Report we shall consider some of the chief points suggested by the facts and opinions adduced by witnesses representing the various interests involved.

In the first place, we may appropriately refer to the statements of Sir Herbert Jekyll, R.E., Assistant-Secretary

of the Railway Department of the Board of Trade. This witness gave an interesting outline history of artificial waterways in Great Britain, commencing with the Fossdyke, attributed to the Romans, and now in the joint ownership of the Great Northern and Great Eastern Railway Companies; making incidental mention of the Exeter Canal, constructed in 1539, and containing the first lock in this country; and then referring to the numerous important canals formed during the forty years following the completion of the Bridgewater Canal in 1761. The gradual decadence of inland navigation subsequent to the establishment of the railway system, the transfer of many canal undertakings into the hands of railway companies, and the tribulations of the remaining independent canals, are matters of history upon which we need not dwell. Statement No. 1 put in by Sir Herbert Jekyll shows how twelve important canals have fared since the year 1838, which may be regarded as the high-water mark of canal prosperity. Speaking generally, although tonnage increased rather than diminished between 1838 and 1848, the receipts fell off considerably, pointing to the effect of railway competition; and in some cases the decrease of receipts was, and has since continued to be, out of all proportion to the decrease of tonnage. On the other hand, both tonnage and receipts have increased on the Birmingham Canal, the Leeds and Liverpool Canal, the Aire and Calder Navigation, and of late on the River Trent. These satisfactory results are not without significance when

considered in connexion with the geographical positions of the waterways in question.

Statement No. 2 put in by Sir Herbert Jekyll contains lists of the independent and railway-owned canals and navigable waterways in the United Kingdom, and from it we have prepared the subjoined table, showing the commanding position occupied by railway companies, without taking into account the Birmingham Canal of 158 miles, which is virtually controlled by the London and North-Western Railway Company.

Country.	Independent.		Railway-Owned.		Total.
	M.	Ch.	M.	Ch.	
England and Wales	2,302	79	959	14	3,162
Scotland	69	40	88	61	153
Ireland	490	43	95	69	586
Total.....	2,763	2	1,138	64	3,901

Statement No. 5 by Sir Herbert Jekyll is a list of fifty-three canals not now in use, and it is significant that of these no fewer than fifteen have been applied as sites for railways.

Confining attention to English and Welsh canals, we will next consider points suggested by evidence collated from various parts of the Report, and classified according to the standpoint of the different witnesses.

The following is an analysis where all but two of the witnesses examined are classified in accordance with the interests represented. The two remaining witnesses were Sir E. Cecil Hertslet, H.M. Consul-General for Belgium, who has made careful study of Belgian canals

and waterways; and Mr. W. P. Tyler, formerly engaged in the carrying business on German inland waterways.

	England & Wales.	Scotland.	Ireland.
Government Departments	2	1	1
Municipal Bodies and Local Authorities	1	—	—
Civil Engineers	1	—	—
Chambers of Commerce and kindred Associations	8	—	—
Navigation Companies and Authorities	12	1	—
Railway and Canal Companies	1	—	—
Canal Carriers	3	—	—
Iron and Coal Trades	3	—	—
Merchants and Manufacturers	6	1	—
Land and Agriculture	—	—	—
Total	36	3	1

It should be understood that many of the witnesses appeared in a dual capacity. For example, there were nine engineers in all, most of them acting for canals or navigations, and some combining the position of manager with that of engineer.

In considering the contents of the Report we must bear in mind the terms of the reference to the Royal Commission: Very briefly stated, the points for inquiry relative to the Canals and Inland Navigations of the United Kingdom were:—

- (1) Present condition and financial position.
- (2) Causes and means of removing causes hitherto preventing improvements.
- (3) Improvements desirable.
- (4) Benefits anticipated from improvements.
- (5) Future control.

From the "Suggested Heads of Evidence," printed on page iii. of the Report, the Commission appear to have had the intention of calling a large number of witnesses representing municipal bodies or local authorities. So far as matters have proceeded, however, these are very poorly represented, as shown by the table above. The chief facts learned from their representatives are (1) that the Gloucestershire County Council are now some 40,000l. out of pocket as the result of an attempt to revive the derelict Thames and Severn Canal which was taken over in 1901 from the Great Western Railway Company; (2) that in Worcestershire the management of canals by County Councils is considered undesirable; and (3) that in Birmingham and the surrounding district the local authorities generally favour the improvement of four main routes radiating from Birmingham to the Thames, the Mersey, the Severn, and the Humber, and the proposition that these waterways should be controlled by a national trust supported by Government. From the evidence of witnesses coming under other heads we gather that there is a disinclination among local authorities to contribute towards the cost of improving and maintaining canals and waterways, but it is probable that in the next Report of the Commission we may have an opportunity of learning in a more direct manner what are the views of such bodies.

The second class of witness contemplated by the Commission, as indicated by the "Suggested Heads of Evidence,"

includes "Traders or Agriculturists." This is a very broad designation which, for our present purpose, may be conveniently subdivided into classes interested in commercial and industrial pursuits, in agriculture, in the canal-carrying business, and in the construction and management of canals.

Speaking as Chairman of the West Yorkshire Coal Owners' Association, Mr. A. C. Briggs pointed out the serious delays and interruptions caused to traffic owing to lack of water in the canals used by his company, and stated that owing to the rough treatment of coal loaded into and dug out from ordinary barges canal transport was unsatisfactory. This objection, however, does not apply to coal dealt with on the compartment system introduced at some collieries, and on the Aire and Calder Navigation, an important result of the improved method being that a very considerable increase has taken place in the export of coal from West Yorkshire. On the question of canal control, Mr. Briggs spoke in favour of amalgamation and management by private enterprise, considering control by representative bodies undesirable.

Mr. W. S. Barrett, a Wigan colliery manager and Vice-Chairman of the Lancashire County Council, believed strongly in the future prosperity of canals providing they were improved and reorganised in a suitable manner. He also objected to control by locally-elected trusts, although convinced as to the necessity for amalgamation.

The coal industry was further represented before the Commission by two of three witnesses also speaking on behalf of the iron and steel trades. Mr. S. J. Sanders, of the Stanton Ironworks, Nottingham, nominated by the Mining Association of Great Britain, spoke of the benefits already derived from canal traffic, and believed that good canal services, especially on four main routes between the Midlands and the Mersey, Thames, Severn, and Humber, would have the effect of increasing trade and of benefiting the railway companies very greatly. Mr. George Hatton, requested to speak on behalf of the South Staffordshire Ironmasters' Association and the Mining Association of Great Britain, thought that the decreased use of canals in his district had been largely due to divided interests, lack of co-operation in the matter of rates, general want of enterprise on the part of canal companies, and in no small measure to railway ownership.

Mr. A. W. Hutton, appearing for the South Staffordshire Ironmasters' Association and the Walsall Chamber of Commerce, stated the general opinion of those whom he represented to be that a comprehensive scheme of canal control and development was of the highest importance to the prosperity of the district. He attributed the smallness of through-traffic to the difficulty of obtaining through-rates over railway-owned sections of the canal system.

Other witnesses representing Chambers of Commerce and kindred associations agreed in regarding as necessary the amalgamation of canals and their liberation from railway influence, but were by no means unanimous as to the form that

should be assumed by the controlling authority or authorities, the general view being that by the judicious improvement of selected routes in conjunction with proper organisation, the systems so treated would intimately give a fair return on the capital invested. Two of these witnesses believed the State purchase would not be advisable. Mr. E. C. Corbet (Worcester Chamber of Commerce) estimating that if so acquired the annual loss on the present traffic would be about 72,000l., and Mr. S. B. Wheway (Walsall Chamber of Commerce) saying that it would be a suicidal policy for the State to spend from 15,000,000l. to 20,000,000l. in buying canal property which, as the result of more strenuous railway competition, might become a white elephant.

The general conclusion to be drawn from the evidence of witnesses representing industrial and commercial interests is that a strong case has been made in favour of improving some of the more important main canals and of combining them into a completely organised system. Notwithstanding doubts that have been expressed, it is clear that in manufacturing districts the canals, even under existing disadvantages, are very largely used, and there is sufficient reason for believing that if taken over by a single authority, with Government support, these waterways could be so worked as to stimulate trade and to yield a fair return on the purchase price and the additional capital involved in improvements.

Turning now to the position of agriculturists, we find very little hope that farmers will ever make use of canals to any considerable extent. Even those witnesses who thought that inland waterways, if extended and organised, might be of some benefit to agriculturists, were somewhat half-hearted in the expression of their hopes, and most of those who spoke as landowners, land agents, farmers, and agricultural merchants voiced the general indifference exhibited on the subject.

The most significant evidence on this point was that of Mr. C. M. S. Pilkington, nominated through the Board of Agriculture by several agricultural associations. Mr. Pilkington said that although the Land Agents' Society, with nearly 900 members, representing between 9,000,000 to 10,000,000 acres of land, had sent circulars to all their members asking for opinions concerning the value of canal traffic to agriculturists, only two replies were received. Mr. T. Latham, a farmer in Oxfordshire and Berkshire, also recommended through the Board of Agriculture, said that there was little probability of farmers being induced to co-operate in making general use of canals. A similar view was held by other witnesses believing firmly in the future prospects of canal traffic, and we cannot avoid the conclusion that whatever steps may be taken for the revival of our inland waterways must be directed solely to the improvement of routes passing through industrial districts, or connecting industrial regions with great mercantile centres and seaports.

There remain now for consideration the views expressed by canal carriers, owners, and experts, and although it may be said perhaps that some of these

witnesses are not entirely disinterested, it must be admitted that their evidence has been very impartially given, and is of distinct value.

Canal carriers seem to agree fairly well in supporting the improvement of the best canals between manufacturing districts and the great seaports, the elimination of railway influence, and amalgamation with State control as distinguished from administration by local authorities and private trusts. The engineers and managers of canals and navigable waterways favour amalgamation with central control, some advocating local committees or district boards of management. One or two canal engineers recommend purchase by the State of the more successful undertakings, and others look upon State purchase as a last resource, believing that facilities similar to those given by the Light Railways Acts would meet the case.

Mr. J. A. Saner, the Engineer to the Weaver Navigation, gave evidence at great length propounding a scheme very similar to that contained in his paper read last year before the Institution of Civil Engineers, and upon which we commented at the time. His proposal is that certain waterways, requiring little or no improvement, should be purchased by a central authority at a cost of about 11,000,000*l.*, and that a first instalment of improvements should be executed at the cost of 10,000,000*l.* Although some details of the proposal are open to criticism, the main idea is a good one, and deserves serious consideration.

Mr. W. H. Bartholomew, the Engineer to the Aire and Calder Navigation, who has carried out all the improvements and new work in connexion with that successful undertaking during the past fifty years, gave evidence at length advocating amalgamation and facilities for effecting combinations without the cost and delay attending applications to Parliament. While believing that all tidal rivers should be placed under State control, he looked upon the national purchase of inland waterways as a thing to be avoided if possible.

On the important point of water supply practically all the technical witnesses were agreed that the position is becoming more difficult every year. The problem is a serious one that will probably have to be solved in large measure by the application of mechanical lifts, such as are already used in some parts of the country. Available sources of water are rapidly diminishing owing to the activity of local authorities in providing for the needs of their constituents, and for this reason we see an objection to the 300-ton barge locks proposed by Mr. Saner. Moreover, there is a very general consensus of opinion to the effect that barges of more than 100 tons are not necessary.

Mr. W. H. Wheeler, as an independent engineer, thought that while it would be useless to attempt the restoration of the minor canals, the main routes connecting the Midlands and the chief seaports might be remodelled with advantage, although he doubted whether the result would be financially successful. Like some other witnesses, Mr. Wheeler foresaw great difficulty in

obtaining adequate water supplies, especially on the higher levels, and agreed with the principle of amalgamation with unity of control, the best management in his opinion being a board consisting of canal carriers.

Mr. Wheeler is certainly not an optimistic advocate of canal regeneration from the financial standpoint, and for this reason his evidence may have a steadying effect upon any who may be inclined to regard with favour the too-glowing anticipations of more ardent reformers.

In making this remark we do not lose sight of the moderation displayed by other engineers qualified to gauge the financial aspect of the question.

Generally speaking, the evidence now published does not support the view that the application of State funds to the purchase and regeneration of the entire canal system would be a profitable transaction. But a strong case is made out for the acquisition and improvement by a central authority of those canals and waterways which at present connect the Midlands with the principal seaports. As many of the canals in question are already able to pay their way, there is every reason to believe that the realisation of a judiciously-prepared scheme would be financially as well as industrially successful. Having once made a start by the organisation of four radial trunk routes, the possibility of restoring minor canals could be considered. We are inclined to think that some of these, whose position now seems hopeless owing to the lack of through-traffic facilities, might ultimately be revived and placed upon a paying basis.

Of course, until the work of the Commission has been completed, it would not be justifiable to draw any sweeping conclusions from the evidence published. However, two points very clearly made out are the vitality of canal traffic in the great manufacturing districts of the Midlands and the North of England, and the strong demand from the same districts for improved communications with the sea.

In submitting their first Report the Commission announce the intention of taking evidence as to the Canals and Inland Navigation of Ireland, and later of hearing further witnesses from England, Wales, and Scotland. As Scotch and Irish waterways have scarcely been dealt with by the Commission up to the present time, we think it better to defer any comments upon them until more adequate data have been collected.

SUNDAY-SCHOOLS, PAIGINTON.—The large hall of the new Sunday-schools and church buildings of St. Andrew's Church, Paiginton, were recently opened. The new buildings have been erected at a cost of close upon 1,000*l.* The completed portion of the scheme comprises the large hall, a room 55 ft. 6 in. long (including the platform 11 ft. wide), 28 ft. wide and 18 ft. high. The walls are built with local red sandstone, punched externally, with dressings of Monk's Park Bathstone. Internally the walls are plastered with Serapiate plaster and coloured decoratively with distemper. All the windows have leaded glazing. The high-pitched roof has been constructed on a method comprising a combination of the arch and truss principles. The roof is covered externally with Bridgewater plain tiles, and is surmounted by a ventilating turret. The platform has a proscenium opening, with side stairways. The warming is by means of gas-heated radiations, and the lighting is by incandescent gas. Mr. C. S. Appleton, architect, prepared the plans.

NOTES.

The Panama Canal.

AN interesting announcement relative to this great work is to the effect that the United States Government have definitely decided to have the construction of the canal performed by contract. Of course, the execution of so huge an undertaking can only be attempted by millionaire firms, and so competition will be somewhat limited, but we are glad to learn that tenders will be considered without regard to nationality. If those firms who submit tenders are well-advised they will insist upon the further condition that the materials of construction shall not necessarily be purchased in the United States. Tenders are to be expressed in terms of the percentage of profit on prime cost as ascertained by a board of five engineers, two of whom are to be appointed by the successful contractor, and three by the Government, one of the latter to be the chief engineer to the Canal Commission. Whether the opportunity will appeal very strongly to British firms we should not like to say, but so far as we can see the arrangement proposed is perfectly fair, and should have the effect of reducing both the cost of the works and the time required for their completion.

The Human Side of Engineering.

IN an address delivered before the New York Electrical Society on October 31 Mr. V. Karapetoff, of Cornell University, enunciated various good maxims that deserve the consideration of young architects quite as much as of young engineers. Starting with the fundamental thought that professional usefulness and personal satisfaction depend upon a correct conception of life and on the degree in which this conception is manifested in daily work, the speaker discussed first three essential requisites for an efficient and successful engineer, and then illustrated the manner in which he believed a correct theory of life would be helpful. Thus it will be seen that the address was divided into two parts. In the first of these the speaker insisted on the necessity for sound professional knowledge, continuously refreshed and increased; adequate knowledge of business forms and men, picked up by observation and study; and the progressive development of character, without which technical and other knowledge is of no avail. The theory of life sketched in the second portion of the address is one well calculated to illumine the daily work of every professional man who is able to make it his guide. In a word, the engineer is to be filled with enthusiasm and to find "his true compensation in the results of his work." If the aforesaid results may be taken to include reasonable payment they will probably be thought satisfactory. If not, we fancy that a little thistle-down wafted over the ground in which the author sows his seed will be generally regarded as a useful corrective.

The Atlantic City Disaster.

FROM the verdict of the coroner's jury it appears that the lamentable draw bridge accident on the West Jersey and Sea Shore branch of the Pennsylvania Railroad was due primarily to the action

of the bridge attendant in signalling the line as clear when in reality the tracks were not properly aligned. Of course there can be no excuse for such action on his part, but from the evidence submitted we gather that the condition of the bridge was far from satisfactory. The attendant stated that the rails buckled at times, that he had to hammer them back into place, and had received orders to saw them shorter if they buckled again. These statements are suggestive of great laxity on the part of the management and of those happy-go-lucky ways that prevail generally on American railways. The secondary cause of the disaster was the absence of the customary guard rails—which one of our American contemporaries justly characterises as “a most fatal omission.” If these had been fitted the train would probably have remained on the bridge, and so a serious loss of life would have been avoided.

ALTHOUGH valuable as a fire-resisting material, the great disadvantages of cinder concrete in construction are its low tensile and compressive strength, and the corrosion of steel embedded in the material. In connexion with the latter point we may usefully refer to the Report made by a special committee of the Structural Association of San Francisco, by whom reinforced cinder concrete floor slabs have recently been examined in three buildings. Stated briefly, the conclusions drawn were that the metal was corroded to such an extent as to endanger seriously the safety of the floors, and that it was not probable the floors would have continued to support their loads longer than from one to three years. In striking contrast with the state of things in these cinder concrete floors was the condition of the floors in another building inspected, where the aggregate consisted of broken rock and the reinforcing bars, where exposed by the committee, were as sound as when first applied. Various reasons have been brought forward to account for the corrosion of metal in cinder concrete, and various remedies of more or less practical character have been suggested. In our opinion the most efficacious remedy is to avoid the use of cinders as a constituent of reinforced concrete.

In a communication from the American Bureau of Standards Messrs. Waidner & Burgess describe an experimental research they have made to investigate the reasons of the extraordinarily high efficiency of the new metallic lamps which are being made in Germany. The research is of great interest both from the theoretical and the practical point of view as, so far as we know, it is the first time that accurate measurements of temperature as high as 3,200° C. (5,800° Fahr.) have been made. The normal temperature of the carbon filament in a glow lamp is about 1,800° C., which is higher than the melting point of platinum. The temperature of a tantalum filament is 2,000° C., and of a tungsten filament 2,300° C. The higher temperature of the filaments is, therefore, a partial explanation of the great increase in the efficiency. They have proved, however,

that there is another cause which conduces to an increase in efficiency. It is well-known that platinum at a given temperature, for instance 1,500° C., radiates less total energy than a black body at the same temperature. In addition the ratio of the light rays emitted to the total radiation is greater for platinum. The efficiency of a platinum filament is, therefore, greater than that of a carbon one at the same temperature. This phenomenon is called “selective absorption,” and it contributes to the superiority of the metal filament lamp. It is, however, not the only reason, for otherwise a tantalum lamp would be more efficient than a tungsten lamp. The higher temperature of the latter more than compensates for its lack of “selective absorption.” The authors prove incidentally that the melting point of tungsten is 3,200° C. This metal has, therefore, the highest melting point of all metals yet discovered. Experiments have now proved that several types of metallic filament lamps have efficiencies at least three times higher than the ordinary glow lamps. Users of the electric light may, therefore, reasonably hope to effect considerable economies in their electric lighting bills in the near future.

Wireless Telegraphy.

THE new system of wireless telegraphy invented by Mr. Poulsen, of Copenhagen, will probably ultimately supersede the present systems in use. It is the greatest advance made in wireless telegraphy since Hertz demonstrated Maxwell's theory by his experiments on electric waves. We may consider that the problem of tuning wireless messages has been satisfactorily solved, and there will probably be immediate practical developments. The principle of the method was accidentally discovered by Mr. W. Duddell a few years ago when applying his oscillograph to study the direct current arc. Having connected a coil of wire and a condenser between the carbons, he was astonished to hear the arc emit a loud musical whistle. This he soon traced to the development of a large alternating current produced by resonance in the circuit in parallel with the arc. The frequency of this alternating current was extremely high, and very curious effects were produced by it. Mr. Poulsen, by producing a Duddell arc in hydrogen gas, has found that much stronger effects can be produced, and the frequency of the current is measured by millions. Instead, therefore, of using the ordinary spark gap discharger in the circuit of the vertical wire and earth, he uses this resonating alternating current. The frequency can be timed over an extremely wide range with the greatest ease, and hence signals may be sent to hundreds of different receiving stations from the same sending station, the frequency used determining which instrument will work, and consequently communication can be made with one instrument without affecting the others. Mr. Poulsen's practical experiments at Copenhagen in sending messages up to distances of 530 miles were completely successful, the power used being only a small fraction of that ordinarily employed. The system can also be applied to wireless telephony and the wireless transmission

of power. Similar experiments have been made before, but burning the arc in hydrogen so increases the efficiency of the radiation that it turns a difficult laboratory experiment into a trustworthy method. It is calculated that fourteen horse-power would be ample to produce waves sufficiently powerful to affect instruments on the other side of the Atlantic, and so it will be interesting to watch the development of this new means of communication.

Willesden District Council.

The Thirty-first Annual Report to the Willesden District Council by their

engineer and surveyor, Mr. O. Claude Robson, is as usual very well drawn up and full of information on the work of the district. Among the points of special interest, we note that complaints respecting sewer smells are on the decrease, and that the surveyor attributes this to the increased employment of ventilation by upcast shafts, about 30 ft. high, usually fixed on the pathway, and utilised as far as possible for carrying the Council's private system of telephone wires. The increased use of these shafts has rendered it possible to close a large number of the open grids in the roadway surface. The river Brent is reported to have been in a satisfactory condition throughout the year, a practical testimony to the good standard of the effluents from the sewage works. It is proposed, however, in conjunction with the Middlesex Council, to straighten the course of the Brent between the London and North-Western Railway and the Grand Junction Canal, which has been subject to stagnation and flooding here owing to its tortuous course. An old arm of the same river, where the channel had long ceased to act as a medium of flow, has been filled up. In regard to new roads and buildings it is noted that a considerable diminution in building operations has taken place during the year: the surveyor thinks that this is the case throughout most of the London suburbs, where building for the last ten years has been so brisk as to necessarily bring about a quiet time, the supply of buildings now exceeding the demand.

The Memorial to Keats and Shelley in Rome.

WE recently adverted to the project of preserving the house in which Keats died as a memorial to him and Shelley. A loan exhibition of relics of the two poets will be held on March 20 at Stafford House, London. The exhibits will include Mrs. Rawlins's gift to the memorial committee of two oil-paintings depicting the Villa Magni between Leri and St. Terenzio, Shelley's last home, where he wrote the “Triumph of Life,” and the coast by the Gulf of Spezzia, where, near Via Reggio, his body was cast ashore, having Keats's poems and a volume of *Æschylus* in the jacket-pockets. The two pictures are deposited for a few days at Messrs. Mendoza's galleries, No. 157A, New Bond-street. The committee desire to collect 4,600*l.* to enable them to purchase the house in the Piazza di Spagna for the permanent establishment of the memorial and museum, and to take over the custody of the two graves in the old Protestant cemetery outside the

Porta S. Paolo. Sir Rennell Rodd has presented to the committee some correspondence that passed between the late Marquis of Salisbury and the British Ambassador in Rome relating to the threatened disturbance of the poets' remains by the laying-out of a wide road through the burial-ground to Monte Testaccio; the correspondence confirms the belief that the diversion of the road was due to the personal intervention of Queen Victoria. Mr. Harold Boulton, of No. 120, Victoria-street, S.W., is honorary secretary to the memorial committee.

School of Art, AN exhibition of work is on view in the National Institution, Edinburgh. Galleries that covers a large wall area, for two sessions' labour are represented. The School has always made much of measuring old work, and the study has been somewhat differently followed from that of the ordinary student who measures and plots either for a prize or as the result of some scholarship gained, for here a part of the school work is done under supervision, with more attention given to archaeological niceties and more time spent on parts architecturally uninteresting than is usual. Otherwise, of course, it is a question how far this is beneficial to the student, however valuable the result as a historical record may be; it should perhaps be considered as school work that equals the experience he would get in an office where restoration was in hand. St. Michael's Church, Linlithgow, is pretty fully surveyed; parts of Elgin Cathedral, and Melrose so far as attempted; Culross Abbey, which Sir Rowand Anderson restored recently, etc., etc. Classic work has a due share of notice, of parts only rather than the whole fabric; plaster ceilings, as at Wintoun House, chimney-pieces and wall panelling, with particular attention paid to the carving and ornament, generally drawn full-size. Work further afield has been done in the measurement of some English village churches; the drawings show clear and firm draughtsmanship, and the set-off of the work on the sheets is workmanlike. At South Kensington metal work has been studied and furniture. In expansion of former practice, where the United Kingdom was the limit, Italy has been visited by travelling students, so there are coloured sketches, studies of coloured pavements and decoration, and of survey work the Pitti chapel is an admirable example. The display of design is small, and one cannot readily gather how far in these schools supervision goes; amount of work rather than study is perhaps in evidence in some large-scale drawings.

AN archaeologist writes to us:—"If Mr. Goodyear and his 'refinements' were let loose in S. Candida's Church, Whitechurch Canonincorum, they would have a happy time. There may be found—Obliquity of alignment, deflection of axis, vertical curves, parallel leans, and the whole army of such-like galore; nearly all of which are so manifestly due to structural causes that the church is quite an instructive object-lesson to the point."

THE ROYAL INSTITUTE OF BRITISH ARCHITECTS.

THE third general meeting (business) of the session was held on Monday, Mr. Leonard Stokes, Vice-President, presiding. The minutes of the last meeting were confirmed, and the following were elected as members under by-laws 7, 8, and 9:—

As Fellows:—

W. Adamson, Cape Town	D. McNaughtan, Glasgow
G. L. Beattie, Edinburgh	A. Marshall, F.S.A.
A.M. Inst. C.E., Edinburgh	Scott, Edinburgh
G. Bell, Glasgow	N. MacWhannel, Glasgow
E. M. Blake, Wellington, N.Z.	H. E. Mathews, Africa
J. H. Blizard, F.S.I., Southampton	G. Nicholas, Halifax
D. J. Blow	W. T. Oldrieve, F.S.A.
C. C. Brewer	Scott, Principal Architect for Scotland to H.M. Office of Works
W. L. T. Brown	J. W. Paton, Durban, S. Africa
R. M. Butler, Dublin	J. P. Pritchett, Darlington
W. H. D. Caple, Cardiff	E. K. Purchase, London
F. J. C. Carruthers, J.P., Dumfries, N.B.	W. Reid, Johannesburg, S. Africa
M. E. Collins	D. Robertson, A.R.S.A., Edinburgh
G. Conrad, Adelaide, S. Australia	W. W. Robertson, F.S.A., Scot., Edinburgh
W. Cooper, Huddersfield	J. Salmon, Glasgow
W. M. Coddell, Leicester	J. Simpson, Bolton
B. Cresswell, London	E. W. Sloper, Johannesburg
W. Crichton, Wellington, N.Z.	A. P. Smad, Ross, Herefordshire
J. Davidson, J.P., Coalbridge, N.B.	A. D. Smith
W. L. Eves	A. Stenhal, Manchester
J. Farnach	H. Sadow, Calcutta
W. Fenell, F.R.S.A., Belfast, Ireland	J. Swash, Newport, Mon.
H. W. Finch	H. R. Taylor, Edinburgh
E. W. Frichley, F.R.G.S., Boulogne	I. Taylor, Manchester
J. G. Gillespie, Glasgow	S. A. B. Thomas
G. W. Hamilton-Gordon, Director of Public Works, Orange River Colony	R. W. Thomas, Llandrindod Wells
C. Harrison	J. B. Thomson, Glasgow
E. M. Harvey	W. A. Thomson, Glasgow
P. L. Henderson, Edinburgh	G. A. Troup, Wellington, N.Z.
R. A. Hinds	W. J. Wagborne, Calcutta
G. S. Hudson, Durban, S. Africa	W. S. Walker, Hull
A. R. Jemmett	W. T. M. Walker
J. J. Kenn	J. Walerson, Johannesburg
S. D. Kelson, M.A., Calcutta, Leeds	J. Watson, Edinburgh
W. G. B. Lewis	W. F. White, Danes
J. H. McKay, Wellington, N.Z.	J. L. Williams
J. C. McKellar, J.P., Glasgow	C. L. Wilson, Cardiff
C. R. Mackintosh, Glasgow	G. E. Withers
W. H. McNah, Glasgow	E. Woodhouse, Manchester

As Associates:—

D. Bamford	E. T. J. Jones
H. Blackadder	L. R. Kenton, Belfast
A. G. Bray, Blackburn	C. M. Kinsley, B.A. (an)
A. E. Brooker	(an)
J. Bughell	H. J. C. Marshall
W. W. J. Calhoun	H. Moss, Bolton
H. R. Coates	M. Moss, Liverpool
O. H. Cockrill, Great Yarmouth	J. E. Mundell, Dorset
T. H. O. Collins, Brighton	H. F. Murrell
W. H. Cooke	J. Newton
R. W. A. J. Cosway	J. Parlett
H. B. Downs, Yorks	S. H. Penington, Bristol
C. W. H. Holton	G. E. Phillips
E. H. Edleston, Nantwich	H. A. Rowbottom
G. A. Farrar, Manchester	J. Ryecroft, Bradford
F. H. Fitzgerald	W. P. Rylatt, Leeds
J. J. Forster	J. P. Salway
F. B. Foster, Weston-super-Mare	G. S. Santo, Shrewsbury
J. E. Fulton	W. G. Schofield, Leeds
E. H. Gandy, Wolverhampton	H. Shackleton, Keighley
L. M. Gatch	J. Smith, Glasgow
A. C. Goulder	F. A. Snrles
J. W. Hepburn	E. G. Stoddard
G. R. H. Hoole	C. R. Thickpenny
P. C. Hoy, Manchester	W. I. Travers
J. J. Humphry	E. H. Walker
D. B. Hutton, Glasgow	E. G. Walker
	R. M. Ward, Liverpool
	H. Watson
	B. C. Westwick, Mansfield, Notts.
	A. Woodson, Ceylon.

Revision of Charter and By-laws.

The Chairman then brought the following proposal before the meeting:—

By-law 3, as amended at the general meeting of June 6, 1904, not having yet received the sanction of the Privy Council, the old form of by-law is still in operation. The Council suggest, however, that, pending the settlement of the larger questions involved in the revision of the charter and by-laws (suggested by the Registration Committee, and adopted in principle by the general body, but referred to the Council for a report), they continue to act under the old by-law until such time as all the changes may be made together, the Council undertaking in the meantime to act in accordance with the spirit of the proposed by-law until it comes regularly into force.

A number of nominations to the Fellow-

ship have, however, lately been made from the Colonies and elsewhere, some of which had to be referred back for further information. The Council propose to deal with these, in common fairness to the candidates, on the old lines.

It was resolved that the date December 31, 1906, in the resolution of February 29, 1904, be extended to December 31, 1907.

Rural Building By-laws.

Mr. Lacy W. Ridge moved, and it was resolved:—

"That the Royal Institute of British Architects is of opinion that the provisions of the Public Health Acts (Building By-laws) Bill, 1906, which has already passed the House of Lords and is now sent to the House of Commons, will, when enacted, prove advantageous in facilitating building operations in rural districts."

Public Officials Acting as Architects for Public Buildings.

Mr. Herbert W. Wills moved the following resolution, which was agreed to after discussion:—

"That the Royal Institute of British Architects considers it undesirable in the interests of architecture that public officials should act as architects for public buildings unless they have had an architectural training."

THE ARCHITECTURAL ASSOCIATION.

The usual fortnightly meeting of the Architectural Association was held on Friday last week, at the premises in Tufton-street, Westminster, S.W., Mr. Walter Cave, Vice-President, in the chair.

Mr. C. Wontner Smith, Hon. Secretary, read the minutes of last meeting, which were confirmed.

Illness of the President.

The Chairman said he had to express the regret of the President, Mr. R. S. Balfour, that his illness would prevent him being present that evening. He was glad to be able to report that the President was considerably better, and that, through Mr. Driver, Secretary, who had seen him, Mr. Balfour had sent his thanks to the members for their kind inquiries, and had expressed regret at his inability to attend to his duties and the hope to be with them again soon. The members would desire, he (the speaker) felt sure, to send an expression of pleasure to the President that his serious operation and illness had had such a successful course, and he moved accordingly.

The motion was unanimously agreed to, and Mr. Tanner, Hon. Secretary, then read a list of nominations.

Elections.

The following gentlemen were then elected members:—

E. P. Jay, Wimbleton.	R. A. Holland, Brixton-hill.
J. M. Kendall, West End-lane.	A. J. Manton, Wolverhampton.
J. A. Slater, St. John's Wood Park.	H. Brine, Gunnersbury.
M. S. Adams, Chiswick.	R. Lowry, Stockwell-road.
H. A. Gold, Beckenham.	

The Chairman announced the reinstatement of Mr. C. E. Hutchinson.

The Thomas Garner Bequest, etc.

The Chairman said he had to announce the donation to the Association of a number of guide-books which had been given to the library by Mr. Andrew Oliver. He moved a vote of thanks to Mr. Oliver for his generous gift, which would be of great use to members, the motion having been agreed to.

The Chairman said there was also a bequest to the Association of part of the late Mr. Thomas Garner's library, consisting of 200 books, which had not yet been arranged or catalogued. Mr. Warren, who knew Mr. Garner well, was present, and he would say a few words as regards the bequest.

Mr. E. P. Warren said it might add interest to the bequest if he told them something of the way in which the bequest came to be made. Mr. Garner, whose pupil he had the honour of being, conjointly with Mr. Bodley, and with whom he was on terms of intimate friendship for twenty-five years, consulted him, or wished to consult him, as to the disposal of his books. He was to have gone to Mr. Garner's house and to have discussed with him what

he should do with his books, but the various appointments fell through, and Mr. Garner died, he grieved to say, at the end of last April, and his widow asked him (Mr. Warren) to assist her in disposing of the library. They knew it had been his intention to give in his lifetime to his former pupils and assistants and some of his friends certain books, and the task fell to him (the speaker) more or less to allot the books to be given. That made a small deduction of the number at the disposal of Mrs. Garner, and she wished the remainder to be kept together and to form a library for the use of students of architecture. Having, he trusted, like every member, the interests of the Association at heart, he told her what the Association was doing, and that he could conceive no body to which this bequest of books could be more worthily made. Mrs. Garner, when she heard that the Association existed mainly for the benefit of the aspiring young architect, was delighted, and she said that no disposal of the volumes could give her more pleasure. It was in that way that the books had been given. The volumes made an admirable collection of books for an architectural library. He should like to say a few words about his late master, who was little known because he was an exceedingly shy and retiring man, who always kept in the background. He was a consummate draughtsman and one of the most industrious men he had ever met—a terrific worker, whose output was amazing. He (the speaker) had worked at his side for years, and he was astonished at the rapidity of his work. Those who did not know him and his methods of work were prone to think him much of a copyist. He could assure them from intimate knowledge of Mr. Garner that the description did not apply to him. He set extreme store upon precedent, certainly much more than many of us do now—whether rightly or wrongly. But in all of his work there was such a strong individuality that even if he tried to copy he did not succeed in doing it. His work was always—*namas* Garner's work; and he could tell them that, of the work carried out by Messrs. Bodley & Garner. Mr. Garner was wholly and solely responsible for most of the civil and domestic work done by the firm—that he absolutely carried out as an individual architect the large additions to Magdalen College, Oxford; the tower and additions at Christchurch; the master's lodge at University College; the portion of the school at Marlborough; River House in Tite-street, on the Embankment; and the great mansion for the Earl of Plymouth, Hewell Grange, which was his entire work inside and out. His work in co-operation with his partner was considerable. As to the severance of the partnership, it arose from the fact that Mr. Garner joined the Church of Rome; and, though the partners remained intimate friends and had offices adjoining, they never had any deed of partnership, the arrangement being a purely friendly one, and quite informal. At Sir Gilbert Scott's office Mr. Garner was contemporary with Mr. T. G. Jackson, and, he thought, the late Mr. Micklethwaite and Mr. Somers Clark, and he was junior to Mr. Bodley, who had left Scott's office then, although he was in touch with it. After leaving Scott's office Mr. Garner went to his late home in Warwickshire, living in his father's house and practising in a small way for himself; he also carried on works in the neighbourhood for Scott, amongst which was the restoration of the beautiful little Leicester chapel at Warwick; and there a rather curious incident occurred, which showed two sides of his character. He was a keen countryman and an excellent horseman, and at the time the work at the chapel was going on there was some subsidence of the foundation of the old building. This occurred while Mr. Garner was at his home some miles away, and the news that the chapel was tumbling down was brought to him by a horseman who had ridden so hard that his horse was in a lather. Mr. Garner at once got upon the horse and galloped to the spot just in time to take measures to shore it up and make it safe. That showed his resource. He was devoted to travel in pursuit of architecture all over the Continent of Europe, and it used to astonish him (the speaker) in his early days to find

that he could hardly find a town or village Mr. Garner did not know. He might visit such and such a place, and when he told Mr. Garner he had been there he answered: "Oh, yes; jolly place, been there twice." He knew in an accurate way the architecture of most of the northern countries of Europe, and he had an extraordinary recollection of what he had seen, no matter how long a time had elapsed. He sketched with extreme rapidity and vigour, and he had left behind him numbers of small sketch-books filled with the most extraordinarily graphic hieroglyphic sketches which conveyed a great deal to him and to others who knew his methods. Quite apart from architecture, of which he was a most profound scholar, he was also a considerable scholar in the general literary sense. He was particularly well acquainted with English literature, from the time of Charles I. upwards, and he possessed a considerable number of books of old plays. Mr. Garner lived for a long time in Church-row, Hampstead, where he had an old Georgian house, but he always desired to live in the country and come to town occasionally, and that he was able to do about seventeen years ago, when he took a beautiful old Jacobean house in Oxfordshire, which he furnished in an excellent manner, and where he lived for a number of years, merely coming up to town once or twice in the week on business. The first pupil of Messrs. Bodley & Garner was Professor F. M. Simpson, Mr. A. H. Skipworth came second, and he (the speaker) third. Amongst other pupils were Mr. Inigo Thomas, and amongst his assistants the first he (the speaker) knew of was Mr. H. Vaughan, now an eminent American architect, who went from London about twenty years ago, and was known very well as an architect in Boston who had been asked to co-operate with his old master, Mr. Bodley, in carrying out the new cathedral in Washington. All those who made use of the books just presented would feel that a debt of gratitude was due to Mr. Garner and secondly to his widow for the gift.

The Chairman said they were all extremely obliged to Mr. Warren for the part he had taken in the bequest, and he was glad that the meeting had shown its appreciation. He moved that a hearty vote of thanks be sent to Mrs. Garner for the bequest.

This was unanimously agreed to.

The Lewis Presentation.

The Chairman said his next duty was an extremely pleasing one, which Mr. Balfour, as President, had already foreshadowed—*i.e.*, a presentation to Mr. W. G. B. Lewis. They all knew Mr. Lewis and what he had done for the Association in the past. He was elected to the Association in 1874, and he had been one of the most indefatigable workers for the last fourteen years in the studio. Mr. Lewis, he might mention, obtained the Grissel medal of the Institute in 1878. It had been decided to present him with a copy of Mr. Gotch's "Renaissance Architecture in England," and a cheque for 50*l.* On the title-page of the book the following had been written—*i.e.*, Presented to William George Blackmore Lewis by friends and fellow-members of the Architectural Association, together with a cheque for 50*l.*, as a token of esteem and appreciation of his work done in the interests of the Association, especially in connexion with the studio during the last fourteen years.

Mr. Walter Millard said he thought he was one of the oldest of Mr. Lewis's friends amongst architects, for he did not think that many of them could say they had known Mr. Lewis more than thirty years; and he had much pleasure in speaking a word about him. He could remember the time before Mr. Lewis took up the work in connexion with the studio, and both before and since he had felt himself one of his students. There was one thing that distinguished Mr. Lewis as a teacher and that was that he was a born teacher of doing things the right way by right method. He always insisted upon a thing being done the right way from the beginning. If a student of his had only to use the T-square, for instance, Mr. Lewis saw that he used it the right way, and in such little matters as that Mr. Lewis saw that the student did what was right; and the result was that by the time a man had done

his work the right way several times he had established a method which served him for life, and he went on and did other things in the right way as a consequence. Mr. Lewis's knowledge of facts as to building was very great, and it was impossible to say where his influence stopped. He had influenced men probably more than he suspected—not only in London and in this country, but out to the ends of the world. A man who started a pupil in the right way might be setting him straight for life. Than by putting him on the right path he could scarcely do him a greater benefit.

Mr. G. H. Fellowes Pryme said that he thought that in every President's address for the last ten years Mr. Lewis had been mentioned, and there must be something at the bottom of that. The Chairman had said they all knew what Mr. Lewis had done for the Association. He (the speaker) did not think they did; he did not think that the rising generation really knew. The past-Presidents and Secretaries and Mr. Driver knew, however, how thorough had been his work, and his influence had been marvellous in many ways. As Mr. Millard said, it was Mr. Lewis's habit of going down to the bottom of things which had been his chief ground of success, and there could not be a student who had been under Mr. Lewis who would not feel ever grateful to him for the thorough knowledge which had been grounded into him. It was with the greatest pleasure that he had seen the Association respond to the appeal to make this presentation to Mr. Lewis, and he hoped it would be accepted as a sincerely meant recognition of his work.

The book, etc., having been presented, Mr. Lewis, in reply, said he appreciated their kindness very much and thanked the members of the small committee who got up the testimonial. He had endeavoured to do his best for the Association, or, rather, the men in it, and he had been quite willing to sacrifice himself when necessary. He was glad to know that there were many others in the Association who were willing to place themselves second for the benefit of others, and if it were not so he did not think the Association could exist, because otherwise it would have to be financed to an enormous extent so as to get paid men to do the work now done voluntarily. When he joined the Association the voluntary system was in vogue, by which members of a class criticised the work of each other, which was certainly very amusing sometimes. The amount of energy which was sometimes put into criticism of others' work did a great deal of good, and if they could get such energy into their students always other students would not be able to compare with Association men. Without considerable energy and enthusiasm he did not know how a man could become an architect. There were so many things to know about architecture that a man had to be a student until the day of his death if he wished to succeed. He might refer to the water-colour class, of which he was Hon. Secretary for several years. His friends helped him so much that he carried on the work until he could no longer give the time to sending out the notices, etc. They would realise the kind of enthusiasm there was when they knew that men paid three guineas willingly for twelve lessons. It had been a pleasure to have Mr. Weedon as instructor, and he was sorry to say that Mr. Weedon was now quite unable to do anything, and was practically helpless, and required a man to assist him into his wheeled chair. It was sad when a man of a genial disposition got into such circumstances. He hoped to be the means of presenting to the Association a water-colour drawing as a memento of Mr. Weedon's association with the class; several men had promised help to secure the work, and others, when they heard from him (the speaker), would no doubt contribute something to that end. It was a pleasure to have in the studio men willing to work and learn anything he could tell them. He was supposed to know something of everything, and he had had some formidable questions put to him; but he always tried to treat the students fairly and tell them what he knew and not what he did not know. He did not let them take imagination for fact, and it was a great mistake for anyone who was an instructor to give his own ideas as facts when he was not quite certain himself. He

had been loyally supported in his work by Mr. Gilbert H. Jenkins, who put great enthusiasm into what he did, and was always ready to put himself to any inconvenience for the benefit of the studio, and he (the speaker) greatly appreciated his arduous work.

Revolver Club.

The Chairman announced that the Architectural Association Revolver Club was opened the previous evening at the headquarters of the London Scottish Rifle Volunteers, and that the first shot was fired by Sir A. Brunwell Thomas.

Difficulties of the London Architect in Reference to Legislation and the Authorities.

The following paper was then read by Mr. William Woodward, entitled "The Difficulties which Beset an Architect in London, with Special Regard to Existing Legislation and other Controlling Authorities":—

"I suppose as one gets older one chafes at what one conceives to be unnecessary control. Nobody in this room would attempt to deny that there is much virtue in fresh eyes, and in fresh minds being fixed upon our work, as the benefit of fresh experience is brought to bear upon the subject which may be under discussion. It is equally certain that if each architect or building owner in London were permitted to exercise his own uncontrolled free will London would assume a picturesque, to say the least, which would be instructive, if not satisfactory, and in considering this question of control I intend to devote myself not so much to the non-necessity of such control as to the manner in which it is administered.

Official Control.

Any individual who is able to look back, say for forty years, must be startled at the difference between the way in which building works were permitted to be carried on then and the way in which they are permitted to be carried on now; not only in strictly building works, but in the more general municipal operations in London. A grandmotherly legislation has sprung up, and is increasing every day, with the apparent object of stifling all individuality and bringing everybody within a code of Acts of Parliament, rules, regulations, and by-laws, most of them the result of officialism and red tape, and many of them the result of that inadequate knowledge which begets nervousness and want of self-reliance.

The architect who has to erect a building in London is pulled up at every stage of his operations by the London County Council, borough councils, medical officers of health, sanitary inspectors, district surveyors, surveyors to freeholders, litigants in "light" cases, party-wall awards, and sometimes, to add to his miseries, an interfering and objectionable client.

One interesting feature of these various items of control is, to my mind, this—that so many of these bodies, in staying the hand of the architect, take upon themselves, sometimes quite unwittingly, responsibilities in case of accident or failure which they need not at all take; in other words, they wander outside their provinces in dealing with detailed matters of construction, etc., which might, and should be, left entirely to the personal responsibility of the architect.

For example, the London County Council forgets, say in the case of covered ways and projecting iron and glass shelters, etc., that its duty is merely a question of projection beyond the line of frontage, and, having found that there is no objection to such covered ways, they might well leave the construction of the work and the safe erection of it to the architect and building owner; but instead of that they employ a staff of gentlemen to examine into every minute detail of construction, and thereby, of course, in the case of any failure they would be held responsible for the results. All this in addition entails heavy expenditure on the part of the ratepayers, who have to meet the large establishment charges of the London County Council.

The borough councils are far too particular in many cases as regards the works which come under their control, and we all know that at times we have to meet the fads and fancies, and they are really nothing more nor less, of medical officers of health and sanitary inspectors. Recently, too, an enormous amount of unnecessary work is placed upon

the architect's shoulders in preparing plans and sections of water-closets, etc., which a practical-minded surveyor could settle in five minutes without any such drawings.

A word as to district surveyors. Every architect in practice has to meet district surveyors in different districts, and he becomes, sometimes painfully, aware of the different ways in which the provisions of the Building Act are administered by different district surveyors. In some cases the whole intention of the Building Act is maintained and the public interest looked after without causing any friction with the architect. But in other cases a policy of pin-pricks and unnecessary interferences are carried on by straining to its utmost extent every section in the Building Act of 1894; and where one section does not apparently give sufficient elasticity for worrying the architect and the builder the district surveyor will sift out some other clause which will better enable him to pursue his worrying tactics.

Surveyors to Freeholders.

Surveyors to freeholders, again, take upon themselves responsibilities for construction, etc., which they are not bound in any way to assume. As a rule the building leases are granted for eighty or ninety years, and the reversion to the freeholder does not occur till the end of these periods, and if a building is erected in a thoroughly substantial manner, with due regard to appropriate architecture, the surveyor to a freeholder ought to be satisfied and not worry himself and drive the architect to desperation by interferences in minor and trifling matters of detail which in no way concerns the reversion at the end of eighty years. Here, again, such surveyors accept, in consequence of their interferences, heavy responsibilities in the case of failure which they need not have accepted.

It may be quite true that according to the building agreement the building has to be erected in accordance with drawings to be approved by the freeholders, but that approval only means a general approval, and should not be construed to mean that every minute part of the structure is to be the object of concern and alteration on the part of the freeholders. This is clear by the manner in which drawings are approved by the various surveyors to London freeholders.

Light and Air Cases.

Now let us assume that after many months of patient endeavours on the part of the architect the productions of dozens of unnecessary drawings and the consumption of an enormous amount of unnecessary time with all these various bodies in simply obtaining official sanction to what is proposed; the building starts, and almost before the demolition of the old premises is completed down come a little army of adjoining owners with purely imaginary grievances as regards interference with "light"; and after obtaining injunctions, which stop all building works, the case is fought out in the law courts with two or three eminent surveyors on one side, who swear that if the building goes up as designed the owner of the dominant tenement may as well go and drown himself at once, as he can only die a lingering death in consequence of being closed in in tomb-like fashion, deprived of every particle of "light" and every particle of air that is so necessary to sustain life in London; and on the other side three equally eminent surveyors will swear that the erection of the new building will not only not interfere with the "light" hitherto enjoyed by the dominant owner, but his "light" will be very materially improved by the erection of a building double the height of the old building pulled down.

Party-wall Notices and Awards.

We all know the building has not gone so far without being the subject of sometimes several party-wall awards; and in the communications between architect and architect as regards these party-wall awards considerable experience is gained as to the real knowledge of architects and their propensities to adopt the methods of the lawyer in arriving at a conclusion on very simple, practical matters; and the architect to the building owner also discovers how varied the ideas of the architect to the adjoining owner are in the matter of fees. I have myself had instances where, with precisely the same award which I have myself drafted, and with

precisely the same work on the part of the adjoining owner's surveyors in connexion with the same building, the fees have ranged from two guineas to twenty-five guineas. And may I make an observation upon the additional unnecessary trouble and expense incurred in stamping the awards and counter-parts? Personally, I never require this stamping to be done. It is true it only costs 2*l.*, but it is the unnecessary trouble and time which it involves of which I complain. I have been advised that, inasmuch as any dispute as regards the awards is referable to the third surveyor named therein, it would not be necessary to produce the document in a court of law in the first instance, because if a dispute arose upon the award of the third surveyor that document would be stamped, and could be produced in court when an attempt was made to upset it.

Then comes the interfering and objectionable client, whose doings can, of course, be put down to entire ignorance of building matters; but they are none the less vexatious, and in most cases unnecessary.

What should be the limits of legislation are well defined, I think, by Humboldt, who says that "The law should prevent one man from wronging another, and should protect the rights and liberties of all." If the law attempts to do more or less than this we are told it will be liable to be harmful rather than useful. Whether this limitation is correctly defined or not it would appear to be applicable for the guidance of those who wish to make building laws and regulations workable and useful; but we all know that frequently Humboldt's dictum is ignored altogether by many of our controlling authorities.

Some Practical Suggestions.

You will now expect me to make some practical suggestions for improving the present state of things, and I would suggest the following, leaving my hearers to fill in the voids:—

Let us take the London County Council. I would suggest that the Building Act Committee be put an end to, or reduced to, say four members, these members being selected specially for their knowledge of building operations and for their non-political tendencies. In the case of the new Building Act (Amendment) Act, as regards risks from fire, there can be no doubt whatever that the London County Council are unnecessarily worrying, simply because an unfortunate fire occurred in Queen Victoria Street, which entailed loss of life, for which the London Fire Brigade were not wholly irresponsible. The London County Council requirements, in the shape of lobbies, ventilating trunks, and other absolutely unnecessary and untried ideas, are the source of a large expenditure of money and serious interference with the building, and I feel quite sure that if the architects were left to themselves to provide reasonable means of escapes in case of fire far better results would be obtained; and if, after all the expenditure of the ratepayers' money in pressing forward their various Bills before Parliament, one desires to see the efficient way in which the London County Council administers the powers given to them by Parliament an interesting sample will be found in a leading article of the *Builder* of November 17.

The setting back of the building-line at the rear of certain buildings and the angle of 63° deg. is a monstrous interference with the disposition of property. The control exercised by the London County Council over simple projections at the rear or porticos and covered ways in the front of buildings should be shifted from that central body to the surveyors and councils of the respective local boroughs, who are far better able to judge of the effect of such additions than the central body who can know very little indeed of the local requirements of such a vast area as London.

Petty Interference.

For a sample of the petty interferences of local authorities I would point to a case in Charing Cross-road in which a bookseller was summoned before a magistrate by the Westminster City Council for projecting his bookstall some 18 in. below the line of frontage, while at the same time that same Westminster City Council permits hundreds of yards lineal of the footways of the Strand and other congested thoroughfares to be

occupied for hours by intending visitors to the theatres, music-halls, etc. A more glaring instance of the petty interferences of the London County Council was brought before the Lord Chief Justice and Mr. Justice Darling on the 17th of this month, where the Palace Theatre Company had been summoned in consequence of an advertisement in front of the theatre which had been certified to be in some parts 14 in. and 16 in. and in others 22 in. in front of the building-line. Many of us have seen that very artistic advertisement referred to, and the idea of interfering with it is, as I say, monstrous. The fight in the High Court is as to whether the erection was a "structure" or not within the meaning of the Act. The case is not yet decided, so that all I can say is, for myself, that the idea of trying to convert that temporary and movable advertisement into a "structure" shows the pains the London County Council put themselves to to secure a conviction on so trifling a matter.

Theatres.

Take again their requirements as to theatres. We all agree, of course, that proper means of rapid exit should be provided in every building frequented by large numbers of the public, but the Council does not stop there. They must needs grope about in theatres to look after gas taps, opening of doors in certain directions which would probably be more mischievous in case of fire than if they had let the old doors alone. Certain staircases, in the eyes of the Council, are safe if they have a certain tread and rise and a certain number of steps in a flight, and absolutely unsafe if $\frac{1}{2}$ in. or so is taken from the tread or added to the rise. But why an additional step or two should make the building unsafe only the London County Council could say.

Building Agreements.

Then, again, the London County Council requirements in their building agreements for letting land are too much on one side. The conditions in the building agreements of the great ground landlords of London are, heaven knows, sufficiently stringent; but the London County Council requirements are such that every building owner, with due regard to his financial prospects, would hesitate before binding himself to such one-sided conditions. If the great ground landlords of London get the ground rent they stand out for—and, of course, they do or they won't let the property—why should they impose unreasonable conditions when, as I have said before, their reversion is eighty or ninety years hence? And in the case of failure on the part of their lessees these same ground landlords would be only too glad to step into the shoes of their lessees and take over the building, for which they could obtain a rack rent instead of a ground rent.

Grandmotherly Legislation.

Take again the borough councils. Simply because a man desires to make some little alteration to the drain of his dwelling-house he has to go through the paraphernalia of submitting plans and sections, all in duplicate and at considerable cost, because the councils will not leave the matter in the hands of their surveyor, who, after looking at a rough idea of the drainage, could take his pencil and make such alterations as he might desire in ten minutes, leaving the sanitary inspector to see that the more important requirements were carried out, such as the main drain, the inspection-chamber, the disconnecting trap, and the ventilating pipe. Much of this unnecessary interference on the part of borough councils could be obviated if their works committee and public health committee were reduced to, say four members instead of the unwieldy numbers in committees composed mostly of men who have not the least knowledge of what they are considering, but have the power to air their fads and fancies to their hearts' content.

As regards the district surveyors I would frame another Building Act limiting their jurisdiction very much indeed, and only securing that the building should have its walls and floors of a substantial character.

As regards rights of "light" I would prevent any question on that subject being brought before learned judges in the High Court who have never seen the buildings in question, and who are quite unable to understand the effect of a new building upon the

"light" of the dominant owner. Such matters should be left to the decision of a tribunal of experts similar to that which works under the Building Act of 1894.

As regards surveyors to ground landlords I think it would do well to both sides if some case of unnecessary interference and unwarranted straining of the building agreement clauses were fought out in a court of law. We should all then know better "where we are."

London of Forty Years Ago.

I am not aware, in looking back forty years, that London was a very much worse place then under the Metropolitan Board of Works and under the old vestries than it is now under the swelled body at Spring-gardens and under the equally swelled bodies called borough councils. regard for open spaces was secured by the then Lord Brabazon (now the Earl of Meath), the Chairman of the Metropolitan Gardens Association; and although the London County Council takes credit for maintenance as open spaces what would otherwise have been built upon much of that for which they take credit is due to the Association I have referred to: in fact, I was myself, as honorary architect to that Association, the principal mover in preventing the London County Council building upon the triangular plot at the junction of Oxford-street and Bloomsbury-street; and equally in preventing the erection of a block of buildings, projected by the London County Council, right in the centre of Piccadilly-circus.

In all these matters I can, as I have said, see a growing consumption of red tape and officialism; in fact, ink and paper instead of the sound practical knowledge which existed thirty or forty years ago, and which I hope soon to see again revived. But this end will not be attained unless active opposition is made to the unnecessary interferences to which I have referred. Large building speculators are, to my knowledge, shutting up their pockets and thereby adding to the long list of unemployed in the building trade simply because they will not submit to the delays, petty interferences, and results of inadequate knowledge forced upon them by those various bodies. Surely some credit should be given to architects of repute and experience for knowing nearly as much about healthy and sound construction of a building as an assembly of greengrocers and cheesemongers, or perhaps youthful scholars who come from technical schools armed only with superficial knowledge without any experience in active building operations, but who are led away by the crude ideas of faddy councillors who do no good whatever to buildings in course of erection, but, on the contrary, manage to make them inconvenient inside and mutilate them outside.

It may be that there are architects who do not object to this infantile instruction on the part of these constituted authorities, and who know that the more drawings they make to satisfy the whims of such authorities the more money they get from their clients; but I thoroughly believe that the majority of architects would prefer to get on with their building without such interferences, and without such opportunities of adding to their professional charges.

Suburban Control.

We know, going from London to the provinces, what wretched results have arisen from the interferences of the Local Government Board in building operations, and especially in cottages. We all remember the picturesque cottages throughout the Kingdom which have lasted for two or three centuries, which are generally composed of wood, with thin party-divisions and picturesque tile roofs and half-timber exteriors, and that they have not led to any considerable loss of life from fire; and I believe that the only few losses of life through fire in these cottages throughout the Kingdom has been the result of inebriety on the part of the occupiers. The Local Government Board, however, must needs try to apply to these country cottages the impossible provisions of the London Building Act, with brick external walls, the absurd carrying up of party-walls above the roof, and other perfectly ridiculous requirements which have done so much to stop the building of country cottages and the consequent loss of many a decent family, who

come up to London because their landlords cannot afford to properly house them at the rents the poor people are able to pay by reason of these unnecessary and uncalled-for requirements of the Local Government Board.

Conclusion.

I hope that this meeting will discuss the subject in a bold and fearless manner, and, whether the meeting agrees with me or whether it disagrees, I can only say that I have prepared this short paper with much pleasure for the Architectural Association, and I hope that if it does no good it will do no harm."

Mr. J. Douglass Mathews, in proposing a vote of thanks to the reader of the paper, said that although a very old member of the Association this was the first time he had been in the new premises, and he must congratulate them heartily upon the change, and he hoped the Association would continue to prosper as it had done in the last forty years. He had been interested, as no doubt all of them had, in the paper. Most of them would agree that there was a great deal more legislation than there was necessity for. Things had greatly altered in forty years in the architectural profession as in other professions. There was formerly more honourable understanding between members of the profession than there was at the present time, and an architect whose word could not be relied upon was not thought much of. Everything now seemed to be done by grandmotherly legislation; everything had to be done in the most detailed manner, and all sorts of conditions were imposed, so that the life of an architect was not an enviable one. The more Acts of Parliament there were the more difficulties they seemed to find. On the other hand, in dealing with building in London, they could not shut their eyes to the fact that there must be some building authority. Mr. Woodward suggested that a committee of four should manage all the building work which was dealt with now by the Building Act Committee of the London County Council. Well, he did not envy the four. In the first place, he thought there would be an immense amount of difficulty in finding the most suitable four, and when found he very much doubted whether they would agree, and if they did not it would be confusion worse confounded. But they must not shut their eyes to the fact that there must be a body with powers, but those powers should be used and carried out in a fair and reasonable manner. But now came the difficulty.

Take the London County Council, for instance. They were charged with onerous duties, and they were bound to make stringent rules as to how those duties were to be carried out so far as Acts of Parliament were concerned. The Council were placed in a very awkward position, because what would be considered fair in some cases would be quite unfair in others almost but not quite the same. The question was whether there was not some better way of carrying out those duties, and as to that he would make a suggestion later on. There was no doubt that if they could have a little more common sense and a little less law it would be very desirable. As to the unfortunate District Surveyor, as he was the senior District Surveyor present, he would like to say a few words on that head. The work of the District Surveyor of to-day as compared with thirty or forty years ago was very different—the duties were much the same, but they were much enlarged, and difficulties increased through the causes Mr. Woodward mentioned. He thought that the arrangements relating to the appointment of District Surveyors were not so good as they used to be. In former days, as young men they used to look up to the position of District Surveyor as the blue ribbon, and it happened that many of the Professors of the Royal Academy, University and King's Colleges, etc., were District Surveyors. The late Professors Donaldson and Kerr were District Surveyors, as is Professor Aitchison, and many other distinguished men had acted in that capacity, and he ventured to think, with good results. The idea some people had was that the District Surveyor was something of a policeman, but whatever people might think the District Surveyors did a great deal of

good by their helpful advice. The hints they gave, the difficulties they pointed out, and the suggestions which they made were very much valued. There was an idea that District Surveyors should become practically the servants of the London County Council, which they were not now. They were a body having to administer the Building Acts, and were not servants of the Council, and it was very desirable they never should be. There had been District Surveyors for 200 years, and they had always been experienced men who were looked up to, and they were not mere inspectors, which they would be if they were the absolute servants of the London County Council. As to party walls, it seemed to him that if there was a pattern enactment to work upon, it was that part of the Building Act dealing with party walls. He knew of nothing more simple. We in London had as difficult party wall cases to deal with as anywhere else, but the application of the Act to them was exceedingly good. There were very few appeals from awards, and the reason for that was that matters were left in the hands of the two surveyors and there was no necessity in nineteen cases out of twenty for solicitors to be called in. As to the client, he could not be manufactured to suit the architect, who had to study the fads and wants of the client, and he was afraid that that would be a source of anxiety to architects to the end. He wished they would agree to carry out that principle of Humboldt, i.e., "The law should prevent one man from wronging another, and should protect the rights and liberties of all." That was excellent, but there were difficulties in the way of always carrying it out. As to the question of ancient lights, probably they were aware that for the last twenty years the question had been under the consideration of the Institute of Architects, and some five or six years ago a committee was appointed consisting of three members of the Institute and three members of the Surveyors' Institution and one legal gentleman from each of those bodies. Mr. Justice Moulton was the legal member for the Institute and Mr. Freeman for the Surveyors' Institution. They had many meetings, and the result was the drafting of a Bill, which was presented by Mr. Moulton, as he then was, four years ago. It was presented on two sessions, but, unfortunately, the legal element in the House was too strong to carry it far. The committee wanted to make the law too simple and give the lawyers as little work as possible, and so the Bill had not advanced much. He should like to quote some passages from the Bill. Part III. dealt with the limitation of the amount of light of a dominant owner, and was as follows: "From and after the commencement of this Act an owner of a dominant tenement shall, subject as herein provided, be entitled to such amount of light passing over the servient tenement as is reasonably necessary for the comfortable use and enjoyment of the dominant tenement of a dwelling-house or for its beneficial use and occupation if used as a place of business or for any other purpose than a dwelling-house, and he shall not be entitled to any extraordinary amount of light necessary for any particular purpose, trade, or occupation. Nothing in this section shall confer on the owner of any dominant tenement over the tenement servient thereto any right to a greater amount of light than he would have possessed if this Act had not passed. This section shall not apply to a tenement in which a trade or occupation requiring an extraordinary amount of light has been continuously carried on for ten years during the continuance of such trade or occupation. This section applies only when the right of the dominant owner to the light passing over the servient tenement becomes absolute and indefeasible after the commencement of this Act." He thought that Mr. Woodward would be satisfied if light and air matters were dealt with in that way. Part V. of the Bill said "No title shall be acquired by prescription under the Prescription Act, 1832, or at Common Law or otherwise by the owner of any building which shall have been erected after the 31st day of December, 1890, and which abuts on any street to a right to light passing over a tenement on the opposite side of that street." As to the method suggested for

carrying out work, it was based upon the Building Act, i.e., that when a building owner was about to commence, the dominant owner or surrounding owners should have the opportunity of examining the drawings to see how far their lights were interfered with. Both the building owner and the dominant owner should each appoint a surveyor, and these two were to discuss the objections, and if possible agree. If they could not agree, they were to call in an arbitrator who, after hearing both parties and, most important of all, seeing the site and its surroundings, should prepare an award. If there was any need after that double process, the objectors could go to the Tribunal of Appeal, who would hear all parties and have the advantage of seeing the award of the arbitrator. If they awarded damages of 500l. or more, the person who received the award should have the opportunity of going to the High Court. If such proposals were carried out, many troubles of the present time would be got rid of.

He should like to suggest one or two remedies for some of the evils affecting architects. First, as to the Building Act, the great difficulty was that the Act was so confused. What was wanted was something that they could understand. It had fallen to his lot during the last two or three days to go through the Building Act in a matter of importance, and he found that there were four different ways of looking at the Act, and to bring all things together was difficult. One could understand one part of the Act in a certain way, but there were other parts that conflicted and which interfered with the obvious conclusions drawn from the first part. He maintained that in an Act like the Building Act, not only architects and surveyors, but the ordinary builder and even the brick-layer should know exactly what the Act meant and not render it necessary for people to rake in and out the Act and become special pleaders. He thought that the codification and simplification of the Act, so classified that he who runs may read, would be very desirable, and he could not help thinking that some clear-headed man could put it in such phraseology that anyone could understand it, so that a great deal of trouble would be avoided. The same could be done in regard to the Public Health Act. As it was, the two Acts sometimes conflicted, and it was desirable that one Act should be bound up with the other, though, of course, under different administration. He thought that the Tribunal of Appeal was necessary in all cases. They had a great deal of difficulty in passing the 1904 Amendment Act in getting the Committee to see that, and the credit was due to the Institute of Architects and the Surveyors' Institution in forcing that point. The London County Council did not like the Tribunal, and they wanted to get rid of it altogether, but he was certain that the Tribunal was a useful body and could do what the London County Council could not. If every case in which there was doubt were taken to the Tribunal of Appeal a great deal of trouble would be avoided; the same remarks would apply to the provinces. It was an extraordinary thing that a man who wanted to build in a village half-a-dozen miles from a town should be bound by a stronger Act even than they had in London; for in London if they were outside a reasonable distance from other buildings they could do what they pleased; but in the country such was not the case. He appreciated Mr. Woodward's remarks as to the picturesqueness of the country cottages, but he could not go so far as he did. They were bound to look after the health of people, be they in cottages or mansions, and there must be some control over the erection of domestic buildings; but if there could be some modification made in the law in reference to country work it would be very desirable.

Mr. G. Hubbard said he rose for the first time in the Association to second the vote of thanks to Mr. Woodward for an able paper. He agreed with him in many of his remarks, but he could not agree with some of his observations. He was quite aware of the difficulties that beset an architect, and he quite understood that such a striking exponent of originality in architecture as Mr. Woodward, chafed under any form of restriction and especially under the very unnecessary restrictions put upon architects. If

one took sect. 41. of the London Building Act one would find words to this effect:—"There shall be provided in the rear of every domestic building an open space, such open space shall extend throughout the entire width of such building." He happened to know an architect who wished to build certain shops and houses round a crescent-shaped road; the plots of ground were like the vauissour of an arch: wider in front than at the back. The architect submitted plans to the London County Council, and he was surprised by being told that they could not be passed because the areas at the back were narrower than the front of the buildings. This was an obvious necessity if they imagined the vauissours of an arch: the area at the back was the intrados and the front was the extrados. It was worth while bearing in mind, therefore, that it was impossible to build houses that fronted round a crescent, absurd as it might seem. The London County Council ultimately passed the plans, but only after the architect undertook to give up a piece of land on the opposite side of the road! It was satisfactory to know that if the houses were unsatisfactory in the first instance, that they could be made satisfactory by the surrender of a piece of land which had nothing to do with the case. Another section that was interesting to him was sect. 70, which said: "Every habitable room wholly or partly in the roof of any building shall be at least 8 ft. in height throughout not less than one half of the area of such room." He rather fancied that the object in having the area of the flat portion of the ceiling equal to a portion of the floor area was to secure an adequate number of cubic feet to the room. He had found it advisable to put in large cupboards round the sloping roof and had thus reduced the sloping sides and made the relative space between the flat ceiling and the floor compatible with the Act. He had reduced the cubic feet in the room, but the London County Council were satisfied with the result. Then, as to new streets, sect. 9, subsect. 4, said: "The Council may refuse to sanction a new street unless it provides direct communication between two streets." Let them imagine a square site—an estate, say, bounded on two sides by roads; they could not cut into that building site with roads at right angles, because the London County Council said that they would not communicate directly with existing roads! The only way was to take roads diagonally across the square, which was a foolish way of developing such a site, but it had to be done in order to comply with the requirements of the Act. On the subject of the rights of light, he could not agree with Mr. Douglass Matthews nor with Mr. Woodward. He could not see why an owner should have rights over adjoining property. Take, for example, two identical sites sold at the same price. The purchaser of one site might not find it convenient to build at once, and the purchaser of the other might erect a building at once and twenty years afterwards he would have obtained rights of light against the other purchaser if he had not built in the meantime. The American system, by which every building owner had to provide his own light, seemed reasonable. It seemed unfair to burden a site by the restriction of adjoining owners over it. There was an odd confusion sometimes between the powers that be. Not very long ago his firm had to build a bonded warehouse. They told their clients that the building would have to be constructed in accordance with the requirements of His Majesty's Customs. His Majesty's Customs' consent was obtained, and amongst other requirements they insisted upon wire netting being fixed over all windows. This was done, but the London County Council authorities inspected the building and objected to the wire over the windows from the point of view of escape from fire. He was told by the London County Council that the gratings must be taken down, but His Majesty's Customs said they had nothing to do with the London County Council, and when he reported this to the London County Council they said they had nothing to do with His Majesty's Customs. The gratings had not been taken down, although the London County Council threatened in the matter. In the case of another bonded warehouse they had got His

Majesty's Customs and the London County Council to come to some agreement in the matter. But picture the position of the architect! He was between the hammer of the London County Council and the anvil of the Customs, and the position was a very difficult one. He did not know whether they would be interested in hearing what they did in some places where there were no Acts of Parliament and Building Acts, but he might tell them of one or two cases that had come under his notice. He had had occasion to go to the Balkan Peninsula, where there was absolute freedom, and the results were most surprising. At a small town called Scutari, in Albania, the houses were built without any fronts to them at all. They were like dolls' houses with the fronts off, showing the interior. None of the houses had fronts, but the roofs met in the centre of the road, and a shady road was thus formed. One saw the contents of the houses, and high up round the interior of the rooms were shelves on which the people sat and worked, thus forming a sort of human frieze. He did not know what would be thought of another town, in Carinthia, where the shops were not more than 4 ft. high—like dog kennels. A man would be seen crouching inside his shop, the wares being in the road in front of him. In another case, in the same State, even wooden buildings were not erected, the houses, etc., being made of wicker work. They were like great baskets, some of them covered with mud. They did not have windows, and only holes in the roofs for the smoke to pass out. We should never build like that in this country, but there was no telling where we might get to without proper regulations. The whole object and intention of by-laws was to restrict the individual and prevent him injuring the health and well-being of the community. If that were taken as the guiding principle, he thought legislation was desirable and beneficial.

Mr. Henry Lovegrove said there was a great deal of good common-sense in the paper. He hoped that Mr. Woodward, in his criticisms of District Surveyors, did not include him (the speaker), because he had never had anything to do with Mr. Woodward officially. He tried to carry out the Act without unduly pressing architects or interfering with their buildings too much. The Acts of Parliament relating to building law were not clear, particularly the 1905 amendment, and he had questions put to him by his colleagues and others as to its meaning which he did his best to answer. The District Surveyors were going to have a meeting to discuss methods of procedure. The amendments were discussed in the committee-rooms of the House of Commons last year, and in his opinion that was about the worst possible form of tribunal to consider an Act of Parliament. A committee of men from Scotland, Ireland, and the provinces were called together to consider a technical matter like the Building Act of London! The best thing would be to hand over the present Acts to a competent body of men, and get them to draw up a concise, sensible Bill which every man could understand. A late member of the London County Council suggested to him sometime ago that he (the speaker) should deliver a lecture on the subject of the real building law of London to the technical schools, and "make the matter perfectly clear in a few words"! His reply was that he did not know anyone who had the ability to do that, and that he would not attempt it. He quite agreed with Mr. Woodward as to the absurdity of preparing a complete set of drawings to submit to the Borough Councils in such a work as the alterations to a water-closet. If someone with time and money would fight a case of the kind with a Borough Council, he thought that the Borough Council would lose. What could an elevation or a section be required for in such a work? If the application form stated what was wanted and plans of drains, of course, supplied, the whole case would be met. It seemed a wicked waste of clients' money to be required to supply elevations and sections in the case of an alteration to a water-closet. He was glad to hear Mr. Mathews' remarks as to the Tribunal of Appeal. It was a first-rate body, and he wished they had more work to do

instead of less. Why did Mr. Woodward want to alter the powers of District Surveyors? If more was left to the discretion of them the better, as he once remembered the late Professor Roger Smith saying. As to the case mentioned by Mr. Hubbard of the area at the end of a building, he had had a case before him of a great depth at the end of a building for half the width, but no area behind the other half; the total area being many times the minimum required. As to fees of surveyors to ground landlords some charged a fee equal to the District Surveyor's fee, others 1½ to 2½ per cent. on the cost of the building. The same remarks applied to fees in party wall cases as stated by Mr. Woodward. Was there not an alteration in the matter of stamping awards to be made on January 1?

Mr. Tanner said the alteration had already been made. He had had an award stamped with the alteration already.

Mr. Lovegrove said it seemed absurd to pay 2½ for a small matter. He did not think the four men suggested by Mr. Woodward could manage all the work of the Building Act Committee. The present Committee already had plenty to do. As to taking land from a public body, that was a very important matter. Some land remained unlet for a long time. There was the large area in the Strand, and in his district there were two large areas vacant, and they had been vacant for some time. No one seemed inclined to take land, partly because they did not like the conditions—the building agreements. He had never seen a building agreement of the London County Council, and he did not know what was put in, but builders told him that they did not build on this land because of the conditions. Building regulations generally were having an unfortunate effect on architects and the building world. Several firms to his knowledge had gone outside London because of the restrictions and the rates. In the case of warehouses and factories the rates were an enormous item.

Mr. C. H. Brodie said that remarks had been made which were a little severe on the Borough Councils. The sanitary regulations were handed over to them by the London County Council, and the Borough Councils had no alternative whatever in the matter; they had to carry out the regulations. The by-laws gave them power to call for drawings for a small or large sanitary requirement. He had a case in Hampstead the other day. The tracings alone demanded cost 5½, only because he substituted a pedestal water-closet for a slop-sink, and the cost of the drawings exceeded the cost of the work. In another case in Central London the building cost 18,000, and the prints they had the tracings already done—which the Borough Council demanded cost nearly 20. Such a thing was monstrous! The prints came back with the request, or order, practically, to carry all the sink wastes to the ground and parapets like a soil pipe. The place was a lithographic works, and it was full of sinks, and everyone of those sink wastes had to be carried to the ground gully and parapets in lead or heavy iron. That was a monstrous and useless interference with the liberty of the subject. What was to be the outcome of this paper and discussion? And what were they going to do? If in order, he should like to move the following resolution, i.e.: "That this meeting of the Architectural Association, having listened to a paper on the difficulties which beset the architect in London, and a discussion thereon, declares its conviction that the ratepayers of the metropolis are put to a large amount of unnecessary trouble and expense by the excessive and often absurd requirements of the various authorities having control over building and sanitary works."

Mr. Woodward said he thoroughly agreed with the resolution, which he seconded, and hoped that some substantial result should come from that meeting. A resolution could go forward to the public, whereas a paper and discussion such as they had heard was not likely to go. He believed that such a resolution would do a great deal of good in bringing before the public in a brief form the mischief which arises from unnecessary interference.

The Chairman then put the resolution, which was carried unanimously.

Mr. Bernard Dickes said he supported the vote of thanks to Mr. Woodward, but he could not go quite as far as that gentleman in his conclusions. He did not think that Mr. Woodward was quite fair in what he said about District Surveyors, and Mr. Woodward must have had an unfortunate experience, and he should have spoken in the singular and not in the plural. There was no doubt some friction caused by either the London County Council or their officials in granting consents. His view was that where the legislature gave the London County Council power to dispense with certain provisions of the Act, or power to grant certain consents, that power was intended to be exercised and not so often withheld, as was the case. His view was that no matter what power was given to authorities it should always be subject to appeal, and he was quite sure that District Surveyors, where they had any power or discretion, would not have the slightest objection to that discretion being subject to appeal; the mere existence of a right of appeal was a wholesome corrective. Mr. Hubbard, in the case he touched upon as to the open space at the rear, was to a certain extent under a misapprehension. The authority to administer the law as regards open spaces at the rear of a building was not the London County Council, but the District Surveyor. Under sect. 138 Mr. Hubbard would see that that was specially placed under the control of the District Surveyors, and there was no necessity to submit plans to the London County Council for their consent. On the question of the law of the case, whoever took the view mentioned by Mr. Hubbard took the wrong view, for the section said that the open space was to extend over the full width of the building—the width of the building against the open space must surely be the same as the open space against the building, and the fact that the ground was narrower at the back than it was at the front did not invalidate that open space. [Mr. Hubbard: It does not say so.] Common-sense must be used in such matters.

Mr. A. Saxon Snell said he thought that Mr. Woodward did not intend them to take him too seriously, and therefore he would not object to them taking exceptions to some parts of his paper. After all, the difficulty was this, i.e., that we live under a democratic régime. He did not object to that, and, at any rate, the democracy were earnest; they desired to have things done and not talked about. But democracy had not learnt how to govern, and it had not learnt how ignorant it is. That was not the case only with democracy; it applied to all our governing classes. The late Sir William Harcourt had to do with the building of the Admiralty, and one morning, while at the new building, he came across a number of piers and asked what they were for. "They are for the portico," he was told. "Portico! What portico?" he replied, and when he was informed that it was according to the drawings, which were produced, he said: "I did not know that was the portico; have it removed!" That was typical of the attitude of his class towards architecture.

The Chairman, in putting the vote of thanks to the meeting, said they had listened to a very interesting paper and discussion, and it was very satisfactory to know that a practical resolution had been agreed to as the result of paper and discussion. It was gratifying to him, as it must be to those who were present, to know that District Surveyors were not the terrible people they were represented to be. If they were approached properly, much could be done, and that was a point for students. What students should learn was the value of tact in dealing with people in authority. That was of the first importance, and another important point was the method of getting one's way without appearing to do so. His experience was that the way to get one's own way was to make the opposition think it was theirs. He had found one of the most sensible methods of getting his own way was to make his client or the District Surveyor think that his way (the speaker's) was the way of the other. Difficulties of the kind referred to that evening were sometimes real benefits to design. All limitations, especially

to young architects, were of importance, and designs were often improved by being worked at again and again because of restrictions.

The vote of thanks having been agreed to, Mr. Woodward, in reply, said he was not worried by District Surveyors, and the difficulty he had with them were very few. He quite agreed with Mr. Mathews and others that it was necessary to have some controlling authority. But it was not so much general control that he referred to, as the worrying little details which gave more trouble to architects and surveyors than the important suggestions which ought to be made, and which were made, and usefully made, sometimes by the various controlling authorities, including surveyors to leaseholders. He also agreed that there should be power to appeal. It exercised considerable influence over others who exercised control if they knew that there was power to appeal to other authorities. What he desired was to be able to go to Spring-gardens, or wherever else it might be, and get one's drawings approved or disapproved, as the case might be, without having to go subsequently to the Borough Councils and other authorities. It was most vexatious to be compelled to go to the London County Council for one thing, and the Borough Councils for another, and then to be subject to the public health officers, and even then not to be at the end of one's troubles. There should be one authority only, and when that authority had been passed, that ought to be sufficient. Mr. Lovegrove said that more discretionary power should be given to District Surveyors, when he (the speaker) suggested that they should be limited, he did it in the interests of District Surveyors themselves, because he thought they had too much to do, and for what they do they were very inadequately paid. He was pleased that the matter had been brought to a practical issue by the passing of Mr. Brodie's resolution, as he thought a great deal of good would result. As to the efforts of the London County Council to make District Surveyors subservient to the London County Council, he was glad to hear that the surveyors were an independent body. The District Surveyors who were architects were of the greatest assistance to architects, for they knew the difficulties in the way of carrying out work in London, and they were willing, without deviating from their duty, to assist an architect in carrying out his building, and he hoped the day was far distant when the District Surveyors would be under the thumb of the London County Council. There had been District Surveyors who were architects of distinction, and he hoped there always would be, and that men would be appointed to that office who had received a proper architectural education and had passed a proper examination. As to the Chairman's remarks about getting one's way, when there was any attempt to exercise control which he (the speaker) did not think right, he was off at a tangent, and it took some time for him to get back to his normal state.

The Chairman announced that the next meeting would be held on December 14, when Mr. W. H. Seth Smith would read a paper on "The Architecture of Sicily."

The meeting then terminated.

DESIGN AND DESIGNERS OF THE VICTORIAN ERA.

At the London Institution on Monday evening Mr. G. C. Haite lectured on "Design and Designers of the Victorian Era." He said it was not his intention to deal completely with any names or any particular phase, for it would be impossible in the time at his disposal to attempt to give a history of design. The element of design existed in all art expression, but that was not the design he was referring to. He wished to deal with that phase of art which had no *raison d'être* for its existence, but to be applied to a structure or to a specific purpose; and that unless it was suitable for that purpose it would have been in the interests of art if it had never been used at all. It was a remarkable fact that in the limited period of sixty years the art of design developed from the very lowest depths to the very highest that this country had yet given expression to. In the few years prior to 1837 the only phase of design worthy of

notice at all was that by a very obscure number of men who made reputations for great houses and designed for what was known as the Paisley trade. Then came the Great Exhibition of 1851, and the Prince Consort was apparently the only man in this country who thought at that time of improving the industrial commercial arts. That Exhibition demonstrated not only that we were lamentably behind, but also that all the other nations which had been great in art were in a decadent state. Although the Exhibition was in one sense a great success, yet, viewed in the light of modern achievement, it was almost a Chamber of Horrors.

The outcome of the Exhibition was first to set the architects to study the subject, and the architects started with the advantage that they had been compelled in the course of their studies to thoroughly understand and appreciate those eternal principles which govern all art. So that they came to design, if not with a free hand, at least, with a frank acknowledgment of the conditions which seemed to block the way of everyone else. Another factor following the Exhibition was the wonderful work of Owen Jones, "The Grammar of Ornament." One of the first architects to take up the study of design was Pugin, and he excluded him from his remarks as to work shown in the catalogue of the Exhibition. Another thing which came from the Exhibition were the Government schools at South Kensington. It had been the fashion to ridicule these schools, but to say they had done nothing for art was nonsense. In the last ten years the schools had had almost the best advice possible, and were doing as good, if not better, work than any other system of schools they had at the present moment. About 1870 the architects had taken the matter up, and good work was done by Godwin, Robinson, Bruce Talbot, Eastlake, and Dr. Dresser. Between 1870 and 1880 a remarkable thing took place which came almost without warning; he referred to the illustrated books in which Kate Greenaway and Walter Crane suddenly took hold of the country. At that time Morris and Burne Jones associated themselves with design, and were doing excellent stained glass, tapestries, and wall-papers. The reign of Queen Victoria was remarkable for three great Alfreds—Alfred Tennyson, the poet; Alfred Stevens, the artist; and Alfred Gilbert, the greatest designer and worker in metal we know of. The lecturer proceeded to show specimens of the work of Stevens, Gilbert, and Dresser. About 1870 they saw the introduction of Japanese art, and its influence upon the art of the day it was impossible to estimate. It came in just at the time when the Gothic feeling which had been running riot was beginning to decay, and it was a very good corrective. Dealing with design of various kinds since that date Mr. Haite exhibited on the screen designs for lettering by Mr. Lewis Day; illustrations by Mr. Walter Crane; mosaic and metal by Mr. T. R. Spence; relief decoration by himself; china by Mr. Lunn; friezes by Mr. Rigby; lace by Mr. Hammond; interiors by Messrs. O. Clark and E. Foley; and work by Mr. H. Jackson, Mr. H. Davis, and others. He next touched on the development of photography in book illustration and the origin and development of the Christmas card. The rage for cheapness had caused the decadence of both these branches of art. A phase which had reached a position which justified it being called an art was the design of posters. Another class of designers which arose during the Victorian Era was for want of a better term he would call decorative designers—men who worked with the idea of beautifying the structure—and amongst these were Sir W. Richmond, Messrs. Frampton, Pomeroy, Brangwyn, Herkomer, Sauber, and Fisher. In conclusion, he said that the work of the designer was one of which the nation ought, and he thought might be, justly proud. He was bound to point out that fine art was not the cause, but the result of commercial prosperity, whereas design was the cause and not the result of national and commercial prosperity. Design had derived little, if any, benefit, and had been advanced to no considerable extent, by the attempts of the picture painters or artists, as they were called. The reason was that quite apart from natural capacity the painter had not been trained to a knowledge of what was required. Many of

their designers, on the other hand, had worked in and added to the honourable roll of painters. The greater included the less, and the greater in this case was decorative art. It was a fact that if the painter's art ceased altogether there would be no loss to the nation's progress or prosperity; but, on the other hand, if the art of design and the applied arts fell, it would mean little short of national bankruptcy, since millions of general workers and skilled artisans would find no employment. Therefore, design should be fostered and encouraged, and its standard nurtured and advanced, and the workers should be encouraged both by the State and the public. During the Victorian Era all phases of applied art might be said to have been carried from the lowest expression to the highest mark of excellence that it had ever reached in the whole history of this country—it stood the foremost in the world, and gave the lead to France, Germany, and Austria.

THE ROYAL SANITARY INSTITUTE: SANITARY ADMINISTRATION.

A provincial sectional meeting of the Royal Sanitary Institute was held at the Imperial Hotel, Malvern, on the 1st inst., when Colonel J. Lane Nottter (Chairman of the Council of the Institute) presided. Mr. J. W. Willis Bund (Chairman of the Worcestershire County Council) opened a discussion on "The Area of Sanitary Administration," in which Dr J. Robertson (Medical Officer of Birmingham), Mr. W. Whitaker, F.G.S., F.R.S. (Croydon), Mr. James Woodyatt (Malvern), Mr. J. E. Willcox (Birmingham), and others took part. A paper on "Progress in Works of Public Health in Malvern in Recent Years," was read by Mr. W. Osborne Thorp (Surveyor and Waterworks Engineer to the Malvern Council).

Mr. Willis Bund said the present sanitary areas for England and Wales were constituted over a quarter of a century ago. In that interval new governing bodies had arisen and taken over the powers and duties of those that then existed. In some cases the areas had been reduced by the Local Government Act, 1894. In many ways circumstances had altered. New powers and duties had been given to authorities, quite irrespective of the wants of their areas. Sanitary science had advanced, but the Legislature had not altered the law so that full advantage could be taken of these advances. There could be no doubt that better work could be done than was done if a change were made in the areas of the sanitary authorities. Worcestershire in this respect furnished a very interesting object-lesson; it was one of the smaller counties, yet from its peculiarities as to boundaries it possessed more authorities dealing with sanitation than those of much larger size. The area of the administrative county was 473,328 acres, and the estimated population in 1905 was 385,610. It was divided into thirty-two sanitary areas, consisting of two county boroughs (Worcester and Dudley), thirteen urban districts, and seventeen rural districts. Leaving the county boroughs, there were thirty authorities (with no less than 506 members) to administer an area of 473,328 acres, with a population of 385,377 in 1901. No one could say that the number of persons engaged in carrying out the law was too few; nor, looking at the funds at the disposal of these authorities as a whole, could it be said that they were utterly insufficient. If each district were called upon to carry out the sanitary law effectively, it could only be done by raising the rates to an almost prohibitive sum. Nor was this confined to the rural districts. It followed that the ability of the different sanitary areas to do useful work was to a great extent impeded by the fact that the small sum a penny rate produces implied a very large rate in the pound. This fact explained the often expressed complaint that the sanitary authorities did nothing. It was, however, hard to see how any elective body could be expected to do much when the doing involved a shilling rate. The wonder was not that they did so little, but that they did so much. It seemed obvious that the direct result of this number of small areas with low rateable values was to restrict sanitary work and to delay sanitary improvements. It

became, therefore, a point of the highest importance to all who were interested in sanitary work to see if some change could not be made that would enable the sanitary work to be carried out without inflicting any additional charge on the rates. The simplest and most obvious remedy would be to annex parishes to the adjoining areas in the county, and it was difficult to see, except for the loss of rateable value to the unions from whom they were taken, why this should not be done. But this would only meet the outside of the question, and leave the far more important subject, the small urban areas, untouched. This was a real and pressing question; merely amalgamating the smaller with the adjoining areas would not meet the case; some much more drastic change was required. But the matter should not be looked at merely from the financial side. The administrative side was equally important; here the multitude of authorities led to great confusion. The by-laws of these authorities were by no means uniform; the boundaries of the areas were purely arbitrary: on one side of a road you were prohibited doing an act which you could legally do on the other; go a little further down the road and the legality and illegality changed sides of the boundaries of the districts changed. It therefore followed that both on administrative and financial grounds there should be a change, and while merging the very small rural areas into the adjoining areas would to some extent lessen the evil, it would not furnish an adequate remedy or give complete relief. That the areas should be greatly enlarged would not, he presumed, be denied. What would be raised as an objection was that there must be local control; to some extent this was so, but it was by no means impossible to have larger areas with local control. In his view the county should be the area, and the sanitary work should be carried out by the county authority. The county should have the supreme control, and should work through local committees. The county being divided into a number of convenient districts, each should be placed under a local committee with a proper staff. The duties of the committee would be defined, and they would report at fixed periods to the county council as to the work they had done and the work required to be done. It would be the duty of the county council to supply them with funds, and see that proper sanitary work was carried out in a proper manner. The county council would also be able to deal with the large questions of water supply, river pollution, and sewerage on a broad basis; and the difficulties of works inside and outside the district, which was now continually occurring, would not arise, or very seldom. There would be one set of sanitary regulations for the whole county, and there might be some prospect of these being effectually and consistently carried out. There would be effective means of dealing with infectious disease and promptly isolating any cases. As all the hospitals would be under one authority, they could be utilised to the full extent without the great cost that now fell on the ratepayer, if cases from their own areas were taken in by another authority. As to the cost, so far as could be seen, this would be less than at present.

Dr. J. Robertson (Medical Officer of Birmingham) said the subject which Mr. Willis Bund had brought forward was a most important one. They must realise that, while the larger towns and many of the middle-sized towns were doing good work, in the smaller districts there was the hindrance of the lack of funds, and in many places a lack of men with sufficient knowledge to carry out existing laws and by-laws, and to adopt the sanitary progress of the times. If sanitary administration was in the hands of the county council there would not be local control, as local control was understood. The English liked to have local control in sanitary administration, as distinguished from the central control one heard so much of in Germany. That something ought to be done would be acknowledged by everybody who had taken the trouble to study the question.

Mr. W. Whitaker, F.G.S., F.R.S. (Croydon), remarked that Malvern itself was an example in favour of amalgamation. In matters of water supply it was not difficult

to provide for big places; it was in the small districts that trouble began.

Mr. J. E. Willcox (Birmingham) said that in rural districts the parish was the unit for works of water supply and sewage disposal. There were many parishes in Worcestershire where a penny rate brought in less than 200l. consequently sanitary work was almost prohibitive.

The Local Government Board's requirements were the same for rural districts and small parishes as for large towns. Cost prevented sanitary reform, and they could not wonder that rural districts hesitated to incur expenditure; in fact, it was easy for them to procrastinate for many years.

The Chairman (Colonel J. Lane Nottor) said there was a great waste of time and money under the present system, but he was afraid it would be a long time before the British public would give up the local control of finance—and he was not sure they would be right in doing so.

A public luncheon followed the business meeting. Colonel Twynnam (Chairman of the Malvern Sanitary Committee) according a hearty welcome to the Institute on behalf of the Council and residents of Malvern.

The visitors subsequently inspected the sewage works, isolation hospital, and other public undertakings, after which they were entertained at tea, at the Imperial Hotel, by the townspeople.

The following Fellows, Members, and Associates were elected last month*:

Fellows.
W. E. Adeney, D.Sc., Dublin.
F. D. Archibald, M.A. Oxon., London.
C. H. Cooper, M.Inst.C.E., Wimbledon.
R. M. Gloyne, M.Inst.C.E., Spring gardens, London.
J. N. Cook, L.R.C.P. Lond., Calcutta.
D. S. Davies, M.D., Bristol.
S. Davies, M.A., M.D., Woolwich.
W. A. Evans, M.D., Bradford.
†† T. J. Moss-Flower, Assoc. M.Inst.C.E., Westminster.

Members.
H. W. Baillie, L.R.C.P., Belfast.
C. Blaney, Newry, Co. Down.
A. U. Burke, Dublin.
J. Cook, A.M.Inst.C.E., Cape Town.
A. P. J. Cotterell, M.Inst.C.E., Bristol.
S. H. Gaizer, M.R.C.V.S., Lahore, Punjab.
H. F. Gullan, Assoc. M.Inst.C.E., Belfast.
J. Lovibond, F.R.M.S., Salisbury.
W. J. O.G. Gill, Upper Norwood, S.E.
G. Glehill, Balby, near Doncaster.
A. Green, Bonhill.
A. Leitham, M.A., M.D., Hamilton, Lanark.
R. S. Phillips, Gloucester.
J. Sorley, M.B., C.M., New Zealand.

Associates.
Miss S. D. Houlton, Maido Vale.
K. C. Ninkuri, Calcutta.
F. Barnes, Bury.
W. H. Bass, Old Charlton, S.E.
W. Catherall, Chester.
Miss L. Collier, Bristol.
Miss B. Crowshaw, Wadley, Sheffield.
W. Daniel, Islington, N.
A. E. Edwards, Bath.
G. Garrett, Leeds.
B. C. Hall, Newport, Lincoln.
T. Hickson, Winstord, Chester.
C. F. Holland, Sowerby Bridge.
C. T. James, Barrow in Furness.
C. J. H. Keeley, Weymouth.
W. Newman Barborough, near Chesterfield.
W. Kidd, Addington, Leeds.
W. Lea, Ormskirk.
Miss H. S. MacBride, B.A., Belfast.
J. R. G. Nicholas, Doncaster.
A. Priest, Brockley, S.E.
F. J. Rouse, Chislehurst.
S. P. Shelly, New Cross, S.E.
G. R. Silkstone, Normanton, Alfreton.
Miss K. Steep, Mapperley, Nottingham.
J. Walker, Northampton.
J. H. Ward, Newport, Salop.

SANATORIUM, SEAFORTH, ROSS-SHIRE. The foundation-stone has just been laid of the Seaforth Sanatorium. The sanatorium consists of two large detached blocks which are being erected on the Seaforth estate, not far from Brashan Castle, and about two miles from Dingwall. The front block contains accommodation for twelve patients, each having a separate room, and rooms at the end of each wing for special cases, the whole being arranged so as to give free passage of air throughout the buildings, and on the south side of this block sliding glazed screens open on to a broad plat which extends the whole length (200 ft.) of the building, where the patients can have their beds and couches in the open air when desired. The large rear block contains accommodation for the administrative department. The architects are Messrs. Ross & Macbeth, of Inverness.

* Marked † have passed the examination of the Institute for Local Surveyors and are marked † have passed the examination of the Institute for Inspectors of Nuisances.

THE SURVEYORS' INSTITUTION.

A SPECIAL general meeting of this Institution was held on November 15 at 4 p.m., under clause 62 of the by-laws, the President (Mr. George Langridge) in the chair.

The following notice convening the meeting was read by the Secretary:—

"Notice is hereby given that, in accordance with the request below, a general meeting of members will be held in the Lecture Hall of the Institution on Thursday, November 15, 1906, at 4 p.m., for the purpose of considering the proposals embodied in the subjoined memorial:—

To the President and Council of the Surveyors' Institution.

We, the undersigned Fellows and Professional Associates of the Institution, by virtue of the powers we possess under clause 62 of the by-laws, request you to call a general meeting of members to transact the following business:—

(a) To consider the advisability of drawing up a scale of charges for the preparation of bills of quantities for building works undertaken by public authorities, and of publishing the same under the authority of the Institution.

(b) To elect a sub-committee to draw up the scale, and to submit the same to an adjourned general meeting of members.

(c) To consider any further or alternative proposals for taking action in reference to quantity surveyors' fees."

The discussion was opened by Mr. A. J. Gate, and, after a debate in which many members took part, the meeting decided by a show of hands that a scale of charges on the lines indicated in the notice was inadvisable. The meeting then closed.

THE LONDON COUNTY COUNCIL.

THE usual weekly meeting of the London County Council was held on Tuesday in the County Hall, Spring-gardens, S.W., Alderman Spicer, Chairman, presiding.

Loans.—On the recommendation of the Finance Committee, it was agreed to lend Chelsea Borough Council 7,910l. for baths and wash houses, and Islington Borough Council 12,633l. for electric lighting purposes.

Tramways.—The following recommendations of the Highways Committee were agreed to:—

"(a) That the estimate of expenditure on capital account of 190,670l., submitted by the Finance Committee, be approved in respect of the reconstruction of the underground conduit system of electric traction of the tramways in (i.) Holloway-road, (ii.) Hackney-road, and (iii.) City-road, namely—Track work, etc. (exclusive of rails), 128,700l.; cables, cable ducts, etc., 39,710l.; sub-station machinery, plant, etc., 22,260l.—total, 190,670l.

(b) That the estimate of expenditure on capital account of 15,930l., submitted by the Finance Committee, be approved in respect of the reconstruction of the overhead trolley system of electric traction of the tramways in Bow-road from near Coborn-road to Bow Bridge, namely—Trackwork, etc. (exclusive of rails), 10,500l.; cables, cable-ducts, overhead equipment, etc., 5,430l.—total, 15,930l.

(c) That the estimates of expenditure on capital account of 15,000l. and 6,000l., submitted by the Finance Committee, be approved in respect of the reconstruction of the bridges (i.) along the route of the tramways in Holloway-road, and (ii.) over Regent's Canal in City-road.

That the estimate of expenditure on capital account of 255,000l., submitted by the Finance Committee, be approved in respect of the provision of additional electric cars required for use on the Council's tramways."

Further Strand Improvement.—The Improvements Committee presented a long report on the subject of the line of frontage between the two churches in the Strand, on which subject they had received representations from the Further Strand Improvement Committee, from Sir Edward Poynter, P.R.A., and other Royal Academicians, from the Royal Institute of British Architects, and other bodies. After giving full consideration to the various views put before them, the Committee recommended that the Council do confirm its decision of October 20, 1903, to the effect that no alteration be made in the present northern line of frontage in the Strand between Wellington-street and the Law Courts, as, in the opinion of the Council, no suggestion has been made which offers sufficient advantage to justify the Council in incurring the heavy loss which would be involved in increasing the already adequate width (100 ft.) of the portion of the thoroughfare in question.

Mr. T. E. Harvey moved as amendment that the matter be referred back to the

Committee, with instructions to report as to the possibility of adopting the plan suggested by the Council's Architect, which was to make a small increase in the width at the eastern end, which would only cost 65,000.

Mr. Granville Smith, in seconding the amendment, said the whole gist of the argument used by the Committee was that they did not like the Council to spend any more money on this improvement. Almost all those who stood for the official representation of art in the kingdom had condemned the Council's plan. Therefore he thought the Council should pause and consider whether this plan could not be altered, and he suggested that there should be a conference between the Committee and those who claimed to be authorities on art.

Sir Thomas Brook Hitching, who spoke against the amendment, said that the reason the Council's land did not let was because of the building conditions.

Colonel Evelyn contended that it would be waste to spend even 65,000, for an improvement which was not wanted for traffic purposes.

Mr. Hubbard, the Chairman of the Committee, said there was no doubt that the road was quite wide enough for traffic purposes.

On a show of hands only eight voted for the amendment, and the recommendation of the Committee was adopted.

Designs for the New County Hall.—The Establishment Committee submitted the following recommendation:—

That the outlines of the competition for designs for the new County Hall be provided that the eight selected architects invited by the Council to send in designs in the final stage of the competition be not required to lodge their designs with the Council until the date fixed for the delivery of the designs in the final stage of the competition.

Sir M. Beauchamp said it was now five or six months ago since the Council resolved to invite designs for the new County Hall, and he thought they ought to have some information as to what progress was being made. There were reasons which made some of them very hopeful that the matter might be allowed to stand over for a few months, and, personally, he would not be sorry if the question of proceeding with the building was postponed for another year or two, if not given up altogether.

Mr. Cleland, M.P., replied that it was in the interests of good government that, whichever party was in power, the officers of the Council should have proper accommodation. The Council's Bill had passed the Houses of Parliament, and, acting on the strength of their instructions, the Committee had entered into binding agreements to acquire a considerable amount of property, and they had settled many of the claims. The very highest architectural authority had suggested to them to change they proposed reference to the time for sending in the final designs, and he hoped to be in a position next week to report the names of the eight selected architects and to bring before the Council the conditions of the competition. He believed that the present scheme was the cheapest that had ever been brought forward that had provided amply and properly for the future. Their staff was now in twenty-eight separate establishments, and he was afraid that fresh accommodation would have to be provided, so it was very important that the building of the new Hall should be proceeded with as quickly as possible.

The recommendation was agreed to.

Sites for Educational Purposes.—The Education Committee recommended:—

"That the resolution of October 30, 1906, so far as it relates to obtaining compulsory powers of purchase over the Chalton-street site (St. Pancras E.), be rescinded.

That application be made in the session of Parliament, 1907, for compulsory powers of purchase over the undermentioned sites, which are in the possession of the Council:—

Chelsea—site in Hortensia-road, Fulham—site in Munster-road, Poplar—site in Dingle-lane; White-chapel—site in Buxton-street.

That the Education Committee do take all necessary steps in connection with the acquisition of a site known as the Camboor-road site (Wandsworth). That the purchase at 3,000, of the site referred to in the foregoing resolution be approved.

The recommendations were agreed to.

Temporary School Accommodation, Basset-road, Battersea.—The Education Committee recommended, and it was agreed:—

(a) That the resolution of November 13, 1906, so far as it relates to the sanction to expenditure of 200, in respect of the erection of two iron buildings on the Basset-road site (Battersea), be rescinded.

(b) That one iron building be erected on the

Basset-road site (Battersea) for the purpose of providing temporary school accommodation; and that expenditure not exceeding 550l. be sanctioned for the purpose.

(c) That the instruction of Humphreys, Ltd., to erect the iron building referred to in the foregoing resolution (b) at a cost of 550l., be approved.

London County Council Technical Institute, Westminster.—The Education Committee recommended that consent be given to the application of the Official Receiver in Bankruptcy to transfer the contract of Hudson and Co. for the erection of new blocks of buildings at the London County Council Westminster Technical Institute, Vincent-square, Westminster, to John Barker and Co., Ltd., Kensington.

In December, 1905, the Committee recommended the Council to accept the tender of the third lowest contractor, viz., Messrs. Garrett and Son, amounting to 21,490l. The Council, however, after some discussion, accepted the lowest tender, that of Messrs. A. Hudson and Co., amounting to 21,050l.

The recommendation was agreed to.

British Museum Improvement.—The Improvements Committee recommended an expenditure on capital account of 6,000l. towards the cost of paving a new street in the neighbourhood of the British Museum.

Mr. W. Davies moved that the recommendation be referred back, on the ground that this was quite a private matter, and that the Council should not spend money on improving private property.

Mr. J. Lewis supported the amendment, and stated that the new street would largely increase the value of the dual holdings in the neighbourhood.

Sir Melville Beauchamp said this was almost a national improvement, and the Council should not be niggardly in the matter.

Mr. Howell Williams said if the Duke of Bedford made the new street wholly at his own expense he would be making a very good investment.

Mr. Hubbard, the Chairman of the Committee, hoped the Council would adopt the recommendation, because this was a most important improvement, which would enormously assist in dealing with the traffic problem of London.

The recommendation of the Committee was adopted, the amendment being defeated on a show of hands.

Disposal of the Council's Surplus Land.—The Improvements Committee submitted a report dealing with the disposal of the Council's surplus property, and recommended that no departure be made from the present practice.

Sir T. Brooke Hitching asked whether, in view of the fact that the land in Aldwych was going off very slowly—in fact, he believed it was practically at a standstill as far as letting was concerned—the Council would consider the question of trying to dispose of the land on building leases on the same conditions and terms as those adopted by the City Corporation. The Corporation, instead of putting up its own value to act as auctioneer, put its land into the hands of one or more eminent firms of London auctioneers with a view of letting it at the very highest possible price to those who would assist the lessees by advancing money to enable them to erect suitable buildings on the land.

Mr. Davies replied that many of the restrictions on the land had been removed, and they had had no complaint from anybody since. He did not know where Sir T. Hitching had got his facts from. They were not facts at all. It was not true to say that the letting was practically at a standstill, and he hoped that the Committee in a very short time would be able to bring up more than one recommendation to the Council.

The recommendation was opposed, and its consideration will come on next week.

Houses Adopted as Tenements.—The Public Health Committee reported as follows:—

"On May 10, 1905, we reported the result of an inquiry, conducted under our direction by Sir Shirley Murphy, the Medical Officer of Health, as to the sanitary accommodation in houses originally built for one family, but subsequently let in separate tenements to several families, and we then pointed out how little had been done by owners of such houses to adapt them to their altered circumstances, and how defective such houses were in the first requisites of healthy existence and cleanliness, such as an adequate water supply in a convenient position, facilities for the disposal of fouled water, and accommodation for the preparation and cooking of food. We again reported the question on July 3, 1906, and the Council then decided, on our recom-

mendation, to apply to Parliament in the session of 1907 for power to enable sanitary authorities to require owners to make reasonable provision for the supply of water and the storage and cooking of food in tenement houses. We have received a further report from the medical officer as to the conditions now obtaining in houses adapted as tenements, and the result of this inquiry confirms and strengthens the case for legislation with regard to this class of dwellings.

Dealing first with the subject of water-closet accommodation, it is satisfactory to note that the Council's by-law, which requires, in tenement houses, one water-closet for every twelve persons, has been, generally speaking, enforced throughout London, and considerable improvement has thus been brought about, though, unfortunately, the requirement of the by-law relates only to the proportion the water-closet accommodation provided bears to the number of residents, and does not apply to position.

The most important sanitary requirement for tenement houses is, in our opinion, that of an adequate water supply easily accessible to the inhabitants of each tenement of adapted houses. Sects. 24 and 48 of the Public Health (London) Act 1891, were, in the first instance, thought to authorise sanitary authorities to require a supply of water to the tenants of each floor of tenement houses, and in December, 1904, the Woolwich Metropolitan Borough Council directed proceedings to be taken in respect to the water supply in a three-story tenement house situated in High street, Woolwich, and occupied by five sets of tenants. The only appliance for supplying water for domestic use to the tenants in this house was that situated in the back yard of the house, and all water for cooking, drinking, personal ablution, washing clothes, and scrubbing floors had to be fetched thence. The magistrate made an order to abate the nuisance at the house, and ordered the defendant to pay 5l. 5s. costs.

A recent inspection made of these premises shows that two water taps and sinks have been provided above the ground floor level in this house, and it appears from the annual report of the borough Medical Officer of Health that the precedent established in this instance has led to similar improvement being effected in the case of a few other houses in the borough.

The Council directed the attention of the metropolitan borough councils to the matter's decision in the case referred to above, and, as a result, several borough councils have considered to the matter, and the Paddington Borough Council authorised one of its committees to secure the provision of a proper and sufficient supply of water for the tenants of every tenement house in the borough, and the committee approached the owners of certain houses in Charendon, Cirencester, and Woolchester streets, in which the need for the provision of a "proper and sufficient supply of water was particularly apparent. In some instances a good supply was provided, in others nothing was done, and ultimately summonses were taken out against the owners of six houses. The first summons—against the owner of three houses in Cirencester street—was heard by Mr. Plowden in November, 1905, who dismissed the summons with 1l. 1s. costs at the Borough Council, and in his judgment stated that the words of the section of the Act as to the provision of a "proper and sufficiently supply" of water referred to the source of the supply, and not to the provision of taps within the house. The magistrate did not think that the section was intended to deal with an instance in which the occupant would be put to inconvenience, as was alleged was the case in these houses.

The houses in this test case presented particularly striking instances of the need for the provision of that additional supply of water which the magistrate held could not be insisted upon in the existing state of the law. The only tap available for the supply of water to the inmates of these houses was over a sink in the back addition wash house in the basement, and the two water-closets provided at each house are situated in the yard. The tenants at the top floor have therefore to descend the stairs for use in the tenements up three flights of stairs, consisting of forty-eight steps, and being a vertical height of about 30 ft., and all waste water has to be taken down a similar distance to the water-closets or sinks in the yard.

The subjoined particulars with regard to certain of the tenements may be regarded as typical of the conditions existing. The water for use in the first floor front room, which is occupied by a man, his wife, and one child, at a rent of 4s. 6d. a week, is stored in a one-gallon can which was under the bed at the time of inspection. This can is said to be filled about ten times daily, thus necessitating a return journey to the basement ten times; the basement floor is thirty-one steps, and about 20 ft. below the first floor, the labour involved being therefore equivalent to that required to lift 10 lb. weight of water to a height of 220 ft. A top floor front room is rented at 4s. per week, and is occupied for living and sleeping purposes by two adults and one child. An iron bucket is used for the water drawn from the tap in the basement, and water is stored in a large jar in the room. About 6 gallons of water are required each day, and this necessitates at least three journeys to the basement for the carrying of 60 lb. of water up three flights of stairs, to a height of about 30 ft. Almost a like quantity of waste water has to be taken down a similar distance, which contains the only fittings available for disposing of waste water.

In one of the houses, consisting of six tenements, occupied by fourteen adults and ten children, there are two water-closets for the use of the tenants, but both are in the yard at the basement level, and the only sinks for waste water are at the basement level; two of the single room tenements are without sinks in connexion with the fire-grates provided for the purpose of cooking food, and although there are cupboards at the side of the fire-grates in some of the rooms, none are suitable for the storage of food, being without ventilation to the external air. Like conditions obtain in the other two houses.

A bare recital of the details of water used and the heights in feet through which they need to be carried conveys but a meagre idea of the hardship inflicted upon the tenement population by the London under existing conditions as to water supply. One of the most serious questions, from a health point

of view, is the tendency to limitation of use of water which these conditions of necessity foster. In standard works on hygiene it is commonly stated that, excluding the water needed for use in water-closets, and in general baths about 12 gallons (weighing 120 lb.) per head per day are required for domestic purposes, but inquiry shows that in several London tenemented houses only about one-sixth of this amount, i.e., some 2 gallons instead of 12, is the average quantity employed where the difficulties associated with carrying the water upstairs are specially experienced. With such small amounts of water, after deducting the quantity needed for maintaining life, there remains an absurdly inadequate supply for cleansing purposes. Personal ablution necessarily can be only imperfectly carried out, and for "such purposes as floor washings," for example, the quantity of water used is too often only sufficient to soak the dirt into the boards.

The hardship entailed by the need for carrying coals, etc., up a lofty flight of stairs is more or less felt in most London houses, even when they are occupied by only one family, and it has been estimated that in many houses some four foot-tons of work per diem are performed by the individual thus employed. This hardship, however, is vastly intensified when houses of the sort in question are adapted as tenement houses, and even under conditions of parsimony as regards use of water such as have been described above, many thousands of foot-tons of work per annum need to be performed in conveying water upstairs. The criticism may be made that this entails expenditure of muscular energy which may be remembered that the labour, which is poor enough exercise at the best, falls to be performed, as a rule, by the mother of the family, and that she has to carry it out day by day without intermission, and even at times when she is rendered for one or another reason, unfit to perform hard work.

Further useful information collected by the Council's inspectors is set out below.

Total number of houses inspected.	Number of tenements.				Total number of tenements.
	One room.	Two rooms.	Three rooms.	Four rooms or more.	
274	114	377	101	63	1,055

It will be noted that in 86 per cent. of the houses the only water supply is situated on the basement or ground floors.

We are glad to observe that some improvement is being effected with regard to the provision of ovens for cooking food, though only very gradually. For recent inquiry shows that, in place of 33.7 per cent. three years ago, 30.4 per cent. of the tenements are still unprovided with ovens. Further provision in this respect is especially needed in tenements of one room. The question of the need of provision for carrying away all the products of combustion from gas stoves, which we have previously commented on, is assuming increasing importance as years go on, and in many instances gas stoves are now used in sleeping-rooms. The provision of a supply of hot water in tenement houses is quite exceptional. In most instances food is stored in cupboards, but, save in exceptional cases, there exists no means of ventilating the same other than through the cupboard-door opening into the room.

The facts set out above show, not only the necessity for legislation such as the Council has resolved to promote, but also the need for prompt action in the matter by the sanitary authorities when the necessary authority shall have been conferred upon them.

Houses Let in Lodgings.—The Public Health Committee brought up the following report:—

"On February 3, 1903, we reported at length on the proceedings of the several sanitary authorities in London with regard to the by-laws made by them, under sect. 94 of the Public Health (London) Act, 1891, as to houses let in lodgings, and we then presented a report by the Medical Officer on the by-laws of the authorities in question, and the number of houses registered under such by-laws. We stated that we were convinced, from the figures given in the report, that in a number of the metropolitan boroughs, sufficient use was not made of the by-laws and as an example we cited the fact that, although in London the total number of tenements of less than five rooms was 672,030, only 16,433 houses let in lodgings were registered under the by-laws. The Council, on our recommendation, ordered a copy of the report to be sent to each of the sanitary authorities."

The comparatively small number of houses registered under the by-laws appears to be due to the exemption clause inserted in the by-laws, but, although the Council was advised that these clauses were illegal, the Local Government Board, who supervise the making of the by-laws, do not take this view. In several of the series of tenements in the county a rent limit is fixed, and houses in which tenements are let at a rent above this limit are exempt from the operation of the by-laws. This exemption militates against efficient supervision, owing to the low weekly rental fixed as the limit, and this view was taken by the conference on the administration of the Public Health (London) Act, 1891, who resolved that the efficient administration of sect. 94 of the Public Health (London) Act, 1891, relating to the registration and regulation of houses let in lodgings, was a matter of extreme importance to the public health of London; that the efficient enforcement of by-laws relating to houses let in lodgings was the most effective method of dealing

with overcrowding; and that it was advisable that in the by-laws there should be no real limit of exemption, but that they should be so framed as to apply only to such houses as are registered by the sanitary authority.

We are considering what steps can be taken to secure that the objects for which sect. 94 of the Act was framed shall be met, although the Council is at a disadvantage in the matter, by reason of having no voice in the making of the by-laws.

In the course of correspondence with the several sanitary authorities on the subject of the Medical Officer's report referred to above, it was pointed out to us that the figures appearing in the census returns for 1901 as the number of tenements of less than five rooms in certain boroughs were misleading when used as an index to houses let in lodgings, because there were numerous blocks of artisans' dwellings which could not be registered under the by-laws, and a large number of tenement buildings belonging to the same class which had been excluded from the operations of the by-laws by a decision of the divisional court.

With a view of ascertaining what proportion of the tenements of less than five rooms were in artisans' dwellings, we instructed the Medical Officer to inquire as to the number of rooms and the rents of the tenements in block dwellings in the several metropolitan boroughs, and he has presented to us the result of his inquiries.

It will be seen from this statement that of 672,030 tenements of less than five rooms in London as shown in the census return of 1901, 53,571, or 7.9 per cent., are in block dwellings. In the central districts Westminster, Holborn, and Finsbury the percentages are 21.4, 21.4, and 19.5, while in the outlying districts of Lewisham, Wandsworth, and Woolwich the percentages are 0.7, 0.2, and 0.3 respectively. A comparison of the number of tenements of one, two, three, and four rooms in the block dwellings, with those in London generally, shows that 3.3, 11.6, 11.3, and 2.6 per cent. respectively are in block dwellings. Thus, over 11 per

Total number of houses inspected.	Number of tenements.				Total number of tenements.
	One room.	Two rooms.	Three rooms.	Four rooms or more.	
274	114	377	101	63	1,055

cent. of the tenements of two and three rooms are in the block dwellings, while a much smaller proportion of the one and four room tenements are in these dwellings.

The large proportion of two and three room tenements in block dwellings, when compared with the proportion of such tenements in London generally, may be further seen on reference to the subjoined table, which shows the percentage of one, two, three, and four room tenements in every 100 tenements of less than five rooms in London generally, and in block dwellings:—

	London Generally.	Block Dwellings.
One-room tenements...	22.2	100
Two-room tenements	37.0	13.9
Three-room tenements	29.0	38.4
Four-room tenements	20.8	6.9
Total	100.0	100.0

Having transacted other business, the Council adjourned.

APPLICATIONS UNDER THE 1894 BUILDING ACT.

The London County Council at their meeting on Tuesday dealt with the following applications under the London Building Act, 1894. The names of applicants are given between parentheses:—

Lines of Frontage and Projections.

Hackney, South.—The retention of three bay-windows in front of No. 105, 107, and 109, Daubeney-road, Hackney, nearer to the centre of the nearest party-wall than the extreme amount of their projection from the main wall (Mr. A. B. Conwell).—Consent.

Hampstead.—The retention of a projecting porch in front of No. 13, Arkwright-road, Hampstead (Mr. J. D. Hunter for Mr. E. Sondheim).—Consent.

Hampstead.—Projecting hoods in front of two houses on the north-eastern side and four houses on the south-western side of Bracknell-gardens, Hampstead (Mr. W. A. Burr for Mr. J. Tomblin).—Consent.

Holborn.—A projecting electric letter sign in front of the Horsehoe Brewery, Tottenham Court-road (Mr. W. T. Foster for Meux's Brewery Company, Ltd.).—Consent.

Kensington, South.—The retention of a projecting sign at No. 11, Young-street, Kensington

(for the Young-street Motor Garage Company).—Consent.

Lewisham.—A one-story shop in front of No. 11, Brownhill-road, Catford (Messrs. Norfolk & Prior for Mrs. E. E. Reader).—Consent.

Lewisham.—The erection of porches to twenty-one houses on the western side of Manor-lane, Lee, northward of the bridge over the river Quaggy (Mr. G. A. Lansdown for Messrs. W. A. Scudamore & Sons).—Consent.

Lewisham.—The erection of eight houses, with porches, half timber work, barge boards, and oriel windows, on the western side of Hither Green-lane, Lewisham (Mr. H. Lewis Upham for Mr. S. Wood).—Consent.

Woolwich.—Bay windows in front of Nos. 21, 23, and 29, Glenshiel-road, Eltham (Mr. J. J. Basset for Mr. A. Cameron Corbett).—Consent.

St. George, Hamover-square.—Consent to the application of Messrs. Brown & Barrow, on behalf of Col. Sackville West, for permission to use artificial material in lieu of stone in the erection of a porch in front of No. 34, Hill-street, Berkeley-square. Consent.

Bermondsey.—Buildings upon the site of No. 71 Upper Grange-road, Bermondsey, and on the north-eastern side of Lynton-road (Mr. T. W. Soman for Mr. T. Sloan).—Refused.

Kensington, North.—An iron and glass covered way in front of No. 20, Lansdowne-road, Holland-park, Kensington (Mr. G. H. Fox for Mr. T. Peckington).—Refused.

Lewisham.—One-story shops in front of Nos. 232, 234, and 236, High-street, Lewisham (Mr. F. Adams Wyndham).—Refused.

Strand.—Two iron and glass shelters in front

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274	114	377	101	63	1,055

of the Baker-street and Waterloo railway station, the Criterion Restaurant, and the Criterion Theatre, on the southern side of Piccadilly (Mr. C. H. King for Messrs. Spiers & Pond, Sir Charles Wyndham, and the Baker-street and Waterloo Railway Company).—Refused.

Westminster.—A porch and a one-story shop in front of No. 117, Victoria-street, Westminster, with the one-story shop to also abut upon the western side of Francis-street (Mr. R. G. Hammond for the Reformatory and Refuge Union Incorporated).—Refused.

Lines of Frontage and Space at Rear.

Hammersmith.—An irregular open space at the rear of the Hammersmith District Railway Station, The Broadway, Hammersmith, with a projecting shelter in front of such station (Mr. C. H. King for the Metropolitan District Railway Company).—Consent.

Hammersmith.—Stabling at the rear of No. 60, Wood-lane, Hammersmith, to abut upon a roadway leading out of the south-east side of Wood-lane (Mr. L. S. Haskins for Mrs. S. Taylor).—Consent.

Hampstead.—A Friends' meeting-house on the site of Stamford Lodge, Heath-street, Hampstead, at less than the prescribed distance from the centre of the lane leading from Heath-street to Hampstead-square (Mr. F. Rowntree for the Hampstead Preparation Unity of the Society of Friends).—Consent.

Rotherhithe.—Erection of six cottages on the site of Nos. 74 to 79, George-row, Bermondsey, at less than the prescribed distance from the centre of the roadway of Elizabeth-place (Mr. J. M. Kennard for Mrs. Portlock).—Consent.

Southwark, West.—A one-story building abutting upon St. Margaret's-court, Red Cross-street, Southwark, at less than the prescribed distance from the centre of St. Margaret's-court (Messrs. Barlow, Roberts, & Thompson).—Consent.

Width of Way.

Hampstead.—That the Council do consent to the application of Mr. F. R. Hasluck, on behalf of Mr. W. Clark, for an extension of the periods within which the erection of an addition to a coach-house on the eastern side of Shepherd's-walk, Rosslyn-hill, Hampstead, with a boundary wall at less than the prescribed distance from the centre of Shepherd's-walk, was required to have been commenced and completed.—Consent.

Width of Way, Projections and Construction.

Islington, East.—The erection of a wood and glass tinskeeper's box on the north-western side of Canonbury-grove, Islington, near its junction with Canonbury-road (Mr. R. T. Kingham for

the London General Omnibus Company, Ltd.).—Refused.

Width of Way and Deviations from Certified Plans.

Bermondey.—A building at the rear of No. 184, Long-lane, Bermondey, at less than the prescribed distance from the centre of Balfin's-place (Mr. J. M. Kennard for Mr. G. Brenner).—Consent.

Width of Way and Height of Buildings.

Limehouse.—A building on the site of No. 19, Dod-street, Limehouse, to exceed in height the width of the street and with a pier at less than the prescribed distance from the centre of the roadway of such street (Messrs. H. Herrmann, Ltd.).—Consent.

Lines of Frontage, Projections, and Construction.

Rotherhithe.—Two iron ganeways to connect two warehouses over the public way of Pickle Herring-street, Rotherhithe (Messrs. Ashby & Horner for Mr. W. H. Nesbitt).—Consent.

Space at Rear.

St. Pancras, West.—A modification of the provisions of section 41 with regard to open spaces about buildings, so far as relates to the proposed erection of a block of working-class dwellings on the western side of Hampstead-road, St. Pancras, adjoining the London and North-Western Railway cutting, with an irregular open space about such building (Messrs. Joseph & Smith for the London and North-Western Railway Company, Ltd.).—Consent.

Deviation from Certified Plans.

Strand.—The erection of buildings on the site of Nos. 89 and 91, Wardour-street, and Nos. 1 to 13, Down's-place, Strand (Mr. J. P. Briggs for Mr. I. Moss-Vernon).—Refused.

Strand.—Deviations from the plans certified by the District Surveyor so far as relates to the proposed erection of a building upon the site of Nos. 7, 8, and 9, Coventry-street, and 60, 61, 62, 63, and 64, Rupert-street (Mr. W. J. Ancell for Messrs. J. Lyons & Co., Ltd.).—Refused.

Alteration of Buildings.

Kensington, South.—The uniting of two warehouse buildings on the western side of James-street, Kensington, by means of openings on the basement, ground, first and second floors, without the buildings so united being wholly in one occupation (Messrs. Crickmay & Sons for Messrs. Bowerman & Forward).—Consent.

The recommendations marked † are contrary to the views of the local authorities.

Architectural Societies.

THE GLOUCESTERSHIRE ARCHITECTURAL ASSOCIATION.—A general meeting of this Association was held on the 27th ult. at the Gloucester Municipal Schools, and among those present were: Messrs. F. W. Waller, M. H. Medland, W. B. Wood, J. Fletcher Trew, H. A. Dancy, and W. F. Jones, of Gloucester; J. Villar, A. H. Smithson, S. H. Healing, T. Malvern, and T. Overbury, of Cheltenham; and G. P. Milnes, of Stroud. Mr. F. W. Waller was voted to the chair, and before proceeding to the business of the evening he expressed his great regret at hearing the sad news of the death of Mr. H. A. Prothero, of Cheltenham. With this expression of sympathy the meeting entirely concurred, and it was decided to forward a note of condolence from the meeting to the relatives of the late Mr. Prothero, and to enter it in the books of the Association. The minutes of the Founders' meeting were then read and confirmed, and the draft rules of the Association, which had been prepared and submitted by the sub-committee appointed for that purpose, were thereupon considered in detail. After some amendments and revisions these rules were approved by the meeting, and formally adopted by the Association. The election of the officers for the ensuing year was then proceeded with, with the following result: President, Mr. F. W. Waller, F.R.I.B.A.; Vice-Presidents, Mr. M. H. Medland, F.R.I.B.A., Mr. H. W. Chatters, F.R.I.B.A.; Council, Mr. W. B. Wood, A.R.I.B.A.; Mr. J. Villar, F.S.I., Mr. H. A. Dancy, Hon. Corresponding Secretaries, Mr. E. Fletcher Trew, Gloucester; Mr. G. P. Milnes, A.M.I.C.E., Stroud; Hon. General Secretary, T. Overbury, Lloyds' Bank Chambers, Cheltenham.

BIRMINGHAM ARCHITECTURAL ASSOCIATION.—Mr. W. H. Bidlake lectured on the subject of "English and French Architecture," on the 30th ult., at Norwich Union Chambers before the members of the Birmingham Architectural Association. Mr. Bidlake

pointed out that Englishmen and Frenchmen had carried out their antagonism so far as to dispute each other's claim as to the origin of Gothic architecture; but in these days of the *entente cordiale* we were willing to make mutual concessions. While the French allowed that the high vaults like those of Durham and the English decorated style were the precursor of the French flamboyant, we, on our part, allowed the great French cathedrals to be the most perfect expression of Gothic art. Proceeding to make a comparison between the French and English cathedrals he pointed out the much greater loftiness of the former and the consequences it entailed, as, for instance, the scaffolding of flying buttresses to resist the thrust of the vaults and the suppression of the central tower; whilst great external magnificence was thus attained the English had as compensation a grander external effect in the triple towers of such cathedrals as Lincoln and Durham and the crowning steeple of Salisbury. Owing to the lower elevation of the English vaults, bringing it more within the range of the eye, the English architect was induced to elaborate the groining; and from this had resulted the magnificent vaults of Exeter and King's College Chapel. Mr. Bidlake then compared the simple square ending of the English choir with its large window with the complex system of radiating chapels of the typical French choir; and concluded by a series of illustrations of the west fronts of the great French cathedrals with their marked triple portals. He allowed that while we in England had no triple doors to compare with France we had at least in Peterborough a façade which might console us for their absence. The lecture was illustrated by lantern slides. A cordial vote of thanks was passed to Mr. Bidlake for his lecture.

NORTHERN ARCHITECTURAL ASSOCIATION.—The opening meeting of the session of the Northern Architectural Association was held on the 21st ult. in the rooms of the Association, Higham-place, Newcastle. Mr. J. T. Cackett, the President, was in the chair, and delivered an address. Mr. Cackett dealt with the Market-street extension scheme, upon which, as at present it existed—the mere continuation of Market-street through to New Bridge-street 183,000 ft. had been expended. Last year, in addressing the Association, he referred to defects in the scheme, and now it was his pleasure to explain its successor, of which the City Council had approved, and which they had decided to submit for Parliamentary sanction. He explained the reasons for the disposition of the streets forming the Market-street improvement which the city authorities now had in hand. He thought that if the Corporation exercised a control over the new façades there could be no doubt that this would prove the most beneficial and artistic improvement to the city since the days of Grainger. There was some discussion upon the address, and the President was cordially thanked by the members.

Archæological Societies.

THE NEWCASTLE SOCIETY OF ANTIQUARIES.—The Northumberland History Society have during the present year carried out a system of excavations in the neighbourhood of Corbridge. The object of these excavations has been principally to discover whether the Roman settlement known as Corstopitum was a military or a civil station, and what was the general outline and nature of its defences. An interesting report by Mr. C. L. Woolley on the results so far achieved by the excavators was read on the 28th ult. at the meeting of the Newcastle Society of Antiquaries. In this report Mr. Woolley says that Corstopitum is situated a little to the west of modern Corbridge, and does not appear to have been built on since Roman times, although it has been used as a quarry for the neighbourhood ever since. With regard to the town walls nothing satisfactory was revealed, and it is concluded that at least towards the south the river was relied on as a defence. The remains of two buildings were excavated, but they do not seem to have been of very early date, and the

chief finds were about twenty-two coins and eight spear heads, together with a cornelian representing Jupiter with eagle. The architectural discoveries of importance were confined to the discovery of two voussoir stones in an arch of 12 ft. 6 in. span, this being the largest arch and composed of the finest stones known in the North of England. From the quality of the stones and the fact that the arch was found in a room with four floor levels it is believed that the building for which the voussoir stones were originally designed goes back to the very earliest date of the occupation. It may be added that although in the original scheme these excavations were to cease this year they are now to go on, and further reports will be presented. A further report dealt with the old Roman bridge at Corbridge. From these excavations it is concluded that the Roman bridge did not traverse the present river course at right angles, but pointed down stream looking from the south. The bridge was probably, like the present one, of considerable length, much of the space being occupied by gravel beds, this allowing a free flow of water in time of flood. The length, in fact, is put down at 154 yards twenty yards less than the present bridge—there being ten water piers and eleven waterways. Eighty yards away, it is added, remains have been discovered of what appears to be an ancient quay with 37 ft. frontage to the river, composed of large stone blocks with four large balks of timber.

Engineering Societies.

THE JUNIOR INSTITUTION OF ENGINEERS.—On Friday evening, November 30, through facilities granted by Mr. Jas. B. Chapman, the chief engineer of the Underground Electric Railways Company of London, a party approaching 200 in number paid a visit of inspection to the Company's Great Northern, Brompton, and Piccadilly Railway, which is to be opened to the public on December 15. Starting from Piccadilly-circus Station, they were taken by train to the extreme west end of the line at Hammersmith, the working being explained en route. On returning, some alighted at Hyde Park-corner Station to see the special signalling arrangements there, whilst the others proceeded to Covent-garden, where similar apparatus is installed. The whole party on arriving at Holborn walked along the tube of the Strand extension works, and saw the Greathead shield in operation at the working face. Entering the train again, they went on to Holloway-road Station, and examined with much interest the double spiral continuous electric moving track, which is to travel at 100 ft. per minute and take passengers up and down simultaneously, and is being fitted in lieu of lifts. The electrically-driven pumping plant at Finsbury Park Station was the last item in a long evening's programme. Here four hydraulic lifts are used, each working by three rams with a water pressure of 700 lb. per square inch.

Fifty Years Ago.

FROM THE *Builder* OF DECEMBER 6, 1856.

ARCHITECTURE ON THAMES SIDE.

SO RAPID is the change which is taking place in the architectural features of London that in a very few years it will be almost as difficult to find examples of buildings erected between the reign of Queen Elizabeth and the occurrence of the Great Fire as it is now to discover remains of Norman and mediæval work. The almost complete disappearance of a city in less than 300 years enables us in some measure to account for the small number of architectural fragments which remain to assist us in forming an idea of the appearance of Roman London. This circumstance has led some to suppose that the now famous city, which was occupied more than 400 years by the Roman conquerors, was a place of trifling importance. The great embankment of the Thames—the extent of the Roman wall of London—the varied and beautiful portions of the basement of buildings which, from time to time, are exposed to the sight—and

the glimmering accounts of remote historians show that this was not the case. Like the city of Verulam, Roman London was, no doubt, chiefly built with such bricks or tiles as could be readily made not far off.

A ground-plan of Roman London may be arrived at from the remains of the Roman period which have been discovered. Of Saxon London we know less; and it is much to be regretted that none of the painstaking artists of that time have, even in their imperfect perspective, left us a view, however slight, of the Saxon city. Indeed, we have little in the picture and plan way about London until Queen Elizabeth's days. Feeling the value of such records, we have from time to time given slight sketches of parts of London as they then existed. Many of these have already disappeared, and it is to be hoped that the time is not far distant when sanitary inquirers and students will look upon the illustrated facts in our pages as curiosities.

Along the banks of the river some houses have tumbled down: others have been condemned, and many removed, to make way for more substantial buildings. Soon there will not be one of the old-fashioned balconied houses, in which our forefathers enjoyed the breezes of Father Thames, left. Let us, therefore, preserve the appearance of one or two specimens before it is too late. Many of these houses have been little changed since the time when Queen Elizabeth passed them on her way to Greenwich.

"ENGINEERING WORKS, QUEENSFERRY."—We learn that the names of "Messrs. Creswell & Maule," as architects, were incorrectly put in the title of the above plate, Mr. H. B. Creswell being alone the architect. The mistake arose from the fact that Mr. Creswell has a London address at Mr. Maule's office, and we have had one or two communications with both their names on the letter-paper.

Illustrations.

CHURCH OF ST. SIMON, PLYMOUTH.

THE church of St. Simon, Plymouth, is one of the first of the new churches being erected under the Bishop of Exeter's Three Towns Extension Scheme, the foundation-stone being laid by the Archbishop of Canterbury on November 8, 1905.

The materials are local limestone, with Bath stone dressings and slate roof. Space has been left at the west end for a future tower, but meanwhile a bell-cote is provided over the north porch. Covered ways will connect with the parish hall and Sunday-schools on the north side. Internally the limestone walling will show, and have triple barrel roofs. Advantage has been taken of the sloping ground to provide undercroft clergy and choir vestries, lavatories, stoke-hole, and blowing motor-room, etc., a further vestry and sacristy being on the main floor level. Accommodation is made for 760, including the choir.

The builders are Messrs. Pethick Bros., of Plymouth, and the architect Mr. Harbottle Reed, of Exeter.

BRITISH MEDICAL ASSOCIATION'S NEW PREMISES.

THIS important block of buildings is to take the place of the existing buildings at the corner of the Strand and Agar-street, and erected from the designs of the late Mr. Cockerell. Additional houses have since been added to the site on the Agar-street side. On the ground floor will be shops, and possibly a bank at the corner, and all above this will be the offices and rooms in connexion with the British Medical Association.

On the ground floor there is a spacious entrance-hall, with staircase and lift leading to the upper floors. On the first floor is

the large library and council-room, and the general offices of the Institution. On the second floor the medical secretary's department. On the third floor are rooms for officers of the Association, chairmen of committees, a general conversation-room, and rooms for extension. On the fourth floor is the editorial department, and on the fifth the printing department.

The elevations: The lower part of the two frontages is to be of grey granite, the upper part of Portland stone, and the roofs covered with westmorland green slates; a feature is made in the elevations of the wide windows.

The architect is Mr. H. Percy Adams.

DRAWINGS OF OLD HOUSES:

OLD VICARAGE, BURFORD.

BURFORD is a small town in Oxfordshire, whose main street stands on the side of a long slanting hill, at the foot of which is the river known as the Windrush.

The town has been very little altered from what it was centuries ago, and is free from the invasion of railway stations and the noise of engines, the nearest railway station being five miles distant.

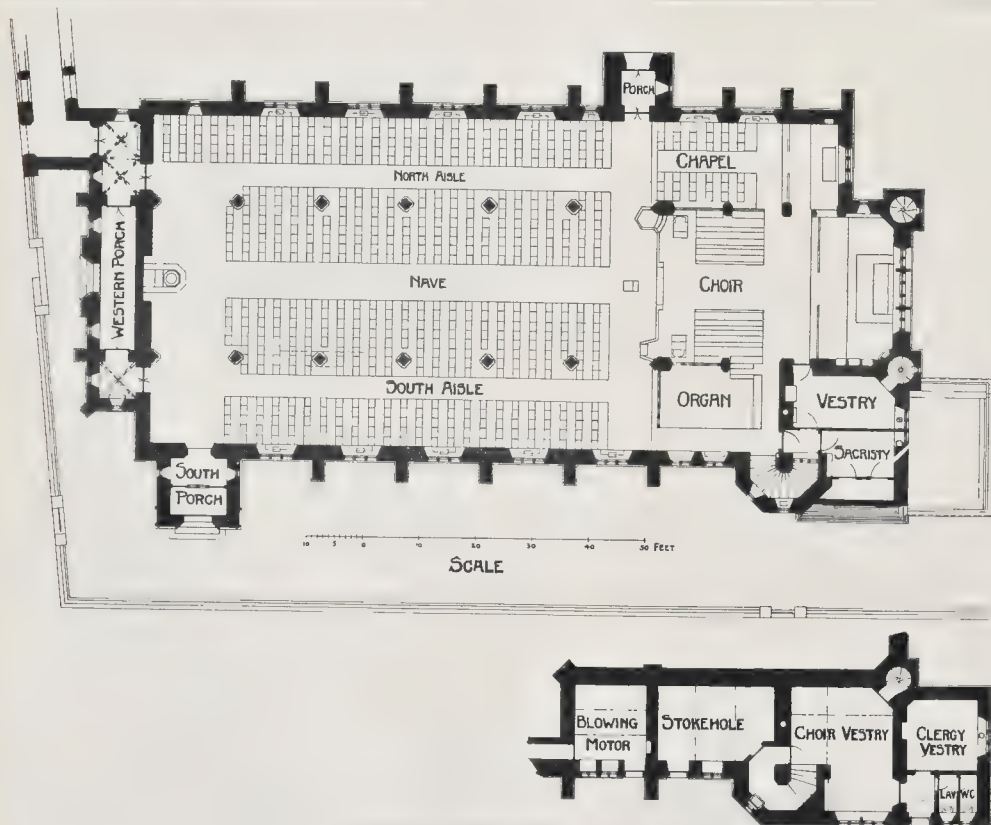
The old Vicarage, which is one of the first buildings met with upon entering the town, overlooks the priory and the church, which contains the beautiful monument to the memory of Sir Lawrence Tanfield, Kt., Lord Chief Justice of England, who died in 1626.

The Vicarage was erected in 1679, the date being inscribed on the centre gable.

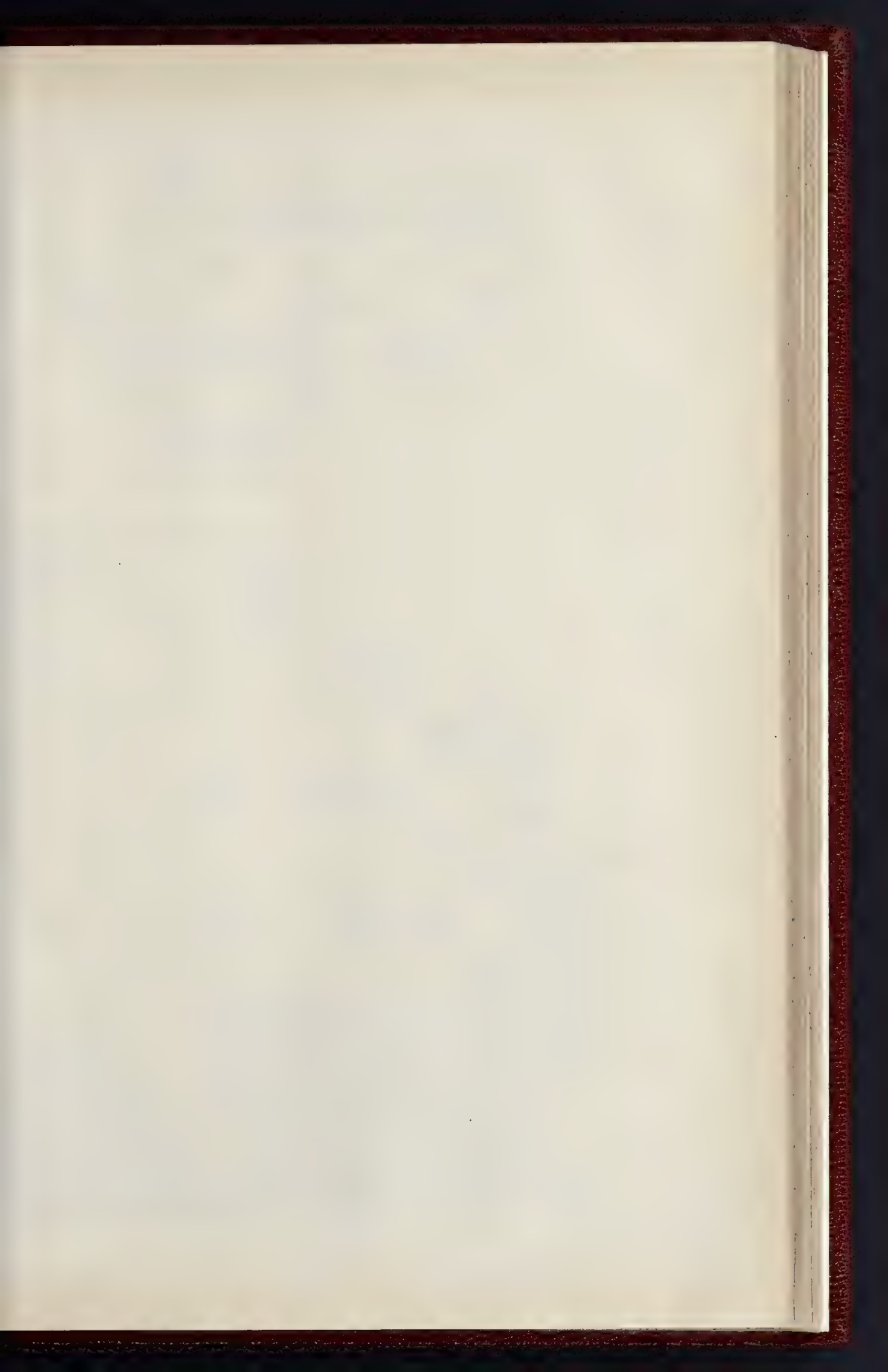
OLD HOUSE, SHEPTON MALLET.

THIS house, which abuts on one of the side roads not far from the market place, is supposed to have been at one time the residence of the Duke of Monmouth.

It is now converted into business premises, and is used by a co-operative society.



Church of St. Simon, Plymouth. Plans.

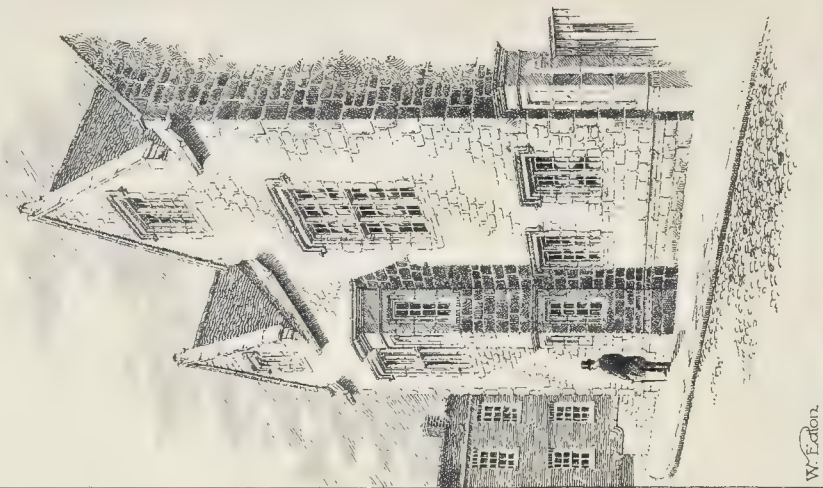


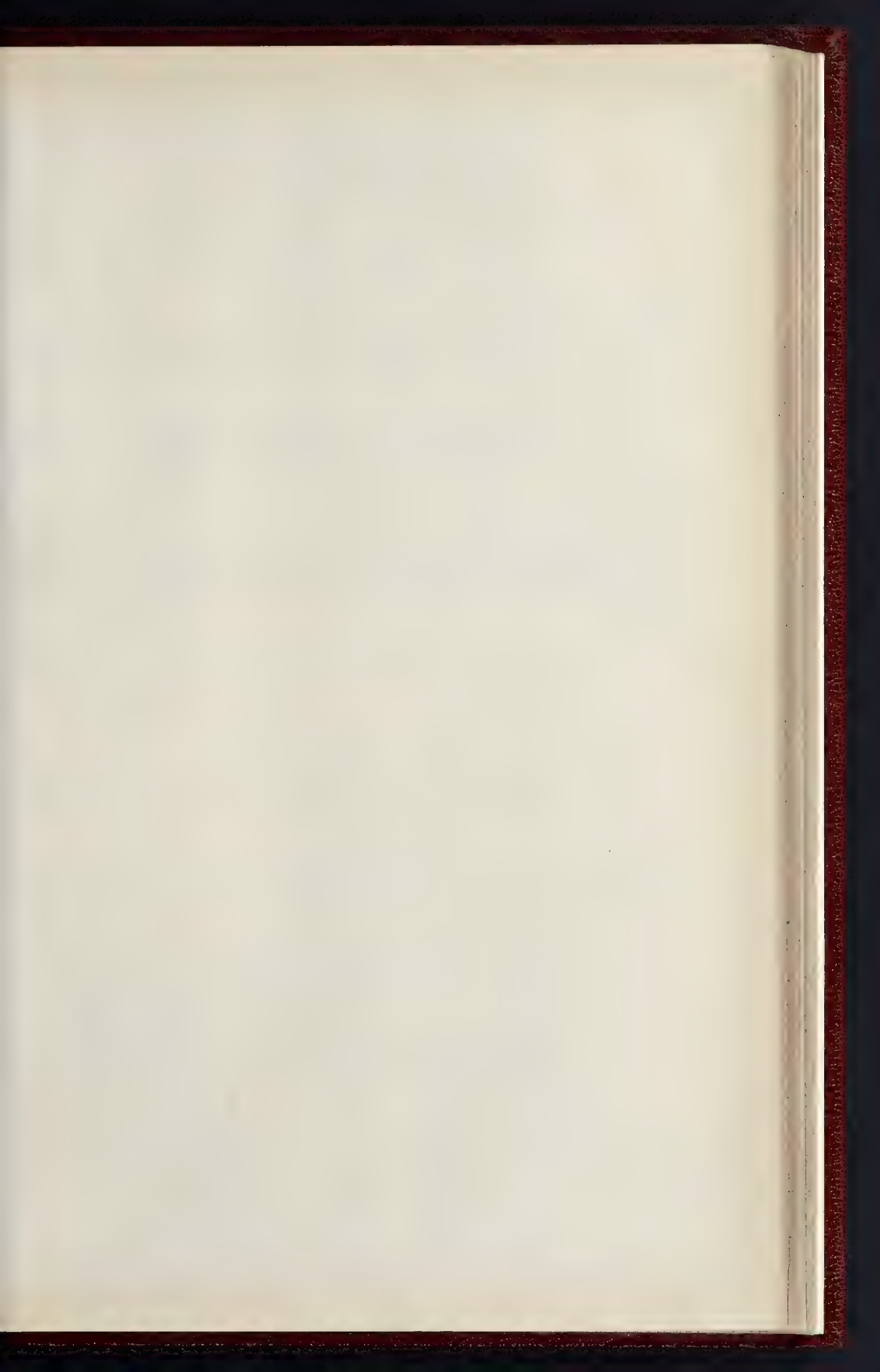
THE BUILDER, DECEMBER 8, 1906.

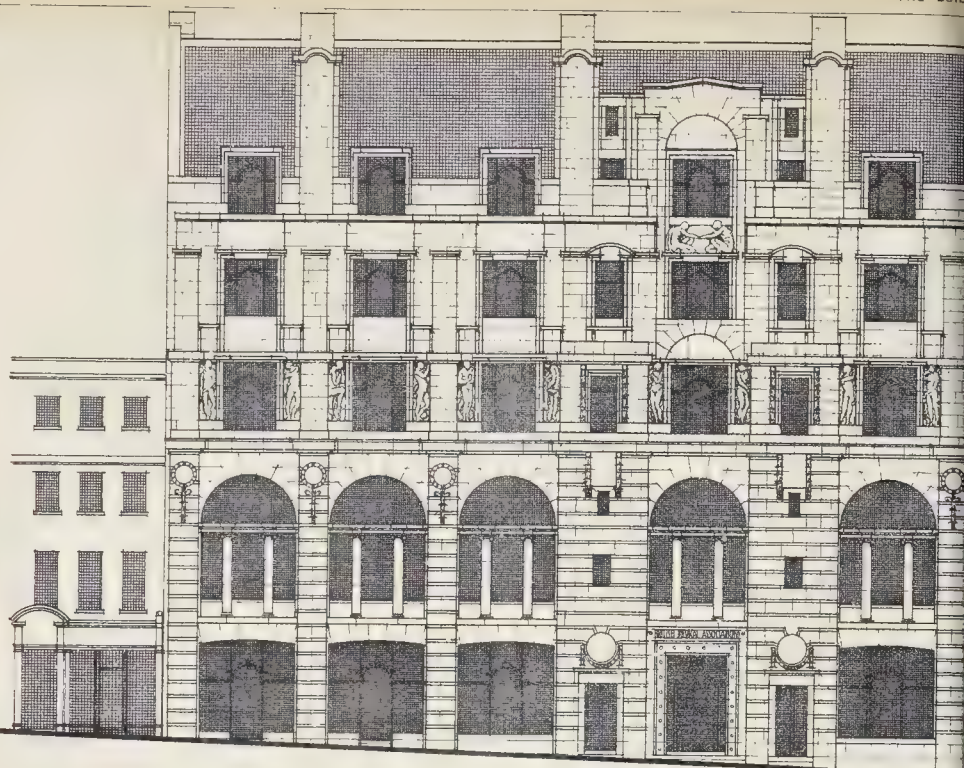
The Old Vicarage
Burford
Oxon



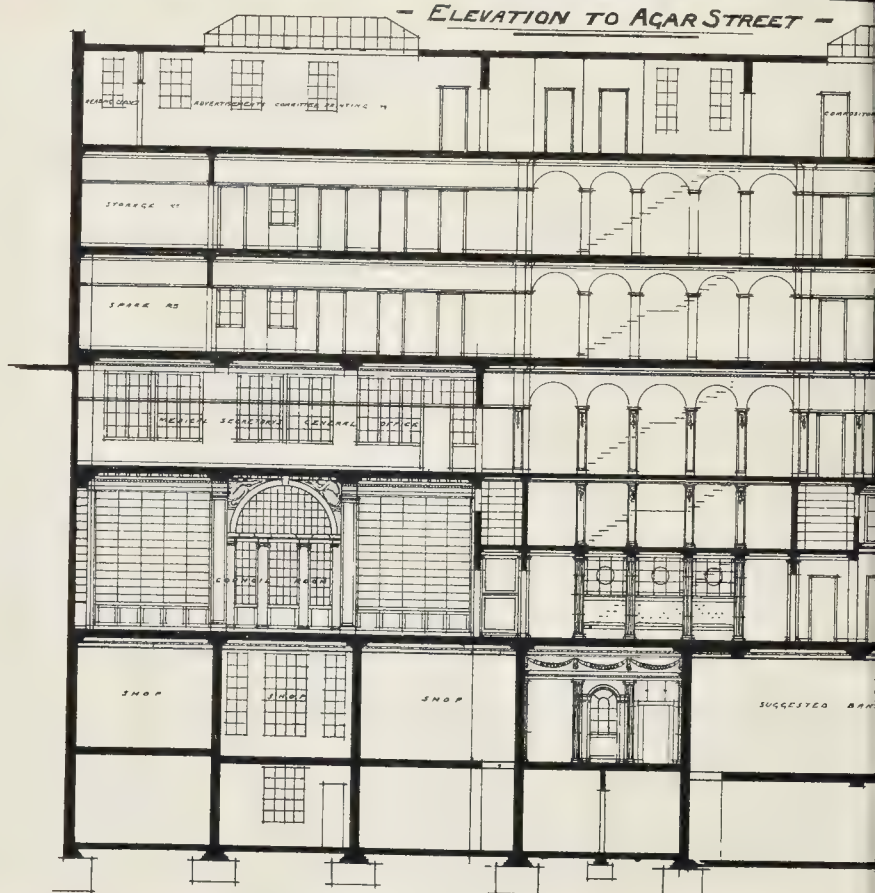
Old House
Shepton Mallet
Somerset



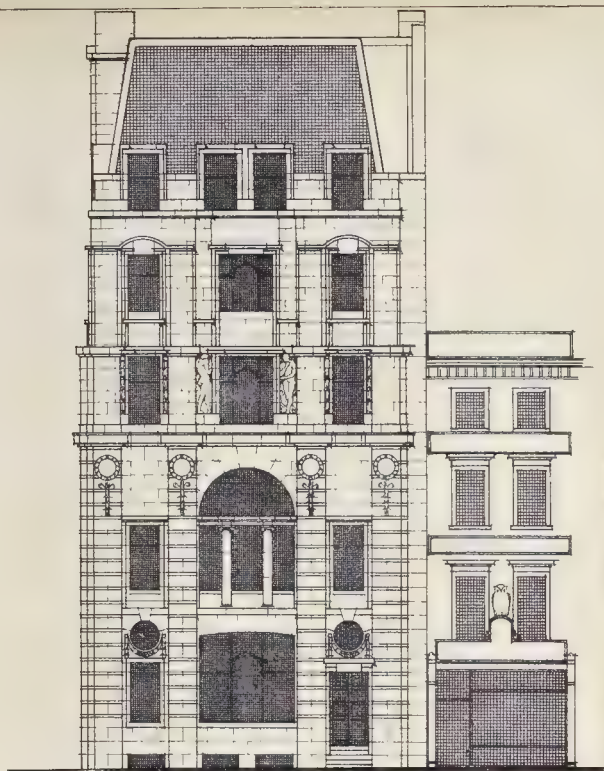
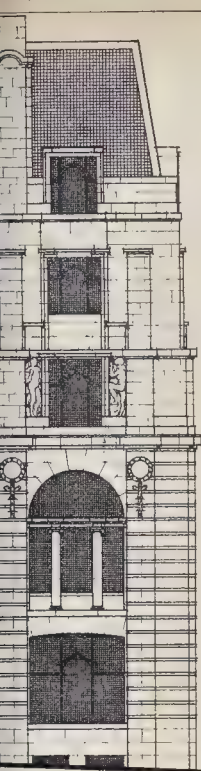




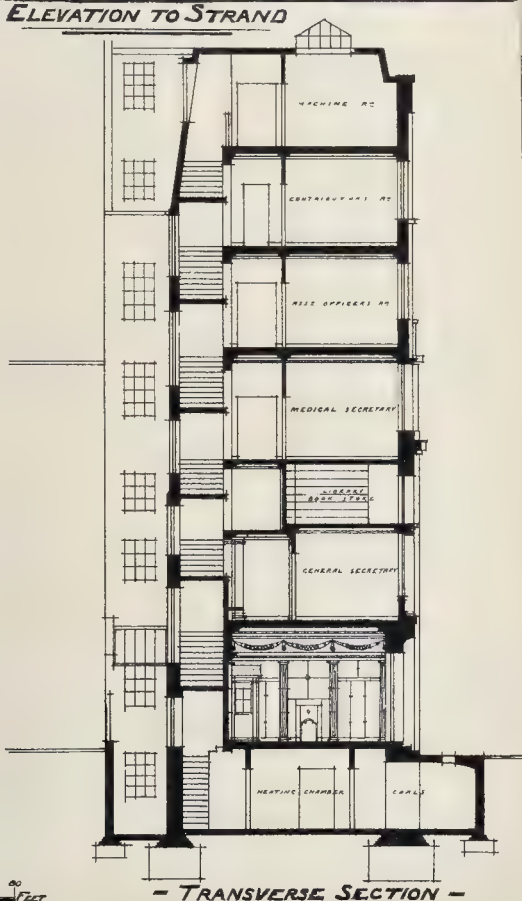
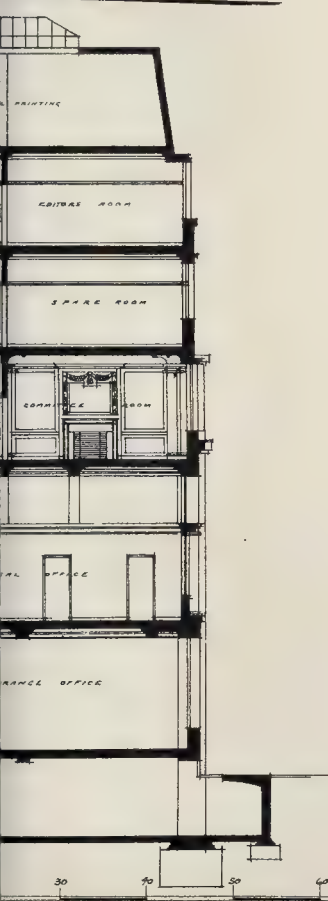
- ELEVATION TO AGAR STREET -



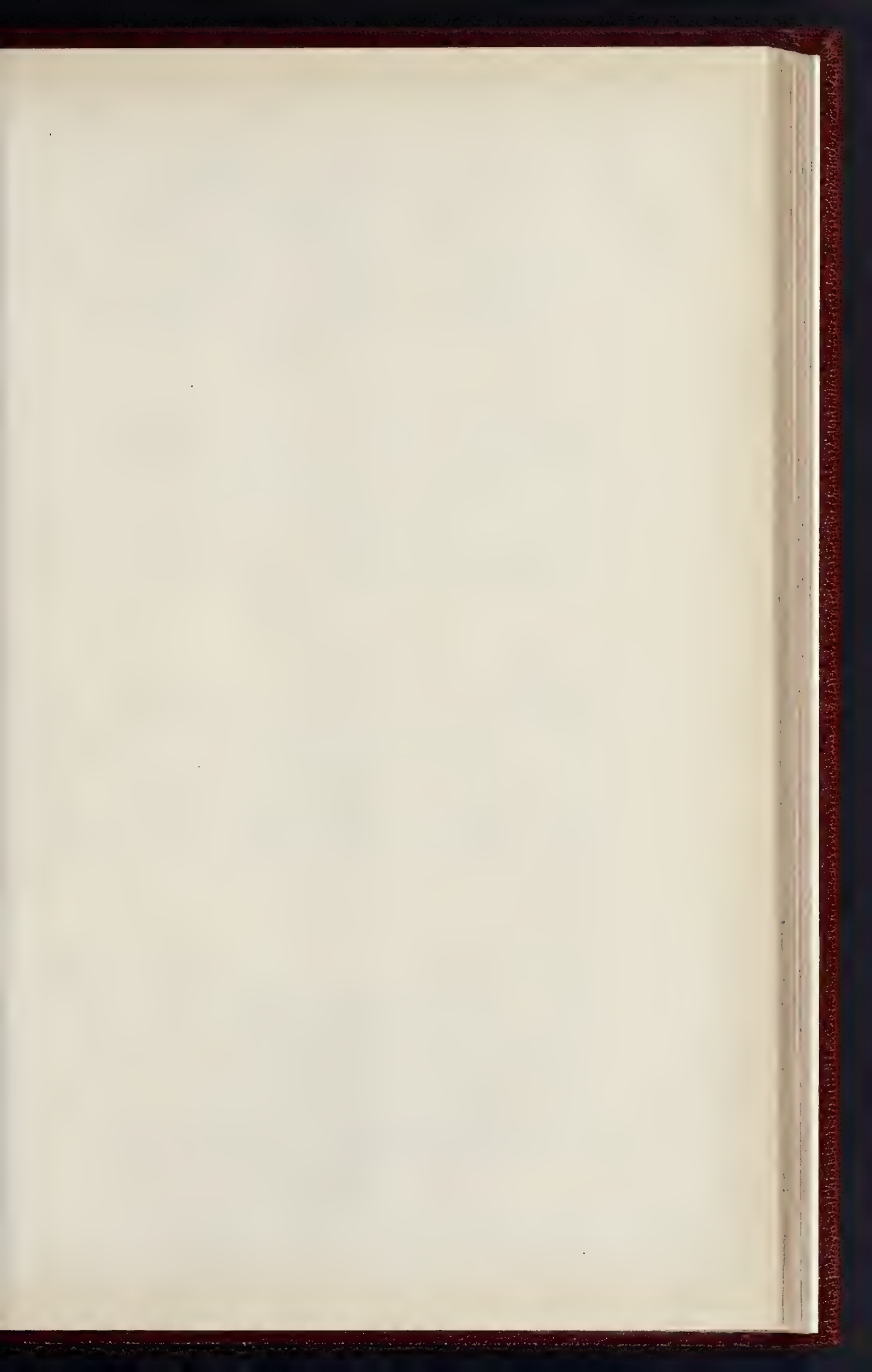
- LONGITUDINAL SECTION -



ELEVATION TO STRAND



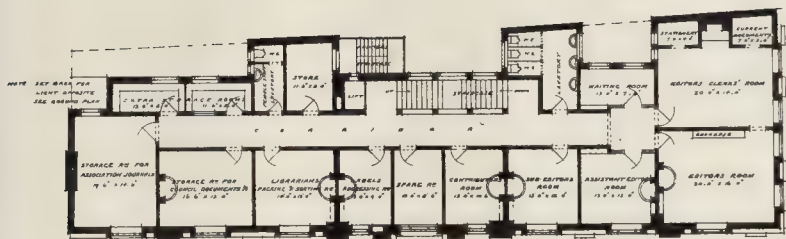
- TRANSVERSE SECTION -



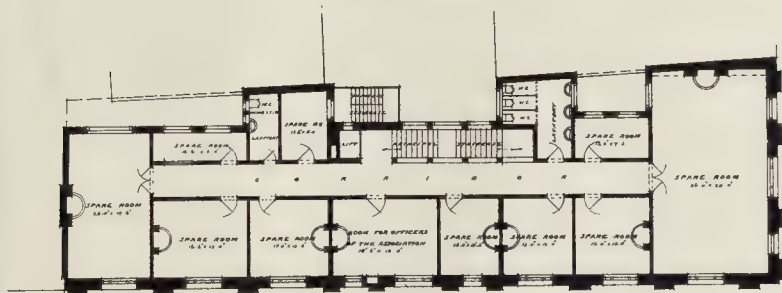
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Floor plan of the basement of the Sisseton Bank Insurance Office. The plan shows three large rooms labeled "BASEMENT UNDER SHOP" on the left, a central area with "STAIRS", "REST ROOM", and "KITCHEN", and a large room on the right labeled "BASEMENT OF SISSETON BANK INSURANCE OFFICE". There are also smaller rooms labeled "COAL" and "STORAGE".

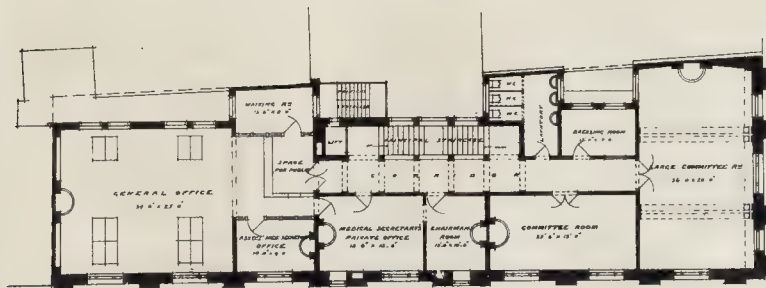
- FIFTH FLOOR PLAN -



- FOURTH FLOOR PLAN -



- THIRD FLOOR PLAN -

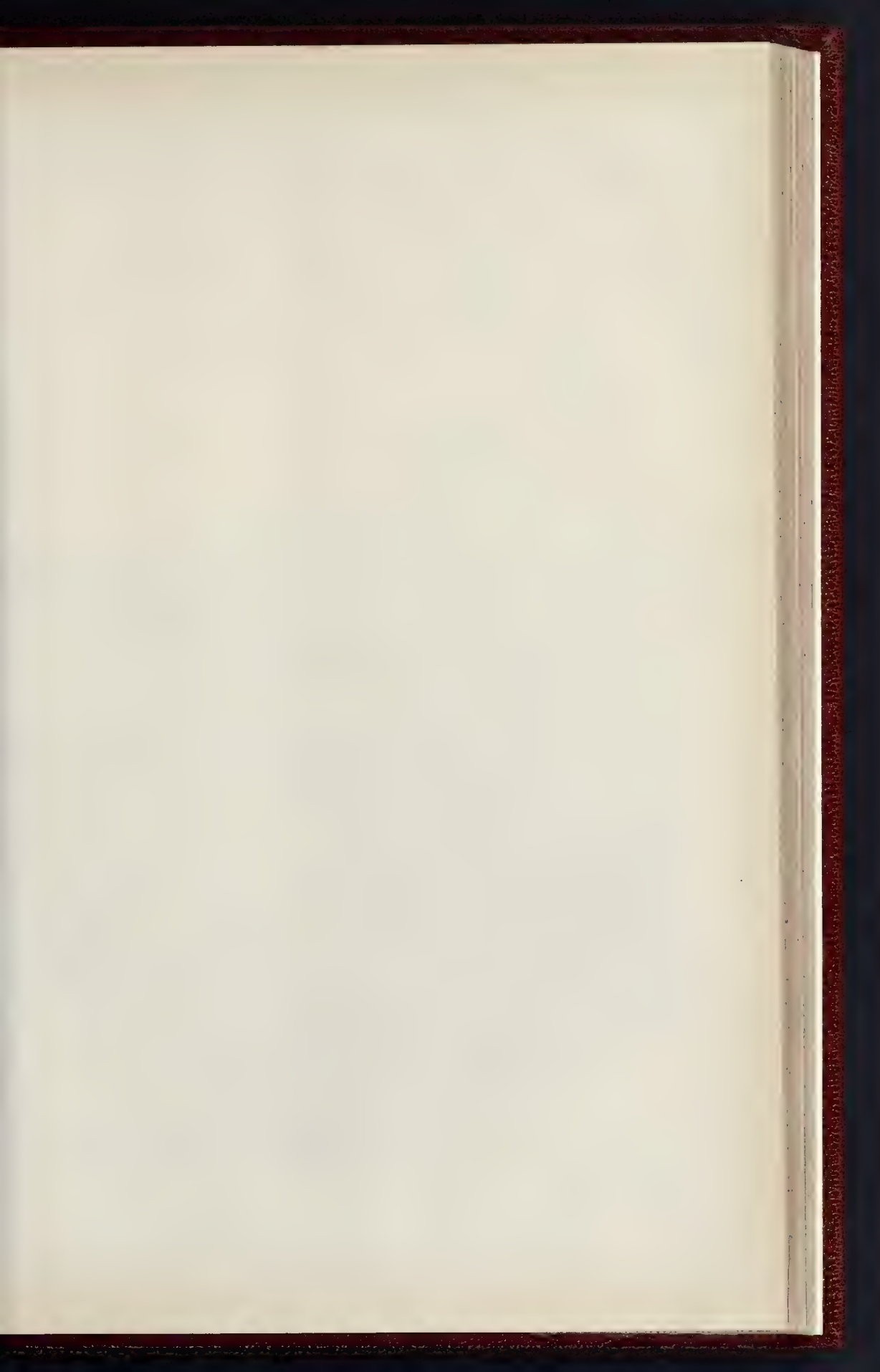


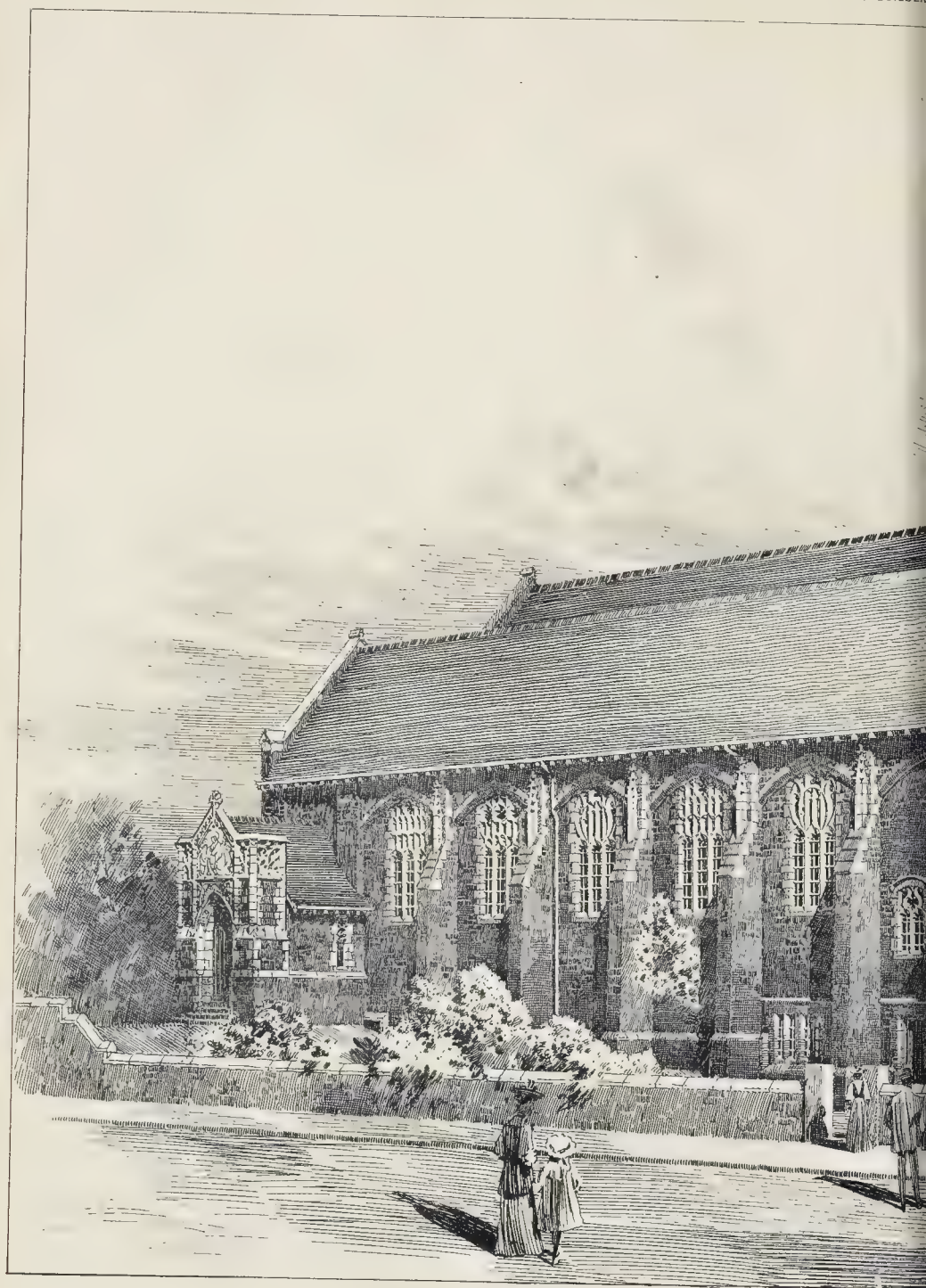
- SECOND FLOOR PLAN -

Figure 1 shows a horizontal beam with several dimensions and labels. The dimensions are marked along the top of the beam: 18, 3, 9, 14, 24, 30, 40, 30, 60, 70, and 80. A vertical line is drawn at the 30 mark. Below the beam, there are labels: 18, 3, 9, 14, 24, 30, 40, 30, 60, 70, and 80. The right end of the beam is labeled EET.

PHOTO LITHO SPRAGUE & C 4 1/2 EAST HARDING STREET FETTER LANE EC

N.—MR. H. PERCY ADAMS, F R I B A., ARCHITECT.





NEW CHURCH OF ST. SIMON, PLYMOUTH

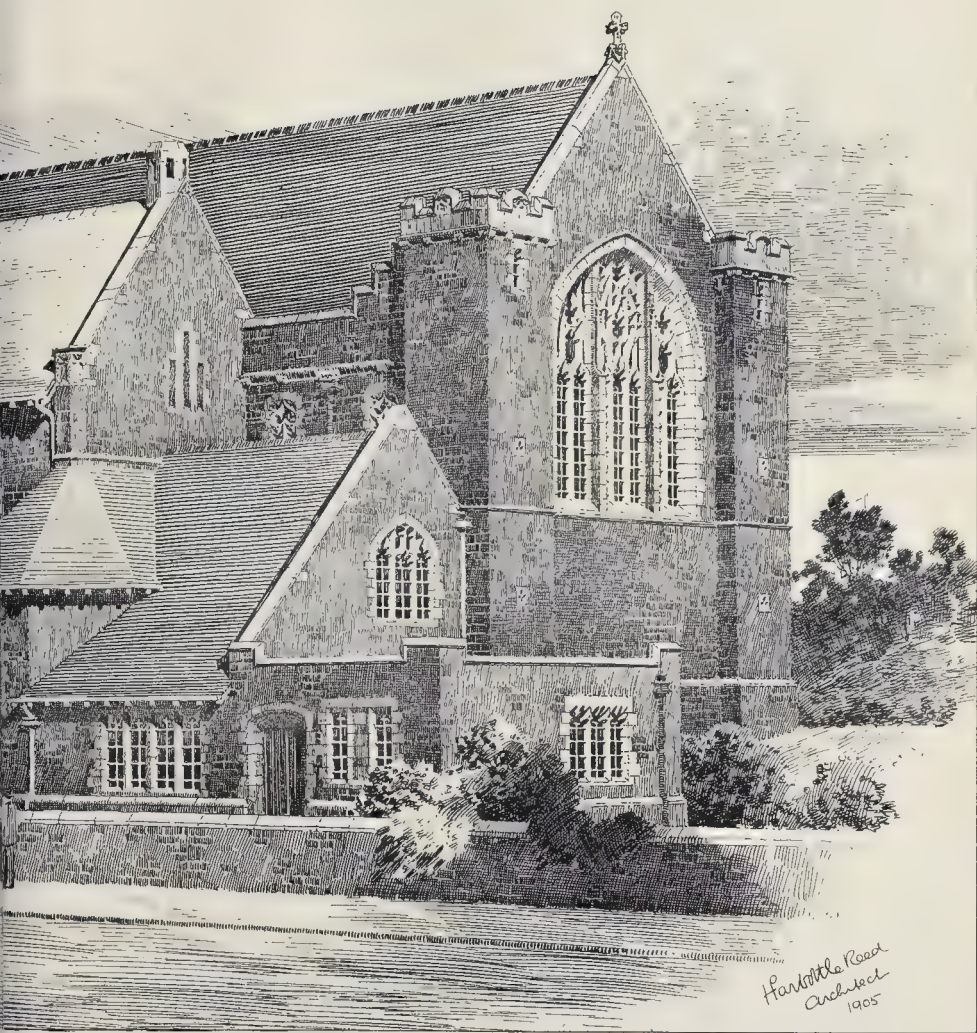
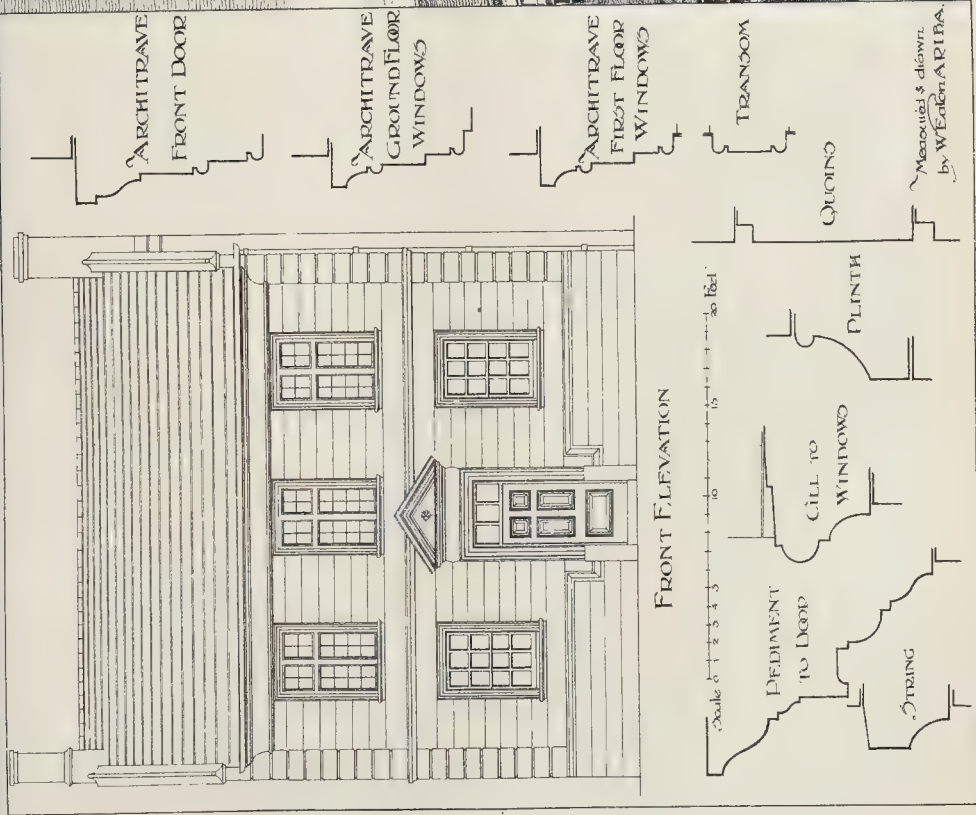
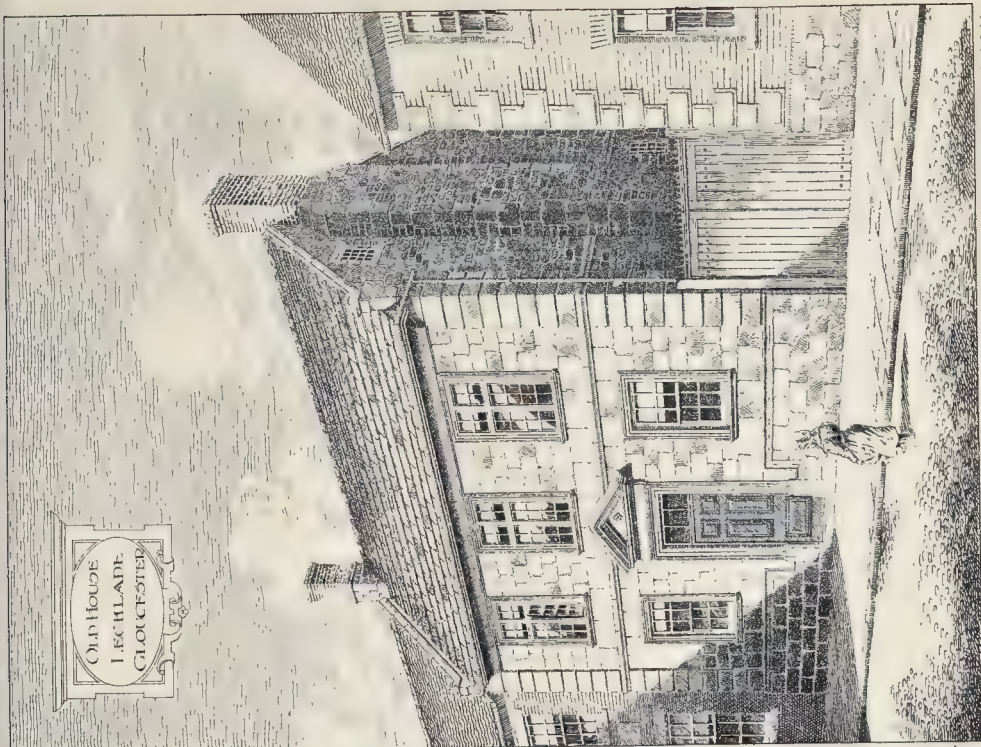


PHOTO LITHO SPRAGUE & CO. 155 EAST HANCOCK STREET KETTER LAKE, E.C.



OLD HOUSE, LECHLADE.

LECHLADE is a small village on the borders of the counties of Gloucester and Oxford.

Its chief attraction to the architect is the church and the quaint old Swan Inn, which is situated almost opposite, although this has somewhat lost its old-world charm, having been restored during the last few years.

The house shown in the illustration is a typical example of many to be found in the Cotswolds and fronts the main road. It is well proportioned, and the details are simple and good, but very appropriate to a domestic building.

In all probability the windows to the ground floor had at one time mullions and transoms similar to those on the first floor.

The front entrance has now a ledged and braced door, but what is supposed to have been the original one is shown in the drawing.

The building is now used as a store by a provision dealer in the village.

The date of erection is supposed to have been about 1707. W. Eaton, A.R.I.B.A.

BOOKS RECEIVED.

SKETCHES AND SONNETS. By John T. Cresswell, A.R.I.B.A. (The De La More Press.) BUILDING CONTRACTS, BUILDING LEASES, AND BUILDING STATUTES. By T. Bridge Matthews and W. Valentine Ball. Fourth edition. (Butterworth & Co.)

Correspondence.

THE THAMES OCEAN WHARF PROJECT.

Sir,—Referring to the remarks in your issue of November 24, under the heading "Notes," protesting against the intention to build the wharves of timber on account of its inflammability, and liability to injury by sea worms, and also decay, perhaps it would interest your readers to know that all these dangers were very carefully taken into consideration when the engineers intended to use West Australian Hardwood, which is non-inflammable, of great durability, and a resister of the sea worm.

With regard to the reference to the disastrous fires on the Thames, in New York Harbour, and Antwerp Docks, the presumption would be that the kind of timber to be used, which is mislabeled, as Jarrab, the timber specified, has been very extensively used for the building of wharves, piers, and bridges in Australia and other parts of the world, and has stood the test for over sixty years. In no case has any damage been done by fire, and moreover these structures, which are in semi-tropical and tidal waters, where the sea worm is very fierce, are in excellent preservation to-day. MILLARS' KARRI AND JARRAB COMPANY.

** We grant the admirable qualities of the woods in which our correspondents are commercially interested, and their superiority to more flammable and less durable varieties of timber. At the same time it must be perfectly evident that no vegetable product can approach refractory mineral substances in resistance to fire, decay, and destructive influences generally. Hence timber is inferior to concrete-steel, and, further, a timber wharf with numerous joints and bolt-holes is inferior, not only in durability, but also in rigidity, to a concrete-steel wharf of monolithic construction throughout.—Ed.

CHEAP COTTAGES.

Sir,—With reference to Messrs. Gregg & Detmar's pair of pretty cottages, published in your issue of December 1, which they state were built for the sum of 379*l.* 19*s.* 6*d.*, I think this amount is even yet too high when you take into consideration the additional cost of architects' fees and prices of land, because Mr. Rider Haggard, in his "Back to the Land" articles, published some time ago in a London daily paper, wrote (if I remember rightly) that the cottages cost less to build than at present in order that the landlord may get an adequate percentage on his outlay, and the labourer in his turn to pay the lowest rent possible out of his scanty week's earnings. The Letchworth exhibition was supposed to demonstrate how cheaply houses can be built, but I was informed at the time by visitors from the exhibition that the internal finishings in some cases were of such an elaborate character that it is doubtful whether some of these cottages could have been built at the sums stated, which is now proved by the house supposed to have cost 180*l.*, but which in reality amounted to 230*l.* Naturally the employer of labour, building on his own land, has a great advantage, and is enabled to charge only a small weekly rent. I have no doubt that if some of the strict rural by-laws could be amended we shall yet see the day when architects will be able to design at a much smaller cost than at present. A. H. T.

The Student's Column.

ROOFS: STRUCTURALLY CONSIDERED.—XX.

21. The Complete Design of a Timber Truss (continued).

THREE more types of the rafter and tie-beam joints, illustrated on p. 402, remain to be dealt with.

Fig. 126, p. 402, represents a joint similar to that in Fig. 125, except that the heel strap is formed by two separate eyebars connected at the top by a bridge-plate secured by nuts on the forged and screwed end of the bars.

As before, the resistance of the tie-beam to shear, and the resistance of the rafter toe to crushing, are equal to 14,400 lb., leaving the strap to resist the force of 15,400 lb., which is the component of 14,300 lb. in the direction of $21^{\circ} 30'$ from the horizontal, as in Fig. 161, ante.

In this case the strap consists of two separate parts, each taking its share of the tension. Consequently, the sectional area of steel in each bar will be

$$\frac{15,400}{2} \div 16,000 = 0.48, \text{ say, } 0.5 \text{ sq. in.}$$

Making each bar $\frac{1}{2}$ in. wide, the thickness becomes

$$0.5 \div 1.5 = 0.33, \text{ say, } \frac{1}{3} \text{ in.}$$

The diameter of the bolt through the tie-beam, calculated as in Article XIX, is $\frac{1}{2}$ in., which gives adequate resistance to bending moment and shearing stresses in the metal, and does not involve excessive strain upon the end fibres of the timber. But to reduce compression across the grain to 350 lb. per square inch, the diameter of the bolt must be 2/68 in. (see Article XIX.).

The screwed end of each bar of the strap must have the effective area of 0.5 sq. in., or at least 0.53 sq. in., which is not quite given by a British Standard screw-thread of $\frac{1}{2}$ in. full diameter. As $\frac{1}{2}$ -in. screws are not in general use, a 1-in. thread should be adopted (see Table XL.).

The bridge between the screwed ends of the strap must be adequate to withstand the uniformly distributed load of 15,400 lb. on the span of 6 in.

Taking the width of the bridge at 3 in., to distribute compression over a sufficient area of the rafter surface, we obtain the requisite thickness (d) by formula (18), p. 462.

$$d = \sqrt{\frac{15,400 \times 6}{16,000 \times 3}} = \sqrt{1.4} = 1.19 \text{ in.}$$

This is the thickness at the centre of the bridge where the bending moments attain maximum value.

The necessary resistance to shear at each end is amply given by the thickness of $\frac{1}{2}$ in.

Thus, the safe shearing stress by *par. (a)*, p. 513, being 10,000 lb. per square inch, and the shear at each end of the bridge being $15,400 \div 2 = 7,700$ lb., the minimum thickness for the plate 3 in. wide is

$$7,700 \div (10,000 \times 3) = 0.256 \text{ in.}$$

If preferred, the bridge might be made of less width than 3 in., with a separate bearing-plate to guard against crushing the fibres of the rafter. But, as will be seen by Table XII., a 1-in. nut measures 1.95 in. across the corners, and for this reason the bridge could not be less than 2 in. wide. Consequently, expense will be saved by using the wider bridge.

Fig. 127 represents a joint that is by no

means a good one for the roof design now under consideration, although useful for trusses of smaller span and lower pitch.

The angle at which the heel strap is placed constitutes a compromise between the conditions necessary for resisting horizontal thrust on one hand and "kicking" on the other, and, like most compromises, is not entirely satisfactory. The angle cannot be materially reduced, because that would mean cutting a notch so deep as to impair the resistance of the rafter to a serious extent, and if the angle were increased the resistance of the strap to horizontal thrust would be greatly diminished.

If the joint were applied to our present roof, with the rafter notched to the depth of 1 in., the upper fibres of the timber would be exposed to shearing stress along a plane measuring 8 in. or 9 in. long.

Consequently, it would not be safe to take the resistance of the rafter toe, with an abutment 6 in. wide by $\frac{1}{2}$ in. deep normal to the rafter axis, at more than

$$\begin{aligned} \text{Shear} & \dots 150 \times 6 \times 9 = 8,100 \\ \text{Compression} & \dots 1,600 \times 6 \times 0.5 = 4,800 \end{aligned}$$

$$\text{Total} \dots 12,900$$

The resistance of the tie-beam against shear is

$150 \times 6 \times 16 = 14,400$ lb., as before, but the effective strength of the joint is only 12,900 lb., leaving 15,800 lb. to be resisted by the heel strap, as shown in Fig. 162. The figures can be calculated as follows:—

$$34,500 \cos 33^{\circ} 40' = 28,700 \text{ lb.}$$

$$\text{and } 28,700 - 12,900 = 15,800 \text{ lb.}$$

Assuming the heel strap to be placed at the angle of 45° deg. with the horizontal, the tensile force in that direction is ascertained as in Fig. 162, or calculated thus:—

$$15,800 \div \cos 45^{\circ} = 22,344 \text{ lb.}$$

To provide the resistance necessary the strap must have the cross-sectional area of

$$\frac{22,344}{16,000} = 1.4 \text{ sq. in.}$$

If the strap is made $\frac{1}{2}$ in. wide the necessary thickness would be $1.4 \div 4 = 0.35$ in., say, $\frac{1}{3}$ in.

The bolt through the tie-beam would have the diameter ascertained below.

By the usual rule

$$M = \frac{22,344 \times 6}{8} = 16,758 \text{ in.-lbs.}$$

and by formula (31),

$$R = 25,000 \times r^3 \div 0.7854 = 19,635 r^3.$$

Therefore,

$$r = \sqrt[3]{\frac{16,758}{19,635}} = 0.85$$

and

$$r = \sqrt[3]{0.85} = 0.95 \text{ in.}$$

Then the diameter of the bolt will be $0.95 \times 2 = 1.90$, say, 2 in.

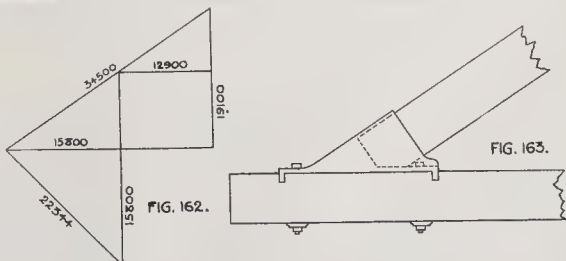
The effective bearing surface of the bolt against the timber is $6 \times 2 = 12$ sq. in., and as the horizontal component to be resisted is 15,800 lb., the compressive stress along the fibres of the tie-beam will be

$$15,800 \div 12 = 1,316 \text{ lb. per square inch.}$$

which is well within the permissible limit of 2,500 lb. per square inch.

The vertical component of 22,344 lb. is 15,800 lb., and the use of a 2-in. bolt involves the strain of

$$\begin{aligned} 15,000 & \div 6 \times 2 = 1,316 \text{ lb. per square inch,} \end{aligned}$$



which is far above the limit of 350 lb. per square inch stated in *par. (a)*, p. 513.

As it is not possible to use a bolt of sufficient diameter to reduce the stress down to the permissible limit, only three courses are open:—(1) To run the risk of splitting the tie-beam through the bolt hole; (2) to add a strap transferring part of the strain to the underside of the tie-beam so as to insure safety; and (3) to adopt some other form of joint. The last course is clearly the best, its necessity being further emphasised by consideration of the compression caused by the strap against the upper surface of the rafter.

The component of 22,544 lb. normal to the rafter is such that a bearing-plate about 10½ in. long would be required beneath the strap for the purpose of keeping compressive stress across the fibres of the rafter within the limit of 350 lb. per square inch. A plate of this length would be quite impracticable because so long a notch is out of the question at the angle here under consideration.

Fig. 128 illustrates a joint somewhat similar to that in Fig. 124, the only two points of variation being (1) that a single abutment takes the place of a double abutment; and (2) that the heel strap is secured by screws and a bridge-plate.

The resistance of the tie-beam to shear and of the rafter to compression are 14,400 lb. each, leaving the horizontal component of 28,700—14,400=14,300 lb. to be taken by the strap, in which tension will be developed to the amount of $14,300 \div \cos 56^\circ 20' = 25,800$ lb., as in Fig. 156, p. 606.

The cross-sectional area of the strap necessary for resisting this force is

$$\frac{25,800}{16,000} = 1.614, \text{ say, } 1\frac{1}{4} \text{ sq. in.}$$

Taking the width of the strap at 4 in., the thickness must be

$$1.75 \div 4 = 0.4375, \text{ say, } \frac{1}{2} \text{ in.}$$

The proportions of the screws, bridge-plates, and bearing-plates can be determined by the methods illustrated in Articles XVIII and XIX.

It is evident, however, by reference to Tables XL and XLI., that the screws and nuts would be of somewhat awkward dimensions, necessitating costly forging, with the attendant risk of weakness due to the mechanical and heat treatment of the metal.

Fig. 129 illustrates a joint with a cast-iron shoe, wherein the toe of the rafter and the end of the tie-beam are housed.

We will first consider the suitability of a shoe designed on the lines of that in Fig. 129, but modified slightly to accommodate members of the dimensions in the roof now in question.

The altered shoe is shown in Fig. 163. If the shoe were provided with only one rib at the right-hand end projecting downward into the tie-beam, shearing force in the tie-beam would be exerted along a plane 33 in. long by 6 in. wide, between the rib and the end of the beam.

Therefore, taking the safe shearing stress = 150 lb. per square inch (*par. (a)*, p. 513), we should have the resistance of

$$150 \times 6 \times 33 = 29,700 \text{ lb.}$$

Being greater than 28,700 lb. (the horizontal component of 34,500 lb.), the fibres of the tie beam are safe against shear, as the stress is only $28,700 \div 33 \times 6 = 145$ lb. per square inch.

So far as shearing stress is concerned, nothing is to be gained by the addition of the second rib projecting downward into the tie-beam. On the contrary there is a slight loss, to an extent corresponding with the thickness and width of the additional rib. But the second rib is useful for the purpose of dividing the strain over the metal used in the construction of the shoe.

Let us now see what should be the thickness of one projecting cast-iron rib, ½ in. long by 6 in. wide, for withstanding the load represented by the horizontal component 28,700 lb.

Treating the rib as a cantilever, the bending moment by the usual rule is:—

$$M = \frac{Wl}{2} = \frac{28,700 \times 1.5}{2} = 21,525 \text{ in.-lb.}$$

Then by formula (29), taking the value of f for cast iron at 36,000 lb., with 6 as the

factor of safety, the safe resistance of the rib = 6,000 lb. per square inch.

$$R = \frac{6,000 \times 6 \times d^2}{6} = 6,000 d^2 \text{ in.-lb.}$$

Then, as $M = R$

$$\text{we have } 21,525 = 6,000 d^2,$$

and

$$d = \sqrt{21,525 \div 6,000} = 1.89, \text{ say, } 2 \text{ in.}$$

A rib of this thickness projecting from a comparatively thin base-plate is likely to cause weakness at the angle of the casting owing to the fact that the thick rib would cool less rapidly than the thinner plate. Consequently, it is advisable to employ two ribs of 1 in. thick each, as shown in Fig. 163.

TABLE XLIII.—ULTIMATE SHEARING STRENGTH OF CAST-IRON.

Pounds per Square Inch.	State of Metal.	Authority.
27,800 17,900		Rankine
29,600		Stoney
29,600 7,650	Turned Rough	University College

Before finally settling the thickness of the ribs, we must ascertain whether the proposed dimension of 1 in. will be adequate for resisting shearing stress.

Close to the roof of each rib the total amount of shear is $\frac{28,700}{2} = 14,350$ lb., and as the area of metal is $6 \times 1 = 6$ sq. in., the value per square inch is

$$14,350 \div 6 = 2,400 \text{ lb., nearly.}$$

By Table XLIII. it will be seen that the shearing strength of cast-iron may be taken at 15,000 lb. per square inch. Applying the factor of safety of 2 to this value, we have as the safe shearing stress $15,000 \div 2 = 7,500$ lb. per square inch. Therefore, the proposed thickness is perfectly safe.

COURT OF COMMON COUNCIL.

A MEETING of the Court of Common Council was held at the Guildhall on Thursday last week, the Lord Mayor presiding.

Paving. The Streets Committee submitted a tender, which was accepted, of the London Asphalt Company for paving the yard at the City Mortuary with asphalt for the sum of 255l.

Safety of St. Paul's.—Mr. Thomas asked the Lord Mayor, as a trustee of St. Paul's Cathedral, if it was true that a serious subsidence had occurred. The Lord Mayor, in reply, said that so far as he knew St. Paul's was in no danger by reason of the London County Council sewer.

The Guildhall.—The City Lands Committee, reporting on a reference as to the removal from the walls and columns in the interior of Guildhall of the plaster or stucco with which they have been encrusted, recommended (1) that it is desirable to free the walls from their coating of plaster, etc.; (2) that the work of removing the plaster, etc., be proceeded with in the early part of next year at a cost not exceeding 350l. Mr. Deputy Wallace asked if it was a fact that the sandblast process destroyed the key of the stone. The City Surveyor said he considered that the sandblast process would not be suitable for the treatment of the Guildhall walls. The committee's recommendation was carried.

Shadwell Market. The Billingsgate and Leadenhall Markets Committee brought up a report relative to the utilisation of the Shadwell Market property, and recommended a contribution by the Corporation of 500l. to the Stepney Metropolitan Borough Council in respect of making up and paving a widening to 40 ft. of so much of High-street, Shadwell, as abuts upon the property of the Corporation.

WESTMINSTER CITY COUNCIL.

At the fortnightly meeting of the Westminster City Council on Thursday in last week the following matters were dealt with:—

Loans for Buildings. It was decided to acknowledge the receipt of a letter from the Newport Ratepayers' Association proposing legislation to enable the repayment of loans for all buildings of a practically indestructible character to be extended over a period of eighty years.

Rebuilding of Westminster County Court.—It was resolved to address H.M. Board of Works and the Treasury to the effect that the Council were strongly of opinion that if the Westminster County Court is built wholly on the existing

site it will not be adequate to meet the requirements of the district, and expressing the hope that they will give further consideration to the proposal to increase the area of the site.

Widening of Wardour-street.—The efforts of the Surveyor to acquire property in Wardour-street for the widening of the thoroughfare having proved unsuccessful the Improvements Committee recommended that the Council forthwith proceed to widen the street by setting back No. 105 and to acquire other property scheduled under the terms of the Statute.

Further Strand Improvement.—It was decided, after some discussion, to inform the Further Strand Improvement Committee that the Council were not in agreement with their proposal to erect a hoarding in order that the public may realise what would be the effect of building on the present line of frontage as proposed by the London County Council on the eastern side next to the Strand.

THE LIVERPOOL COTTON EXCHANGE.

THE new cotton exchange, which was illustrated in the *Builder* for July 9, 1904, stands on an island site of more than an acre in area, having streets on all four sides. The main facade fronts Old Hall-street, and is carried out in Portland stone. The style of the architecture is Classic, the Doric order being used in the lower portico and the Ionic order in the upper colonnade, which masks the roof of the great hall and connects the towers which flank the building. The towers are enriched with sculptured figures at the angles, symbolical of the arts, science, industry, commerce, etc. The two crowning figures represent the river Mersey and the ocean. The elevation towards Edmund-street is carried out in steel encased in ornamental cast iron. This form of construction was devised by the architects to meet the requirements of the cotton trade, in which a maximum amount of light with a minimum of obstruction is necessary, so that the quality of the cotton may be accurately judged. The Bixteth-street facade is faced with Portland stone, and the elevation to Ormond-street with grey sand-faced and white glazed bricks. There are entrances on all four sides, with contiguous staircases, and twelve electric lifts, three of which are reserved for messengers and cotton samples. The principal feature of the interior is the main hall or exchange. There are seventy-four moulded royal pearl granite columns, which were quarried in Norway, shipped to Aberdeen, where they were turned and polished, and then shipped to Liverpool. The ground floor columns are of the Doric order, and those of the gallery of the Ionic order. The caps and bases are of Bleu Belge marble, and the balustrades of the galleries are of cipollino and antique. The moulded architraves of the door openings and the entrance porches are in Italian Mazzano cream-coloured marble. The entablatures and cornices are executed in Portland stone from the base bed. The walls are panelled in Spanish mahogany, finished with a carved cornice above that the walls are finished with French plaster, which is also used for the large ornamental ceiling over the central area. The floor is laid with Australian jarrah wood blocks, keyed together and bedded in an asphalt composition. The surrounding steps are in French Eschallion stone, which was adopted on account of its non-slippery surface. The floor of the upper floors is covered with rubber flooring in 2 ft. 6 in. squares with black diamonds at the intersections. The angle fireplaces are in mazzano. The dimensions of this large hall are 140 ft. long by 165 ft. wide. The side wings are occupied by telephone boxes, post, telegraph, and cable offices. Synchronised electric clocks are fitted throughout the building. Beyond the hall are the members' smoke and reading rooms, panelled in Italian walnut, with a polished oak floor. From the gallery access is gained to the anteroom, boardroom, secretary's room, and committee-room. The boardroom is panelled to the ceiling in wainscot oak. It has a mantelpiece in Mezzano, and ornamental plastered ceiling. The boardroom table and other furnishings are to be in dark polished walnut. The clearing-house and bank are situated on the first floor next Ormond-street. On the sixth floor are placed the arbitration and appeal rooms, with a north-east light. The remainder of the various floors are occupied by suites of cotton offices and salerooms. The building is lighted throughout by electricity. The fresh air is brought in, is filtered and washed, and passed over heating-coils in winter, and propelled into the large hall by powerful electrically driven fans. The fresh air, which is cool in summer and warm in winter, is concentrated at the cotton ring where the crowd of traders congregates. The exhausted air is drawn away through the perforated risers in the steps of the pit and through other openings, and is expelled by a 20 horsepower fan up the main shaft above the roofs. Fireproof construction is used throughout the building, and fire mains and hydrants are placed in several positions. The building and its fittings have been designed by Messrs. Mearns & Simon, architects, Liverpool, the Waring White Building

Company, Ltd., of London, being the general contractors. The heating and ventilating has been carried out by Messrs. Ashwell & Nesbit, Ltd., of Leicester, under the supervision of their engineer, Mr. Taylor. The Northern Electrical and Ventilating Company of Liverpool have carried out the electric lighting, under the supervision of the consulting electrical engineer, Mr. Alfred H. Gibbings. Messrs. Waring & Gillow, Ltd., Liverpool, have executed the wall panelings and the ornamental joinery. Messrs. A. & F. Manuelle, of London, are responsible for the granite columns and marble work, the balustrades and mantelpieces being executed by Messrs. Emley & Son, Newcastle-on-Tyne. The constructional steel work was in the hands of Messrs. Edward Wood & Co., Ltd., of Manchester, and carried out from the detail drawings and under the superintendence of Mr. Henry S. Woodhouse, C.E., of Liverpool. Messrs. Walter Macfarlane & Co., of Glasgow, executed the ornamental cast-iron work of the Edmund-street and internal facades. The Fram Fireproof Flooring Company executed the fireproof floors. The figure and decorative sculpture has been ably executed by Mr. Birnie Rhind, R.S.A., of Edinburgh, and Mr. E. O. Griffith, of Liverpool. The ornamental plaster work was in the hands of Messrs. Henry Johnston & Sons, of Liverpool, the modelling being done in their shops by Mr. Stenborn. The wrought-iron work of the lift enclosures, the large ornamental ceiling of the exchange hall, and the lead light glazings throughout were executed by Messrs. George Wragge, Ltd., of Salford. Mr. Joseph Ebner and the Acme Wood Block Flooring Company laid the wood-block floors. The terrazzo floors were executed by Messrs. Diepolder, Limited, of London, and the wall tiling by Mr. G. Swift, of Liverpool, also Messrs. Martin Van Straaten and Messrs. Doulton & Co., of London. The latter firm are also responsible for the sanitary fittings. The lifts have been executed by the Easton Lift Company, of London, and the metal cases by Messrs. Henry Hope & Sons, of Birmingham. The rubber flooring of the colonnade was executed by Messrs. George MacLellan, of Glasgow, under the supervision of Mr. R. H. M. Taylor. The furnishings of the smoke and reading rooms are being supplied by Messrs. Maple & Co., of London, and Messrs. Waring & Gillow, Ltd., are supplying those for the boardroom. The bank and clearing-house, as well as the arbitration and appeal rooms, were fitted up by Messrs. W. A. Peters & Son, of Rochdale. Messrs. Ockleston & Drayton, of Liverpool, have executed the iron sliding gates across the portico at night. The tickers and electric clocks have been installed by the Private Wire and Telephone Installation Company, of London, and the telephone installation has been in the hands of the Telephone Company. Messrs. Hurrell & Taylor, of Liverpool, were the quantity surveyors.

MARYLEBONE BUILDING COLLAPSE.

On the 3rd inst. Mr. Schroder resumed the inquest at Marylebone on the body of Mrs. Millie Ellen Loomes, 46, who was killed by the collapse of The Grosvenor Hotel, on November 22. The deceased was employed as caretaker of the two houses, and at the time of the collapse she was the only person in the buildings. Mr. Syper appeared on behalf of the owner of the adjoining property; Mr. Carter represented the London County Council; and Mr. Freke Palmer for the builder, and the relatives were also represented. Police-Inspector Jefford said soon after the collapse had taken place he found that there were cracks in the walls of No. 9 and No. 12, the adjoining houses. He sent for the fire brigade and other assistance, but he refused to allow any attempt at rescue until the adjoining buildings had been made safe. He had not done so it would have been seriously endangering the lives of the rescuers. The witness did not think that an explosion had occurred.—Answering Mr. Palmer, the witness said that owing to Edgware-road being up some of the heavy traffic had been directed along Molyneux-street. The witness had not heard the building had fallen since the occurrence in Seymour-place, which was close by. Walter James Edney, builder, of Hereford-street, Lisson-grove, stated that on October 2 he received instructions to raise the top floor of 12 and 13 by about 18 in. in order to bring the height of the room to 8 ft. 6 in. as required by the London County Council regulations. This necessitated the putting on of a new roof of lead, slate, and wood. At the time of the collapse the work was complete with the exception of slating one of the roofs. The witness could not estimate what the weight of the added portion would be, but he knew that two tons of lead were used on the roofs. New drains had also been laid, and this was complete with the exception of one of the back gardens. No excavations had been made under the houses, the pipes being laid 2 ft. below the surface along a passage way. Altogether he took about 100 loads of rubbish from the yards of the houses, and he thought about 30 or 40 tons came from the houses themselves.

He did not think the removal of the rubbish would affect the stability of the houses. Each load of rubbish would weigh about a ton.—A Juror: What do you consider the cause of the collapse?—I think it was because the party-wall between Nos. 10 and 11 was not strong enough to support the building on either side. The party-wall was about 100 years old. It was not under-pinned, or otherwise interfered with, during the building operations. There was nothing to indicate that the wall was defective.—Samuel Thomas Edney, son of the previous witness, said that the raising of the roof would throw a little extra weight on the party-wall. Before any work was commenced the regulations made by the London County Council were complied with as regarded the shoring of the houses. He was unable to give an opinion as to the cause of the collapse of the building. No sand or ballast was taken from the house.—A foreman bricklayer engaged on the work estimated that the added brickwork would weigh about 3 tons, and the weight would be distributed. The centre or party-wall would take double the amount of weight than the other walls.—Mr. Phillips, the architect engaged in connexion with the repairs, said he had examined the buildings before the proposed work was commenced, and considered that there was no reason why it should not be carried out. He frequently visited the premises whilst the work was in progress, and saw nothing to suggest that a collapse was likely to occur. The extra weight thrown on the party-wall would be about 2 tons. He considered that the builder had carefully carried out all the directions given him. In answer to the coroner the witness said it would have been dangerous to attempt to rescue the deceased woman earlier than the attempt was actually made.—Mr. Arthur Ashbridge, District Surveyor, said the builder carried out all the requirements of the London County Council. The party-wall showed no indication of defect. It was strong enough to support the added weight. He was of opinion that it was the unusually heavy rains experienced lately, followed by a cold and exceptionally long and dry summer, that caused the subsoil under the party-wall to become moistened by the rain which fell on the back yard and ran through the trench. This caused the wall to sink and collapse.—After some deliberation the jury returned a verdict of "Accidental death" and attached blame to no one.

General Building News.

PRIMITIVE METHODIST CHAPEL, PLYMOUTH.—A Primitive Methodist chapel and schoolroom is to be erected on a site at the junction of York-street and Cobourg-street, Plymouth. The premises will be built in the Gothic style, with limestone facings and freestone dressings, and there will be accommodation in the chapel for about seven hundred worshippers. Messrs. A. R. Lethbridge & Son are the contractors; and the joint architects are Mr. H. J. Snell and Messrs. Thornely & Rooke, of Plymouth. The total cost of the undertaking is estimated at 9,000l.

CHAPEL IMPROVEMENTS, DERBY.—After being closed for several months for structural alterations and improvements, the King-street Chapel in Derby was recently re-opened. The architect for the work was Mr. Alfred Hendy. The cost, which is estimated at 2,200l., covers the provision of a new entrance-staircase and lobby, removal of new doors, improvement of the heating, lighting, and ventilation, provision of a rostrum, and two vestries underneath.

WESLEYAN SCHOOL, BENWELL.—The new school erected in Atkinson-road, South Benwell, by the members of the Paradise Wesleyan Methodist Society, was opened a short time ago. Including the value of the land, the cost of the undertaking now completed has amounted to nearly 3,000l. The contractors for the work were Messrs. E. & A. Storey, of Benwell; and the designs were prepared by Mr. F. Marshall Dryden, architect, of Newcastle.

DEAR DROGHDA TRAINING COLLEGE.—In connexion with the Diocesan Training College for Schoolmistresses, on the Uttoxeter New-road, Derby, additions to the building have just been opened by Mr. Victor Cavendish, M.P. The new buildings, which are of brick, comprise schools, a laboratory, halls of residence, and classrooms. The total cost of the buildings has been about 13,000l. The old practising schools have been thrown into the college, and in consequence, accommodation has been made for 130 students, or forty more than previously. The old schools have been altered and converted into lecture and classroom, and a physical laboratory has been added. The lighting, heating, and ventilation have received special attention. The sanitary arrangements have also been overhauled, and a villa at the west end of the block has been purchased and converted into a hall of residence. A large piece of land has been added to the lawn at the rear of the college. The new practising schools have been

built upon land adjoining the college, and will accommodate 200 girls and a like number of infants. There are two central halls, one upon each floor, and a room has been specially set apart for the very young scholars. The new schools have been erected at a cost of 10l. per scholar. The architects for the work have been Messrs. Currey & Thompson, of Derby.

MISSION ROOM, SOVEREY BRIDGE.—A new mission room is to be erected at Eye Nest. Messrs. Jackson & Fox, architects, have prepared the plans of the new structure, which will cost about 850l., exclusive of furnishing. Local stone will be used for the exterior of the building, which is to consist of a mission room to seat 260. It will be provided with a gallery. On the same floor will be two classrooms. Being on a sloping site, it is proposed to utilise the basement for a recreation-room.

MEMORIAL INSTITUTE, HARTLEPOOL.—On the 21st ult. the new Sunday-school and Institute, erected on the site of the old Sunday-school buildings adjoining the Northgate Wesleyan Church, in memory of the late Mr. George Horsley, J.P., were opened. The building comprises on the ground floor a hall with seating capacity for 250 persons, and adapted for the purposes of a gymnasium, classrooms, ladies' parlour, etc.; and above a larger hall, capable of accommodating 500 people, and so arranged that by the use of sliding screens it may be divided into classrooms. A caretaker's house is attached. Messrs. H. Barnes and Chas. F. Burton, of West Hartlepool, were the architects; and Mr. E. M. Tweddle, of the same town, the contractor.

NEW INFIRMARY, KINGSTON-BY-SEA.—The new infirmary buildings, erected for the Steyning Board of Guardians at Kingston-by-Sea, have recently been completed. Messrs. Clayton & Black, of Brighton, were the architects. The buildings are of stock bricks, with red tiled roofs. The main buildings are in four blocks, to accommodate 240 persons: every block has a ward on the ground floor and one exactly similar on the floor above, each containing thirty beds. These buildings run from north to south and have a southerly aspect from the wards. The floors are of polished maple wood blocks, while the corridors are of terrazzo mosaic paving. The walls are of an emerald tint, the dadoes being of apple-green glass tiles. There is a day-room in every ward for the patients, and another for the nurses. The maternity ward is a one-story structure. There is a small isolation block in the extreme north-east of the grounds, containing two beds. A mortuary has also been provided, and provision has also been made by means of a padded room for occasional cases requiring such treatment. The nurses' home, which has a southerly aspect, is in three stories. A corridor runs the length of each, the apartments opening into each one. Provision has been made for twenty-four nurses, but only the first two floors will be utilised at first. An emergency exit with iron fire escape stairs has been provided from every ward.

Appointment.

ST. PAUL'S CATHEDRAL.—Mr. Macnulty, the architect to St. Paul's Cathedral, makes the following communication to the Press:—"Having now submitted my report on the condition of St. Paul's Cathedral, the Dean and Chapter, in view of the grave importance of the matter, have decided, on my recommendation, to invite Mr. T. E. Collcutt, the President of the Royal Institute of British Architects, Sir Aston Webb, R.A., and Mr. John Belcher, A.R.A., to form a committee of inspection as to the condition and circumstances of the structure.

Sanitary and Engineering News.

BRIDGE RECONSTRUCTION, BRAEMAR.—The bridge which crosses the waters of Churny and connects the Auchindrine portion of Braemar with the Castleton side is about to be reconstructed. Under the scheme of reconstruction the existing features of the bridge—chiefly a stone arch having a span of 40 ft.—will be retained. The present width of the roadway averages 16½ ft. Under the scheme of reconstruction a clear roadway of 21½ ft. in width will be provided. The contract for the work has been placed in the hands of Messrs. Littlejohn Brothers, builders, Ballater and Aboyne. The material to be used will be the grey granite of the district and cement mortar. The engineers for the undertaking are Messrs. Walker & Duncan, C.E., Aberdeen, who have prepared the plans and specifications. **ULSTER WATER SUPPLY.**—The Yorkshire Henebique Contracting Company, of Leeds, have undertaken to erect two water-towers of ferro-concrete, at Gascoigne Wood and Milford Junction, for the North-Eastern Railway

Company. The tank at Milford, holding 20,000 gallons of water, 8 ft. deep, will be carried by six columns, 30 ft. high, resting upon ferro-concrete piles, 1 ft. square in section. The tank at Gascoigne Wood, with a capacity for 60,000 gallons, 12 ft. deep, will be similarly constructed of ferro-concrete. Mr. W. J. Cudworth, of York, chief engineer, southern division, North-Eastern Railway, is director of the works.

SEWER SMELLS IN LONDON.—The Works Committee of Kensington Borough Council issued on Saturday last a report which they had received from Mr. A. R. Finch, the Borough Engineer and Surveyor, in regard to sewer smells. After going into the question fully from a local point of view, the report proceeds as follows:—"The question of sewer smells has hitherto been regarded by sanitarians as chiefly, if not entirely, a question of ventilation, and shaft ventilation in lieu of surface ventilation is now persistently advocated; as a matter of fact this suggested expedient is simply a supposed method of passing the smell on and provides no real remedy. Engineers practically acquainted with the construction of sewers know very well that the deeper a sewer is below the surface the more difficult it is to ventilate; it may be assumed that the gases become chilled in the long shaft, and in the absence of an artificially-induced current cannot rise freely. By placing a shaft 40 ft. high to ventilate a sewer 20 ft. deep the depth of the sewer for ventilating purposes is 60 ft., and there can be little doubt that many ventilating shafts so called are corked up with a long stopper of stagnant air, and consequently simply act as safety valves in times of abnormal pressure and are not ventilators in the proper sense of the term. Shafts, although a useful adjunct to, can never wholly supersede, surface ventilators as a system of ventilation by natural means. So much has been said on the question of sewer ventilation that I shall content myself by saying here that in my opinion there is no known system of sewer ventilation which is practicable in the Metropolitan area which will remedy sewer smells. The question is not a small one to be answered by the general application of palliatives; sewer smells must be prevented rather than cured; it involves no less than the important questions of the sewerage system and the water supply of London. It is a matter of almost common observation that by a heavy rainfall sewer smells are not only cured for the time being, but their recurrence is prevented for some days; this is a practical demonstration that the sewers require flushing and cleansing, not only ventilating. The effluvium is given off by the dirty, exposed surfaces of the sewers, and when a flood rushes through the sewers, the fruitful cause of which sewer smell is the effect, is washed away. Flushing and cleansing, in addition to ventilating, is the potent remedy for sewer smells, but with the existing system of sewerage and the present limited available supply of water this remedy is impossible of application; even if the cost of the water were not prohibitive a water famine would soon be made imminent in London by the effective application of sewer flushing. A supply of water ever available for all sanitary, as distinct from domestic, purposes should be available in London. There is only one source which, so far as I am aware, could be drawn upon for this purpose—the sea. What is wanted is a bountiful supply of sea water laid on to London. The systematic flushing and cleansing of sewers could then be made obligatory upon local sanitary authorities. With regard to the sewerage system of London having an important bearing upon this question, there can be no doubt that if London were drained on a dual system, that is, one system of comparatively small sewers (many miles could be pipe sewers) for the carriage of ordinary sewage, and another system of large culverts for storm water, the problem of flushing and cleansing would be appreciably simplified and the volume of sewer gas which under any circumstances could be generated would be minimised. It will, I think, be gathered from the foregoing very brief remarks that in my judgment a certain modicum of sewer smells must be accepted in our streets whilst the present system of sewerage obtains, and the only available supply of water is wholly potable. Drain smells no longer exist in our houses because of a nicely-adjusted system of flushing, cleansing, and ventilation; the same principle must be applied out of doors. With a dual system of sewers and a supply of sea water, London would be not only one of the healthiest cities, but one of the healthiest places in the world. A solution to the most pressing question of the immediate future, the problem of the water supply of London, would probably be found by the provision of a secondary supply for sanitary purposes, and with separate storm-water sewers the flooding of basements would be prevented, and in my judgment it will only be by the realisation of the reforms indicated that sewer smells will or can be wholly abolished."

COMBINED DRAINAGE.—Recently a number of the Metropolitan Borough Councils, at the instance of the Poplar Borough Council, applied to the London County Council, urging them (a) to insert a clause in their next General Powers

Bill dealing with the question of combined drainage in a satisfactory form; and (b) to consider in this connection whether the object in view could not be obtained by following the precedent of the Corporation of West Ham, who obtained a definition of the word "drain" in their Act of 1898. A reply has now been received from the Clerk of the London County Council pointing out that the Council had on many previous occasions endeavoured to obtain legislation upon the subject, but without success, owing to the fact that such legislation would constitute an amendment of the Metropolitan Management Acts. They therefore regretted, in view of their previous experience, that they cannot see their way to take any further steps in the matter.

PROPOSED SURFACE WATER SEWER, SLOUGH.—Mr. R. H. Bicknell, M.Inst.C.E., an Inspector of the Local Government Board, recently held an inquiry at the Council Offices as to the application made by the Urban District Council of Slough to the Local Government Board for sanction to borrow 1,555l. for the construction of a surface-water sewer from Upton-road to Langley-stream. Mr. W. White Cooper (Surveyor) gave particulars of the scheme.

APPOINTMENT OF SANITARY OFFICERS.—The Local Government Board have sanctioned the appointment of Mrs. A. C. Young and Miss M. Fitzgerald as additional sanitary inspectors of the Metropolitan Boroughs of Islington and Woolwich respectively.

Foreign.

FRANCE.—A statue of Ste. Geneviève has been inaugurated in the Church of Saint Denis de la Plaine, by M. Pichon, the sculptor. It is proposed to make use of the Hôtel de Rohan for the keeping of the National Records. It was formerly in use as the Imprimerie Nationale.

—A statue of Flaubert, by M. Bernstamm, is to be erected in a public place in Rouen. An abattoir, with an installation of freezing-chambers, is to be built at Angers, at an estimated cost of 1,200,000 francs.—Important works, including a Hôtel de Ville and a hospital, are to be carried out at the Sables d'Olonne.—A sum of 2 million francs has been voted for the rebuilding of the theatre at Nancy, recently burned down.

—A college for girls is to be built at Belfort.—M. Aynard, Deputy of the Département du Rhône, has purchased the ancient abbey of Montbard (côte d'Or), founded in the XIIIth century, and connected historically with the name of St. Bernard. The abbey buildings include a fine cloister of the XIIIth century. The buildings are to be "restored" (two regret to learn) and kept carefully in repair subsequently.

—A competition has been opened for a new Savings Bank at Vesoul.—The Government has classed among the Monuments Historiques the cathedral of Viviers, which dates from the XIVth century and possesses a remarkable tower.—The archaeological museum at Nîmes has received in addition to its collection a tomb dating from early Christian times, and decorated with sculpture in relief.—At Nîmes also there has just been inaugurated a monument to the memory of the architect Revolt. The monument, which is the work of MM. Albert Ballu (architect) and Belloc (sculptor), consists of a bust of Revolt on a stele, against which is placed a figure symbolising "L'Architecture Romane."—A school of Commerce and Industry is to be established at Bordeaux.—M. Guillaume de Saint Cyr, architect, has been commissioned to carry out a large casino at Mentone.—The Cercle Artistique of Nice proposes to form a special exhibition of the works of Fragonard, on the occasion of the inauguration, at Grasse, of the monument raised to the memory of the painter.—The remains of a feudal château of the XIIIth century have been discovered at Dionay, near Saint Marcellin, as well as fragments of arms, and some pottery and jewellery.—The Municipality of Aix-les-Bains have passed a vote for the building of a new Mairie at a cost of 470,000 francs.

—A small museum of Archaeology has been established at Lisle-sur-Tarn.—The death is announced, at the age of thirty-eight, of M. Auguste Arbeau, member of the Société Centrale des Architectes. He was architect of some important industrial buildings, in particular of the factory of the Mors Electricity Society, and of other buildings in the provinces.

GERMANY.—In his address to the Society of Architects, Mannheim, Professor Karl Widmer said that the stagnation in the development of a XIXth century style was only the symptom of universal disintegration of artistic culture. Modern technique was the cause of a disruption between art and craft, and the result was a speed with which modern towns grew up, turned architecture into a sort of manufacture produced by the mass. The only way in which a new style could be developed was by drawing art from her isolation, and giving her legitimate position in the midst of the advancing culture of our age. Style was in ancient times the fruit

of joining art and life, and might still be produced by that union only.

SWITZERLAND.—The strong measures adopted by Switzerland show that she is in earnest in by safeguarding her scenery. Several districts have decided to give up all business posters and advertisements which hitherto have disfigured their neighbourhood, and in the diet of Canton Uri the well-known author, Ernst Zahn, has proposed a measure which will forbid every sort of advertisement injuring the landscape, and will order the removal of existing eyecoses. Professor E. Gladbach, of Zurich, has published book on "Swiss timber houses" from the XVIIIth—XIXth centuries. Besides elevations and perspective views, the book is rich in constructive details, plans and sections, so that all the peculiarities of Swiss timber architecture of the last three centuries are illustrated.

SOUTH AFRICA.—Mr. J. Adams, architect, invites tenders for the erection of an hotel and store at Ereylingstad.—In Cape Town the contract has been signed with Messrs. A. B. Reid & Co., for the erection of the eastern portion of the new cathedral. The Architectural Appeals Board has granted a reduction of 10 per cent. for a sum of 16,000l. to enable the committee to complete the transepts also.—The men engaged in the construction of the Rhodes Memorial, near Grootte Schuur, have settled their labour troubles, owing, it is stated, to the good offices of Messrs. Baker & Massey, the architects.

Miscellaneous.

PROFESSIONAL AND BUSINESS ANNOUNCEMENT.—Arrangements have been completed for the amalgamation of the firms of Jessop & Appleby Bros. (Leicester and London), Ltd., and the Glasgow Electric Crane and Hoist Company, Ltd., under the style of "Appleby's, Ltd.," as makers of giant cranes, shipbuilding berth equipments, lifting appliances of all types, and powers, etc., with head offices at 56, Victoria-street, S.W.

METAL LADDER TAPE.—This is the name given to a new form of expandable metal made by the Metal Ladder Tape Company, of Birmingham. The material is produced from $\frac{1}{2}$ in. by No. 24 gauge steel strip by making incisions in a diagonal direction and extending nearly from one side to the other. After treatment in this way the tape is coiled up in lengths of 300 ft. each. Before use it has to be expanded by pulling the sides of the strip in opposite directions, thus causing the metal to assume the form of a ladder-like bar, 1 in. deep with the mean width of about $\frac{1}{2}$ in. To facilitate the operation of expansion a simple apparatus is supplied by the makers. When expanded and embedded in plaster or cement mortar the tape constitutes reinforcement of sufficient rigidity to render unnecessary the steel rods or bars that are usually employed in plaster partitions built up on a basis of metal netting. In forming partitions, uprights of the expanded tape are stretched tight and secured by staples at intervals of from 12 in. to 18 in. apart, and horizontal strips are interlaced at distances of from 4 in. to 6 in. apart. The meshwork of tape is then ready for plastering, which is performed in the usual manner. Metal ladder tape seems to be a convenient and useful variety of reinforcement for thin partitions and similar structural details. The two sides of the "ladder" are virtually compression and tension flanges securely connected by web members represented by the "treads." We must point out, however, that even when applied with the smallest recommended spacing of 12 in. by 4 in. the non-reinforced area of plaster measures 24 sq. in., whereas by employing expanded metal or other types of network every square inch of the plaster can be adequately reinforced and therefore more effectively protected against accidental injury and surface cracks.

ART UNION OF LONDON.—The Art Union sends us a proof of the large plate issued this year to their subscribers; a pretty picture of a child with a dog engraved in mezzotint by Mr. E. M. Hester, from the painting by Mr. W. R. Symonds. As an example of mezzotint engraving the work is very good, but the plate is far larger than the subject is worth.

A NEW BAR FOR FRONT DOORS.—Messrs. Chittenden & Co. send us a specimen of their locking bar for front doors, the special advantage of which is that it can be locked from the outside when leaving the house. It consists of two steel bars connected to an Edwards patent bolt-lock fixed to the centre stile of one of the doors. Under ordinary circumstances the ends of the two bolts just clear the door frame. On a double turn of the lock, which can be made by a key from the outside, the two bars are shot into slots or hasps in the door-posts. The bolt can be withdrawn by both hands from the inside, and by the key from the outside. When the latch of the household retires for the night, only one half of the bolt need be shot if so desired. By doing this the door becomes impenetrable from the outside, as the key will only work when the two bolts are together bolted or unbolted. This patent bolt-lock

stocked in a size suitable for 38 in. doors, but the doors are narrower, a corresponding one must be cut from one of the bolts, or if the y-plate is preferred in the exact centre of the or, a suitable piece cut from each bolt. This adjustment is easily made when the lock is fitted. It appears to be a very good and useful invention. It was presented to the Liverpool University, at a meeting of the 30th ult., decided to establish a degree of Bachelor of Architecture (B.Arch.). Vice-Chancellor Dale, in moving the adoption of the degree, said it had been decided to arrange for a course of study for this degree, including practical work, to extend over less than five academic years; further, that the University all grant diplomas and certificates in architecture. So far as he knew, Liverpool was the first British University to include architecture in its course for the Bachelor of Arts degree, and they were now the first British University to try the experiment of establishing a separate and special degree for students in architecture, with the object of giving such students the scientific and historical knowledge they needed to build upon that foundation of the superstructure of professional and technical knowledge.

ROYAL SOCIETY.—Lord Rayleigh has been elected President of Council for 1906-7, amongst the members of the new Council is Benjamin Baker, K.C.B.

CITY LIEUTENANT.—At their first meeting, held on November 30, the Lieutenant appointed Mr. Herbert Shoppee as Surveyor to the City.

A NOVEL WHITEWASHING MACHINE.—The latest application of mechanical whitewashing is that devised by Mr. G. C. Cunningham for the Metropolitan London Railway tunnels, which are periodically treated with a coat of whitewash. The frame is fixed at one end of a motor-driven car containing a white-wash tank of some 800 gallons capacity and an electrically-operated pump by which the liquid is forced to a distribution cylinder connected with the radial pipes. By running the machine at the rate of about four miles an hour both the top and bottom of the tunnel are treated with a coat of whitewash in one night, three successive coats being considered necessary for the efficient protection of the metal.

BURDON'S CAMBERED FLOORING GIRDERS.—As the name implies, these girders are cambered in the manner practised by all bridge builders, but with the additional feature that they are designed so as to be readily bolted together in pieces, and are fitted with a screw at the centre of the compression flange, by which the degree of camber can be increased or reduced at will. Usually supplied, the girders are built with web plates in short lengths and spaced at such intervals as to permit timber or other floor joists to be passed through the openings, continuous web plates being fitted when joists have not to be applied. One special advantage claimed for the cambered girder is that for floors up to 10 ft. span, the supporting members need be no deeper than the thickness of the floor, thus obviating the need of beams, girders, or other heavy timber. Another point is the facility with which girders for large floor spans can be put in position during the construction of the building, being hoisted in separate parts, built up *in situ*, and finally adjusted by means of the screw.

THE GRIFFIN-GOREHAM FLOUROMETER.—Some time ago we printed an account of the Gorchow florometer, a form of apparatus devised for the purpose of separating and measuring the impalpable dust or "fleur" contained in samples of Portland cement. Although sifting is useful for the purpose of enabling the architect or engineer to discover that some cements are inferior to others, the process cannot differentiate between two or more samples of cements which have all passed through a sieve of given fineness. As the cohesive power of a cement depends very largely upon the proportion of fine material contained in it, it is important that quantitative determinations should be made by all who are concerned with the selection of a cement for structural purposes. The fundamental principle of the florometer is extremely simple. A weighed quantity of cement is placed in the apparatus, and the flour is separated by a current of air, the weight of the residue thus gives a direct estimate of the proportion of flour present in the original sample. The Griffin-Goreham Florometer has been introduced with the object of overcoming certain inconveniences experienced by those using the original apparatus, and is almost automatic in operation. A weighed sample of cement is placed in a funnel-shaped receptacle, the foot of the florometer, the end of a simple aerometer, connected by a rubber tube with the stopcock at the foot of the florometer, is raised to its full extent,

and when the stopcock has been opened a current of air is forced through the cement. At the expiration of about ten minutes all the flour has been carried away to a receptacle which is fitted with a trap, effectually preventing the passage of dust into the laboratory, while the residue of the cement falls by gravity into a removable glass tube at the foot of the apparatus. In making subsequent tests it is only necessary to replace the residue receptacle and to proceed as before. It is claimed that, as compared with instruments of the original type, the new florometer effects a saving of thirty-five minutes per test, in addition to the saving of time due to its semi-automatic action.

PROPOSED NEW THAMES EMBANKMENT.—The Thames Conservancy Board, at its meeting on the 3rd inst., received a report from the Lower River Committee to the effect that the London County Council had submitted an amended plan for the Embankment wall at the site of the County Hall on the Surrey side, below Westminster Bridge. The London County Council desired an assurance from the conservators that they would in due course grant a licence for an embankment on the new line. The engineer to the Conservators suggested a modified line of frontage which, in his opinion, would not be objectionable, and the meeting resolved without debate to grant the necessary licence if the London County Council were prepared to conform to the suggestions of the engineer.

A NEW WOOD-WORKING TOOL.—An improved type of Elephant machine, which can readily be fixed to an ordinary vertical spindle moulding machine and driven without additional power transmission gear, has recently been placed on the market by Messrs. Bastin & Co. We have had an opportunity of inspecting the appliance in operation at the works of Messrs. Grace & Marsh, builders, Croydon, and, therefore, are in a position to endorse the claims made for it by the patentees. The main frame of the Elephant is fitted with runner wheels, serving as pivots, on which the machine can be swung clear of the moulding machine, and generally facilitating its adjustment in the required positions. One feature of the appliance to which special attention may be called is that the boring spindle can be set to work either vertically, horizontally, or at any desired angle, and for this reason the operator is able to perform various kinds of work that would otherwise be out of the question. To illustrate the universal character of the Elephant we mention a few out of the many uses to which it is adapted:—Boring at any angle, plain or rounded stop chamfering, moulding or chamfering pierced tracery work or any shaped rib either on the face or the edge, moulding handrail ramps or quadrants to any section, sinking and moulding foliated or circular panels, sinking and mortising for ash frame pulleys, housing and trenching shelving, standards, divisions, and chair strings by special tools and templates, and shaping the nosing of stair treads in one handling. The operation of changing the position of the machine can be performed very quickly, and when swung back from the vertical spindle machine it does not occupy more space than when in the "on" position. The machine is strongly made, and runs without perceptible vibration. As an addition to the mechanical equipment of builders', joiners', and cabinet-makers' works the improved Elephant is an apparatus that we can recommend with confidence.

THE SLATE TRADE.—The prices now being fixed for the coming year will show a slight advance on some of the larger sizes, as the improvement in the general trade of the country, combined with the falling-off in make, has brought down the stocks of the quarries. The reductions in prices during the last two years have also greatly checked the importation of foreign slates.

Legal.

CASE UNDER THE PUBLIC HEALTH ACTS.

In the Court of Appeal before the Master of the Rolls and Lords Justices Cozens-Hardy and Farwell on the 3rd inst., the hearing was concluded of the case of the Urban District Council of Wood Green v. Louis Joseph, on the appeal of the District Council from the judgment of a Divisional Court of Kings Bench composed of the Lord Chief Justice and Justices Lawrance and Ridley. The case came before the Divisional Court in the form of a special case stated by the Middlesex Justices from which it appeared that on March 25, 1904 they heard and determined a complaint preferred by the District Council against Mr. Joseph for the recovery from him as the owner of six houses in a street in the Council's district called Parkhurst-road, of 49l. 16s. and interest, which the Council claimed as due to them from him under Sect. 41 of the Public Health Act, 1875, and Sect. 10 of the Public Health Acts Amendment Act, 1890, in respect of drainage works executed by the Council.

It appeared that Parkhurst-road runs north and south and on the east side of it there is a row

of sixteen houses, numbered consecutively 2 to 32 (even numbers). Mr. Joseph was at all material times the owner of six of the houses, viz., Nos. 18, 20, 22, 24, 26, and 28, the remaining houses belonging to other owners. The drainage of the row of houses was conveyed to a public sewer in Marquis-road by means of a system of pipes arranged in the following way: The houses were drained in pairs, and each pair of houses was drained by a separate pipe into a pipe common to both houses, and each of such common pipes discharged into a line of pipes laid in private ground on the east of the row of houses and parallel to it. The drainage of Mr. Joseph's houses was therefore conveyed to the alleged single private drain first by pipes which were not, and then by pipes which were common to each pair of such houses, and the County Council admitted that the pipes which were common to each pair were "sewers" within the meaning of the Public Health Acts, and that as the houses they served belonged to the same owner such common pipes did not come within the operation of sect. 19 of the Public Health Acts Amendment Act, 1890. On October 29, 1902, notice was sent to the Council by their Inspector of Nuisances stating that a drain belonging to some one or more of the premises Nos. 2 to 32, Parkhurst-road, was a nuisance, and on that day the Council authorised the Inspector to open up the ground and inspect the drain. This the Inspector did, and then he made the drains in bad order and condition. The Council, acting upon the report of the Inspector, required certain work to be done to the drains separately draining Mr. Joseph's six houses, and the latter executed such work, the Council doing the necessary work to put the common pipes into repair, and this cost they defrayed. On February 13, 1903, the Council gave notice to the owners of the houses in the row to do certain specified works to the alleged single private drain so as to put it into proper repair, and the notice not being complied with the Council did the work and apportioned the cost between the owners, the sum apportioned to Mr. Joseph being 49l. 16s. Before the justices it was contended on behalf of Mr. Joseph that as the Council's proceedings in the present case were based on a notice from their own Inspector, the requirements of sect. 41 of the Public Health Act, 1875, had not been complied with, and that therefore Mr. Joseph was not liable, but this point the justices decided in favour of the Council. It was further contended for Mr. Joseph that the alleged single private drain was not a "single private drain" within sect. 19 of the Public Health Acts Amendment Act, 1890, and that even if it were a single private drain within that section as drainage was discharged into it by means of a series of pipes which were admitted by the Council to be, for part of their length, "sewers" within the meaning of the Public Health Acts. Mr. Joseph's houses were not connected with the public sewer in Marquis-road by such single private drain. It was argued that as in the present case there were lengths of admitted sewer between the alleged single private drain and the house drains, Mr. Joseph's houses were not "connected with a public sewer by" the alleged single private drain. The justices were of opinion that had it not been for the intervention of the common pipes the Council would have been entitled to their judgment, but the common pipes being "sewers" repairable solely by the Council and intervening between Mr. Joseph's house drains and the alleged single private drain, they could not agree, and they accordingly dismissed the complaint. The Divisional Court on appeal affirmed the decision of the Justices. Hence the present appeal of the Council.

Mr. Macmorran, K.C., and Mr. A. F. Jenkin appeared for the appellants, and Mr. Danckwerts, K.C., and Mr. R. Glen for the respondents on the appeal.

At the conclusion of the arguments of counsel their lordships affirmed the decision of the Divisional Court, and dismissed the appeal with costs.

DISPUTE AS TO THE OWNERSHIP OF A VESTRY HALL.

MR. JUSTICE JOYCE, in the Chancery Division, on the 30th ult., delivered a considered judgment in the case of the Mayor, etc., of the City of Westminster v. the Vicar and Churchwardens of the parish of St. Martin-in-the-Fields, an action by the plaintiffs for a declaration that the Vestry hall of the parish of St. Martin-in-the-Fields was vested in them and was their property; or in the alternative that if it vested in the defendants it was held by them in trust for the plaintiffs. The plaintiffs contended that the Vestry hall and those which had preceded it had been used by the vestry for the time being as a parochial institution for secular and administrative purposes and not merely for ecclesiastical purposes.

It appeared that in 1719 certain commissioners were appointed under a private statute to rebuild the parish church of St. Martin-in-the-Fields, the steeple of the church, and to build a room for the vestrymen of the parish to meet in. The commissioners erected the hall, and the plaintiffs' case was that for the next 100 years it was used by

the vestry for the general administrative purposes of the parish, but in 1828 it was pulled down and the present building erected, and this building had since been similarly used. This building was erected by the Commissioners of Woods and Forests under an act of George IV., which was passed for the purpose of making certain street improvements, and the Act provided that the new Vestry-room and the ground on which it was erected should be vested in the persons in whom the room in lieu of which it was erected would have been vested if the Act had not been passed. The case for the plaintiffs was that by virtue of the London Government Act, 1894, and other Acts, the property of the old Vestry was transferred to them, and the legal interest in all property vested either in the overseers or in the churchwardens and overseers of the parish (other than property connected with the affairs of the church of the parish, or held for an ecclesiastical charity within the meaning of the Local Government Act, 1894), became vested in the plaintiffs. The case for the defendants was that the Vestry-hall, built by the commissioners, was erected on part of land which had been added for the purpose of enlarging the burial ground, and that the whole of the added land, including the site of the Vestry-room, was, in 1831, consecrated, and as part of the churchyard was vested in the Vicar and Churchwardens of the parish. Defendants further said that since 1891 the Vestry-room had ceased to be required for meetings of the elective vestry or other civil purposes, and had been exclusively used by the Vicar and Churchwardens of the parish for purposes connected with the ecclesiastical affairs of the parish.

His lordship, in an elaborate judgment, after dealing with the documentary evidence in the case, held that the premises in question in law were vested in the Vicar, like the church and churchyard, subject to the rights of the parishioners, and that the contention of the plaintiffs could not be sustained. The result, therefore, was that in his opinion the action failed, and he dismissed it with costs.

Mr. W. H. Upjohn, K.C., Mr. Hughes, K.C., and Mr. Gover appeared for the plaintiffs, and Mr. Warrington, K.C., Mr. A. B. Kempe, and Mr. Theobald for the defendants.

THE LONDON BUILDING ACT: A DANGEROUS STRUCTURE AT THE MILLWALL DOCK.

At the Thames Police Court recently Mr. Dickinson gave his decision on the summons against the Millwall Dock Company for refusing to pay the London County Council 11s. 2s. 6d. expenses incurred respecting a dangerous structure. A fire occurred in a building in the Millwall Dock, and in consequence Mr. John Clarkson, District Surveyor, surveyed the place at the request of the Council. Finding it a dangerous structure he issued a certificate in accordance with the London Building Act, requiring the Dock Company to take down some portion of the building which had been damaged, and directing that other portions should be shored up. Mr. F. W. Hunt and the Dock Company contended that the Metropolitan Building Acts did not extend to any building belonging to the company, and that one private Act could not override another private Act.

Mr. Dickinson, in giving his judgment, said the only point at issue was whether the London Building Act, 1894, applied to the Millwall Dock. On behalf of the Dock Company Mr. Blunt called attention to the 60th section of the Millwall Dock Act passed in 1864, which enacted that "The provisions of any Metropolitan Building Act from time to time in force do not extend or apply to any building of the company." He was satisfied that the word "do" in that place was equivalent to "shall," and related to any future Building Acts which might thereafter be passed. New had that section been repealed by necessary implication of the subsequent Building Act of 1894? He said by necessary "implication," because there were certainly no express words of repeal in the later Statute. The question was how far that special Act of Parliament creating special rights was to be supposed to be repealed by a subsequent Act which made no reference to it. The Dock Act was a special Statute made applicable to future Building Acts, and it was the express intention that it should apply to every Building Act which should be passed in the future. The Legislature, therefore, having had its attention called to the special subject, and having observed all the circumstances of the case, had clearly expressed its mind, and (over and above the general presumption against an intention to disturb the established state of the law, or to interfere with the vested rights of the subject) he thought it ought to be presumed, *prima facie* at all events, that it was still of the same mind on a subsequent occasion unless it clearly appeared that the intention had been changed, or unless there was something which showed that the attention of the Legislature had been turned to the special Act, and that the general one was intended to embrace the special cases within the previous one. The attention of Parliament was certainly

drawn to the position of the dock companies, because they were specially exempted from the operation of Parts VI. and VII. of the Building Act. Therefore Mr. Coleman contended they were to be included in the rest of the Act, which was intended to be a Building Act for the whole of the metropolis. It might be that that was so with regard to the other dock companies carrying on business within the districts to which the Building Act, 1894, applied. He offered no opinion on that. His decision was that the general provisions of the London Building Act, 1894, did not affect the rights and powers given to the Dock Company by the 60th section of the special Act passed in 1864, and he therefore gave judgment for the defendants.

THE LONDON COUNTY COUNCIL AND BUILDING ACTS.

UNDER the Dangerous Structure sections of the London Building Acts of 1894 and 1898, Mr. Curtis-Bennett, at Westminster Police-court, had before him summonses which the London County Council had issued against the lessees of a number of houses in Wake-street, Lambeth, certified by the District Surveyor to be unsafe through "bulged and defective brickwork of front and back walls."

Mr. Colman, for the County Council, asked for an order to "take down" the brickwork.

Mr. Rose-Innes, counsel for the defendants, cross-examined the District Surveyor, and elicited that the old houses were all unoccupied, and that for months past they had been shored up with heavy timber. The struts if not interfered with, might possibly support the houses for a century.

Counsel for the defendants submitted that on case had been made out for demolition. The lessees had only a two and a half years' lease of this old property to run, and for that period it was safe enough as far as the public were concerned.

Mr. Colman: It has not yet been held that shoring-up with timber is a removal of the danger within the section. If this is allowed, half London might be on unsightly struts for any length of time. The defendants have not complied with the terms of the notice.

Mr. Curtis-Bennett: Your difficulty is that the Act says take down, secure, or repair. I think they have secured these old premises. Your own surveyor admits that they might perhaps remain shored up for 100 years. I will adjourn the summonses for three months, and if the shoring up is as good then as it is now said to be the Council had better withdraw the proceedings.

Mr. Rose-Innes remarked that if they did not he should certainly press for costs on another occasion. *Morning Advertiser.*

ACTION BY SUB-CONTRACTORS AGAINST CONTRACTOR.

THE case of Samuel Mason, Ltd., v. Henry Lovatt came on for hearing in the Court of Appeal before the Master of the Rolls and Lords Justices Cozens-Hardy and Farwell, on the 4th inst., on the appeal of the plaintiffs from a judgment of a Divisional Court of King's Bench, affirming an award of a special referee.

It appeared that the plaintiffs, who are brass-founders and plumbers, carrying on business in Birmingham, brought the action against the defendant to recover a sum of 3,274l., the defendant being a contractor of Wolverhampton. In 1897 the defendant contracted with the London County Council for the erection of the Health Asylum at Bexley, Kent, and plaintiffs entered into a sub-contract with the defendant to do the plumbing work for such asylum. On the completion of the work the plaintiffs furnished defendant with an account of the work under the contract and extras amounting to 15,618l. odd, and after crediting the defendants with payments made and credit given, the balance left was the sum claimed in the action. The case originally came before Mr. Justice Wills who, after disposing of certain legal points raised, referred the matter to a quantity surveyor of Birmingham as special referee. That gentleman subsequently after a hearing of between thirty and forty days gave judgment for the defendant on the claim with costs and also for the defendant for 11l. with costs on the counterclaim. Against that decision the plaintiffs appealed to the Divisional Court, consisting of the Lord Chief Justice and Justices Lawrance and Ridley who, after putting certain specific questions to the referee, affirmed his award. Hence the present appeal of the plaintiffs.

Mr. McCardie appeared for the appellants, and Mr. Disturnal for the respondents.

After Mr. Disturnal had taken the preliminary objection that according to the rules an appeal to that Court did not lie, which their lordships overruled, Mr. McCardie, on behalf of the appellants, contended that judgment should have been entered for the plaintiffs on the counterclaim, and also upon the claim for a sum amounting to at least 2,474l. 6s. 8d.

In the result their lordships, without calling upon Mr. Disturnal for the respondent, affirmed the decision of the Divisional Court and dismissed the appeal with costs.

Patents of the Week.

APPLICATIONS PUBLISHED.*

22,908 of 1905.—K. PANTERMULLER: *Draught-producing Device for use in Chimneys, Flues, and the like.*

This relates to a device for producing a uniform draught in a flue or chimney, and is characterised by a horizontal vane wheel arranged in the flue or chimney itself or above the same, which vane wheel is set in rotation by the draught which always exists in the flue or chimney.

23,646 of 1905.—L. COURLANDER: *Automatic Door Fastening.*

This relates to means for effecting the fastening of a hinged door with varying degrees of tightness of contact, comprising a coupling device in which one element of the coupling is secured to the door, and the other to the door-frame, and are guided relatively to one another so as to become approximately coaxial prior to engagement.

24,021 of 1905.—W. BROWN and W. G. PIKE: *Chimney-top Ventilator.*

This relates to means for preventing down-draught and improving the up-draught in a chimney-flue, or ventilator shaft, comprising a conoidal curtain depending from the extremity of the flue or shaft, a conical cover mounted beyond the extremity of the said flue or shaft, and substantially corresponding therewith in diameter, a spherical wind-guard subtending the space between said cover and flue and extremity, but not reaching to the full depth of the curtain, so that there is formed between the curtain and the wind-guard an annular passage adapted to divert the wind upwards as regards the windward side of the chimney-top or ventilator and downwards as regards the leeward side thereof.

24,172 of 1905.—W. H. HASLAM: *Blowers on Draw-Plates for Fire Ranges or Stoves.*

This relates to the method of mounting and counterbalancing blowers or draw-plates used in connexion with fire ranges or stoves, and consists in arranging the blower or draw-plate to slide within casings formed by the framework of the stove, or by parts in connexion therewith which draw-plate or blower is suspended from appropriately-shaped pulleys or drums carried by a shaft in such a manner that a counterbalancing weight may be used suspended from the opposite side of another pulley on the same shaft.

25,002 of 1905.—J. R. BURNETT: *Geyser on Water Heaters and Circulating Boilers.*

This relates to geyser or water heaters and circulating boilers and consists of two cylinders, inner and outer, one slightly less in diameter than the other, and producing a thin water space between them, the two cylinders being joined to each other and the space between them closed at each end. The body of the heater thus formed stands vertically, and upon its upper end is a small cistern or tank. Connecting such cistern to the lower end of the heater is a circulating pipe or pipes, and at the upper end of the heater and near the cistern is a draw-off pipe. Branching from such draw-off pipe is a branch pipe, which opens into the cistern. In or below the lower end of the heater is a gas or oil burner, and at its top end and passing through the cistern is a small cistern or tank. Arranged within the inner cylinder at slight distances apart, and also at varying angles to each other, is a series of cross tubes opening into the water space of the heater. When the heater and cistern are filled with water, and the burner is lighted, the water is rapidly heated, and as it becomes heated the warmer portion is displaced by the colder, which flows down the said pipe from the cistern into the lower part of the heater, whilst the warmer water passes up and, when the draw-off pipe is closed, flows through the branch pipe back to the outer, from whence it may be constantly circulated through the heater until required for use, when it is readily drawn off through the draw-off pipe.

25,687 of 1905.—J. H. HARRADINE, J. T. BIDDLE, and L. W. CROSTA: *Conduits for Electric Conductors, Pipes, and the like.*

This relates to a conduit for wires, pipes, and the like, consisting of a trough with grooves in its edges for a joining material, and a cover the sides of which overhang the trough, which cover has flat jointing surfaces on its undersides, and lugs for fixing it in position relatively to the trough.

25,774 of 1905.—D. SINCLAIR and SINCLAIR IRON CO., LTD.: *Fireplaces.*

This relates to fireplaces and consists in the combination of a canopy and an adjustable damper, the latter being located in the passage between the canopy and the back plate of the fireplace, or in the nozzle by which the grate discharges the fumes into the chimney, and

* All these applications are in the stage in which opposition to the grant of Patents upon them can be made.

PATENTS.—Continued on page 674.

List of Competitions, Contracts, etc.

For some Contracts still open, but not included in this List, see previous issues. Those with an asterisk (*) are advertised in this Number; Competition, —; Contracts, iv. vi. viii. x.; Public Appointments, xvi.; Auction Sales, xxvii.

Certain conditions, beyond those given in the following information, are imposed in some cases, such as: the advertisers do not bind themselves to accept the lowest or any tender; that a fair wages clause shall be observed; that no allowance will be made for tenders; and that deposits are returned on receipt of a boni-fide tender unless stated to the contrary.

Competitions.

JANUARY 12. Cefn.—HALL.—The Committee of the George Edwards Memorial Hall offer a prize of £1, for the best design (including plans and elevations) of the hall. The successful competitor will have the option of carrying out the work upon terms, which, together with full particulars, may be obtained from Mr. W. Evans Jones, Secretary, High-street, Cefn, Rhondda. Designs, etc., to be in hand on or before January 12.

FEBRUARY 14.—Kendal.—LIBRARY.—Kendal Corporation invite architects and tenders for the erection of a public library in Kendal, or born in Kendal and following their profession elsewhere, to submit competitive designs, together with written descriptions and estimates, for the erection of a public library in the said borough. A premium of £50 is offered for the design considered by the Corporation first in order of merit, and further premiums of £25, £10, and £5, respectively for those which are, in their opinion, second and third in order of merit. If the author be employed, the premium will merge in the commission of £1,000, and will be treated as paid on account of the same. Particulars and conditions of competition, together with plan of site, showing levels, etc., may be obtained free on application to Mr. John Walton, Town Clerk, Kendal. Complete designs, descriptions, and estimates, marked with a motto, sealed, and endorsed "Public Library," are to be delivered at the office of the Town Clerk, Kendal, on or before February 14.

NO. DATE.—Swansea.—BRIDGES.—Swansea Harbour Trustees invite designs and tenders for the construction and erection of two swing bridges, one over the entrance lock to the King's Dock, and the other over the communication passage with the Prince of Wales's Dock, together with hydraulic machinery for working the same. Specifications and plans, and forms of, and instructions for, tender, can be obtained on application to Mr. Talford Strick, Clerk, Harbour-Office, Swansea, on payment of 5s. 5s.

Contracts.

BUILDING.

DECEMBER 8.—Cardiff.—ADDITIONS TO OFFICES.—For making additions to the offices of the Powell Duffryn Colliery Company, Bute-road, Cardiff. Plans, specification, and form of contract may be seen, and quantities obtained, at the office of the architect, Mr. E. W. M. Corbett, Castle-street, Cardiff. Tenders to be sent to the architect before 10 o'clock on December 8.

DECEMBER 8.—Llantrisant.—OFFICES.—The erection of new offices and workshops at Llantrisant for Messrs. Mountford, Phillips, & Co., Ltd. Plans and specification may be seen at their office, Llantrisant, on or before December 8.

DECEMBER 8.—Orrell.—OFFICES.—For erecting new offices for the Orrell U.D.C. Names to Mr. Richard Pennington, architect, Malvern-chambers, Worcester. Two guineas will be charged for bills of quantities.

DECEMBER 10.—Alexandria, West Rainton.—HOSPITAL.—Houghton-le-Spring and Bolton Joint Smallpox Hospital Board invite sole tenders for the erection of hospital buildings at the Alexandria Colliery (now dissolved), near West Rainton, consisting of a pavilion to contain eight beds, with administrative block and other erections. Names to Mr. J. G. Cowe, Messrs. J. G. & R. G. Cowe, architects, Chester-le-Street, not later than December 10. A deposit of 1s. is must accompany each application. Mr. John George Baty, Clerk to the Board, Union Offices, Houghton-le-Spring, R.S.O.

DECEMBER 10.—Amersham.—Amersham Guardians invite tenders for certain alterations in the laundry, and for the erection of a mortuary at the Amersham Workhouse. Plans and specifications, together with bills of quantities, and forms of tender obtained, at the offices of Messrs. Kerkham, Burgess, & Myers, architects, of Beaconsfield and Gerrards Cross, on payment of a deposit of 10s. 6d. Sealed tenders, endorsed "Tender for Laundry Alteration," must be sent to Mr. R. H. Rashford, Clerk to the Guardians, Amersham, on or before December 10.

DECEMBER 10.—Caversham.—LIBRARY.—For the erection of a public library for the Caversham U.D.C. Plans, etc., may be seen at the office of the architect, Mr. W. Lewton, 6, The Forebury, Reading. Bills of quantities on application to Mr. E. E. Rawstone, Clerk, 4, Bridge-street, Caversham, by December 10, between 10 a.m. and 5 p.m., on payment of 2s. The Clerk's office will be delivered at the Clerk's office by 10 a.m. on December 20, endorsed "Tender for Public Library."

DECEMBER 10.—Lower Whitwood.—DWELLINGS.—The C.G. of two dwelling-houses and shop and stables, Castleford-road, Lower Whitwood, for Mr. Simpson. Plans and specifications may be seen at the office of the architect, Mr. Arthur Hartley, District and Surveyors County Chambers, Castleford. Tenders to be sent in before 9 a.m., December 10.

DECEMBER 10.—Nottingham.—BANDSTAND.—Not-

tingham Public Parks Committee invite tenders for the erection of a bandstand at the Arboretum. Plans may be seen, and copies of the bill of quantities, and form of tender obtained, from Mr. Frank B. Lewis, City Architect, Guildhall, on payment of a deposit of 1l. 1s. Sealed tenders, endorsed "Tender for Bandstand, Arboretum," to be delivered to Mr. Samuel G. Johnson, Town Clerk, Guildhall, Nottingham, at or before noon on December 10.

DECEMBER 10.—Pickett How.—LOOSE BOXES.—For working a new road, for Messrs. Timothy White & Co., Pickett How, near Egremont. Plan and specification at Mr. Jackson's, Pickett How Farm. Tenders, endorsed "Pickett How," must be sent in by December 10, to Mr. Herbert J. Watson, Cocker-mouth Castle.

DECEMBER 10.—Portsmouth.—SHOP.—For erecting a new shop at the corner of High-street and Cister-road, Portsmouth, for Messrs. Timothy White & Co., Portsmouth. Drawings, etc., can be seen, and bills of quantities and forms of tender obtained, at the office of Messrs. Rake & Cogswell, architects, Prudential-buildings, Portsmouth. Tenders to be delivered to 23, Chandos-street, in the addressed envelopes to be supplied, before noon on December 10.

★ DECEMBER 10.—Swansea.—Pavilion.—The Royal National Eisteddfod of Wales, Swansea, 1907, invite tenders for a temporary pavilion in the Victoria Park, Swansea, to seat 15,000 persons. Contractors are invited to tender for either or both of the following, viz.—(a) The timber work; (b) the canvas roofing. Plans may be seen at the office of the architect, Mr. J. H. Davies, General Secretary, 68, Wind-street, Swansea, on or before December 10.

DECEMBER 11.—Arlington.—SHOP AND HOUSE.—For the mason, carpenter, slater, plaster, and painter works of rebuilding shop and house at Arlington. The plans and specifications may be seen, and quantities obtained, at the office of the architect, Mr. J. H. Davies, General Secretary, 68, Wind-street, Swansea, on or before December 11.

DECEMBER 11.—Goodwick.—ALTERATIONS AND ADDITIONS AT STATION.—Great Western Railway Directors invite tenders for alterations and additions at Goodwick Station, Pembrokeshire. Plans and specification may be seen, and forms of tender, and bills of quantities obtained, at the office of the engineer at Neath Station, between the hours of 10 a.m. and 4 p.m. Tenders, addressed to Mr. G. K. Mills, Secretary, Paddington Station, London, and marked outside "Tender for Works at Goodwick," will be received on or before December 11.

DECEMBER 11.—Manchester.—SUPER-STRUCTURE FOR OFFICE ADDITIONS.—All trades for the erection of the super-structure of additions to the offices of the Refuge Assurance Company, Ltd., Oxford-street, Manchester. Application, in writing, on or before December 11, to the architect, Mr. Paul Waterhouse, 30, Abchurch-lane, London, E.C. 4.

DECEMBER 12.—Cowling.—RESIDENCE.—For the plumber, glazier, and slater's work required in erection of a residence at Cowling. Plans may be seen, and quantities obtained, on application at the offices of Mr. James Hartley, architect, Skipton, from December 5 to December 12, on which latter date sealed and endorsed tenders must be sent.

DECEMBER 12.—Hull.—EMIGRANT'S ROOM.—North-Eastern Railway Directors invite tenders for erecting emigrants' room, etc., Paragon Station, Hull. Plans and specifications may be seen, and quantities and further information obtained, on application to Mr. William Bell, the Company's Architect, at York; duplicate plans may also be seen at the Station-master's Office, Paragon Station, Hull. Quantities supplied on personal application to parties tendering for the whole of the work. Sealed tenders, marked "Emigrants' Room, etc., Hull," to be sent to the Secretary, at York, not later than noon on December 12.

DECEMBER 12.—Llanmorlais, Penrheol, etc.—SCHOOL WORKS.—Glamorgan C.C. invite tenders for the following works, viz.—(1) Alterations at the Llanmorlais Council School, near Goverton; (2) minor alterations at Penrheol Council School, near Gorseionn; (3) erection of a new infants' school at Beddington; (4) additions and alterations at the Llanmorlais Council School, near Goverton. Plans, specifications, and quantities for all the works may be seen or obtained at offices of Mr. W. E. R. Allen, Deputy-Clerk of the C.C., Glamorgan County Offices, Westgate-street, Cardiff. Tenders are to be delivered to the Deputy-Clerk not later than December 12, marked outside, "Tender for Llanmorlais School" or "Beddington School," etc., as the case may be.

DECEMBER 12.—Mardy.—CO-OPERATIVE BUILDINGS.—New buildings at Mardy, Glam. for the Ferndale Industrial Co-operative Society, Ltd. Plans and specifications can be seen at Pontypridd offices of Messrs. Lewis & Davies, architects, at Mardy, on street. Bills of quantities can be obtained at Pontypridd office, or at 12, Edward-terrace, Cardiff, on payment of a deposit of 1l. 1s. Tenders to be delivered before 10 a.m. on December 12, addressed to Mr. James J. Jenkins, Secretary, Co-operative Society, Ferndale, and properly endorsed "Tender for Mardy Branch."

DECEMBER 13.—Dewsbury.—VILLA RESIDENCE.—The various works required in the erection of a villa residence in Birkdale-road, Dewsbury. The drawings and specifications may be seen, and bills of quantities obtained, at offices of Messrs. Kirk & Sons, architects, Dewsbury, from December 6 to December 13, on which latter date tenders are to be delivered before 3 o'clock p.m.

DECEMBER 13.—Hill of Garmouth.—RESTORING FARM STANDING.—Thomson, carpenter, plumber, and slater works of restoring, after fire, at the farm standing, Hill of Garmouth. The plans and specifications may be seen with Mr. John Wittet, architect, Elgin, with whom offers must be lodged on or before December 13.

DECEMBER 13.—Tulow, Ireland.—HOSPITAL.—Carlow Board of Guardians will, at their meeting to be held on December 13, consider tenders for the erection of an hospital at Tulow, in accordance with plans and specifications prepared by Mr. James O'Donnell, A.M.I.C.E., Engineer to the Board of Guardians. Tenders, which must be on the forms provided, and accompanied by priced bills of quantities, on which such tenders are founded, enclosed in separate sealed packets, endorsed with the contractor's name, and the words "Priced Bill of Quantities for Tulow Hospital," and shall, on a separate form, state the names of two sureties willing to join in a bond for a sum equal to twice the amount of the contract, for the due performance thereof, to be addressed to the presiding Chairman, endorsed "Tender for Tulow Hospital," and shall be posted so as to reach office of Mr. Thomas E. Coyle, Acting Clerk of the Union, Clerk's Office, Workhouse, Carlow, not later than 12 o'clock noon on December 13. Forms of tender, etc., and copies of bills of quantities, can be obtained at office of Clerk on payment of a sum of 3l. 3s.

DECEMBER 14.—Colne.—SCHOOLS.—For works required in erection of public elementary schools off Burnley-road, Colne. Plans may be seen, bills of quantities, etc., obtained, at the offices of Messrs. Hoagate & Survey, architects and surveyors, Market-street, Colne. Sealed tenders, endorsed "Primer Schools," to be sent to Mr. A. Varley, Town Clerk, Town Hall, Colne, by noon, on December 14.

DECEMBER 14.—Launceston.—DRILL HALL.—A drill hall at Launceston. The plans, specifications, and conditions may be seen at the office of Mr. Otto B. Peter, architect, Launceston, to whom sealed and endorsed tenders should be sent on or before December 14.

★ DECEMBER 14.—Lewisham.—SORTING HOUSE.—The Commissioners of H.M. Office of Works invite tenders for the enlargement of a sorting office at Lewisham. Drawings, specifications, etc., may be seen on application to Mr. J. Wager, H.M. Office of Works. Bills of quantities and form of tender may be obtained from the Secretary, Storey's Gate S.W., to whom tenders must be delivered, endorsed "Tender for Enlargement of Sorting Office," not later than December 14.

DECEMBER 14.—Workington.—SHOP, ETC.—For the various works required in erection of a shop, warehouse, and hall at Westfield, Workington, for the Industrial Co-operative Society, Workington. Plans, etc., upon application to Messrs. W. G. Scott & Co., architects and surveyors, 2 Park-lane, Workington, to whom will be received, endorsed tenders, up to 12 noon on December 14.

DECEMBER 17.—Bournemouth.—CONVENIENCES.—The Bournemouth Town Council invite tenders for the construction of conveniences on beach, east and west of Bournemouth Pier, and other works in connexion therewith. Full particulars, forms of tender, and specification can be obtained of the Borough Engineer, Mr. F. W. Lacey, at whose office drawings may be seen, provided that the sum of 2l. 2s. has been previously deposited with Mr. F. W. Lacey, M.I.C.E., Borough Engineer and Surveyor, Municipal Offices, Bournemouth. Tenders to be sent in envelopes provided for the purpose, to the Town Clerk, Mr. Geo. Wm. Bailey, before noon of December 17.

DECEMBER 15.—Keith.—BANK.—For the mason, carpenter, slater, plumber, plaster, painter, and glazier work of New Town and County Bank, to be erected in Keith. Plans and specifications may be seen with Mr. D. J. Corrigan, architect, Keith. Offers to be lodged with Messrs. Thurburn & Fleming, Bank Agents, Keith, by December 15.

DECEMBER 17.—Matlock.—WALLS, ETC.—Matlock U.D.C. invite tenders for the taking down of existing buildings and walls, and the rebuilding of walls on Bakewell-road. Plans and specification may be seen, and form of tender obtained, upon application at office of Mr. James Duglie, Engineer and Surveyor, Town Hall, Matlock. Sealed tenders, endorsed "Bakewell-road Walls," to be delivered to Engineer not later than 10 a.m. on December 17.

DECEMBER 17.—New Shoreham.—SCHOOL ALTERATIONS AND ADDITIONS.—West Sussex and Chichester Local Education Authority invite tenders for executing alterations and additions to New Shoreham Council Schools. Plans, specifications, and conditions of contract may be seen, and forms of tender obtained, at the office of Mr. A. W. Dyer, 2, Duke-street, Brighton. Tenders, sealed and endorsed "Tender for Alterations and Additions to the New Shoreham Council Schools," to be addressed and delivered to Mr. Lionel Thompson, Secretary, Education Office, Horsham, not later than first post, December 17.

DECEMBER 12.—Croxdale.—ADDITIONS.—Sole tenders for additions to Croxdale Council School, for the Durham C.C. Plans, etc., may be seen at the office of Mr. W. Rusworth, F.R.I.B.A., Architect, 1, Regent-hall, Durham. Quantities may be obtained on application to the architect, to whom sealed, endorsed tenders must be delivered by December 18.

DECEMBER 12.—Pontnewydd and Blaenavon.—OFFICES, ETC.—For the following works for the Managers of the Eastern Valleys group of Council schools:—(1) Erection of iron railings and other work at the Pontnewydd Council School; (2) erection of new offices at the Forge Side Council School, Blaenavon. Plans, etc., can be seen at the office of Mr. H. J. Griggs, architects, Newport, Mon. Tenders, endorsed "Pontnewydd School and Forge Side School," respectively, to be sent to Mr. Henry Bythway, Clerk to the Managers, Pontypool, by December 12.

DECEMBER 12.—Kington.—SCHOOL ALTERATIONS.—The Governors of Lady Hawkins' Grammar School, Kington, invite tenders for the carrying-out of certain additions and alterations to the school. The works comprise two new classrooms, cloak-rooms, offices, and a workshop, and certain consequential alterations. Plans and specifications of the proposed works can be seen at the School-house daily between the hours of 10 a.m. and 5 p.m. from December 12 to December 18, and bills of quantities and form of tender can be obtained on application to Mr. Alfred Dryland, Sheriff, Hereford, upon payment of 2s. Tenders, endorsed "Kington School," must reach the Clerk to the Governors, Grammar School, Kington, before 10 a.m. on December 19.

DECEMBER 12.—Lossiemouth.—BUILDINGS.—All trades in the erection of block of buildings in Stoddard, Lossiemouth. Plans and specifications and conditions of contracts to be seen with Mr. R. B. Pratt, architect, Town and County Bank-buildings, Elgin, who will receive offers not later than December 19.

DECEMBER 12.—Marshfield.—HOUSE.—The building of a house at Marshfield, Mon., near Cardiff, for the Rev. T. Harris. The plan and specification may be seen at the office of the architect, 2, Church-street, Cardiff, from whom copies of the quantities may be obtained on deposit of 1s. Sealed and endorsed tenders to be delivered to the architect on or before December 19.

DECEMBER 12.—Rednor.—CHAPEL.—For Bible Christian Chapel at Rednor, near Redruth. Plans and specifications may be seen by appointment at the office of Mr. Sampson Hill, architect, Green-lane, Redruth, from whom all particulars relating to the work may be obtained. Sealed, endorsed tenders are to be sent to the Rev. J. H. Newbold, Clinton-road, Redruth, on or before December 19.

DECEMBER 22.—Callington.—SCHOOL.—Cornwall Education Committee invite tenders for the erection of a new secondary school at Callington, according to plans and specifications, which may be seen at the office of Mr. John Sansom, Architect to the Committee, Liskeard, from whom all particulars relating to the work may be obtained. Sealed, endorsed tenders, on official forms, which may be had from the architect, are to be sent to Mr. F. R. Pascoe, Secretary, Education Office, Truro, on or before December 22.

DECEMBER 22.—Hove.—PUBLIC LIBRARY.—The Hove Council invite tenders for a public library in Church-road, Hove, in accordance with specification and bills of quantities prepared by the architects, Messrs. Percy Robinson and W. Alban Jones, of Yorkshire Post Chambers, Leeds. Plans and specification may be seen, and bills of quantities obtained, at the office of the Borough Surveyor, Mr. H. H. Scott, on payment of 1s. Tenders, on forms supplied, endorsed "Tender for Erecting Proposed Library," addressed to Mr. H. H. Endicott, Town Clerk, Hove, will be received up to 6 p.m., December 28.

DECEMBER 31.—Hither Green.—BRANCH LIBRARY.—The Libraries Committee of the Borough of Lewisham are prepared to receive tenders for erection of a branch library at Hither Green. Drawings and specifications may be inspected at the Architect's office (Mr. H. Hopwood, 27, Kings-road, East) or the quantity surveyor (Mr. C. O. Robson, 33, King-street, Chislehurst), on or after December 10, between 10 a.m. and 4 p.m. Sealed tenders, with priced bills of quantities, addressed to the Clerk, are to be delivered at the Town Hall, Catford, on or before December 31.

JANUARY 8.—Surrey.—NEW BUILDINGS.—Guardians of Kingston Union invite tenders for the erection of new buildings at Norbiton Common Farm, New Malden, Surrey, in accordance with plans and specifications by Mr. W. H. Hope, C.E. Hampton Wick, which may be seen, and bills of quantities obtained, on application to the Clerk to the Guardians, Union Offices, Kingston-on-Thames on and after 27th inst., from 9 a.m. to 4 p.m., and until 1 p.m. on Saturdays. Tenders, which hold good for three months from acceptance, are to be delivered to the above not later than 12 noon on January 8.

JANUARY 15.—Enfield.—SCHOOL.—Enfield Education Committee invite tenders for the erection of junior mixed school at Bush Hill Park, Enfield. Application for bills of quantities to be made to the architect, Mr. G. E. T. Lawrence, 22, Buckleham-street, Adolph, W.C., before December 25. Sealed tenders, on form supplied, must be delivered at the Clerk's Office, Public Offices, Enfield, not later than 12 noon on January 15.

No Date.—Aspatia.—ACTION MART.—Building action mart at Aspatia for Mr. O. B. Wood, auctioneer, Aspatia and Silloth.

No Date.—Barrow.—MISSION HALL.—The Barrow Island Baptist Mission invite tenders for the erection of a mission hall on Ramsden Dock-road. Through tenders for the whole of the trades only will be accepted. Contractors desiring to tender are requested to apply at once for bills of quantities and further particulars to the Rev. W. Walker, 24, Oxford-street, Barrow; or Messrs. Fred Howarth & Walter Widdows, joint architects, Bank-chambers, St. Anne's-on-Sea.

No Date.—Broughton Astley.—ENLARGEMENT OF SCHOOLS.—The Managers invite tenders for the enlargement and alteration of the schools. Quantities, forms of tender, and all further particulars may be obtained upon application to Messrs. Harrison & Sons, architects, St. Martin's, Leicester.

No Date.—Cork.—STONE-ROOF BUILDING A STORE IN Hanover-street for Mr. M. O'Donoghue. All particulars may be had on application to the architect, Arthur Hill, L.E., M.K.I.A., 22, George's-street, Cork.

No Date.—Nottingham.—HOUSES.—The several works required in the erection of three houses, Wells-road, Nottingham, Names at once (stating trade) to Mr. Fred Mitchell, architect and surveyor, 9, Upper Fountain-street, Leeds, and quantities, when ready, will be duly forwarded.

No Date.—Speelbank.—CORRAGE.—Whole or separate trades for the erection of a gamekeeper's cottage at Speelbank, near Carmel, for Mr. R. F. Grayrigg. Plans may be seen, and quantities obtained at the offices of the architects, Messrs. Settle & Brondrit, A.R.I.B.A., architects and surveyors, Ulverston and Barrow.

No Date.—Springdale.—TWO HOUSES.—Erection of two houses at Springdale. Quantities forwarded on sending name and address to Mr. Lewis Jenkins, 8, Springdale-street, Huddersfield.

No Date.—Wigton.—CLASS-ROOMS, HALL, ETC.—For proposed assembly, classrooms, at the Thomson Girls' Grammar School, Wigton. Names to the office of the architect, as quantities will only be supplied to such applicants. Mr. H. Higginson, architect, etc., 3, Lonsdale-street, Carlisle.

ENGINEERING, IRON, AND STEEL.

DECEMBER 10.—Keighley.—BOILER.—The Guardians of the Keighley Union invite tenders for supplying and fixing a Cornish boiler at the Union Infirmary, Bell-lane, Keighley. Specifications may be obtained from Messrs. M. and A. Keighley, architects, Keighley, and sealed and endorsed tenders are to be delivered to Mr. Geo. E. Spencer, Clerk to the Guardians, Keighley, not later than December 10.

DECEMBER 11.—London.—WHEELS AND AXLES, ETC.—Bombay, Baroda, and Central India Railway Directors invite tenders up to noon on December 11 for the supply of the following stores:—Class A. (1) Wheels and axles for carriages and waggon; (2) steel plates for boilers; (3) red and white lead. Class B. (1) Beater picks, 10 lbs. Crabs, 10 lbs. Tenders must be made on forms, copies of which, with specifications, can be obtained at offices of Mr. W. V. Constable, Secretary, Gloucester House, 2, 3, and 4, Bishopsgate-street, Without, London, E.C., on payment as follows:—For Class A, 1s. 1s. each, and for Class B, 10s. 6d. each (which will not be returned).

DECEMBER 11.—Mountain Ash.—PIPES.—Mountain Ash U.D.C. invite tenders for the supply of about 225 yds. of 15-in. cast-iron spigot and socket pipes, with the necessary accessories, in iron, for a main sewer, and bill of quantities may be obtained on application to Mr. W. G. Thomas, Surveyor, Town Hall, Mountain Ash. Sealed tenders, prepaid, and endorsed "Mountain Ash Sewer," must be sent to Mr. H. P. Linton, Clerk to the Council, Town Hall, Mountain Ash, so that they be received not later than 9 a.m. on December 11.

DECEMBER 12.—Durban.—IRON WINDOW FRAMES.—The Corporation of Durban, Natal, invite tenders for the supply and delivery "free on board" of 10 No. 18 iron window frames, size 10 ft. by 5 ft., for the tramway carshed. Specifications, drawings, and sealed and endorsed tenders must be delivered to Messrs. Webster, Steel, & Co., Agents to the Durban Corporation, 5, East India-avenue, Leadenhall-street, London, E.C., on or before December 12.

DECEMBER 12.—London.—BUILDING IN LANCASHIRE BOILER.—Hackney Guardians invite tenders for building in a Lancashire boiler, etc., at the Workhouse, Edmonton, London, N. Plans and specifications of contract, form of tender, and order to view the site can be obtained at office of Mr. Frank B. Cotes, Clerk to the Guardians, Clerk's Office, Hackney Union, Homerton, London, E. The plans (as prepared by Mr. L. J. Todd, Consulting Engineer, 7, Brook-road, Stoke Newington, N.) may be inspected. Sealed tenders, endorsed "Building in Lancashire Boiler, etc.," must be delivered at office of Clerk not later than 2 p.m. on December 12.

DECEMBER 12.—Ford, Devonport.—IRON BALCONY.—Devonport Board of Guardians invite tenders for providing and fixing a covered iron balcony to the Workhouse Infirmary at Ford, Devonport, and for the necessary work in connexion with the same. Plans and specifications can be seen, and particulars obtained, at the office of the architect, Mr. Chas. Cotes, 44, Chapel-street, Devonport. Sealed tenders, endorsed "Infirmary Balcony," are to be sent to Mr. Albert Gard, 19, St. Aubyn-street, Devonport, Clerk, on or before December 13.

DECEMBER 17.—Flemington, Motherwell.—GOODS YARD, ETC.—The Glasgow and Fife Company invite tenders for the works to be executed in the construction of a goods yard and relative works at Flemington, Motherwell. Drawings may be seen at the office of the Company's Engineer, Buchanan-street Station, Glasgow, where copies of the specification and schedule may be obtained on payment of 2s. 6d. Tenders, to be lodged with Mr. J. Blackburn, Secretary, Caledonian Railway Company's Offices, 302, Buchanan-street, Glasgow, on or before December 17.

DECEMBER 17.—Leeds.—TRANSFORMER CHAMBER.—Leeds Corporation invite tenders for the construction of an underground transformer chamber in Lodge-lane, Beeston Hill, Leeds. Plans and specifications forming the contract can be inspected at the office of the Electric Lighting Department, 1, Colton-road, Leeds, and forms of tender may be obtained from Mr. H. Dickinson, the Engineer of the Department. Tenders must be in the form provided, and must be delivered to Mr. Robert E. Fox, 1, Colton-road, Leeds, in sealed envelopes, endorsed "Tender for Transformer Chamber, etc.," not later than 10 a.m. on December 17.

DECEMBER 17.—Southsea.—ELECTRIC POWER CABLES.—Portsmouth B.C. invite tenders for the supply, delivery, and maintenance of 550 volt electric power cables for the power supply underground main, in connection with works for the prevention of storm water flooding on the low-lying area of Southsea. Specifications and forms of tender may be obtained from Mr. Alexander Hellard, Town Clerk, Town Hall, Portsmouth, on payment of a sum of 2s. 2s. Further information will be supplied on application at the offices of Messrs. Bramwell & Harris, 5, Great George-street, Westminster, S.W. Tenders, under seal, and endorsed "Tender for Works for Prevention of Storm Water Flooding in the Low-lying Area of Southsea, Contract No. 2," must be delivered to Mr. Alexander Hellard, Town Clerk, Town Hall, Portsmouth, on or before 12 o'clock on December 17.

DECEMBER 17.—Southsea.—FLOOD PREVENTION WORKS.—Portsmouth B.C. invite tenders for the construction and maintenance of an overflow weir chamber on the existing main low level sewer, an underground pumping station, and other works. The specification, form of tender, and bill of quantities may be obtained from Mr. Alexander Hellard, Town Clerk, Town Hall, Portsmouth, on payment of 2s. 2s. Further information will be supplied on application at the offices of Messrs. Bramwell & Harris, 5, Great George-street, Westminster, S.W. Tenders, under seal, and endorsed "Tender for Works for the Prevention of Storm Water Flooding in the Low-lying Area of Southsea, Contract No. 3," must be delivered to Mr. Alexander Hellard, Town Clerk, Town Hall, Portsmouth, on or before 12 o'clock on December 17.

DECEMBER 19.—Warrington.—LAUNDRY MACHINERY.—The supply and fixing of laundry machinery, electric motors, wiring, etc., for the Crofton Mental Hospital, situate at Warrington, Surrey. Plans and specifications may be seen on application at the office of the Borough Engineer, Town Hall, Crofton, and copies thereof on forms of tender may be obtained on receipt of a deposit of 1s. Tenders on the prescribed form to be sent to Mr. A. L. Lloyd, Clerk to the Visiting Committee, Town Hall, Crofton, by 11 o'clock on the forenoon of December 19.

April 2, Bombay.—RECLAMATION.—Bombay Port Trust invite tenders for the construction of a reclamation between Mazagon and New Marine Lines. The contract will include the building of a rubble masonry quay wall, about 12,600 ft. long, on piled foundations, and the reclamation of about 515 acres of the foreshore, such reclamation to be effected by silt or mud pumped or dredged from the bed of the harbour, and covered with a layer of good earth. Plans and specifications, and drawings of the work can be obtained from the Chief Engineer, Bombay Port Trust, Ballard-road, Bombay; or from the Trustees' consulting engineers, Messrs. Sir J. Wolfe Barry & Co., Secretary, The Corporation of Bombay, S.W., on payment of 5s. sterling. Tenders, which must be endorsed "Tenders for Mazagon Reclamation," and accompanied by a deposit of Rs. 1000 (1000 rupees) in favour of the Secretary, Bombay Port Trust, Bombay, up to 5.30 p.m. or by the Trustees' consulting engineers, 7, The Sanctuary, Westminster, up to noon on April 2, 1907.

DECEMBER 19.—Carnarvon.—IRONWORK.—The Carnarvon Corporation invite plans and tenders for the provision and complete erection of all necessary ironwork for their public abattoir, as per particulars, to be obtained from Mr. Robert O. Roberts, Town Clerk, Guildhall, Carnarvon.

MISCELLANEOUS.

DECEMBER 8.—Chesterfield.—SCAVENGING.—Chesterfield R.D.C. invite tenders for the term of three years from December 22, 1906, for cleansing streets, privies, and dustholes in the following districts, and for removing the contents of the same:—Waterloo (North Wingfield), Heptonstall (North Wingfield), Wingfield (North Wingfield), Upper Peld (Pilsley), tips provided by the Council. Forms of tender may be obtained from Mr. E. S. Robinson, Woodthorpe House, Tupton, Chesterfield. Tenders, stating the price per house and the person tendering is willing to undertake the work must be delivered to Mr. R. F. Hartwright, Clerk to the Council, Union Offices, Chesterfield, on or before December 8, endorsed "Tender for Cleansing Ashpits."

DECEMBER 10.—Belfast.—TIMBER.—Belfast Harbour Commissioners invite tenders for the supply of a quantity of sawn pitch-pine timber and spruce planks, particulars of which may be obtained from the Harbour Engineer, Mr. W. Redfern, Kelly, M.I.S.T.C.E. Sealed tenders, on the special forms provided for the purpose, to be addressed to Mr. W. A. Currie, Secretary, Harbour Office, Belfast, endorsed "Tender for Timber," and sent in on or before December 10.

DECEMBER 10.—London.—CANVAS.—The Royal Agricultural Society of England invite tenders for the supply of canvas at its annual shows. Forms of tender and other particulars may be obtained upon application to the Secretary of the Society, at 16, Bedford-square, London, W.C. Each tender, which must be on the official printed form, must be delivered at the Society's Offices, 16, Bedford-square, London, W.C., not later than 2 p.m. on December 10.

DECEMBER 11.—Bradford.—SCHOOL FURNITURE, ETC.—Bradford Education Committee invite tenders for the supply of a quantity of school furniture. Samples may be seen, and drawings, quantities, and tender forms obtained, at the Education Office (Architect's Department). Sealed tenders, endorsed "Tender for School Furniture, etc.," must be delivered to the Education Office not later than 5 p.m. on December 11.

DECEMBER 11.—London.—BELTING.—Bombay, Baroda, and Central India Railway Directors, up to noon on December 11 (tenders for the supply of the following stores, viz.:—(1) Leather belting, 100 yds. and (2) laundry coils. Tenders must be made on forms, copies of which, with specifications, can be obtained at offices of Mr. W. V. Constable, Secretary, Gloucester House, 2, 3, and 4, Bishopsgate-street, Without, London, E.C., on payment of 1s. each (which will not be returned).

* JANUARY 2. — **Epping.**—SEWAGE. — The Epping R.D.C. invite tenders for the construction of sewer disposal works and the laying of about 2,500 lin. yd. of pipe sewers with manholes and contingent work in the parish of Chigwell. Drawings can be seen and further particulars and bills of quantities obtained, at the office of Mr. H. Tooley, architect, Buckhurst Hill, on deposit of 10s. Applications 10

bills of quantities before December 19. Tenders on forms supplied to Mr. R. D. Trotter, Clerk, Epping, Essex, before 5 p.m., January 2.

JANUARY 12.—Chelmsford.—WOOD PAVING.—Chelmsford B.C. invite tenders for laying about 140 sq. yds. of footpaths with concrete flags, excavating, laying a concrete foundation, and paving with wood blocks an area of about 800 sq. yds. in New-street, Chelmsford. Plan and specification may be seen at the office of the Borough Surveyor, Mr. Cuthbert Brown, A.M.I.C.E., 16, London-road, Chelmsford. Tenders, endorsed "Tenders for Wood Paving," must be delivered at the office of Mr. Thos. Dixon, Town Clerk, Town Clerk's Office, 16, London-road, Chelmsford, not later than January 12.

STONE, MATERIALS, AND STORES.

DECEMBER 10. Croydon.—GUERNSEY GRANITE.—Croydon Guardians invite tenders for the supply of 1,000 tons of unbroken Guernsey granite 500 tons to be delivered on or before January 1, 1907, and 500 tons on February 1, 1907, at Thornton Heath Railway Station (L.B. and S.C. Ry.), carriage paid. Tenders to be delivered to Mr. Harry List, Clerk to the Guardians, Union Offices, Mayday-road, Thornton Heath, Surrey, endorsed outside "Tender for Granite," not later than 9 a.m. on December 10.

DECEMBER 10. Dartford.—STONE.—Dartford Guardians invite tenders for the supply of about 250 tons of one of the following kinds of hard stone: Welsh, Aderney, Leicester, Jersey, Cornish, Kentish, to be delivered at the Workhouse, Dartford, at the Contractor's expense, within one month from the date of the acceptance of the tender. Tenders to be delivered at office of Mr. J. C. Hayward, Clerk, Sessions House, Dartford, on or before December 10, endorsed "Tender for Hard Stone," together with samples of the stone tendered for.

DECEMBER 10. Edinburgh.—STORES.—Edinburgh and District Tramways Company, Ltd., invite tenders for the supply of various articles required by them from January 1, 1907, to December 31, 1907. (1) Oils and greases; (2) general stores (engine and boiler); (3) ironmongery; (4) files, drills, and cast steel; (5) miscellaneous tools; (6) tubing, piping, couplings, etc.; (7) springs; (8) iron and mild steel; (9) steel (special quality); (10) brushes and sash tools; (11) ropes, canvas, etc.; (12) miscellaneous stores; (13) goods; (14) colour, varnish, etc.; (16) offices and workshops; (15) cement, pitch, etc.; (16) electric light supplies; (17) cement, pitch, etc.; (18) timber; (19) glass; (20) tinsmith work; (21) iron castings; (22) steel castings; (23) chilled castings; (24) stationery. Sealed tenders, addressed to the General Manager, must be lodged on or before December 10. Forms of tender may be had at the offices of the Company, 1, South Charlotte-street, Edinburgh, or will be sent on application on payment of 1s. for each schedule. Samples of the various articles may now be seen at the Stores Department, Shrubhill Power Station, Leith-works, Edinburgh.

DECEMBER 10.—Leeds.—STORES.—Leeds Improvement Committee invite tenders for the supply of the following, until March 31, 1907:—Timber, ironmongery, plumbers' materials, and builders'

materials. Particulars, schedules, and forms of tender may be obtained at the City Engineer's office, on payment of a deposit of 1s. 1s. Tenders, properly endorsed, should be received at the City Engineer's office not later than 10 a.m. on December 10.

DECEMBER 12.—Kingston-on-Thames.—GRANITE.—The Kingston-upon-Thames Corporation invite tenders for supply of 1,500 tons of Quenast, Gurnsey, or other granite for making roads, all to be broken to pass a ring of 15 in. diameter. Form of tender obtainable from the Borough Surveyor, Municipal Offices, where samples must be left. Sealed tenders, endorsed "Granite," to be delivered at the Town Clerk's Office on or before December 12.

DECEMBER 12.—Middlesbrough.—STORES.—Tees Conservancy Commissioners invite tenders for the supply of stores and materials for the year ending December 31, 1907, as under:—Timber, castings (steel and iron), bolts and nuts, brass and copper work, cement, oils and paints, ropes, ironmongery, and general stores. Forms of tender and any other information can be obtained on application. Sealed tenders, endorsed "Tender for Stores," addressed to Mr. John H. Amos, Secretary, Board-room, Middlesbrough, to be sent not later than December 12.

DECEMBER 13.—Nottingham.—MATERIALS.—Nottingham Works and Ways Committee invite tenders for the supply of the under mentioned stones and materials, the contracts to commence on January 1 next, and to terminate on December 31, 1907:—(1) cement; (2) blue lias lime; (3) red bricks; (4) blue bricks; (5) timber; (6) earthenware pipes, etc.; (7) cast-iron pipes, etc. (patent joints); (8) iron castings, iron gullies, etc.; (9) Yorkshire flags, kerbs, etc.; (10) granite setts, kerb and broken granite; (11) broken slag, chippings, etc.; (12) river gravel; (13) coal; (14) picks, shovels, and scoops; (15) ironmongery; (16) scavenging and other brushes; (17) disinfectants. Forms of tender may be obtained by applying to Mr. Arthur Brown, M.I.C.E., City Engineer, Nottingham, on payment of 5s. each. Patterns and samples may be inspected at the Eastcroft Depot, London-road, Nottingham. Tenders must be sent to Mr. Samuel G. Johnson, Town Clerk, Guildhall, Nottingham, on or before December 13.

DECEMBER 15.—Aberdeen.—MATERIALS.—The Town Council of Aberdeen (Electricity Department) invite tenders for the following materials for the twelve months ending December 31, 1907:—(1) Ironmongery; (2) paint, oil, varnish, glass, etc.; (3) timber; (4) plows, drysalteries, etc.; (5) ropes, rope yarn, twine, etc.; (6) brass, lead, and tin work; (7) cast-iron work; (8) carting; (9) brushes. Duplicate schedules will be supplied on application to Mr. J. Alex. Bell, City Electrical and Tramways Engineer, Millburn-street, to whom sealed tenders must be addressed, suitably marked, and delivered on or before noon, December 15.

DECEMBER 15.—Longton.—MATERIALS.—Longton Corporation invite tenders for the supply for twelve months ending December 31, 1907, of the following, viz.:—Broken granite and granite setts, Macleod setts, stone kerbs, cast-iron work, ironmongery, rope yarn, twine, etc.; (6) brass, lead, and tin work; ware pipes, wheelwright's work, and blacksmith's work. Specifications and forms of tender may be had on application to Mr. J. W. Wardle,

Assoc. M.I.C.E., Borough Surveyor, Court House, Longton, Staffordshire. Tenders, under seal, endorsed "Tender for Granite, etc.," as the case may be, are to be left with the Surveyor on or before December 15.

DECEMBER 17.—Bristol.—STORES.—Bristol Sanitary and Improvement Committee invite tenders for the supply of lead pipe, glass, and plumbers' sundries during the three months ending March 31, 1907. Specification and form of tender may be obtained at the offices of the City Engineer, 65, Queen-square, Bristol, on payment of 10s. Tenders must be sent in the envelopes provided, to 65, Queen-square, not later than 1 p.m., on December 17. Mr. T. H. Yallop, Assoc. M.I.C.E., City Engineer and Surveyor, Bristol.

DECEMBER 19.—Halifax.—STORES.—Halifax Gasworks Committee invite tenders for the supply of (1) ironmongery; (2) steel goods; (3) fireclay goods; (4) tarred gaskin, etc.; (5) iron valves and connections; (6) wet and dry gas meters required during the year ending December 31, 1907. Forms of tender, and further particulars, may be obtained on application to Mr. John Wilkinson, F.C.S., Engineer, Gasworks, Halifax. Tenders, endorsed "Gasworks," together with the names of the articles tendered for, must be sent to Mr. Keighley Walton, Town Clerk, not later than 10 o'clock a.m. on December 19.

DECEMBER 29. Horsham.—MATERIALS AND CARTAGE.—West Sussex Roads and Bridges Committee invite tenders for the supply of:—(1) Picked surface flints, and pit flints, delivered on the main roads; (2) broken quartzite, granite, or other stone to Shoreham Harbours and to railway stations; (3) tattered slag, or other tar macadam to railway stations; (4) Cartage from railway stations, wharves, and stone pits to main roads, and team labour per day, for the year ending March 31, 1908. Forms of tender may be obtained on application to Mr. Wm. McIntosh, County Surveyor, County Surveyor's Office, 22, Worthing-road, Horsham, and applicants are requested to state which form of tender (1, 2, 3, or 4) they require. Sealed tenders, endorsed "Tender for Materials" or "Tenders for Cartage," together with samples, to be delivered to the Surveyor on or before December 29.

JANUARY 1. Reading.—ROAD MATERIAL.—Berks shire C.C. ask for tenders for the supply of broken road materials, setts, channels, and kerbs for the twelve months ending March 31, 1908, delivered at railway stations and wharves in the county. On the receipt of a stamped addressed envelope forms of tender, list of stations and wharves, and full particulars will be forwarded by the County Surveyor. Tenders, endorsed "Tender for Materials," to be sent to Mr. J. Fred. Hawkins, County Surveyor, Bank-chambers, Cross-street, Reading, by January 1. A specimen form of contract may be seen at the office of the Clerk of the County Council, 28, The Forebury, Reading.

NO DATE. Maldstone.—STORES.—The R.D.C. of Maldstone give notice that in or about the month of February next they will, by advertisement, invite tenders for the supply of about 3,000 yds. of surface picked stone for the repair of certain roads in the parishes of Boughton Monchelsea, East and West Farleigh, Hinton, Linton, Leese, and Otham. Further information to be obtained of Mr. M. C. Warner, Surveyor, Barming.

Public Appointments.

Nature of Appointment.	By whom Advertised.	Salary.	Applications to be in
*INSTR. OF MANUAL TRAIN, (WOODWORK), DAY SCHLS.	London County Council	1600	Dec. 15
*SURVEYOR AND SANITARY INSPECTOR	Clifton, Dartmouth, Etc., T.C.	1700	Dec. 17
*DEPUTY CITY BUILDING SURVEYOR	Liverpool Corporation	2500	No date

Auction Sales.

Nature and Place of Sale.	By whom Offered.	Date of Sale.
*BUILDING SITE, (TO LET), LOWER THAMES-STREET.—At the Mart	S. Walker & Son	Dec. 2
*DEALS, BATTENS, ETC.—Great Hall, Winchester House, Old Broad-street, E.C.	Chubb & Sims	Dec. 12
*BUILDERS' MERCHANT'S STOCK.—At 210, Upper Richmond-road, Putney, S.W.	J. T. Skelking	Dec. 13
*BUILDERS' PLANT AND MACHINERY.—On land in Millbank-street and Wood-street, S.W.	J. T. Skelking	Dec. 17-18
*CONTS., PLANT AND STOCK, FINSBURY PK., N.—155, St. Thomas rd., Finsbury PK., N.	Fuller, Horsey, Sons, & Cassell	Dec. 18
*BUILDING SITE, MILE END, E.—At the Mart	Daniel Watney & Sons	Jan. 10

PATENTS.—Continued from page 670.

adjusted by means of a handle on the exterior of the fire plates.

26,062 of 1905.—A. T. HOUSE: *Scutch or Hand Tool for Trimming Bricks and the like.*

This relates to a scutch, adze, or hand tool, comprising a head fitted to a suitable handle, a projecting part on said head, the end of which is split and formed with jaws, renewable bits or blades adapted to be clamped by said jaws, an abutment in said jaws for the ends of the bits or blades, and means for securing said bits or blades in said jaws.

2,495 of 1906.—J. C. HARRISON and C. F. HAYTON: *Mortising Machines.*

This relates to a mortising machine, and consists in the combination with the tool-holder of a rotating device or like cam, a lever pivotally connected to the tool-holder at one end and engaging the cam at the other end and a fulcrum for the said lever, the lever being free to move

bodily as well as axially about the fulcrum, and the cam being designed to give through the lever an uniform rate of movement to the tool-holder on the forward stroke and a quick movement on the return stroke.

4,851 of 1906.—A. R. KYLE: *Flushing Cisterns for Water Closets and the like.*

This relates to a flushing cistern, and consists in the combination with a float operating inlet valve and a flushing valve of a horizontally balanced pawl or lever, the ends of which engage respectively with the said actuating mechanism and a float arm, the said lever being actuated to lock and release the said actuating mechanism and being controlled by the movement of the float.

4,945 of 1906.—H. E. TAYLOR: *Apparatus for Heating Air, for Heating Houses, Ships and the like.*

This relates to an apparatus for heating air and the like, and consists in making a hole or holes

from the interior to the exterior of a house, ship, or the like, through which hole or holes pipes are placed to convey cold air from the deck of a ship, or any required distance. The heater consists of a number of circular embedded tubes which are placed on the outside of a boiler or in the boiling water of a tank or on the outside of a fire-oven or the like, so the air passing through the tubes becomes heated. To these tubes is attached a pipe or pipes of required length to convey said heated air to any part of a ship or the bedrooms of a house, or where wanted.

5,194 of 1906.—A. E. CARTER and F. A. WRIGHT: *Screw-down Valves.*

This relates to a screw-down valve comprising a tubular casing or body having at one end an internal valve seat, the face of which is at right angles to the axis of the body, and a second tubular portion or casing at an inclination to the said body, and through which passes a valve spindle having a valve which seats itself upon the seat provided in the tubular body.

6,187 of 1906.—C. WHITEHEAD: Machinery or Apparatus for Moulding Sinks, Dishes, Quarries, Seat Blocks, Building Blocks, Saddle Tiles and the like.

This relates to machinery or apparatus for moulding sinks, baths or the like, seat blocks, saddle tiles, and other similar or suitable articles from fire-clay or the like, and is characterised by a movable moulded box contiguous to a taper, conical or bell-shaped clay box or chamber communicating with a clay barrel or channel, in combination with a steam cylinder and piston or plunger for forcing the clay under pressure into the mould.

8,241 of 1906.—F. DE GRAUWE: Gas-stoves and Radiators.

This relates to gas-stoves provided with lateral flue-boxes connected by transverse flues, and consists in the arrangement of several flue-boxes divided into separate compartments, and connected together by transverse flues arranged obliquely one behind the other, and arranged to conduct the combustion gases from both sides of the combustion chamber in distinct and separate currents flowing in opposite directions through the transverse flues to the chimney outlet.

9,543 of 1906.—E. H. McCLOUD: Fire-resisting Shutters or Screens.

This relates to a hood for rolling fire-resisting curtains, and consists in the combination with the hood an instrument of supplemental shield hinged within the hood and adapted to rest in proximity to the curtain or roller to close the sets between said curtain or roller and the hood proper.

11,368 of 1906.—T. F. J. TRUSS: Method and Means for Propelling and Distributing Air, Gas, and the like for ventilating and other purposes.

This relates to an apparatus for propelling, distributing and circulating air, gas, and the like in which air, gas or the like is driven upwardly by a suitable or propeller against a deflector of such a shape as to remain in equilibrium when under the influence of the impelled streams of air, gas or the like.

12,724 of 1906.—W. B. CLARKE and J. R. ADAMS: Fire-stoves.

This relates to a fire-stove, and consists in the combination with a supporting ring having upon its under side a lug provided with a T-shaped slot in which is pivotally supported a lever having its outer end forked for engagement with a poker handle instrument, and a second lug also slotted in which is supported so as to be free to move laterally the end of the lever aforesaid, of a sliding grid working always between projections upon the supporting ring, and removably connected to the lever, said grid having its edges bevelled.

13,857 of 1906.—W. P. BONWICK: Devices for Promoting the Combustion and Economising the Consumption of Fuel in Grates, Ranges, and the like.

This relates to a compound refractory block comprising sections, each formed in one piece, with suitably shaped projections and with corresponding recesses adapted to be so securely engaged by the projections of a similar section that the several sections are held against relative movement in all directions but the one necessary to disengage them, appropriate passages for heating air and leading it to the fuel being formed by grooves in the walls of the block sections.

18,051 of 1906.—P. A. NEWTON (The New Jersey Wire Cloth Company): Fireproof Structures.

This relates to fireproof floors and similar structures having metal bars extending between the beams and supported thereby, and metal strips extending longitudinally of the beams between and supported by said bars, and consists in the use of thin strips of wood or equivalent material extending transversely to the beams, and supported on said metal bars and strips for supporting the concrete during setting.

SOME RECENT SALES OF FREEHOLD ESTATE EXCHANGE REPORT.

November 22—By S. B. CLARK & SON (at Portsmouth).	
Portsmouth, Hants.—3, Alexandra-ter, f., y.r. 104, 108.	320
21 and 53, Crossway, f., y.r. 324.	550
167, Stambury-rd., f., y.r. 171.	195
32, 44, 68, and 69, Havant-rd., f.	165
9, Torio-rd., f.	210
12, Arnaud-rd., f.	160
57A, Ensworth-rd., f., y.r. 181.	305
42 and 43, Orchard-rd., f., y.r. 381.	700
November 28.—By JONES, LANG, & CO.	
City—8 and 9, Gillespue-st., area 1,250 ft., building lease for 81 yrs., at per annum.	275
122 and 124, Queen Victoria-st., area 3,140 ft., at 47 yrs., f., y.r. 602.	11,000
Brentford, Midd.—320 and 321, High-st., f., e.r. and y.r. 181.	910
11, 12, and 13, Church-rd., f., w.r. 851.	755
By C. SPARROW & SON (at Finchley).	
Finchley—Lone-la, two parcels of freehold building land.	925

November 27.—By H. J. BROMLEY.	
Forest Hill—19 and 21, London-rd., and cottage in rear, area 2 acres, f., w.r. 1143.	2,750
1, 3, 5, and 7, Malvern-rd., f., w.r. 1143.	1,010
101 to 111 (odd), Ewart-rd., f., w.r. 1451, 123.	1,795
Ewart-rd., a freehold plot of land.	100
6 to 20 (even), Rockbourne-rd., u.t. 50 yrs., e.r. 851, y.r. 287.	1,695
Perry Vale—Ravenswood, u.t. 68 yrs., e.r. 221, y.r. 801.	700
Dulwich—9 and 11, Melior-rd., f., y.r. 701.	1,020
By G. H. HEARD & CO.	
Battersea—7, St. John's-Hill, (s), u.t. 88 yrs., g.r. 201, y.r. 841.	550
Clapton—128, 134, and 138, Upper Clapton-rd., (s), u.t. 67 yrs., g.r. 721, y.r. 2901.	2,300
By KENNELLY.	
Woodford—Chelmsford-rd., "Middleton House," f., d.	1,000
By MARLER & CO.	
Kensington—23, Holland-st., f., y.r. 841.	1,430
By MILES, BOOKER, & CO.	
Baywater—57, Chepstow-pl., u.t. 51 yrs., g.r. 121, p.	700
By RUTLEY, SON & VINE.	
Fitzroy Square—11, Fitzroy-mews, u.t. 171 yrs., g.r. 201, w.r. 361, 88.	120
Holloway—109 and 111, Seven Sisters-rd., u.t. 36 yrs., g.r. 91, y.r. 901.	755
By ALFRED SAYILL & SONS.	
Edmonton—Hendon, g.r. rents 511, reversion in 92 yrs.	1,060
By DOLMAN & PRARCE (at Camden Town).	
Kenish Town—36, Kenish Town-rd., u.t. 25 yrs., g.r. 108, y.r. 551.	425
6, Preston-st., u.t. 33 yrs., g.r. 51, w.r. 521.	230
November 28.—By A. ALDRIDGE & CO.	
Thornton Heath—38, Woodville-rd., f., y.r. 391.	383
Battersea—Queen's-rd., g.r. 91, 151, reversion in 68 yrs.	230
Woolwich—10 and 11, Prospect-row, f., w.r. 921, 88.	400
27, Wood-avenue, 1/2 acre, f., p.	800
By RAMSAY, WAINWRIGHT, & CO.	
Finchbury Park—18, Queen's-rd., u.t. 53 yrs., g.r. 91, w.r. 551.	400
By SOUTHOFF & ROBINSON.	
Bermondsey—114 to 122 (even), Bermondsey-st., (s), with warehouse and factory, area 5,800 ft., f., y.r. 2151.	3,300
Islington—3 and 4, Waterloo-ter., 2 1/2, 241 yrs., g.r. 131, y.r. 701.	500
17, Sherborne-st., (s), u.t. 201 yrs., g.r. 101, 108.	300
By EDWIN EVANS (at Battersea).	
Tooting—114 to 148 (even), Essey-rd., u.t. 67 yrs., g.r. 981, w.r. 934.	3,650
Battersea—52 to 68, Vanbrugh-rd., f., 741 yrs., g.r. 241, w.r. 1611.	1,230
Wandsworth Road—No. 534, (s), u.t. 23 yrs., g.r. 108, y.r. 451.	330
Wandsworth—41 and 43, Vandell-rd., u.t. 87 yrs., g.r. 101, w.r. 701.	433
By MADISON, MILES, & CO. (at Yarmouth).	
Loud, Norfolk—Freehold cottage and gdn., y.r. 81, w.r. 281.	102
Rednam, Norfolk—A riverside house, and 2a, 8r. Op. f. and c.	225
Ranworth, Norfolk—Freehold house and market garden, 4s. 6d., y.r. 181.	243
Rollsby, Norfolk—Freehold house and market gdn., 1 acre, p.	400
November 29.—By BLAKE & DAKYART.	
Greenwich—41 and 43, Catherine-st., u.t. 112 yrs., g.r. 101, w.r. 521, 108.	130
By GRAVES & SON.	
Baywater—27, Bark-pl., u.t. 61 yrs., g.r. 71, 141, w.r. 281.	190
By W. W. JENKINSON & CO.	
Streatham—55, Thrale-rd., and 1/2 acre, f., p.	1,710
By C. C. & T. MOORE.	
Bethnal Green—84, Pollard-row, and 2, Old Bethnal Green-rd. (factory and warehouse), area 2,500 ft., f., y.r. 1701.	2,400
Limehouse—3 and 5, Pigott-st., u.t. 311 yrs., g.r. 81, w.r. 711, 161.	243
Leytonstone—397 and 399, High-rd., (s), u.t. 751 yrs., g.r. 101, 108, e.r. 781.	410
By ROGERS BROS.	
New Cross—50, Hatcham Park-rd., u.t. 37 yrs., g.r. 41, y.r. 281.	255
1, Kender-gr., u.t. 70 yrs., g.r. 51, w.r. 261.	170
3, Kender-gr., f., d.	350
By STINSON & SONS.	
South Lambeth—147 and 149, Harrington-rd., u.t. 36 yrs., g.r. 121, w.r. 671, 121.	510
Southwark—66 and 68, Redcross-st., (s), u.t. 151 yrs., g.r. 91, 181, y.r. 841.	170
17, 17A, and 19, Glenham-rd., u.t. 151 yrs., g.r. 91, y.r. 791, 88.	210
Camberwell—5, Poval-rd., u.t. 741 yrs., g.r. 41, 151, w.r. 51, 181.	270
170, Camberwell-gr., u.t. 161 yrs., g.r. 101, 108, e.r. 551.	145
Peckham—34, St. Mary's-rd., u.t. 25 yrs., g.r. 81, y.r. 61, 151.	345
11, St. Mary's-rd., u.t. 25 yrs., g.r. 201, e.r. 451.	300
Forest Hill—Rockbourne-rd., u.t. 931 yrs., g.r. 71, 108, e.r. 401.	100
Walthamstow—52, Russell-rd., f., w.r. 331, 161.	230
November 30.—By GROOM & BOND.	
Mayfair—36, Berkeley-sq., and 9, Farm-st., u.t. 78 yrs., g.r. 2001, p.	18,000
By BRODIE, TINKS, & CO.	
Piccadilly—11, Cork-st., and 7, Cork Mews, area 1,600 ft., beneficial lease for 10 yrs., y.r. 1751.	660
By C. HATLEY MARON.	
Willesden—33, Church-rd., u.t. 621 yrs., g.r. 81, 88, e.r. 501.	350
71, Church-rd., u.t. 61 yrs., g.r. 71, 108, y.r. 361.	280

By G. HASLET.

Catford—81 to 107 (odd), Davenport-rd., u.t. 80 and 91 yrs., g.r. 701, w.r. 5101, 28. £3,370

By ROBERTS, GORE, & MERCEY.

Soho—3, Walker-st., (s), u.t. 121 yrs., g.r. etc. 851, 181, with goodwill, fixtures and fittings.

Breamham—85, Palace-rd., u.t. 92 yrs., g.r. 101, e.r. 851. 750

By WHEELER & WHEELER.

Muswell Hill—11, Hillside-pk., u.t. 92 yrs., g.r. 131, e.r. 701. 650

Contracts used in these lists.—F.g.r. for freehold ground-rent; l.g.r. for leasehold ground-rent; i.g.r. for improved ground-rent; g.r. for ground-rent; r. for rent; f. for freehold; c. for copyhold; l. for leasehold; p. for possession; e.r. for estimated rental; w.r. for weekly rental; q.r. for quarterly rental; y.r. for yearly rental; u.t. for unexpired term; p.a. for per annum; p.c. for years; l.a. for lane; s. for street; rd. for road; sq. for square; pl. for place; ter. for terrace; cres. for crescent; av. for avenue; gdn. for gardens; yd. for yard; gr. for grove; b.h. for beerhouse; p.h. for public-house; o. for office; s. for shop; ct. for court.

MEETINGS.

SATURDAY, DECEMBER 8.

Association of Teachers in Technical Institutions.—Mr. Arnall, M.R.S.I., on "Practical Sanitary Science."

Association of Water Engineers.—Eleventh winter meeting to be held at the Geological Society's apartments, Burlington House, W. Ballots will be taken for the Council and Officers for 1907-8, and for new members, etc. The following papers will then be read and discussed: "The Use of Sulphate of Copper in Filtration," by Dr. Adolph Kenna; "The Wind-Kogin for Pumping," by Mr. George Phelps; "The Laying of a Submerged Water Main under the River south of E.R. N.B.," by Mr. Herbert Hall; "Various Causes of Waste of Water and Methods of Prevention," by Mr. Ralph Blackiston, 10 a.m.

Junior Institution of Engineers.—Visit the Honor Oak Reservoirs of the Metropolitan Water Board. 3 p.m.

Incorporated British Institute of Certified Carpenters (Carpenters' Hall, London-vault, E.C.)—The annual general meeting. 8.30 p.m.

MONDAY, DECEMBER 10.

London Institution.—The Rev. J. S. Barras, M.A., on "The Churches of the City," illustrated. 5 p.m.

University of London (Imperial Institute-road).—Mr. Baister Fletcher on "Greek Temples of the Corinthian Order." 8 p.m.

Surveyors' Institution (Afternoon Meeting).—Mr. Leslie S. Wood on "The Improvement of our Woodlands." 4 p.m.

Clerks of Works' Association (Carpenters' Hall).—Paper by Mr. A. Flincham. 7.30 p.m.

British Society of Architects.—Mr. A. Needham Wilson on "Architectural Development in the South of France," illustrated by lantern slides. 8 p.m.

Institute of Builders.—Visit to St. Paul's Cathedral at 2.30 p.m.

TUESDAY, DECEMBER 11.

Institution of Civil Engineers.—(1) Papers to be further discussed: "The Talla Water Supply of the Edinburgh and District Waterworks"; "Repairing a Limestone Concrete Aqueduct"; and "The Yield of Catchment Areas." (2) Time permitting, paper to be read: "Mechanical Considerations in the Design of High-Tension Switch-Gear," Mr. H. W. E. Le Fanu, M.Inst.C.E. 8 p.m.

WEDNESDAY, DECEMBER 12.

Edinburgh Architectural Association.—Mr. J. L. Lawrence on "The Sanitary Consideration of Building." 8 p.m.

Northern Architectural Association.—Mr. G. A. T. Middleton on "Continental, Romanesque, and Gothic Detail," with lantern illustrations. 7.30 p.m.

Institution of Civil Engineers.—Lecture visit to the Wire-Rope Works of Messrs. Bunnell & Co., Ltd., 38, West Ferry-road, Millwall, E. 2.30 p.m.

THURSDAY, DECEMBER 13.

London Institute Builders' Association (at 31 and 32, Bedford-street, Strand, W.C.)—Finance Committee Meeting. 3 p.m. Council Meeting. 4 p.m.

FRIDAY, DECEMBER 14.

Glasgow Architectural Craftsmen's Society.—Mr. Colin Sinclair on "The Philosophy of Art." 8 p.m.

Institution of Mechanical Engineers. 8 p.m.

Institution of Civil Engineers (Students' Meeting).—Mr. A. Carmichael on "Mechanical Improvements in the Drainage of the Bedford Level." 8 p.m.

TO CORRESPONDENTS.

H. E. J. (Amounts should have been stated).

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PRICES CURRENT OF MATERIALS.

* Our aim in this list is to give, as far as possible, the average prices of materials, not necessarily the lowest. Quality and quantity obviously affect prices—a fact which should be remembered by those who make use of this information.

BRICKS, &c.

Hard Stocks	£ s. d.	
10 0	0	per 1000 alongside, in river.
Grizzles	1 7 0	" " " "
Picked Stocks for Facings	2 17 6	" " delivered.
Flettons	1 8 0	" " at railway depot.
Red Wire Cuts	1 14 0	" " " "
Best Fareham Red	3 12 0	" " " "
Best Red Pressed	"	" " " "
Bunton Facing	5 0 0	" " " "
Best Blue Pressed	"	" " " "
Staffordshire	3 15 0	" " " "
Do. Bulhouse	4 0 0	" " " "
Best Stourbridge	"	" " " "
Fire Bricks	3 14 0	" " " "
GLAZED BRICKS.		
Best White and Ivory Glazed	"	" " " "
Stretchers	12 0 0	" " " "
Headers	11 0 0	" " " "
Quoins, Bullnose, and Flats	16 0 0	" " " "
Double Stretchers	19 0 0	" " " "
Double Headers	16 0 0	" " " "
One Side and two Ends	19 0 0	" " " "
Two Sides and one End	20 0 0	" " " "
Slays, Chamfered, Squinted	20 0 0	" " " "
Best Dipped Salt Glazed Stretchers and Headers	12 0 0	" " " "
Quoins, Bullnose, and Flats	14 0 0	" " " "
Double Stretchers	15 0 0	" " " "
Double Headers	14 0 0	" " " "
One Side and two Ends	15 0 0	" " " "
Two Sides and one End	15 0 0	" " " "
Slays, Chamfered, Squinted	14 0 0	" " " "
Second Quality White and Dipped Salt Glazed	2 0 0	" " less than best.
Thames and Pit Sand	7 0	per yard, delivered.
Thames Ballast	5 6	" " " "
Best Portland Cement	27 0	per ton, "
Best Ground Blue Lias Lime	18 0	" " " "

NOTE.—The cement or lime is exclusive of the ordinary charge for sacks.

Grey Stone Lime 11s. 6d. per yard, delivered.
Stourbridge Fireclay in sacks 27s. 6d. per ton at rly. dpt.

STONE.

BATH STONE—delivered on road wag- gons, Faddington Depot.	s. d.	
Do. do, delivered on road wag- gons, Nine Elms Depot.	1 8½	" "
PORTLAND STONE (20 ft. average)—Brown Whitbed, delivered on road wag- gons, Faddington Depot, Nine Elms Depot, or Pimlico Wharf.	2 1	" "
White Baseded, delivered on road wag- gons, Faddington Depot, Nine Elms Depot, or Pimlico Wharf.	2 2½	" "
ANCASTER in blocks.	s. d.	
Beer	1 6	" "
Greenhill	1 10	" "
Darley Dale in blocks	2 4	" "
Red Cornehill	2 2	" "
Clooseburn Bed Freestone	2 0	" "
Red Mansfield	2 4	" "
YORK STONE—Robin Hood Quality, Scappled random blocks.	2 10	" "
6 in. sawn two sides land- ings to sizes (under 40 ft. super.)	2 3	per ft. super., "
6 in. rubbed two sides ditto, ditto	2 6	" "
3 in. sawn two sides slabs (random sizes)	0 11½	" "
2 in. to 2½ in. sawn one side slabs (random sizes)	0 7½	" "
1½ in. to 2 in. ditto, ditto	0 6	" "
HARD YORK—Scappled random blocks.	3 0	per ft. cube, "
6 in. sawn two sides land- ings to sizes (under 40 ft. super.)	2 8	per ft. super., "
6 in. rubbed two sides ditto	3 0	" "
3 in. sawn two sides slabs (random sizes)	1 2	" "
3 in. self-faced random slabs	0 5	" "
HEPTON WOOD (Hard Bed) in blocks	2 0	per ft. cube, deliv. rly. depot.
" " " " 6 in. sawn both sides landings to sizes (under 40 ft. super.)	2 7	per ft. super. deliv. rly. depot.
" " " " 3 in. sawn both sides random slabs	1 0	" "
" " " " 2 in. do.	0 8½	" "

SLATES.

In. In.	£ s. d.	
20x40 best blue Bangor	13 2 6	per 1000 of 1200 at r. d.
20x12	13 17 6	" "
20x40 first quality	13 0 0	" "
20x42	13 15 0	" "
15x8	7 5 0	" "

SLATES (continued).

In. In.	£ s. d.	
20x10 best blue Port- madoc	12 12 6	per 1000 of 1200 at r. d.
16x8	6 12 6	" "
20x10 best Eureka un- fading green	15 17 6	" "
20x12	18 7 6	" "
18x13	13 5 0	" "
16x8	10 5 0	" "
20x10 permanent green	11 12 6	" "
18x10	9 12 6	" "
16x8	6 12 6	" "
TILES.		
Best plain red roofing tiles	s. d.	
Hip and Valley tiles	3 7	per doz. at rly. depot.
Best Broseley tiles	50	0 per 1000
Do. Ornamental tiles	52 6	" "
Hip and Valley tiles	4 0	per doz.
Best Bunton red, brown, or brindled do. (Edwards)	57 6	" "
Do. Ornamental do.	60	0
Hip tiles	4 0	per doz.
Valley tiles	3 0	" "
Best Red or Mottled Stafford- shire do. (Peakes)	51 9	per 1000
Do. Ornamental do.	54 6	" "
Hip tiles	4 1	per doz.
Valley tiles	3 8	" "
Best "Esomary" brand plain tiles	48	0 per 1000
Best Ornamental tiles	50	0
Hip tiles	4 0	per doz.
Valley tiles	3 8	" "
Best "Hartshill" brand plain tiles, sand-faced	50	0 per 1000
Do. pressed	47 6	" "
Do. Ornamental do.	50	0
Hip tiles	4 0	per doz.
Valley tiles	3 6	" "

WOOD.

BUILDING WOOD.	At per standard.	£ s. d.	
Deals: best 3 in. by 11 in. and 4 in. by 9 in. and 11 in.	13 10	0	15 0 0
Deals: best 3 by 9	13 0	0	14 0 0
Battens: best 2½ in. by 7 in. and 8 in. and 3 in. by 7 in. and 8 in.	11 0	0	12 0 0
Battens: best 2½ by 6 and 3 by 6.	0 10	0	less than 7 in. and 8 in.
Deals: seconds	1 0	0	less than best.
Battens: seconds	0 10	0	" "
2 in. by 4 in. and 3 in. by 8 in.	3 0	0	10 0 0
2 in. by 4 in. and 3 in. by 5 in.	3 10	0	9 10 0
Foreign Sawm Boards—1 in. and 1½ in. by 7 in.	0 10	0	more than battens.
2 in.	1 0	0	" "
At per load of 50 ft.			
Fir timber: best middling Danzig or of Menckelstrange specification	4 10	0	5 0 0
Seconds	4 0	0	4 10 0
Small timber (8 in. to 10 in.)	3 12 6	0	3 15 0
Small timber (6 in. to 8 in.)	3 0	0	3 10 0
Swedish balks	2 10	0	3 0 0
Pitch-pine timber (30 ft. average)	4 0	0	4 15 0

JOINERS' WOOD.

At per standard.	£ s. d.	
White Sea: first yellow deals, 3 in. by 11 in.	24 0	0 25 0 0
3 in. by 9 in.	22 0	0 23 0 0
Battens, 2½ in. and 3 in. by 7 in.	16 0	0 18 0 0
Second yellow deals, 3 in. by 11 in.	18 0	0 20 0 0
3 in. by 9 in.	17 0	0 19 0 0
Battens, 2½ in. and 3 in. by 7 in.	13 0	0 14 0 0
Third yellow deals, 3 in. by 11 in.	13 0	0 15 0 0
Battens, 2½ in. and 3 in. by 7 in.	11 0	0 12 0 0
Petersburg first yellow deals, 3 in. by 11 in.	21 0	0 22 0 0
Do. 3 in. by 9 in.	18 0	0 19 0 0
Battens	13 0	0 15 0 0
Second yellow deals, 3 in. by 11 in.	16 0	0 18 0 0
Do. 3 in. by 9 in.	14 0	0 16 0 0
Battens	11 0	0 12 0 0
Third yellow deals, 3 in. by 11 in.	13 0	0 14 0 0
Do. 3 in. by 9 in.	12 0	0 13 0 0
Battens	10 0	0 11 0 0
White Sea and Petersburg—First white deals, 3 in. by 11 in.	14 10	0 15 10 0
3 in. by 9 in.	13 10	0 14 10 0
Battens	11 0	0 12 0 0
Second white deals, 3 in. by 11 in.	13 10	0 14 10 0
3 in. by 9 in.	12 10	0 13 10 0
Battens	10 0	0 11 0 0
Pitch-pine: deals	13 0	0 21 0 0
Under 2 in. thick extra	0 10	0 1 0 0
Yellow Pine—First, regular sizes	44 0	0 upwards.
Oddments	32 0	0
Seconds, regular sizes	33 0	0
Yellow Pine oddments	28 0	0
Kaur Pine—Planks, per ft. cube.	0 3 6	0 5 0
Danzig and Stettin Oak Logs—Large, per ft. cube	0 8 0	0 3 6
Small	0 2 6	0 2 6
Wainscot Oak Logs, per ft. cube.	0 6 6	0 6 0
Dry Wainscot Oak, per ft. sup. as 1 in.	0 8½	0 0 9½
3 in. do. do	0 7	0
Dry Mahogany—Hoarders, 3 in. do. do	0 0 9	0 1 0
Selected, Figury, per ft. super. as inch	0 1 8	0 2 6
Dry Walnut, America, per ft. super. as inch	0 10	0 1 0
American Whitewood Planks, per ft. cube.	17 0	0 22 0 0
Prepared Flooring, etc.—1 in. by 7 in. yellow, planed and shot	0 13 6	0 17 6
matched	0 14 0	0 18 0
1½ in. by 7 in. yellow, planed and matched	0 16 0	0 1 0
1 in. by 7 in. white, planed and shot	0 12 0	0 14 6
1 in. by 7 in. white, planed and matched	0 12 6	0 15 0

WOOD (continued).

JOINERS' WOOD (continued).	Per square.	£ s. d.	
Prepared Flooring, etc. (continued)—1 in. by 7 in. white, planed and matched	0 15 0	0 16 6	" "
3 in. by 7 in. yellow, planed and beaded or V-jointed brds.	0 11 0	0 13 6	" "
1 in. by 7 in.	0 14 0	0 18 0	" "
3 in. by 7 in. white	0 10 0	0 11 6	" "
1 in. by 7 in.	0 12 0	0 15 0	" "
6 in. at 6d. to 9d. per square less than 7 in.			" "

JOISTS, GIRDERS, &c.

In London, or delivered by Railway Vans, per ton.	£ s. d.	
Rolled Steel Joists, ordinary sections	7 5 0	7 15 0
Compound Girders, ordinary sections	9 10 0	10 10 0
Steel Compound Stanchions	13 5 0	13 5 0
Angles, Tees, and Channels, ordi- nary sections	9 5 0	10 5 0
Flitch Plates	9 5 0	10 5 0
Cast Iron Columns and Stanchions including ordinary patterns	8 0 0	9 0 0

METALS.

Per ton, in London.	£ s. d.	
Iron—Common Bars	8 10 0	9 0 0
Staffordshire Crown Bars, good merchant quality	9 0 0	9 10 0
Staffordshire "Marked Bars"	11 0 0	9 10 0
Mild Steel Bars	9 10 0	9 10 0
Hoop Iron, best price	9 10 0	9 15 0
" Galvanised	17 10 0	—
" (And upwards, according to size and gauge.)		
Sheet Iron Black	10 0 0	—
" 24 g.	11 0 0	—
" 26 g.	12 10 0	—
Sheet Iron, Galvanised, flat, ordinary quality—Ordinary sizes, 6 ft. by 2 ft. to 3 ft. to 20 g.	14 10 0	—
Ordinary sizes to 22 g. and 24 g.	15 0 0	—
Sheet Iron, Galvanised, flat, best quality—Ordinary sizes to 20 g.	17 10 0	—
" 22 g. and 24 g.	18 0 0	—
Galvanised Corrugated Sheets—Ordinary sizes 6 ft. to 8 ft. 20 g.	14 10 0	—
" 22 g. and 24 g.	14 15 0	—
" 26 g.	15 0 0	—
Best Soft Steel Sheets, 6 ft. by 2 ft. to 3 ft. by 20 g. and thicker	13 0 0	—
Best Soft Steel Sheets, 22 g. & 24 g.	13 0 0	—
Cut Nails, 3 in. to 6 in.	10 0 0	10 10 0
(Under 3 in., usual trade extras.)		

LEAD, &c.

Per ton, in London.	£ s. d.	
LEAD—Sheet, English, 3 lb. and up.	22 0 0	—
Pipe in coils	22 10 0	—
Soil pipe	25 0 0	—
Compo pipe	25 0 0	—
ZINC—Sheet—Vieux Montagne	34 0 0	—
Silesian	33 15 0	—
CORRUG.—Strong Sheet	per lb. 0 1 4	—
Thin	0 1 5	—
Copper nails	0 1 3	—
BRASS—Strong Sheet	0 1 2	—
Thin	0 1 3	—
Tin—English Ingots	0 1 11	—
Solders—Plumbers'	0 1 0	—
Tinmen's	0 0 11½	—
Blowpipe	0 1 1	—

ENGLISH SHEET GLASS IN CRATES OF STOCK SIZES.

24 oz. thirds	24 d. per ft. delivered.	
" fourths	34d.	" "
21 oz. thirds	34d.	" "
" fourths	24d.	" "
26 oz. thirds	44d.	" "
" fourths	34d.	" "
32 oz. thirds	54d.	" "
" fourths	44d.	" "
Fluted Sheet, 15 oz.	34d.	" "
" 21 oz.	44d.	" "

ENGLISH ROLLED PLATE IN CRATES OF STOCK SIZES.

24 d. per ft. delivered.	
Hartley's	24d.
" "	24d.
Figured and Oxford Rolled	34d.
" Oceanic " Glass, white	44d.
Do. " tinted "	54d.

OILS, &c.

per gallon	£ s. d.	
Baw Linseed Oil in pipes	0 8 0	0 1 10
" " in drums	0 8 0	0 1 11
Boiled " in pipes	0 2 0	0 2 0
" in barrels	0 2 1	0 2 1
" in drums	0 2 3	0 2 3
Turpentine in barrels	0 4 0	0 4 0
" in drums	0 4 2	0 4 2
Genes Ground English White Lead	per ton	25 0 0
Red Lead, Dry	24 0 0	—
Best Linseed Oil Putty	per cwt.	0 7 0
Stockholm Tar	per barrel	1 12 0
VARNISHES, &c.	Per gallon	£ s. d.
Fine Pale Oak Varnish	0 8 0	0 8 0
Fine Copal Oak	0 10 0	0 10 0
Superfine Pale Elastic Oak	0 12 6	0 12 6
Fine Extra Hard Church Oak	0 10 0	0 10 0
Superfine Hard-drying Oak, for seats of Churches	0 14 0	0 14 0
Fine Elastic Carriage	0 12 6	0 12 6
Superfine Pale Elastic Carriage	0 16 0	0 16 0
Fine Pale Maple	0 18 0	0 18 0
Finest Pale Durable Copal	0 19 0	0 19 0
Extra Pale French Oil	1 1 0	1 1 0
Eggshell Flattening Varnish	0 13 0	0 13 0

LONDON.—For reconstructing drains, providing and erecting new w.c.s, etc., at the Workhouse, Tanner-street, Bermondsey, S.E., for Bermondsey Guardians, Messrs. Newman & Newman, Architects, 31, Tooley-street, S.E.

Caban & Son	£125	Thomas & Edge	£93
R. E. Nientingale	120	W. Glendinning	88
W. Renon	110	W. J. Negus	76
Brass & Sons	107	The North British	
J. T. Chalkley	104	Plumbing Co.	76
J. A. Bonwick	98	S. J. Collins, 48, Kellyn-	
W. C. Harper	95	road, Wandsworth-	
		rd., Clapham*	70

LONDON.—For heating apparatus and for the necessary builder's work in connection with Hildrop-road, Secondary School, Islington, N., for the London County Council—

G. Davis	£1,150 0 0	Comyn Clark	
Turner & Co.	823 0 0	& Co., Ltd.	1614 0 0
J. Grundy	777 0 0	G. & E. Brad-	
G. Kite & Co.	750 0 0	ley	613 0 0
W. Richard-		Brightside	
son & Co.	710 0 0	Foundry &	
H. C. Price		Engineering	
Lea, & Co.	675 0 0	Co., Ltd.	609 0 0
J. Deires & Co.		J. & F. May	599 0 0
Sons, Ltd.	658 0 0	Strode & Co.,	
J. Vettion & Co.		48, Osnab-	
Stevens & Co.		burgh-st.*	510 0 0
Sons	650 0 0		

The estimate of the Architect (Education) comparable with those tenders is £850.]

LONDON.—For heating apparatus and for the necessary builder's work in connection with Clifton-hill school, Deptford, for the London County Council—

Korting Bros.	£725 0 0	Sons, Ltd.	£544 16 0
J. Boyd & Sons	630 0 0	Brightside Foun-	
Wipell Bros. & Row	614 3 0	dry & Engin-	
J. Grundy	597 0 0	ering Co., Ltd.	629 0 0
H. C. Price, Lea, & Co.	590 10 0	H. J. Cash & Co.,	
J. Deires & Co.	590 10 0	Ltd., Caxton	
Sons, Ltd.	590 10 0	House, West-	
G. & E. Bradley	571 0 0	minster*	514 0 0
		Stevens & Sons	450 0 0

An assigned tender amounting to £583 was also received. [The estimate of the Architect (Education) comparable with these tenders is £565.]

MANOR ASYLUM.—For erection of additional buildings, for the London County Council: the erection and equipment of two new blocks, staff quarters, etc., at the Manor Asylum—

Cummins & Sons, Ltd.	£22,173 0 0
H. Potter	16,476 3 8
Potter Bros.	16,402 6 2
Lovell & Sons	16,288 0 0
H. Lovatt, Ltd.	16,164 0 0
Longley & Co.	15,980 0 0
Messom & Sons	15,932 0 0
C. Wall & Co., Ltd.	15,899 0 0
Leslie & Co.	15,706 0 0
Cropley Bros.	15,695 0 0
Lawrence & Sons	15,594 0 0
Hyde & Co.	15,570 0 0
Coak & Son	15,568 0 0
Forster & Dickson	15,522 0 0
J. & M. Patrick	15,511 0 0
J. Allen & Sons, Ltd.	15,500 0 0
S. E. Moss	15,474 0 0
Droving & Co.	15,020 0 0
Goddard & Sons	15,000 0 0
Johnson & Co.	14,977 0 0
Stephens & Sons	14,944 5 0
Kirk & Randall	14,899 0 0
Thomas & Edge	14,902 0 0
F. & T. Foster	14,881 0 0
A. J. Colborne	14,768 7 8
Holliday & Greenwood	14,749 0 0
Oak Building Co.	14,633 0 0
R. J. Saunders	14,624 0 0
Hawkins & Co.	14,304 0 0
A. Faulks	14,080 16 0
Harris & Sons	13,700 0 0
A. M. Coles	13,652 10 7
W. Moss & Sons	13,193 16 8
B. E. Nightingale, London*	13,237 0 0

NEW HIRST.—For erecting new Council school, Ashington, for Northumberland Education Committee, Mr. G. Topham Forrest, architect to the Committee, Quantities by Messrs. J. P. Allen & Partners, of Newcastle-on-Tyne.

B. Carre & Son, Amble*	£8,017 13 10
------------------------------	--------------

[Twenty-one contractors tendered for the work.]

PEMBREY (Wales).—For building a schoolroom, etc., and renovating Bethel M. Chapel. Messrs. G. Morgan & Sons, architects, Carmarthen.

Brown, Thomas, & John	£1,235 0 0	Thomas & Evans & Sons	£1,100 0 0
R. Thomas	1,209 13 6	B. Howell & Son	1,062 10 0
James & Reynolds	1,199 12 6	R. Malpas, Pembrey*	1,095 0 0

ROSCREA (Co. Tipperary).—For erecting a bacon factory, for the Roscrea Bacon Factory Ltd. Directors, Messrs. W. Douglas & Sons, Ltd., architects, Putney, London.

T. Power & Son, Kilkenny*	£2,197 13 9
---------------------------------	-------------

[Thirteen others tendered all higher than the above.]

STOKE-UPON-TRENT.—For erecting boiler-house at electricity works, for the Corporation. Mr. A. Burton, Borough Surveyor, Town Hall, Stoke—

G. Tull	£332 33 1	J. Rappall	£268 0 0
J. Boston	288 0 0	Bell & Robinson	
T. Godwin	285 0 0	Stoke-on-Trent*	255 0 0
S. Heath	277 9		

TOTTENHAM.—For heating the Parkhurst-road School with low-pressure hot water, for the Education Committee. Mr. G. B. T. Laurence, A.R.I.B.A., 25, Buckingham-street, Adelphi, W.C.—

Clark, Hunt, & Co., 159 and 160, Shoreditch*	£910 15 8
--	-----------

TOTTENHAM.—For tar-paving and wood-block flooring for Parkhurst-road and Belmont-road schools, for the Education Committee. Mr. G. B. T. Laurence, A.R.I.B.A., 25, Buckingham-street, Adelphi, W.C.—

Parkhurst-road Tar-paving, Grounds & Newton, Page-green, Tottenham* ..	£319
Belmont-road Tar-paving, Grounds & Newton, Page-green, Tottenham* ..	429
Parkhurst-road Wood-block Flooring, Ellis, Geary, & Co., London*	680

TUNBRIDGE WELLS.—For painting, etc., at the Town Hall, for the Borough Council. Mr. W. H. Maxwell, Borough Surveyor, Town Hall, Tunbridge—

Benoy & Son	£116 11 0	S. & J. Jones	£93 8 0
J. Crates & Son	108 0 0	F. Donovan	69 10 0
Sykes & Son	95 8 0	W. B. Jury & T. Lester	94 19 0
C. Goddard	94 19 0	Son*	61 17 0

[All of Tunbridge Wells.]

WOODFIELD.—For erecting twelve houses at Woodfield, near Blackwood, for the Pezmann Building Club, Mr. W. A. Griffiths, architect, Pontlanfraith, Mon. Per House—

A. R. John	£292 0 0	H. Rees	£212 0 0
H. Phillips	229 0 0	Bisby & Thomas	205 10 0
H. J. Davis	228 17 9	P. Passmore & E. T. Davies	222 11 9
S. Edwards	215 10 0	J. Nyddall, T. I. Evans	215 0 0

[Mon.* 194 0 0]

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The Builder.

VOL. XCI.—No. 3332.

DECEMBER 15, 1906.

ILLUSTRATIONS.

Design for a Theatre Ceiling.....	By Mr. A. C. Conrade.
House, Kensington Palace-gardens	Mr. E. J. May, F.R.I.B.A., Architect.
Village Hall, Shorne.....	Mr. R. Weir Schultz, Architect.
Some "Pugin" Sketches.....	By Mr. Geo. Drysdale.

Illustrations in Text.

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Village Hall, Shorne. Plan	Page 695	Figs. 164 and 165	Page 697

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The Forum of Trajan and other Notes from Rome.



COMM. BONI'S examination of the column of Trajan is now completed, but it has led him on to further researches in the Forum of Trajan, which are still in

progress, and which bring before us problems of considerable importance. He himself published an interesting account of them, as far as they had gone up to that date, in the *Nuova Antologia*, for November 1, 1906, pp. 3-39. The first portion of the article deals with the mediæval legend of Trajan and the widow, according to which Trajan, when starting for one of his wars, was stopped by a poor widow who demanded vengeance for her son who had been killed, and, conquered by her persistence, did her justice on the spot. Dante tells the tale in the *Purgatorio* (X.). It was for this act of clemency and justice that Gregory the Great obtained the deliverance of the soul of Trajan from hell. Comm. Boni has collected a large number of interesting representations of the legend in art (pictures, engravings, sculptures, etc.), and traces back its genesis with some probability to a relief, formerly attributed to Trajan, which probably belongs to the period of Marcus Aurelius, and was used by Constantine for the decoration of his arch. In this relief (*Papers of the British School at Rome*, Vol. III., pl.

XXIV., No. IV.) the arrival of the Emperor in Rome is represented, and a recumbent female figure, with the body nude (the legs being draped) and, with her left arm resting on a wheel (the personification, therefore, of one of the great high roads), stretches out her left arm to him. It must be said that the attitude of this figure seems hardly suitable, and we may note that it has generally been supposed that a relief representing the emperor with a captured province, personified as a kneeling woman before him, was the source of the legend; but in such a relief on the arch of Trajan at Benevento there are no horses or floating standards, such as are seen in the mediæval representations. It is not difficult, however, to assume that the actual relief has since disappeared.

The rest of the article deals with the rediscovery of the chamber within the base of the column (see *Builder*, Vol. XC., No. 3296, April 7, 1906, p. 368), and with the results of excavation below the level of the courtyard in which it stood. It was discovered that a large hole had been made in the foundation, consisting of one course of large travertine blocks (themselves resting on a mass of concrete), upon which the base was erected, no doubt by mediæval treasure-seekers who hoped to find the golden urn in which the ashes of Trajan were enclosed. The hole had been used as a place of burial in connexion with the Church of S. Nicola de Columna, and contained some fifteen skeletons, below which lay a stratum of earth with pottery of the VIIIth-Xth century A.D., and above them Renaissance

pottery, the church not having been removed until the time of Pope Paul III., in 1536. This hole has now been filled up with solid concrete, and the stability of the column thus secured, so that it is possible to leave open the chamber in the base. It was in this chamber, in all probability, that the urn containing Trajan's ashes was placed: on the north-west side the wall is now rough for a height of 2½ ft., and the floor for a width of 4 ft., and both for the full length of the chamber, showing that originally there was a bench or table there of solid marble of these dimensions, which has since (very possibly in classical times) been chiselled away. The lower section of the whole base is composed of two enormous masses of marble, which must have been worked to a great extent—as indeed must the whole column—after they had been put in position.

The excavation of the cavity in the foundation before alluded to led to the discovery, immediately to the north-west of the column, and 5 ft. below the level of the time of Trajan, of the pavement of a road, the orientation of which, as given by remains of buildings on its northern edge,* diverges some 19 degrees to the north of that of the Basilica Ulpia, and ascends slightly towards the Quirinal. Below it runs a drain in *opus incertum*, and below it again remains of an earlier pavement of rammed tufa fragments. The virgin soil was nowhere reached.

More recently the line of this road has

* These are built of concrete, faced, not with bricks, but with fragments of tiles (*larici testaceæ*), and may be attributed to the 1st century A.D.

been followed further to the west, and the drain, which ran beneath it, has been brought to light once more at the western edge of the enclosing wall of the excavated area. Close to this drain and parallel to it are two blocks of tufa, measuring 4 by 2 by 2 Roman ft., one of which has been cut by the foundations of the portico which surrounded the column, and which was destroyed on this (the north) side when the Temple of Trajan was added to the original plan of the Forum.

Whether these blocks belong to the early fortifications which must have blocked the valley at or near this point is not yet clear, and the answer to the question must await the continuance of the excavations. It is noticeable that the existence of pre-Trajanic foundations was discovered in the course of the excavations of 1812-14. Nibby, in his edition of Nardini's *Roma Antica* (Rome, 1818), II., 351, says: "This [the hemicycle to the north-east of the Forum proper, known to mediæval topographers as the Bagni di Paolo Emilio, whence the corrupted form Magnanapoli] only served to support the lower slopes of the mountain, and to cover the previously existing buildings or substructions, which were cut irregularly to give a regular plan to the Forum.* These buildings exist in great part under the Palazzo Ceva, and in the nunnery of S. Caterina di Siena, and are all constructed on the slope of the hill, and some of them even at a level higher than that of the Forum. Similarly other walls of earlier buildings which had been cut were found in making the drain to allow the water to run off exactly beneath the floor of the porticoes indicated above (i.e., those of the two libraries, on each side of the column and that to the north of it), near the column. All this proves that the part of the Quirinal which was levelled down was not where the great column was afterwards raised, because the hill never reached so far, and if it did, it had been levelled at a time before Trajan. He rather destroyed the hill towards the Palazzo Imperiali, i.e., in the northern portion of the Forum."

This passage has, however, been almost entirely forgotten by subsequent writers, and is not alluded to by Comm. Boni in his article; and though geologists, such as Brocchi (*Dello stato fisico del suolo di Roma* (1820), 133), and Portis (*Storia fisica del bacino di Roma* (1893), 17), have doubted the possibility of the existence of a ridge joining the Quirinal and the Capitol, the inscription on the column,† has, by several topographers, been taken to mean, not only that the column was erected to show the greatest height of the hillside cut vertically by Trajan in connexion with his building operations, as Professor Hülsen maintains (*Roman Forum*, p. 21), but that, before Trajan began the construction of his Forum, the ridge connecting the two hills existed to a height equal to that of the column at the exact point where the column stands. This has, of course, been now proved to be impossible; and it seems best to accept the explanation of Professor Hülsen. Comm. Boni, on the other hand, prefers a new interpretation of the inscription,

* Comm. Boni has found remains of earlier buildings under the *solee* pavement of this hemicycle.

† Ad declarandum quante altitudinis mons et locus ante operibus sit egestus.

according to which the reference would be, not to the height of the cutting at any point, but to the erection of the column as a belvedere, from which might be observed the height to which the magnificent buildings of Trajan had been raised, and the depth and width of the site between the two hills on which they were erected. This interpretation of the Latin seems, however, somewhat difficult to accept.

The question as to the most suitable line of road through the Forum of Trajan and the other Imperial Fora, in order to connect the Via Cavour and the Piazza Venezia, has been comparatively little discussed during the last few months (see *Builder*, Vol. XCI., No. 3313, August 4, 1906, p. 166). But a proposal has been made by Signor Monaco (*Tribuna*, October 2, 1906) to bore a tunnel under the Capitol from the south-east end of the Via di Marforio to the Theatre of Marcellus so as to connect the quarters of Rome near the Tiber with the upper districts of the city, and obviate the necessity of crossing the Forum Romanum. As he rightly remarks, the Via Cavour was originally intended to make this connexion by crossing the Forum; the progress of the excavations, and especially the uncovering of the Basilica Aemilia (which, by the way, will be continued next year, the houses which occupied the rest of the site having been almost entirely demolished during the summer) have considerably increased the width of the area to be traversed; but the present viaduct is utterly inadequate, and has the demerit of dividing the buildings immediately below the Tabularium from the rest of the Forum. An open iron bridge across the Forum would be ugly, it is true, but would have the merit of not dividing it into two disconnected parts; and from a practical point of view either it or the tunnel will probably be found to be necessary to the traffic of Rome in the not very distant future. The tunnel project, as its author points out, would go with any of the schemes for the connexion of the Via Cavour and Piazza Venezia.

In the course of last May the newspapers announced the discovery, a little more than 11 miles from Rome, on the Via Salaria, of a "puteal constructed for expiation near the Allia, at the point where the disastrous battle between the Romans and the Gauls occurred." The site is, indeed, quite close to the Fosso Bettina, the probable representative of the Allia—though whether the battle was fought on the left or the right bank of the Tiber is uncertain, the probabilities being, perhaps, in favour of the latter.*

But the monument referred to, which lies in the low ground between the road and the river, about 100 yds. from the former, and due west of the Casale S. Colomba, is neither more nor less than a large circular tomb, just over 100 ft. in diameter, the foundations of which, in concrete, are alone preserved. From the centre radiate six walls (a rectangular hole at their junction has been wrongly supposed to be the actual puteal), each of which runs to the centre of the back of a semicircular niche with a vaulted roof facing outwards. These six niches must

* The question is fully discussed in *Papers of the British School of Rome*, III., 24 sqq.

have formed the principal part of the external decoration of the tomb; below them came the circular base, which was faced with blocks of travertine, some of which are still preserved. Of the upper part of the tomb nothing is preserved, and there are no elements for the reconstruction. Nor is it possible to determine the position or the nature of the chamber which contained the remains of those buried within. It would seem probable that the centre was occupied by a mound of earth, inasmuch as here the foundations all finish off on one level, and look as if they had never been higher.

THE WORKMEN'S COMPENSATION BILL.

THE Workmen's Compensation Bill has passed through the Report stage, and by the time these words are printed it will have passed the third reading.

Some important amendments have been introduced at this stage in the Commons, and we will briefly draw attention to the most noteworthy. Since the introduction of the Bill continual alteration has been effected in the period which should elapse during which an injured workman should not be paid compensation. In the present Act this period is fourteen days, in the Bill as introduced this was shortened to seven days, further abbreviated to three days in Committee, but now again has been placed at seven days, but with this important qualification—that when the incapacity lasts fourteen days the compensation is to date back to the time of the accident.

Two amendments have been introduced into the Bill to which we take very serious objection, and which we will treat of together.

In cases of death from injury or serious and permanent disablement the fact that a man has been guilty of serious and wilful misconduct is no longer to prevent him from obtaining compensation. Also, in the cases of disease which are within the Bill, the fact that a man has contracted the disease through wilfully and persistently disobeying regulations made for his own safety is not to prevent him from being compensated. How is it possible to justify the omission of these necessary provisions from the Bill?

Legislation of this character is an entirely new departure. When the Legislature placed the liability to compensate a workman on his employer even when that workman had contributed to his own injury, that was in itself a departure from a well-established principle of law. The meaning of the words "serious and wilful misconduct" has been very strictly construed in interpreting the Act, and in England very few cases have occurred where this defence has been substantiated. The House of Lords have laid it down that the misconduct must be really serious, such as would justify an employer in summarily dismissing his servant, yet this limitation has not sufficed to meet the views of the Labour Party, and the servant guilty of serious wilful misbehaviour and persistent neglect of the precautions provided for

his own safety is to call upon his employer for compensation wholly caused by his own misconduct, and is placed on the same platform—if the consequences are also serious—as the faithful and well-behaved employée. What will be said in future ages of legislation devised on such principles?

In connexion with this subject we may point out that amendments have also been introduced into the Bill which give the Secretary for State power by order to extend the Act to diseases other than those which are scheduled in the Act, and that although the order will be laid on the table of the House, the House will have no voice in approving or disapproving this order.

Another surprising extension of the Act has taken place in a somewhat dramatic manner. Domestic servants have all along been excluded from the operation of the Bill, and the Home Secretary opposed an amendment which proposed their inclusion, but at the invitation of the Prime Minister the amendment was accepted. Such an extension of the Act should hardly have been sprung on the country at the eleventh hour. The Home Secretary and the Solicitor-General both pointed out that although the accidents were few and the risks very low there was reason to believe that the rates of insurance would be very high, and there can be no justification in placing this burden on all employers. Domestic servants being employed on their employer's own premises, depending upon him for food, lodging, washing, and very often medicines, are in no way in the same category as other employées, and it would be nearly as reasonable to apply the provisions of the Factory Acts to domestic houses as to make domestic servants the subjects of compensation.

During the present Parliament an inclination has been only too apparent to alter the entire character of measures during their passage through the House, as it were on the spur of the moment, and without adequate debate or consideration, and the Bills introduced have been offered to the country in the form of dissolving views.

THE TRADES DISPUTES BILL.

THE Trades Disputes Bill was read the second time in the House of Lords last week. There was a general consensus of opinion in the House that objection should not be taken to the Bill at that stage, but many of the noble Lords who spoke upon the measure voiced the objections to the Bill which we have urged against it in these columns during its passage through the House of Commons. The Marquis of Lansdowne, however, expressed the opinion that it would be useless for the House to oppose this Bill, but they could disclaim any responsibility for it. We venture to think that Lord James of Hereford was right when he said that such a position was untenable, and that in the position of parties in that House it was impossible for the Lords to disclaim responsibility. As long as the House of Lords remains an integral part of the Constitution it would seem impossible for it to disclaim responsibility for any measure it passes, by publicly washing its hands beforehand.

The Leader of the Opposition in the House, it is to be observed, based the impossibility of opposing this measure on the assumption that the country had called for it and had given the Government a mandate in unmistakable terms. If this were the fact there is no doubt that the position of the House of Lords would be one of extreme difficulty—but is it the fact? If the Government was given such an unmistakable mandate by the constituencies, how was it that the Government itself first brought in a measure conceived in quite different terms? The original Government measure was altered in forty-eight hours not by a mandate from the country, but by the importunity of the Government's own followers. If the figures given by Lord Halsbury in the House were correct—that the strength of the unions is 2,000,000, as against 8,000,000 non-union men—should not those 8,000,000 non-unionists be given the opportunity of recording their opinion on the Bill before the House of Lords abdicates its functions and allows the Bill to pass into law?

That some reform in the law is necessary will readily be conceded, and possibly the opponents of the Bill will forego their opinions and allow the Bill to pass with the exception of clause 4. Clause 4, which Lord Halsbury has characterised as outrageously unjust and tyrannical, and which creates an unheard-of privilege, can hardly be allowed to pass unchallenged. Lord James of Hereford, who has advocated the cause of the unions in the past, well sums up the effect of this clause in saying it amounts to this: "Simply register yourself as a trade union; whatever wrong you may inflict, whatever destruction of property may be caused, we, the Legislature, give you our blessing to go forth and do it."

NOTES.

Official
Architecture.

THE full report of the discussion at the Institute of Architects on the 3rd ult. is now in the hands of members, who can form their own judgment on the arguments used on both sides. We must say that we hardly think that the discussion, and the amendment to Mr. Wills's resolution (carried though it was by what is correctly stated as an "overwhelming majority") finally disposes of the question, the real point of which has been rather lost sight of on both sides. Mr. Riley, who made a very moderate and very sensible speech from the "official" side, proposed as an addition to Mr. Wills's first resolution the words "unless they had an architectural training," and this was accepted as an *eirenicon* by the majority of the meeting. But that does not involve a full recognition of the position. Whether a man has had an architectural training or not, he is not appointed town architect or town surveyor for his artistic qualifications, but for the testimony he can show as to his technical knowledge and his administrative ability. There is not a Town Council in the Kingdom who would appoint an official architect on evidence of architectural genius mainly. And therefore, though, as Mr. Burnet suggested, he may turn out a genius—a

concealed Michelangelo—the probabilities are against it. And in addition to this, the work of an official architect inevitably tends to take his attention off from the artistic side of architecture, and to deaden his artistic faculty. The spirit of artistic design requires continual nourishment in a congenial atmosphere; it tends to droop and languish amid a routine of practical duties. And that is why we are still of opinion that the employment of official architects to carry out large and important buildings is a mistake, in the highest interests of architecture. It is desirable that large buildings which form an important element in the architecture of a city should be works of art, and not merely well constructed and well planned shelters. They are more likely to be such if they are carried out by those who have given their minds to the study of architecture as an art, and are not entangled in administrative routine. And it is a duty which official bodies owe to the public (whether they know it or not) to get the best architecture they can, whether by competition* or by engaging an architect of recognised architectural genius.

The Coast
Erosion
Commission.

MOST of the evidence taken during the last two sittings of the Royal Commission on Coast Erosion was tendered by engineers representing various watering-places on the south, east, and north-east coasts of England. The necessity for protective works is well illustrated by the case of Brighton, where, as Mr. Weller stated, erosion has been going on from the earliest dates. Unfortunately, in spite of the outlay that has been incurred by the Corporation of that town in the construction of costly groynes, the supply of littoral drift is steadily diminishing, owing to the erection of groynes and other obstructions to the westward. We quite agree with Mr. Palmer, the Borough Engineer of Hastings, in the opinion that much money has been wasted in the past through the faulty design of groynes. In fact, Brighton affords a very fair illustration of this very point. Mr. Matthews, the Borough Engineer of Bridlington, was certainly correct in the view that piers and harbours are important indirect causes of erosion, but he said nothing of the injury done to the coast beyond some seaside towns by the wholesale interception of shingle by extensive protection works, such, for instance, as those recently executed at Bridlington. At present every large seaside town is looking after its own interests, caring nothing for the rights of landowners beyond. This affords a powerful argument in favour of the proper supervision and control of all coast protection works by a central authority.

The Tribunal
of Appeal.

THE *Law Times* of November 24 contained a paragraph on the case "Receiver of Metropolitan Police v. Piccadilly Hotel."

* The suggestion made by one speaker, that the official architect should be admitted as a competitor with the rest, is absurd and unworkable. There would be an immediate complaint, and with reason, that it was not fair to the other competitors that the official architect, with his special advantages of position, should be arrayed against them.

Syndicate," reported in the *Builder* of November 17, which appears to us a little inaccurate in two respects. In the first place the paragraph states that the London County Council had given a consent to carry the building to the height of 80 ft. It is to be observed that under sect. 48 of the London Building Act, 1894, the consent is only required where the building is to exceed the height of 80 ft.; and in the case in point leave had been given to carry the building to 110 ft. and 120 ft. In the second place our contemporary treats this case as a decision by the Tribunal of Appeal, but no question of construction being raised, the Tribunal had no jurisdiction to hear a case only involving questions of light and air. The facts of the case, we submit, do not bear out this assumption. It was argued that raising the building to this height would affect the sanitary condition of the police-station, where policemen slept, but it was expressly stated that no question of law was raised by the case; and the question was simply whether the London County Council had rightly exercised its discretion. Thus the question of law assumed by the *Law Times* to have been decided was not adjudicated upon by the Tribunal. Subsect. 2 (a) of sect. 48 gives the owner or lessee of any building or land within 100 yds. of the site of any intended building, who may deem himself aggrieved by the consent to raise the intended building to an exceptional height, the right to appeal to the Tribunal of Appeal; but the Act is silent as to the objections which may be entertained by the Tribunal. The question of light and air would seem to enter into the inquiry as to whether consent should be given to raise the building to the exceptional height, but not, as in an action for light and air, with a view to determining whether the particular complainant had sustained damages as for a nuisance.

The Commissions AS SOME of our readers no
and Bribery
Prevention
League.
 doubt know, the Prevention of Corruption Act comes into force on January 1 next. This Act makes it illegal to give to an agent or for an agent to accept anything in the nature of a commission for the purpose of influencing such agent in regard to his principal's affairs. For the purpose of educating the public on this subject, and of assisting to enforce the Act, a body is in process of formation called the Commissions and Bribery Prevention League. It is obvious that a higher tone in business in regard to the offering or taking of commissions will more effectually prevent the evil aimed at by this Statute than the Act itself, which is not one easy to enforce. We hope that both the architectural and building professions will do what they can to assist the work of the League, either by the affiliation of particular bodies or by joining it. The interim committee already contains several influential names, and we should like to see on it eminent representatives of the two above-named professions. A body such as this may materially help by taking up clear infringement of the law, by making its provisions and working known to the public, and, above all, by showing the evils of secret commissions.

Roads
on Building
Estates.

A SOMEWHAT interesting contention was raised in the Chancery Division last week in what was said to be a test case in connexion with the sale of a building estate—"Holmes v. Wenham." The plaintiff had purchased certain plots on a building estate in Pevensey Bay. The building plan had received the approval of the local authorities, and the particulars of sale contained a statement that no charge would be made to purchasers for the formation of the roads, which were being constructed under contract with a well-known contractor. Before completion of the purchase of certain plots, the purchaser, being dissatisfied with the condition of the roads, obtained an undertaking that the roads, if not completed, should be forthwith finished according to the printed particulars. The plaintiff contended that the roads were unfit to draw building materials over. The defendants relied on this reference in the particulars to the contract, and said that as the contract had been carried out to the satisfaction of their architect they had fulfilled their obligations. The Court held that the undertaking was not limited to the performance of the contract with the contractor, but that the roads should be finished so as to be fit for the immediate purpose for which they were required. The plaintiff had contended that the roads were to be made fit to hand over to the local authority, but the Court did not go so far as that. In the result the damages were assessed on the difference in the value of the plots with the roads finished and the value without the roads, which was estimated at one quarter the purchase money.

Tunnel
and Train
Ventilation.

ONE of the speakers taking part in the discussion of the paper communicated by Mr. Churchill to the American Society of Civil Engineers directed attention to a point that is far too little considered by the engineers of underground railways, namely, the vitiated condition of the air inside the carriages as compared with that in the tunnels. The speaker in question, Mr. R. P. Bolton, stated that this feature is nowhere more pronounced than in the crowded cars of the New York Subway, where the discomfort of passengers is greatly augmented by the excessive heat due chiefly to the operation of trains. In that particular system of tunnels considerable relief would probably be afforded by effective means of encouraging the movement of air through the trains in winter as well as in summer. In London, however, a good many people object strongly to draughts, and the open-door remedy would scarcely be appreciated by the majority of those using low-level railway lines. Small windows at the sides of carriages are not effective for the purposes of ventilation, and the problem for solution is the adaptation of apparatus that will insure the extraction of vitiated air and its replacement by the less objectionable atmosphere of the tunnels. Mr. Bolton suggested that the dense air requires removal from the lower part of the car interior, but we are not quite prepared to accept this proposition, for the reason that warm breath emitted by human

beings always tends to rise at first, notwithstanding the fact that it is highly charged with carbonic acid gas. No doubt, as the gases cool they naturally sink to the lower part of the car, but the best plan would probably be to remove them at the upper level before the process of subsidence has had time to begin.

Holyrood
Chapel.

WE are glad to learn that the proposal to restore Holyrood chapel, in accordance with the will and by the use of the legacy of the late Earl of Leven and Melville, has been abandoned. The Earl had made it a condition that his trustees in the matter, Lord Balcarras and Sir John Stirling-Maxwell, should accept the responsibility of supervising the execution of the project. They commissioned Professor Lethaby to report on the state of the building, and his report sums up entirely against it. After describing in detail the present state of the remains, he says:—

"I am of opinion that it would be impossible to restore the ruin for use as a modern chapel, without the ancient architecture almost completely disappearing in the process. The present decayed and leaning wall of the nave should not be loaded with a new clearstory and roof, to say nothing of a stone vault. To take it down and rebuild it would be impossible; so much would break up into powder in handling, so large a proportion of decayed stone, especially about the joints, would have to be cut away, so much would have to be discarded when once out of place as too shapeless and unsound."

I am of opinion that an attempt either to add to the ruin without rebuilding it or to rebuild it would be disastrous to it as a great historical monument, and I cannot but earnestly recommend that no such schemes be entered on." This is the inevitable conclusion from the facts as stated by Professor Lethaby—and there could be no more competent observer. This is quite a different problem from that, for instance, of restoring Dunblane Cathedral for worship, where the walls were sound and it was only necessary to re-roof the building. In the case of Holyrood chapel it is evident that the operation must have resulted in practically transforming an ancient building into a modern one. We were doubtful of the scheme from the first, and feel relieved that it has been abandoned. All that can really be done is to preserve what remains of the ancient architecture from further decay.

Public
Monuments,
Edinburgh.

A REPORT having been made by Mr. Pittendrigh Macgillivray upon the condition of some of the public monuments in Edinburgh the Municipal Authorities have directed Mr. Joseph Hayes, an architectural sculptor, to carry out the cleansing and reparation of the statues of Sir Walter Scott, Allan Ramsay, George IV., and William Pitt. The latter two were sculptured in bronze by Chantrey. The Pitt statue is at the crossing of Frederick and George streets, that of George IV. stands at the crossing of Hanover-street, in the New Town. The Scott monument was erected in East Princes-street Gardens in 1840-4, at a cost of 15,650*l.*, after George M. Kemp's designs, some of the details being adapted from parts of Melrose Abbey. Our number of January 1, 1898, contains a reproduction of Kemp's design taken from one of the lithographs issued to subscribers. The statue, in marble, is by John Steell. Close by are the Black and Wilson

monuments (by Steell); and not far distant in West Princes-street Gardens, by the corner of the Royal Institution on the Mound, is the marble statue, also by Steell, of Allan Ramsay, the gift in 1865 of Lord Murray, a relative of the poet. A proposal is made to complete the National Monument on the Calton Hill for the Scottish National Gallery. Calton Hill belongs to the Corporation, who, it is stated, are willing to give a site there for the contemplated gallery. The monument consists of but twelve Doric fluted columns and their architrave, raised upon a stepped stylobate, the west end of what was intended to constitute a memorial, on the model of the Parthenon, to Scotsmen who fell at Waterloo. The columns are of Craigleith stone; the masonry has, it seems, somewhat suffered from the weather.

THE old-established Castle in Aldersgate, and Falcon Hotel, on the east side of the street, at the southern end, will soon be pulled down, and the freehold site of the adjacent Falcon-square Chapel is offered for sale, or will be let for building purposes upon a ninety-nine years' lease. The chapel stands on the north side of Falcon-square, with a return frontage to Windsor-court, Monkwell-street; the site extends over 5,580 ft. superficial. It was erected by Dr. Bennett as a branch of the Silver-street Chapel, taken down in 1869. The property was withdrawn from sale in last January, no biddings being made in response to the auctioneer's suggestion of a price of 2s. 9d. per square foot for letting the land under a lease. Close by is Cloth Fair, where some further improvements for widening purposes are about to be carried out by the Corporation, involving the alteration of the rear portion of No. 60, West Smithfield, by the removal of the upper floors which project over Cloth Fair, and the sustaining party-wall. Though much changed during recent years Cloth Fair yet retains some of its curious and picturesque features, in the shape of wooden and plastered overhanging houses, whereof one or two examples are illustrated in the *Builder* of January 14, 1882. The name is derived from the resort thither of the clothiers of England and London drapers, together with French and Flemish merchants, who kept their stalls within the precincts of the Priory of St. Bartholomew-the-Great under a grant, *temp.* Henry I., of "free peace" to all who frequented the fair of St. Bartholomew. The fair and its privileges were subsequently shared by the Corporation and Lord Rich in the middle of the XVIth century, by which time the traffic there in cloth had greatly dwindled. Lord Rich's inheritor, Lord Kensington, sold his interest to the Corporation in 1830, and fifty years ago Bartholomew Fair ceased to exist. In his "Every Day Book," vol. i., Hone gives a detailed account, with wood-cuts, of the fair (in 1825) and the Court of Pie Poudre, which was proclaimed by the Lord Mayor at the gateway, of Transitional date, leading into the Priory precincts out of West Smithfield. The Court of Common Council have further undertaken to widen the thoroughfare by setting back the frontage of Nos. 35-41, Little Britain, a locality which commemorates the

town-house of John, Duke of Bretagne and Earl of Richmond, *temp.* Edward II., and famed for its booksellers' shops during the XVIIth century. Washington Irving, in his "Sketch Book," has written a charming description of the houses and their occupants in Little Britain and Cloth Fair.

THE lecture on the City Churches at the London Institution on Monday afternoon, by the Rector of St. Lawrence Jewry, turned out to be not so much architectural as historical, the lecturer going into the outlines of the history of the most important City churches and their sites from the earliest times in the known history of London. A number of photographs were shown by the lantern, some of them from drawings and engravings of churches which no longer exist. Mr. Barras is thoroughly up in the historical side of his subject, and gave some very interesting abridged quotations from ancient documents, especially from one or two of the charters of that high-handed monarch William the Conqueror, whose documents breathe a spirit of peace and goodwill to men with which his actions were oddly out of keeping. Lectures of this kind are very useful in leading people to think of and to realise the past history of the sites they know so well, and the significance of the familiar names. How many people realise that St. Martins-le-Grand, now only connected in their minds with the General Post Office, was the title of a great ecclesiastical establishment as far back as the XIth century? How many even realise that Fenchurch-street Station takes its name from the "Church in the Fen," outside the old walls. There were one or two omissions in regard to architectural fact; in showing the view of old St. Paul's it should have been mentioned that the portico was Inigo Jones's much later addition, and it should also have been mentioned that the remarkable collective view of all Wren's churches (received with much applause) was the work of Cockerell.

IN connexion with the Old Kensington. Borough Council's scheme of improvements lately undertaken for widening High-street, Horton-street, Campden Hill-road, and Phillimore-mews Sir Walter Phillimore agreed to surrender to the public 13,000 ft. superficial of his land along the frontage of Phillimore-place. The terraces were built in three blocks facing the main road and standing to the east and west of the south end of Argyll-road by William Phillimore, whose father Robert had laid out in the closing years of the XVIIIth century Lower Phillimore-place (East). The terrace houses were designed with somewhat uncommon elevations, having large square ornamented panels beneath the upper window-sills. No. 24, in the western block, was the home in the interval 1811-24 of Sir David Wilkie, who there painted his "Blind Man's Buff," "Chelsea Pensioners," and "Village Festival." Wilkie removed thence to Shaftesbury House in The Terrace, on the opposite side of High-street, between the Adam and Eve and Wright's-lane. The Terrace and the large

gardens in the rear were cleared away for a block of residential flats thirteen years ago.

IN two of the rooms at the Leicester Galleries there are on view cases containing silver work and jewellery by Mr. and Mrs. Nelson Dawson, a collection which quite keeps up the reputation they have acquired for artistic feeling in this class of work. There is no numbered catalogue, which makes reference rather difficult; but among the things we specially noticed is a silver centre cup on the upper shelf of one of the cases, very refined in its gently-curved lines, and a set of what might be called, if it is not a Hibernianism, silver wine-glasses, with a bit of jewel ornament on their stems. Silver cups for wine are little used now, but they have a kind of poetic association with them—

("Go fetch to me a pint of wine
An' fill it in a silver tassie")—

and people who can afford it may like them for a change from glass. A necklace in one of the cases is a charming example of design which comes very near to the use of natural flower forms, but just keeps clear enough to avoid realism, and is a beautiful and rather novel ornament. We were interested in some small silver-mounted cups of ivory, in which the slight curve of the actual tusk is left, instead of the ivory being cut away to make a factitious straight line. Also in two cigarette-holders made from black rams' horns, which are supplied with two silver feet near the thick end, the lid forming a most effective-looking mouth. As *objets d'art* of the fanciful or semi-grotesque type these are very good. They are the kind of thing Burges would have enjoyed.

ROYAL ACADEMY STUDENTS' DESIGNS.

THE designs of the students of the Royal Academy, sent in for the various prizes, were open to public view at Burlington House on Tuesday.

The architectural Travelling Studentship of 60*l.* has been won by Mr. William Harvey; the subject being "A Design for a Town Church." The site given was an irregular four-sided figure, narrower at the west than at the east end, with one oblique side, thus giving an opportunity for a widening effect of the interior eastward. Mr. Harvey has worked the plan so as to get a symmetrical interior effect in the principal lines, roofing the western portion with a small dome and the wider portion westward with a larger dome which forms the principal feature in the design. The dome is a single one, on the same lines externally and internally, and is roofed apparently with solid slabs of stone or marble tiles shaped to the curve of the extrados. The style may be called a Byzantinised classic, with a tower designed on very square and severe lines, but it is effective and shows some originality, and the whole design is dignified and monumental in character. As we so often notice in these students' designs for churches, the spaces allotted for the organ is absurdly inadequate; an organ which could be got into that space would hardly be heard in such a large church. The author has not had much to fear from the two other candidates, whose designs, more florid and pretentious, are quite inferior. Mr. Harvey also gains the 15*l.* (first) prize for "Drawing of an Architectural Design." This is a kind of triumphal arch, but not of the orthodox Classic type; the lower portion is occupied by a Doric order from the entablature of which one would expect the arch of the central gateway to spring, according to the usual treatment; but in this case the

arch is stilted to a point a good way above the entablature, and carries over it a considerable erection of stepped pedestals and statues, which seem a little too much in the air, and the upper part of the erection entirely overweighs the order, which hardly seems to belong to it. The author deserves credit, however, for having aimed at something new and original. Mr. A. H. Belcher gains the second prize of 10l. for a very quiet and pleasing design for "Entrance Tower and Gateway to Almshouses," with some agreeable decorative detail applied in a rather original manner. The design for a triumphal arch submitted by another competitor (No. 128) for this prize has merit, but the erection above the attic is rather too heavy and overbalances the composition.

The 25l. prize for an architectural design is gained by Mr. F. J. Watson Hart, for a design for a triumphal arch, on the old Roman lines; it shows no originality, but is correctly carried out and the sculpture well put in. The first of the two silver medals for "A Set of Architectural Drawings" is gained by Mr. Sidney W. Davis for a beautiful and delicately executed set of measured drawings in pencil of the Hall of the Brewers' Company; Mr. A. E. Bullock gains the second medal for drawings of the same subject, but there is a wide difference between the first and the second set. The silver medal for "Architectural Design with Coloured Decoration" is gained by Mr. A. A. Carter, the subject given being a pavement for the entrance vestibule of the Royal Academy. There are two other competitors, but there is no comparison between their designs and the prize one, which is the only one with real merit; in No. 148 the oblique lines of lessening circles from the centre to the angles of the panels have a very ugly effect; and the other (150) is mere commonplace, and hardly worth calling design. Mr. Carter appreciates the importance of strong bounding lines to the panels or spaces in work of this kind, and his smaller decorative detail is very good and refined. We should be glad to hear that the author was commissioned to carry out this design; it is quite worth it. The prize for perspective goes to Mr. A. E. Brooker for a carefully studied drawing of the Hall of the Charterhouse, in which the details of the perspective of the roof are very correctly and learnedly drawn. One is surprised, however, to find, year after year, that there are so few entries for the architectural prizes.

The Armitage prize for a monochrome sketch for an oil painting—subject, "Joseph interpreting Pharaoh's Dream"—is won by a lady, Miss May D. Maltby. Her picture is very dark, some of the figures being almost reduced to silhouettes; the composition has no doubt won the prize for it; this is dramatic and effective; Pharaoh and his attendants are grouped together to the left, and Joseph stands alone, separated from them by a considerable space. The second prize goes to Mr. G. H. Short for a very slight and sketchy design containing only the two figures of Joseph and Pharaoh, the former kneeling, the latter leaning forward on his seat and listening intently. There is the making of a picture in this, but it might be rather difficult to determine whether some of the others were not equally meritorious. On the whole, the general merit of the numerous sketches seems above the average.

The subject for the design in the round in sculpture is "Abraham about to Sacrifice Isaac." The prize of 30l. is gained by Miss Millicent Wadham, whose group is very well composed, and it is restrained in expression. In the work of Mr. Blundstone, who gains the second prize (or would have gained it had he not been disqualified by having gained it in a former year), there is rather more of sentiment, in the figure of Isaac especially, but it is not such a closely knit whole as the prize design. Some of the models are rather over-dramatic and stagey, in the attitude of Abraham especially; but in the main they are an interesting set, and show a considerable amount of ability for future development.

The silver medal for a "Design Containing Figure and Ornament" is well gained by Mr. G. D. MacDougald for an arch design with bas-reliefs in the spandrels. The figures in the spandrels are apparently meant to symbolise The Fall and its consequences: on one side a winged figure offers Eve an apple, on the other side a winged figure shows a

death's head or skull to Adam; at least we take it that the female and male figure represent Eve and Adam. One very great merit in this model is the complete way in which the figures fit and fill up the spandrel, without any appearance of forcing their lines into the space. It is in this respect more particularly that this design is superior to the others, all of which are more or less good. The prize for an "Original Composition in Ornament" should in our opinion have been withheld. Mr. Lessore's panels are no doubt far superior in delicacy of execution and in general ability to the two other designs, but they are not "ornament," they are models of natural foliage in low relief. The other two, we admit, are rather commonplace, but they are "ornament" properly so called; the prize one is not.

We do not know what the Academy have been about in their award of the Creswick prize. The subject given is "Sky Effect over Meadows and River, with a Bridge in the Foreground." The prize is given to Miss M. Robilliard for a picture which is beautiful and unnatural in colour, and technically out of the programme, since the bridge is not "in the foreground," but in the middle distance. The general merit of the landscapes submitted for this prize is higher than usual, and the one to which the prize has been awarded is in our judgment one of the poorest in the collection, and we are not alone in thinking so. Among those which deserve much praise are Nos. 30, 32, 37, 39, and 42; the latter, an upright, is one of the best composed of all, and we certainly far prefer it to the prize one.

The prize for the Cartoon of a draped figure is gained by Miss Joanna Fry; the subject, "A Female Figure in Classical Drapery Carrying a Pitcher." Miss Fry's figure shows the most ability in drawing, but it is too disturbed and tumultuous in line for our liking; as if the drapery were all blown about in the wind. Nos. 16 and 18 are good figures; No. 20 pretty though a little too sentimental.

The subject for the picture for the decoration of a public room (which we always think the most interesting problem of all) is a verse from the Psalms—"The singers go before, the players follow after; in the midst, are the damsels playing with the timbrels." It is a capital subject for a decorative picture, suggesting both movement, composition, and colour. The one to which the prize has been awarded, by Mr. Caron Oliver Lodge, is astounding in a way. It is undoubtedly the clearest and most original among the designs, but it loses the opportunity of colour presented by the subject, for there is little colour in it; and as an illustration of a verse from the Jewish Scripture it is preposterous, for it is completely Pagan; it represents a group of nude dancers and singers, or if not nude, only quasi-robed in diaphanous drapery; a kind of idea wholly at variance, if not with the text itself given, with its context "It is well seen, my God, how thou goest," etc. There is genius in the design, and a kind of vividness of imagination which has something Baskian about it; but we do think that prizes should be awarded for a design which illustrates the subject given, not for one which evades it; it is hardly fair to the other competitors otherwise. We must admit that the other designs on the whole are not so good as we have sometimes seen. No. 7 is clever both in design and colour; No. 8 good in colour but commonplace in design; No. 10 shows good colour.

The large collection of Life Studies is exhibited in two rooms with notices under "Studies from the Nude," to warn off Mrs. Grundy. These represent a great deal of conscientious work, but are not calculated to promote the feeling for beauty. Even among the studies from the female figure we could only see two, seated figures, which could be said to have any beauty of line. Of course the object of life studies is knowledge of the make and mechanism of the figure; but somehow Mulready contrived to get a great deal more beauty into his life studies than one can see anywhere here.

LONDON TOPOGRAPHICAL SOCIETY.

The eighth annual general meeting of this Society was held at Burlington House on Tuesday, under the chairmanship of Mr. T. Fairman Ordish.

Mr. Bernard Gomme (Secretary) read the Report, which stated that the membership of the Society steadily increased, and was now 220, of which fifty-five were public libraries, schools, and institutions. During the past year the third volume of the "London Topographical Record" had been issued, which contained Mr. Head's account of demolitions in St. Marylebone. The Council had put in hand as a publication for 1906 the first three sheets of Hollar's "View of London, 1647."

Mr. Lewis Coward, K.C., proposed the adoption of the Report, and this was seconded by Lord Belhaven, who suggested that they might well consider whether it was possible to reproduce in colour some of the oil paintings of views of London of 100, 200, or 300 years ago. The Report was adopted.

On the motion of Mr. G. T. Whiteley a hearty vote of thanks was passed to the retiring Council and officers of the Society.

The Chairman proceeded to give an address on "London as Seen by Shakespeare," and said that if in these days, when the achievements of science surpassed the dreams of fairyland, he could he vouchsafed the fulfilment of three wishes in regard to this subject, he would say: "Show me Londinium—London as a Roman city, an outpost of the great Roman Empire. Then show me London in the reign of Henry VIII. before the dissolution of the religious establishments. Finally, show me London as Shakespeare saw it." Of the first of these phases they had heard much that they would not readily forget, the address of Mr. Philip Norman at the last meeting, when he described the ancient defensive walls of London, and in the previous year from Mr. Hilton Price. Of the second and third phases to which he had alluded, viz., monastic London and London as seen by Shakespeare, he thought his aspirations had been realised. The story of a great city resembled the history of a people—there was constant movement, perpetual change, but identity remained under all mutations. The impulse that changed the aspect of London after the Reformation was the force which worked out in the extension of a great commercial centre, leading to the congestion which necessitated the great improvements which had transformed London within the recollection of many now living. So one period stood related to another, and ancient buildings were the witnesses and the symbols of the organic unity which ran through the centuries. They saw this when they contemplated a series of maps and views of London and noted survivals from period to period. Historic unity was declared, too, in the ancient buildings happily still standing at the centre, from which had radiated the great colubus of modern London. The reign of Queen Elizabeth, like that of Queen Victoria, was a time of expansion and change reflected in the topography of the capital. There was no London Topographical Society in "the spacious days of great Elizabeth," but the changes which then took place were recorded more fully and more completely than had yet been possible in respect of that period of incessant change and ever-increasing expansion which separated Georgian from Edwardian London. John Stow, who performed this inestimable service, was born in 1525, and the first edition of his "Survey of London" was published in 1598, when he was seventy-three years of age, and the second in 1603, when he was seventy-eight. In his book on London, the compilation of which was the occupation of his later years, he stored the recollections and observations and investigations of a lifetime. He remembered the priories, monasteries, abbeys, and nunneries of the ancient religion, and described them for us as they appeared in the days of his youth. In his selection of anecdote he was guided by the historic sense with which he was so liberally endowed, so that anything he wrote was of value. As distinguished from the history which he gave, Stow's actual survey extended in time from the latter years of the reign of Henry VIII. throughout the reigns of Edward VI., of Mary, and of Elizabeth to the opening of the

* JEWISH SYNAGOGUE, MANCHESTER.—A synagogue is to be erected at Higher Broughton, Manchester, at a cost of between 5,000 and 6,000l. Mr. Delissa Joseph, architect, of London, has prepared the plans.

reign of James I. During this long period there were artists—draughtsmen, cart-makers, and engravers who employed their skill in delineating and portraying the world-famous city that London had become. Some of these had survived, and the elucidation and the reproduction of the best of them had from the beginning been one of the principal objects of their Society. The series of pictures to be thrown on the screen would show what had been accomplished. He would like to see added the plate in which by means of two juxtaposed pictures Hollar illustrated the devastation of the Great Fire, when the London chronicled and described by Stow came to an end. There had been editors of Stow's survey who failed to recognise the limit set by the Great Fire, till the late W. J. Thoms, by representing the survey as it finally left the hands of Stow in his second edition of 1603, restored it to its true position as an Elizabethan document. Their Society could claim to be the first illustrators of Stow, and their publications enabled them to envisage London as it was when Stow was at work and as seen by Shakespeare. The drawing by Van den Wngaerde took place in the first rank of evidential value. It was unsigned and bore no date, but it was obviously a sketch of the aspect of London from a certain point. The first plan of London issued by the Society a reproduction of the engraving by Heetnagel in the *Civitates orbis Terrarum* of Praun and Hogenberg—was apparently coeval with the Wngaerde drawing. The picture and plan should be studied together, for they represented the London of Stow's earlier recollections. In both the central feature, St. Paul's, appeared with its beautiful spire which was fired by lightning and destroyed in 1561. Of London as seen by Shakespeare the pictorial and cartographic illustration was vastly more complete. When Shakespeare arrived in London Stow was over sixty years of age, and it was probable that his work on his survey was already well advanced. The pursuits of a lifetime had produced their effect on his mind; he lived in the past; his observations of what existed around him were related to the ancient glories and the civic dignity of London, and he gave no hint of the great and vital event which occurred in that closing period of the reign of Elizabeth when the genius of Shakespeare was born. There was no echo of the fame of Shakespeare in the second edition of 1603, and the explanation, he believed, was the pre-occupation of Stow—his years and his poverty. From what he wrote of the Bankside it was apparent that he made no attempt to bring his account up to date. Even as it stood in the earlier edition the account was evidently much earlier, for he did not mention Henslow's Rose Theatre, which was shown in Norden's map of 1593. The relation of Stow to Shakespeare was a discovery of our own time. The late J. O. Halliwell Phillips, in his quest concerning the sites and positions of the playhouses of London in the time of Shakespeare, exhausted what little there was in Stow on the subject, and he found more to his purpose in the maps of Agas and Norden. After him came Dr. Furnivall, and the late Mr. Rendle, the historian, of Southwark was set to work on the history of the Bank side and the theatres there, with results of permanent value in that obscure and fascinating subject. The tide of enthusiasm caught Mr. Wheatley, who contributed notes on Norden and his map of London. It was in the midst of all this work that their Society came into existence. From their Norden map published by the New Shakespeare Society, the next step was the publication of the Wngaerde view by this Society. Addressing them four years ago, Lord Rosebery suggested that the Society should have a field day in London to visit some places of historic interest. He would plead that when that excursion was undertaken it should have as its objective the church of St. Andrew's, Undershaft, and Stow's monument there. Let their way be by Bishops-gate, where they could visit the still existing Crosby Hall; thence to St. Helen's Church, which was standing in the days of Queen Elizabeth, a relic of the ancient nursery. In that church they would find a memorial window to commemorate the fact that Shakespeare was a denizen of the precincts. They would thread the narrow ways along

which the buildings grew up, as they filled all the space of the gardens as far as St. Andrew Undershaft. There at Stow's monument let the Society pay its formal tribute of homage to the memory of the patriotic citizen and devoted student who laboured all his life at the history of his country and the record of London, and who died aged, poor, and in neglect, but who, nevertheless, without pre-vision of what his portrayal of London would mean to future generations, gave them his immortal survey.

At the conclusion of Mr. Ordish's address a number of views of old maps republished by the Society were thrown on the screen, and Mr. Ordish pointed out the various buildings which existed in Shakespeare's time.

On the motion of Mr. Wheatley, seconded by Mr. Norman, a vote of thanks was passed to the Chairman.

MAGAZINES AND REVIEWS.

IN the third article on "English Provincial Museums" in the *Burlington Magazine*, the writer touches on the subject of classification. He admits that great advances have been made in this respect; that "the portrait of an XVIIIth century mayor no longer hangs under the Polynesian shield and behind the stuffed flamingo"; but he complains (truly enough) that things good and bad are labelled and displayed side by side with no guide to the learner who comes there for suggestions. The question may be asked, Why hang bad things at all? to which of course the answer is that they may be part of the history of the art or of the particular artist. The author suggests that what has been called the "Boston idea," of exhibiting only a portion—the harmless portion, we suppose—of a collection, and keeping the rest shut up and only accessible to students, is the ideal for a provincial museum. May not this, however, prevent people from becoming students of the history of an art, who might become so? A cheap but well written and authoritative catalogue raisonné would seem a better way out of the difficulty. A corporation anxious to aid the study of art might even give away the catalogue, or charge a nominal price, to encourage intelligent study. Where a provincial town has a leading art-industry which is an important part of its life, we quite agree that the illustration of the best production of such industry should be the central object of the museum.

In the *Art Journal* Mr. Claude Phillips writes an article on Dosso Dossi, partly in reference to a small panel picture of a Pieta, attributed to him, and which the author had come across in a London auction room a year ago, where it was labelled "Old German School." Mr. Phillips recognises in it the work of Dossi, and certainly the character of the illustration quite corresponds with the idea of Dossi as the "frankish responsible romanticist." His Pieta here engraved is one of the oddest of religious pictures; the figure of the dead Saviour treated with a good deal of pathos, the accompanying figures almost absurdly theatrical and forced in their attitudes and expressions. An engraving even of his almost childish yet admirably composed picture "The Spells of Circe" is given. The question of the real portraiture of Dante is discussed by Mr. Addison McLeod. The most important point brought out in the article is the fact, which one or two quotations from the "Purgatorio" seem to put beyond a doubt, that Dante in his middle life wore a beard, though no portrait, whether genuine or not, shows him with one. Mr. McLeod does not dismiss the Bargello portrait, once too hastily accepted as Giotto's—"the wish was father to that thought"; he does not even deny that it might be by Giotto, or if not, by one of his pupils, and he thinks it, moreover, the most probable likeness we have of him in his younger days. But the idea of the Dante of the *Commedia* as a smooth-chinned man must, it seems, be given up. The frontispiece to the number is a reproduction of a fine picture by Israels, under the title, "A Cottage Madonna."

The *Brother Architect* is devoted almost entirely to an article on modern German country houses, condemning the lack of taste and individuality displayed by clients who insist on dwelling in wearisome replicas of bygone styles, which in no way reveal the personality of occupier or designer. The writer then tells us what a home should

be; reposeful, simple, and forming part of its surroundings. As an example of an ideal country house he gives a detailed description, with thirty-one full-page illustrations, of Villa Spindler, an architect's home near Berlin. The greatest care has been taken that the house, internally and externally, and the grounds, may form an architectural whole, the eye being led gradually from house to open loggia, from loggia to arcaded terrace, and thence to velvety lawn with shrubs and trees beyond. The very coarse rough-cast walls and sandstone basement of the building are continued into the entrance-hall, but modified into a fine ochre-tinted rough-cast over a mouse-grey tile plinth. This colour scheme is carried on in the large hall with dull gold paper above a high dado of stained ash, while the chimney-piece is a fine design of yellow marble reaching to the ceiling, supported by Dutch tile jambs surrounded by bronze. The dining-room recalls a method of decoration rarely used; a series of Rhenish landscapes carried out in Intarsia forming a frieze to the high dado of fumed oak. The painted and modelled ceilings, the furniture and fittings, are in the *art nouveau* style, and purposely designed for the place they occupy. Should their forms not meet with universal approval, they at least show a striving on the part of the artist to realise his particular ideals.

The *Architektonische Rundschau* has for its literary feature an essay on "Kleine Sommerhäuser in Harzen," which might be Englished as "Week-end Cottages in the Harz." These, in the numerous pretty little illustrations, take the most unexpected and picturesque forms, and are well worth study. The article is by Professor Lühke, of Brunswick. The coloured plates in this issue add many more illustrations of the same subject. Among the larger buildings illustrated is the Werner-Siemens Gymnasium at Schöneberg (Berlin), by Herr Paul Egeling, an original and powerfully treated building, though the detail is odd to English eyes.

Probably there is no name of a town whose general associations are less Roman than Paisley, yet in the *Antiquary* an article by the Rev. J. B. Sturrock, "Roman Paisley," recalls the time when there was undoubtedly an important Roman fortified camp on what is now the very heart of Paisley. The author supports the opinion that this Paisley camp was the one known in Roman days as Vauduara. There is a little dispute on this head among the archaeological specialists on the subject, for which we refer the reader to the paper itself. Mr. Sievoking contributes an article on the interesting subject of "English Pageants of the Streets," of which the Lord Mayor's Show seems now to be the last lingering relic. But probably the mediæval pageants were a good deal better worth seeing.

The *Nineteenth Century* contains an interesting article by Mr. G. A. Simonson on "Guardi," in which a good deal of information is summed up in a comparatively brief space. The view taken of the great artistic importance of Guardi is one we should hesitate to accept. There seems to be that kind of re-action in favour of Guardi just at present, which is one of the common habits of present-day criticism; an artist who has been somewhat neglected is suddenly taken up, as a kind of fashion, and his importance is exaggerated accordingly. We are certainly not persuaded that Guardi was the superior of his master Canale, commonly called Canaletto. The latter no doubt has been over-rated, and is now beginning to pay the penalty of it; but we still think him superior to Guardi. He has more delicacy in the painting of architecture, and more breadth of aerial effect. The Rev. H. Maynard Smith contributes a fanciful article on "The Study of Furniture"; not "study" as we should understand that word, but a poetical reverie on the great associative interest of furniture, as to which we entirely agree; also that it is more interesting and valuable than architecture, because it can be carried about and is not fixed to one place—in which we do not agree. Furniture is only a kind of delightful toy in comparison with architecture.

The *Century* contains one of those absurd idolising articles about Whistler which we meet with everywhere now—"With Whistler in Venice 1880-85." The writer, one Bacher, succeeds in giving a very strong impression

of Whistler's affectation of greatness, his self-conscious habit of talking about himself in the third person—"I will tell you what whistler will do," etc., etc. The impression produced (though evidently not intended by the devout worshipper) is that Whistler considered himself rather in the light of a joke. Some of the details as to his method of work in etching are of interest. Mr. Timothy Cole produces a remarkably fine wood engraving of Murillo's "Conception" in the Prado Museum; and the "American Artists Series" is represented by a very charming genre picture by Mr. Francis Day, under the title "The First Lesson." The same number contains an article by Mr. W. H. Taft on "The Panama Canal: Why the Lock System was Chosen." The principal reason seems to have been to keep out of the way of the turbulent and erratic river Chagres. The proposed locks will throw everything else of the kind into shade as far as scale goes; but the article is not illustrated with any such sections, etc., as would enable one to form any opinion from it as to the practical character of the scheme.

In *Harper* an article on "The Tiber," by Mrs. Van Vorst, is accompanied by some beautiful illustrations by Mr. André Castaigne, who attempts among other things to give an idea of "the banks of the Tiber under the Caesars." This is not the best of the illustrations; but "Rome and the Tiber from Via Sabina (Mount Aventine)," and the island of St. Bartholomew and its buildings, as seen in the summer dawn, are beautiful examples of delicately executed book illustration.

The *Revue Générale* (Brussels) contains a picturesque article by Comte de Villemonet on "Les Ruines de Postum." He gives a vivid impression of the strange effect on the mind of these dead temples of a dead worship, seen amidst all the renewed life of spring, and by contrast with the bustling littleness of the small modern town of Pesto.

THE ART OF DRAWING.*

By T. RAFFLES DAVISON.

THE art of drawing has been badly misjudged, and its value very much discounted in recent years. It seems at first sight curious that this should be so, for never have there been so many able draughtsmen and artists as there are to-day, and never has there been so much need for their services. In whatever direction of artistic industry you look you will find artists of first rate ability who can draw. In painting, architecture, decorative work, and journalistic work of all kinds you may see the art of drawing carried to a great pitch of perfection. It is unnecessary to mention names just here, but anyone who loves the art of drawing and is interested in its progress and history is familiar with many names distinguished in the art. There is also in every direction the most obvious need for good drawing. Not in architectural competitions alone is good drawing a desideratum, but I maintain it is to be desired at every point in an architect's work. In the immense industries of a decorative nature it is imperatively required. But apart from the architectural world one of the most obvious uses for beautiful drawing is in the decoration or illustration of publications, serial or otherwise. Pictures make a universal appeal and cannot be disregarded in the successful make up of a book or a journal. And in these days of feverish activity in publication there should be the most urgent and widespread demand for good drawing. But the beautiful illustrative work issued about the middle of the XIXth century, though it is highly valued by connoisseurs and collectors, finds no similar market to-day. Nearly anything is good enough for illustrated publications to-day, and the work of the unknown Bill Sykes or Tom Jones ranks equally well with the masterly drawings of a Fred Sandys. The only really high standard of merit I can discover is that set by two or three American magazines, in which one hardly ever sees anything that is not first rate of its kind. In the most artistic of our popular magazines published here the lapses of quality published side by side with the best are lamentable. Sheer quality of

drawing is no more appreciated by the public than are the best qualities of architecture. The demand for really first-rate drawing hardly exists with the general public. The light of the good drawing cannot shine through the impenetrable shadow of British philistinism. Yet the drawings by George Montbard and Samuel Read of English country houses in the *Illustrated London News* were far truer to the artistic impression of the architecture than the best photographs that ever were given. The drawings of old English homes by Nash are far truer to our sympathies and feelings as regards our magnificent old buildings than are the wonderful photographs in Mr. Gatch's Renaissance. The splendid illustrations of St. Paul's which Mr. Pennell did in *Scribner's* years ago remain to me a far more vital realisation of that fine building than any photograph possibly can.

Now, drawing is a pretty ancient business, and it is a very great many years since the Greek artist proved his ability to an astonished audience by drawing a perfect circle, yet I very much doubt if he or any of his contemporaries could set down the essential facts of an old building with the ease and certainty of one of the clever members of our architectural associations of to-day. We have absolutely no record to show that the best of our Pugin students have ever been equalled in past ages in their special ability in the art of drawing. There is something in this beyond the mere imitative ability which we share with our friends the monkeys. A tradition has grown up which has led students along a well lighted path, so that, given the natural instinct, they begin with a better equipment each succeeding year. We need to bear this in mind for our encouragement, not as regards drawing alone, but also as to architectural effort. Many architects assume that you can never do anything better than did the Greeks, but that is a dangerous position to take up, and the history of art would seem to prove that the only wise method is to live one's own life and endeavour to carry our art forward on the lines of current tradition.

One can almost imagine that the crossed lines which have recently become a development of draughtsmen's feelings will lead to something when they have become sanctified by tradition. For a long time past it has doubtless troubled the adventurous spirit of a certain draughtsman that the world had been content with merely making lines meet—perhaps he noticed that the lines very often just stopped short of meeting—so he boldly travelled past the precise meeting point, and was no doubt agreeably pleased with the crispness of the result. Now you see plans and elevations with the lines crossing instead of just meeting, and all uncertainty as to where are the exact corners has disappeared. In setting out a building we cross the lines to insure perfect accuracy of measurement, placing the pegs at some distance from the angles, and it is possible that the great-grandfather of the draughtsman who began this crossing was a setter out of buildings, and so it came down in his blood! Whoever began it must feel gratified by its widespread adoption. Little matters like this, of no importance in themselves, go to prove that the intuitive faculty in us all is a very important thing to reckon with, and may do much either to improve or deteriorate our work. That is why one looks with such anxiety to the work of our successful men in every field of art, for, consciously or unconsciously, it affects us all. It takes, not necessarily an able architect, but a very strong minded one, to do work which runs counter to the general appreciation, and one would rank an architect who sends in competitive designs which he knows to be opposed to the taste of the assessor with the courageous and ascetic devotee who pretends to choose his own way to Heaven. Independence of judgment allied to a sound belief in the value of tradition must be the sheet anchor of the artist, but above and beyond all others, of the architect. Without this we might well be appalled at the prospect of doing anything worth looking at, and fall into the lamentable belief that we have come into the history of the world too late.

The art of drawing may be roughly divided into the artistic or ornamental, and the practical, though actually the two are

constantly overlapping. Artistic drawing may be defined in two ways: as that which is the means to an end, and that which is the end in itself. With the former architects are chiefly interested, but it is impossible to admit that even in the pursuit of drawing as an art an architect's work must necessarily suffer. So far as I have observed, the most accomplished architects have usually combined some distinction as draughtsmen or painters with their power of design, and those who have not are the exceptions. Now, all sorts of things may be said both for and against the cultivation of the art of drawing by architects. It may very well be maintained that too much devotion to drawing *per se* is liable to distract an architect's thought from his own especial mission, and that it may end in his becoming a very good draughtsman, or colourist, or painter, but a very poor architect. You may also quite fairly argue that drawing is the one rapid and ready medium by which architecture may be designed and understood, and that oftener than not the drawing itself suggests a good deal to the architect, whilst the more an architect makes good drawings of architecture the better he understands it and the more sympathetic he becomes in niceties of proportion and refinements of detail. At the same time it would be idle to deny that to an architect the allurement of the art of drawing is sometimes divergent from his architecture. The consolation is that some men are so allured that they end in making very good drawings which are stimulative and useful, whilst they are saved from doing some very bad architecture.

The real thing to consider is how best to develop and express our ideas, how to encourage what talent we have—in short, how to attain the best results possible to us. If a man be more naturally of a sculptor's turn of mind he will look to modelling for the best expression of his thoughts, and it may be true that sculptors would make the best architects—only, unfortunately, they seldom or never do. Modelling is a most valuable aid to the architect, and if our art were a leisurely one, as it ought to be, much ought to be done by modelling. But in practice the architect has to rely very largely on drawing, and the great thing is that he should make the best use of it. If architects would more consistently look upon their elevations as merely upright plans, they would be less deceived by their own drawings, and it is only by a persistent thought of the work in the round that an architect can properly imagine beforehand the result of his work. Of course, there is architecture and architecture. Some architecture is of such a nature that there is really no need to think about it in the round, for it has already been done so often that a study in the round is available all over the land. There is a regulation Georgian cornice that we all know quite well. It is illustrated nearly every week. There are our very old friends, the Classic orders, standing about all over that we may easily count on the result of them when translated from the elevation. The mullioned window and the battlement of a certain type we all know where to find in the round. But it is when we come to the work of an architect who thinks for himself, who is progressive and makes deviations from types, that this study in the round is so essential. But whilst we are speaking chiefly of details we must remember that it is in the main proportions of a building that this study in the round is of the first importance. "Does it really come like that?" says the architect when he sees it for the first time in perspective. Well is it for him if his surprise is *precedent* to the contract drawings.

I have not been able to collect an example of the work of every distinguished artist who has ever lived, but I have borrowed a few drawings which appear to me to reach a high-water level of excellence in architectural drawing.

Of the illustrations lent me by Mr. Griggs, that of Sompston Church is from "The Highways and By-ways of Sussex," just issued by Macmillan. This delightful guide-book by Mr. Lucas contains as good examples of Mr. Griggs's work as are to be found. Some of the landscape outlines are especially charming. The architectural subjects sometimes suffer from the defects of their qualities, and in his New Shoreham Church

* A paper read before the Liverpool Architectural Society on the 3rd inst.

that book one sees how the very charm of such of his work may lead in certain instances to the least satisfactory results and other dangerously near the look of the photograph.

Sir Aston Webb was the ninth on the list of some forty-two Pugin students, and some of his admirable drawings are here to-day. His drawings here, the English ones were one when holding the studentship, and the others were done to obtain it. Mr. Cecil Brewer was a Pugin student in 1896, and the few drawings of his here are enough evidence of his ability, though his good choice of subject, combined with quality of drawing, can only be adequately judged from a large number of them. Mr. Leonard Stokes won the Pugin in 1890, and his drawings of Ely now belonging to South Kensington Museum would be hard to beat; won it in 1889, and delighted everyone by the piquancy and delicacy of his drawings. Mr. Joass in 1893 was one of the most sympathetic and dainty draughtsmen of the whole series, and I am glad to be able to show some of his work. The whole series of Pugin Studentship drawings show a high level of artistic excellence.

The sketches which Mr. Fulton has kindly lent me to show you illustrate his interesting technique. They are divided into two periods of work, those of Italian work being a year later than those from Spain. This is what he calls *elementary* drawing. The intense decorative quality of his drawings will fully realise, and the way in which he compels your attention to the design and the decorative quality of his subjects is admirable. Yet you cannot help liking the drawings also for their own sake. The drawing of a house designed by Raphael (this one notable architecture achievement), with all its slightness, conveys admirably the dignity of the design. To few it is given to make studies of flowers and foliage like these by Mr. Fulton and those by Mr. Edgar Wood.

How is the art of drawing to be defined? That there is ample room for the display of individuality in drawing is evidenced clearly enough when we recall how, in face of such masterpieces of line as Verger and others have created, we can still find pleasure in the character drawing of Keene, the elegancies of Du Maurier, the conventional decorativeness of Sambourne, the clear-cut expressiveness of Phil May. There is the loose drawing on one hand, and the tight drawing on the other; there is the submission of the drawing to the subject by the one artist, and there is the brilliant insistence of the drawing itself by the other. Who shall venture to say that one alone sums up all the virtues? One painter of pictures puts all his drawing into his outlines, and another puts it all into his masses. You will find a painter who cannot really draw in detail can yet draw in large masses of colour with great distinction. A painting may emphasise the drawing or it may mask and blind it. This feeling of drawing is to be found in architectural design most emphatically. In one building we are conscious of the drawing and emphasis of outlines, whilst in another our attention is compelled by surfaces and masses only. A signal instance of the latter method was noticeable in some exhibitions of the architectural gallery at the Royal Academy, when Mr. Henry Wilson treated us to masses of building made up by luxuriant passages of colour, wherein any mere question of drawing seemed almost to be forgotten. There is, as you know, drawing which is not really drawing at all, but only blotches of light and shade. There is drawing which suggests a great deal, but actually shows nothing. There is drawing which shows a vast amount of detail, and still tells nothing one cares to know. There is the drawing of the pedant, the drawing of the mechanician, and the drawing of the swaggerer. There is that drawing which was evidently a great labour to produce, and there is that which shows it was a work of delight. There is the drawing of the audacious youngster, who knows little, but dares everything, and the drawing of the old hand, who knows so much he is almost afraid of everything. There is the drawing of the trickster, and there is the drawing of the sincere artist; there is that which charms at first and palls after, and that which pleases one more and more. But hold! you

say. You are merely detailing the virtues and vices of mankind and tacking them on to drawing. That is just what I think you must do. You do not judge of drawing differently from other mundane affairs. If a man be vulgar his drawing must be so too, or if refined his drawing must exhibit it. Most people like best a generous, free-hearted soul, and the finest sympathy will go to drawing which exhibits generosity and freedom. You may stand in awe and respect before the classical perfections of academic charm, but tons of it will not affect you like the spirited sketch which springs from the hot enthusiasm of a creative thought.

The art of drawing, strictly speaking, might be interpreted to mean the representation of form alone. In speaking here of the art of drawing, you will understand I am not speaking of it in that strictly limited sense; but of the art of drawing as it chiefly appeals to the architect or artist, in whatever stage of his career, in whatever media that may be adopted, and in the form of mere outlines or finished effects of light and shade or colour.

In the extreme purity of method and intention which certain architects have recently adopted, there is little room for artistic drawing any longer. These reformers will still, I believe, allow you to make plans and rough elevations for a building, but they must not be such as will lure you on by any suggestiveness of artistry into any further development of your design than you have already imprinted on your mind's eye. We may, however, venture to question such austerity of mind, and by an illustration to discover its mistake. Suppose that in drawing out an elevation you were to get hold of a double B pencil by mistake in ruling a horizontal line part of the way up the elevation, and thus make a line much more emphatic than all the rest at that particular point. Suppose that this extra emphasis at this point suggested to you the value of that much more definition of horizontality in the design. Would not the mere act of drawing, of dealing with drawing for artistic uses, be very valuable in such a case? Suppose you want the effect of modulation of tone, of broken colour, or the like in a building, and are going to attempt it by the distribution or choice of material, does not the art of drawing help the realisation of such a thing, or has it not often suggested it, even in the first instance? Can the want of artistic feeling in a drawing be otherwise than distasteful and harmful to the artist? Can it be possible that an essay in setting forth a building in an artistic way can be lost time to a true artist? It may be as necessary to warn the young architect against the danger of mistaking artistic drawing for good design as it is to remind him that fine clothes do not make a fine man. The art of architecture is not the art of drawing. The character and being of a man is not to be mistaken either for the fashion of his clothes or the mould of form into which nature has seen fit to cast him. But if a man is instinct with artistic knowledge and thought he will be pretty sure to show it in his drawing, just as an ostentatious or careful man will show it in his clothes.

The supreme wisdom of thinking for oneself and aiming to be true to one's own best instincts, is in some considerable danger of being bullied out of one by the numerous guides and counsellors by whom we are surrounded. Since the term "paper architect" was invented, it has led to a most unfair assumption that the clever designer on paper would very likely be a meretricious and careless executant. The fact really is that things are not half enough realised on paper, and far too much is left to chance in a building. I can tell you my experience points to the greatest success where architecture has been well realised in the round. Instead of less drawing being done, there is need that far more should be done. Let me ask how often have any of our modern architects carefully noted and drawn the effects of an overhanging cornice, of the effects of architraves, or mouldings? Let us consider a cornice for a moment. An architect is anxious that the effect of a certain cornice shall be such that a continuous profile of support shall be provided underneath it, looking up at it from the ground level. Now, suppose he sets down in elevation the effect of certain brackets and bed-mouldings which are to give him this result, and never tries the effect in the round. The chances are that the receding

spaces between the brackets are of so much relative value and importance that the cornice is not judged by the profile of the bed-mould and bracket, but by the profile of the bed-mould, and recessed portion between the brackets. A cornice with brackets or modillions may form the effect of a fairly solid mass if the spacing and bed-moulds are arranged in a certain way, whilst otherwise an effect of much less solidity may be obtained which may not be nearly so good.

You may tell me that a clever architect thinks of all these things, and provides for them. I reply:—I wish he did! Nothing can be more useful to a student (I mean a man of any age) than the habit of noting and drawing the perspective effect of any new arrangement of cornice, architrave, moulding, or pediment, which he sees, and which strikes him as good or bad. The mere fact of drawing it for himself imprints on his mind the effect, whether it is for good or ill. Of course, there are plenty of types of detail which are so familiar to certain architects that the effect is as well known as are the letters of the alphabet. The younger man draws and observes these till he knows what to aim for and what to avoid. But where architecture is a progressive art there may be reason for a good many alterations to a good many drawings.

If you meet with a man who says he has not been influenced by anyone, beware of him. He is not an artist anyway. For one who cannot receive influences, who is not impressionable, cannot have an artistic temperament. Not the influence that comes of sitting poring over the illustrations in the building papers so as to work them up into a competition design, but that kind of influence which may come from the fine frenzy of a drawing by Monticelli, as well as the calm serenity of line of the most refined French artist, from the intimate forcible detail of a Durer, or the exquisite feeling and refinement of Verger.

If one could imagine an entirely unbiassed and unprejudiced person (if there be such a disagreeable nonentity in existence) listening to the various statements put forth on the subjects of architecture and drawing, one might suppose a great difficulty of decision as to their relation and values. The plain truth of the matter is that there is a great deal too much architecture about architecture, and a great deal too much drawing about drawing. In some sense it is like to the case where there is too much evidence of paint in a painting. Whilst architecture is a very ancient art, so, also, is drawing, and it is quite unnecessary that one should be discredited at the expense of the other. Yet something very like this has been going on, and we have at length arrived at the opinion among a few eclectics that the art of drawing has been doing all sorts of harm to the art of architecture, and that we have at last evolved a number of paper architects whose work is good for little or nothing after it has left the drawing-board. Of course, the reason of this is because we are all too clever nowadays, and unless you can ride a bicycle without the use of your hands, and design a building without the aid of drawings, you can hardly be considered to be really educated. There are some architects nowadays who know exactly how a building of many projections and varying roof slopes and gables will look without the aid of anything but plans of floors and fronts, and who can trust to their flat delineations to turn out all right in the round. Architecture is to them, of course, a study in the round, but they don't need to draw it or model it so, but rely on their keen senses to evolve it in the flat. They do not even need to put up vases or pinnacles or hips to see the effect or to learn by expensive trial how it will come. They are sure of it beforehand. These, of course, are men of genius, and their disclaimer of the need of drawings is a modest acceptance of the fact. The average architect of keen sympathies and high ideals generally wants to pull down a lot of his work when he sees it realised in the round, or at least, would be thankful if he might amend it in parts, and, in my humble opinion, we shall never get the finest architectural results until it is a matter of etiquette that an architect shall be allowed to make some alterations as the work proceeds. But one cannot help wondering sometimes whether an architect has realised what is

going to be the effect of his many breakings of a main cornice round flat pilasters throughout a long frontage, which, when the projections are only slight, produce a waved uncertain line when seen in end perspective, and destroy the dignity and continuity of line one hopes he tried to get! It looks so like a want of study in the round.

There are many catchwords in the air to-day, and one is the unity of the arts. But is this unity fully realised or acted up to? There is nothing more essential to be borne in mind than the fact that art is one and indivisible. All arts and artists are, or ought to be, bound together by a common link of sympathy. If you happen to be an architect you are not to be shut out from the sympathetic appreciation of other forms of art. On the contrary, the claim of an architect to universal artistic sympathies is inevitable. The painter of pictures cannot dissociate his sympathies from sculpture, or architecture, or decoration, or dress design. But though we accept the theory, we do not half thoroughly put it into practice. That is where I feel that any attempt to belittle the art of drawing in its relation to architecture is so much to be deplored. We all know—I am sure we all must have known once—the evils of too much sweet cake. But we still take it, and it enlivens and brightens our lives. Drawing does more than that. It is not a mere luxury but the very language of art for the architect, and we shall do far greater harm by discouraging artistic drawing than by giving it free scope. You see out of the very excellence which has been attained in the art of drawing this evil has arisen; that its seductiveness has at last frightened all the tough old professors of architecture into a dread of losing their moral balance when they consider competition designs, and students have had to be gravely warned lest in pursuing the art of drawing they will be losing their hold upon the art of building.

To anyone who has considered drawing critically and sympathetically for many years there is a whole world of revelation of character in the varieties of it. I have been lately looking at the clever drawings of a very accomplished man, and I find in them a very vivid rendering of the general facts of architectural character, a graphic rendering of certain broad facts, but a marvellous absence of accuracy in detail and a woeful ignorance or carelessness of perspective. The profile of a stone cornice shot out sharply against the sky was shockingly inaccurate in proportion, and suggested wood instead of stone, and the near arches and bays of the side of a building in quick perspective were the same width as the distant ones. Yet by the very looseness and freedom of the drawing and its sparkle you are charmed, in spite of yourself, and you somehow feel sure this distinguished man knows the building perfectly well, though he renders it so carelessly and inaccurately. Point this out to a publisher, and he will tell you that the public care nothing at all about accuracy; all they want is to be interested. Put before them side by side the real building and the inaccurate drawing, and they will see no difference. This is doubtless why painters with the most profound ignorance of perspective charm their public notwithstanding by other beauties which are of more vital interest to them than accuracy of drawing. You may be sure I do not suggest, therefore, that one should place little value on accuracy, but I wish to emphasise the need for something more than dull academic correctness about one's work. You all know perfectly well that the more faultless a person is the more he is likely to be detested, but it is not the fault or the lack of fault that is the matter of account, but it is the interest of appeal we make to the thought or affections of others which gives us a place in their heart. I knew a little girl who drew the crudest of figures of men and women, and their drawing was perhaps beneath contempt; but she was full of human sympathy, and all her figures lived right through their drolleries of impossible drawing. The young man was wooden, but you could not mistake his adoration of the lady. The lady was rococo, but she was a gracious angel to the adoring swain. These crude drawings were swept from end to end with passages of brilliant colour—purple and green, orange and blue, red and black; one gorgeousness after another enlivened the

palette, and the sum total was a fairyland of pleasure. The importance of it all was beyond any accuracy of drawing or purity of tone. May I venture to suggest that Professor Beresford Pite has had less pleasure in drawing and designing his splendid Liverpool Cathedral composition than he had in doing his great drawing of the Soane Medallion twenty years ago? I do not wish to appraise the relative architectural value of the two efforts, separated by a quarter of a century of fine architectural study, but I believe there was more artistic joy to be found in the former than the latter, and, though the latter is a fine result of architectural thought and judgment, the former is even now perhaps a more stimulating and suggestive piece of work.

If you pursue art with a whole-souled devotion and sincerity, if it is a genuine delight, and not a mere affectation or the means to the attainment of position, or fame, or profit, you will have no great cause to look back on your efforts with regret. Your greatest regret will be in the shortness of life. You will have no reason to regret that you have not succeeded in being more like somebody else, however famous or worthy of regard. The greatest satisfaction you can secure will be in having been true to yourself and your own powers. Therefore I would urge you to possess your own soul in artistic ideals. Do not be badgered or hindered by any one man's laws or terrors. If you do not believe in a thing you had better not do it. If a man says you must not draw wavy lines, do not believe him if you have a great belief in them. If you are told not to study the work of John Smith, or try to get architectural suggestion from Swedish wooden toys, do not regard it if you find John Smith and Swedish toys help you. I know men who have found great help from the work of John Smith, and I have seen an accomplished architect drinking in inspiration from a row of wooden toys from Sweden. You must be true to yourself though the heavens fall, or you will do little good in art. Years ago I was regarded in a certain school where I was trying to pick up a little knowledge with grave suspicion and disbelief because of my methods of procedure. And this cutting disbelief in my methods would have chilled me to the bone, but my monitor had the kindness to say: "If it were not that you get it right in the end I could not countenance your methods." That word steadied my belief in myself, and that was what I needed. Enough belief in one's self to find a sheet anchor we all need. This is not to be interpreted as dogmatism and obstinacy in getting ideas and sound instruction. That we must ever be greedily looking out for, but we must not persist in taking mental food that we cannot digest. The great need of this age and every other is truth. But that is not truth which you display in your work when founded on unbelief in your methods. I see Mr. Adshedd is down to speak to you on "Characteristics in Draughtsmanship." Now, an intelligent appreciation of characteristics is a great thing. Sympathy counts for much, but you must not let sympathy compel you too far. Out of six clever draughtsmen with fairly distinctive styles there may not be one whose method would quite fall in with your own natural bent. Yet you may learn from all if you will keep true to your own instincts and beliefs.

There are so many aspects from which the art of drawing may be regarded that it is difficult to say which we shall find of the most interest. But, whilst for the architect the chief aim of his life must be architecture, the consideration of the art of drawing of most importance must be that of its value to his professional work. An architect can hardly draw too much, but his drawing should be thoughtful and true, and the less illusion it creates for him the better. It should tend to elucidate design, and not to obscure it, and the less thought given to the drawing, and the more to the subject, the better it will be. But this does not involve any ascetic abstention from the charms of artistic drawing at all, and those who offer cautionary advice against the danger of artistic drawing are likely to create a wrong feeling as to its proper value. You cannot dictate to an artist as to his artistic impulses without endangering their value. And it must always be remembered that the repression of natural gifts tends to destroy that

individuality which is the breath of life to an artist. I have sometimes looked over the work of certain artists with a feeling that it was so perfect in its way as almost to exclude for ever the chances of appeal from other work of a similar kind. Then, of course, there has come later the knowledge that the great world of art is wider and finer than manifold limitations, and that in infinitely varied ways the work of sincere artists is always sure of some individual and separate appeal. Take the clever freehand pencil sketches by J. B. Fulton, and note how curiously those uneven, wavy lines give an impression of architectural truth and distinction of artistic vision. Has no one with a trembling hand ever done such drawings before? Assuredly they have, yet these sketches were a fresh revelation of pleasure when they first appeared. You can not possibly recommend wavy trembling lines in the delineation of architecture, and for the successful rendering of things whose value lies in precision and definite form; but not only did Mr. Fulton defy your want of recommendation, but he has made you take pleasure in what, theoretically, is a defect. Nothing could seem to lie further apart than the firm solidity and precision of a drawing of an old Gothic building by F. L. Griggs, and the tender, hazy drawings by the late F. C. Deshon. Theoretically, how can we say that either was absolutely right? Architecture is a thing of hard facts, but we do not see it in all its hardness, and if one artist chooses to make it hard, and another soft, can we blame them? We may have greater sympathy with one or the other, but we cannot affirm that one or the other is wholly right or wholly wrong. Thus we realise that, according to our sympathies and powers of observation, we assimilate or appreciate certain qualities and reject or lightly esteem others. You may love A., B., and C. A. and B. and C. are very good friends, but C. hates A., and nothing can make B. and C. think alike about A. Just parallel to this is the education of the artist. Certain values are placed before him for his edification and delight—values above all schools or individually of like or dislike. But you cannot compel his sympathies, and the better he is, the more pronounced will those sympathies be. The best man to succeed for sheer powers of imitation is the more prosaic, for he accepts things more unquestioningly, and can therefore make a very good copy. The more prosaic man will therefore be likely to make the more careful results, and supply all the hard facts of a thing—in a very hard way. All fine drawing should be stimulating and encouraging, and, however fine it be, the artist should never admit that any of the masterpieces of the world are fine enough to rule him out of existence. There must always be a personal note in one's work which will count for something if we give it a chance. This, of course, applies equally to architectural design. All architects do not get the strongest expression of the same qualities of design in any style. You may get most breadth and repose out of Gothic, and you may lose a good deal of it in Classic. The place which the art of drawing should occupy in an architect's life cannot be located. It should be in the field of his endeavour everywhere and always. He should draw whilst he thinks, and think whilst he draws. He should draw with spirit and pleasure, and never think that slovenly drawing will produce anything but slovenly architecture. Not a line more of drawing than is absolutely essential should appear on a detail or a working plan, but up to that limit the utmost patience and accuracy which is possible should be bestowed. In any form of pictorial representation of architecture it must never be forgotten that dignity can only be obtained by reticence and precision. A fine outline view often has more dignity and impressiveness than one elaborately shaded or coloured. Sparkle and texture, accidental lights and shades, momentary or undue emphasis of particular parts—these are things which do not as a rule help to realise the truth about new buildings, but proper emphasis of the salient forms and details and general tone effects are of chief moment. In justice to the poor client the architect will, of course, show as far as possible in his drawing how he has cut up the whole building into bits, by here a bit of brick, there

of rough-cast, and there of black and white, and indicate the mixture of tiles and slates with which he has adorned his roofs. I cannot forbear quoting here the example which two Liverpool architects have given us on this question of illustration. One of the most brilliant coloured drawings which has appeared at the Academy was that of the Liverpool new Cotton Exchange, by Messrs. Matear & Simon. It was charming, and it explained the design; but does anybody pretend that it is actually like the fine building we see completed to-day?

I have been told that a busy architect has no time to draw. This may be true, or it may be not. Some of the very busiest architects of our time find time for it. They like doing their own work, I suppose!

All the talking and writing which aims to elucidate the spirit of true art may be of very little use. But I feel sure that its final value lies in the inspiration and enthusiasm which it may create. Ruskin has said many things with which I believe painters and critics and architects would strongly disagree; he has no doubt said much that is futile, and besides the mark. But of the enthusiasm he has created or sustained there can be no doubt. He once told me I should never draw whilst I remained in a place surrounded by the most bestially-degraded forms of human industry. He was wrong, for some of the finest things have been done in such surroundings and some of the worst stuff in the very best environment. The religion that would last long and impel men to their goal through long odds of misery and hardship was fostered on bleak moorlands in England and the dark catacombs of Rome. As the cheerfulness of a doctor often does more than his medicine, so the encouragement of a professor may be more, and wiser, than his teaching. May I suggest to you, gentlemen, that, whilst you keep a wary eye on the dogma, you follow the light of an ideal wherever it is uplifted. Whilst one tells you perdition awaits the Gothick and he delights you by his brilliant rendering of the Renaissance, you may safely cling to your Gothick if you aim for as high a standard in it as the other in his Renaissance. Art is not linked to some style, or place, or man, whilst the beauties of art are available for all.

One needs a broad and sympathetic mind to be a great artist. He who can only read salvation in one style is greatly to be pitied. Even those who cling most closely to tradition are often wise enough to see the light that comes from other ways. It is probably well to start our lives in a groove of some sort and to follow in a school or in a certain style, but whether we develop that particular school, or style, or branch out into other paths, we need to light our way from every source whence inspiration and good counsel can be sought. Are we not constantly wondering over the shortcomings and defects of our greatest men? Does not the pupil often see with a critical vision that is merciless the profound ignorance of his master? Nay; our wretched ignorance and hollowness of profession is even patent to the office boy.

The end and aim of it all is this: You must have that inside you which makes the impulse good, and then tricks and mannerisms, styles and methods, materials and subjects become of secondary value. If your chief thought be of the latter, you may doubt the possession of the former. It is impossibly excellent technician, a perfectly even temperament, will never produce anything that lives. Real distinction and beauty of drawing is not to be accomplished by keen insistence on methods; it is derived from the soul that guides the pencil. This is the meaning of our delight if we see the mass of a cathedral rubbed in with a bit of brick-dust by the hand of a master on a waste scrap of paper, or some blotched and hasty drawing of a hand or foot by one of those great artists who know all about it. We see the mind triumphant over matter and feel keenly the force of contrast. Such things compel our attention to the realities of art. A clean line, a smooth finish, of themselves are nothing, and less than nothing.

Consider the many kinds of drawing with which we are more or less delighted from time to time. In one case it is the smart, clean drawing and the decisive touch which gives the charm, whilst in another it is the very roughness and apparent indecision of

line which creates a most interesting individuality and character. Phil May gave it us all sharp and crisp and certain. Charles Keene gave us a broken line, a roughness of texture, and a something of uncertainty in the production of the drawing. Both May and Keene were singularly able and far above ordinary measure, whilst both produced fine character studies. For certain similarity of results we admired both, but that which constituted their individuality of technique was very different. Mr. Pettit gave us wonderfully vigorous studies of old architecture which seemed to be executed with a thick quill pen. Fred Deshon delighted us by the tender delicacy of his shades and tones. Samuel Prout outlined his work with a picturesque touch which exercised an infallible charm, whilst I suppose it was impossible to feel any real trust in the accuracy of his drawing. One of the most marvellous exhibitions of delicacy and daintiness of touch was to be found in the pencil studies of Mr. Menzies, one of the Scotch travelling students, and it seemed to make the old buildings he drew live again in a new aspect; but how different it was from the decisive and more laborious handling of detail by Norman Shaw in the continental sketches he once published! The delightfully piquant draughtsmanship of Mr. J. Joass in some of his studentship sketches, the keen, incisive, and dainty pencil studies of foliage by Edgar Wood, the luminous water-colour drawings by Ernest George, the vigorous and often brilliant colour studies by E. W. Wimperis, the exquisite refinement of Mr. Reginald Barratt's water-colour drawings of architecture, the nervous pencil outlines by J. B. Fulton, the free, bold, and intensely artistic sketches by Mr. W. Flockhart, the curiously reserved but characteristic drawings by Baillie Scott, the refined and scholarly drawings by R. Weir Schultz, the rococo recklessness of Railton, with his dash and spirit; the fine freedom of large architectural style by Richards—all these, and many more, are proof enough to those who feel keenly the influence of good drawing, that during the last quarter of a century English-speaking folk have contributed something quite real to the art forces of the world.

We may lag behind the French in grace—I am sure we do—we may lack the profundity of the Germans or the intense life of the American, we may lack the imagination of an Austrian, an Italian, or a Spaniard; we may fall short of the marvellously decorative refinement of the Japanese, but we show in the individuality of our drawings something of it all. We Britisners, with all our lamentable faults of reserve, clumsiness, and narrowness, have something to show that is of the essence of human interest in our drawing, just as we have maintained it for long years in our domestic art. Such drawings as I have referred to above may claim to reflect the form and spirit of fine architectural charm in a way that tends for the refinement and elevation of the art of architecture and that counts for something valuable in the art of drawing besides. If I had been able to place before you an adequate record of all the beautiful drawing which has passed as a pleasant vision through my life I am sure you would not hesitate to agree with me that the art of drawing, as developed in Great Britain, has done something very real in our time for the benefit of the great art of architecture which we design or illustrate.

I may say one concluding word; it is this: Do not mistake my effort in speaking to you to-night. I have ventured to address you as artists, as the producers of the one art of paramount importance in the world, which is building every day we live some lasting memorials of our times and thoughts. The great difficulties in doing that well I claim to realise as well as you, and I do not desire to lure you into any foolish fairland of pretty or illusive drawing, even were I able. But I do beg of you to be so catholic-minded that art in all its forms will appeal to you with its full value, and to allow, amongst other things, the art of drawing to brighten your path, inspire your designs, and illumine your spirit, when the cold shadows of specifications and bills of quantities have lowered more on 5 per cent. and social success than on the record you hope to leave behind you of an architect's powers.

THE ROYAL INSTITUTE OF BRITISH ARCHITECTS:

THE NOVEMBER EXAMINATIONS.

The Preliminary.

The Preliminary Examination, qualifying for registration as *Probationer R.I.B.A.*, was held in London and the provincial centres mentioned below on November 5 and 6. One hundred and eighty-eight candidates were admitted, and claims for exemption from sitting were allowed to the number of fifty-seven. The remaining 131 were examined, with the following results:—

District.	Number Examined.	Passed.	Relegated.
London	62	44	18
Birmingham	7	6	1
Bristol	8	5	3
Cardiff	6	5	1
Leeds	16	9	7
Manchester	20	13	7
Newcastle	12	9	3
	131	91	40

The passed candidates, with those exempted—making a total of 148 altogether—are as follows:—

J. B. Adams, Hanley, Staffs.	J. H. Jackson, Horforth, Leeds.
P. J. Adams, Buckhurst Hill, Essex.	E. G. Jenkins, South Tottenham, N.
H. A. Ashford, Hoddesdon, Essex.	S. Johnson, King's Heath, Birmingham.
G. W. Bacon, Croydon, Surrey.	W. S. Jones, Streatham Common, S.W.
G. F. Barker, Birmingham.	L. C. B. Joyman, Wednesbury, Staffs.
A. C. Beasley, Sheffield.	H. Kelly, Carlisle.
N. B. Besant, Stamford Hill, N.	H. F. King, Hammer-smith, S.W.
E. Blake, Herne Hill, S.E.	B. Knowles, Booter's Lane, Glasgow.
C. E. Boniface, Petersham, Surrey.	I. T. Lawrence, Macc-yr-haul, Trealaw, Rhondda.
F. Brewerton, Whalley Range, Manchester.	W. Lawson, Gateshead-upon-Tyne.
H. Brevis, South Kensington, S.W.	W. H. Letheren, Fareham, Hampshire.
W. Burro, Rangoon, Burma.	P. H. Lomax, Bolton.
P. N. Bushill, Birmingham.	F. Lorn, Falkirk, N.B.
E. H. Butcher, Stanford-le-Hope, Essex.	E. Loveluck, Bridgend.
D. A. Campbell, Liverpool.	M. Lyon, Oxtou, Birkenhead.
P. J. Carey, Bromley.	A. Lyth, Burslem.
W. D. A. Cathcart, London.	G. G. Macfarlane, Hillhead, Glasgow.
H. B. Cawthorne, Mexborough, Yorkshire.	R. MacKenzie, Lochinchart, Ross-shire, N.B.
H. S. Chamberlain, Southsea, Hampshire.	M. MacLachlan, Lewisham, S.E.
T. O. Chamberlain, Forest Hill, S.E.	N. A. D. Maclean, Galloway, N.B.
H. F. Chandler, Highgate, N.	W. W. McNeil, Blackburn, Lancashire.
G. D. Channon, Malton.	W. A. Malone, Belfast.
H. A. Cheers, Twickenham, Surrey.	C. W. Marles, Sketty, R.S.O. Glam.
G. Cheeswright, Rawmarsh Hill, near Rotherham.	H. C. Marshall, Sunderland, Durham.
W. G. L. Cheriton, Streatham, S.W.	H. W. Martindale, Bournemouth.
S. Clark, Stanwix, Carlisle.	L. D. Martyn, Tiverton.
W. Clough, jun., Steeton, near Keighley.	S. P. Mather, Mill Hill School.
H. B. Coates, Alfotts, Essex.	J. R. Maughan, Hexham-upon-Tyne.
P. P. Collins, Andover.	G. M. Mayhew, Hitchin.
B. T. Cook, Chingford.	I. E. Monticou, Putney, S.W.
A. Cornell, Birmingham.	J. Moodie, Goodmayes, Essex.
M. J. Cox, Godalming.	H. B. T. Morgan, Wimbledon.
E. Crellin, Ramsey, Isle of Man.	H. W. Morley, Earlsfield, S.W.
H. W. Cruickshank, Aberdeen.	H. F. Mott, Plymouth.
J. G. Dalziel, West Hartlepool.	H. M. Nash, Farnham.
O. F. Davidson, Newcastle-upon-Tyne.	F. B. Nightingale, Wandsworth Common, S.W.
W. F. Davies, Chester.	V. O'Dwyer, Leeds.
O. E. Davis, Regent's Park, N.W.	R. Ordish, Derby.
P. W. Davis, London.	P. P. Patey, Hereford.
W. W. Diggle, Regent's Park.	H. R. Peckles, Reigate.
W. R. Eckerley, Carlisle.	P. Pell-Duerton, Harker, Openshaw, Manchester.
L. E. Edwards, Wimbledon, S.W.	A. V. Pussit, Deganwy, near Llandudno.
R. E. Edgar, London.	H. O. M. Pym, Nottingham.
C. E. Farmer, Prenton, Birkenhead.	J. Quekett, Rathgar, Dublin.
G. H. Fawcett, Scarborough.	M. Ravenscroft, Oxon, Cheshire.
H. B. Fletcher, Hyde, Cheshire.	A. H. Rayment, Crickle.
H. C. Fowler, Ryde, I.W.	A. Revie, Airdrie, N.B.
S. C. Garrett, Brighton.	W. Rhind, Earlsfield, S.W.
J. B. Grant, Inverness.	F. A. Richards, B.A. Oxon, London.
B. Greshall, Openhaw, Manchester.	G. W. Ridley, Nottingham.
H. Gresswell, Balham, S.W.	G. W. Ridley, Nottingham.
C. T. Hall, Reath, Cardiff.	R. P. Rosling, Bristol.
R. B. Hall, Batley.	R. T. Russell, London.
J. J. Harries, Swansea.	W. A. Rutler, Roath, Cardiff.
L. Y. Harris, Nottingham.	J. J. Harries, Carlisle.
A. Howell, Oxford.	J. Seddon, Thornton Heath.
F. Howorth, St. Anne's-on-Sea.	H. P. Shapland, Islington, N.
S. G. W. Hunt, Brighton.	R. Shears, Westcliff-on-Sea.
D. F. Ingleton, Cardiff.	H. W. Sheffield, Earls Barton.
G. W. Jack, London.	

H. J. Shepherd, Darnall, Sheffield.	R. L. Wall, Upper Tooting.
C. T. Sherwin, Stafford.	A. G. Waller, London.
W. J. Smith, Newcastle-upon-Tyne.	T. W. Waller, Edgbaston.
G. M. Stewart, Glasgow.	H. A. Welch, Kent's Park, S.W.
J. T. Stone, Streatham, S.W.	E. G. Wildin, Stoke-on-Trent.
A. D. Stuart, East Finchley, N.	E. W. Wilcox, Montpelier, Bristol.
J. Sutcliffe, St. Anne's-on-the-Sea.	E. Williams, Bon-y-maen, near Swansea.
E. Swann Watts, St. Anne's-on-the-Sea.	C. Williams, Upper Clapton, N.E.
W. E. Sykes, Cottesham.	W. E. Willis, Bristol.
F. Tapping, Aylesbury.	J. Wilson, London.
H. A. Thomerson, Clapton, N.E.	D. C. Winter, Westcliff-on-Sea.
L. Tugor, Southampton.	A. Wintle, Twickenham.
T. E. Turner, Solihull.	T. Wrigley, St. Anne's-on-the-Sea.
M. T. Violet, Stafford.	
F. H. Waldron, Enfield, N.	

Intermediate.

The Intermediate Examination, qualifying for registration as *Student R.I.B.A.*, was held in London and the undermentioned provincial centres on November 5, 6, 8, and 9. One hundred and forty-four candidates presented themselves and were examined. With the following results—

District.	Number Examined.	Passed.	Relegated.
London	93	40	53
Bristol	13	8	5
Dublin	2	2	0
Leeds	13	6	7
Manchester	16	7	9
Newcastle	7	3	4
	144	74	70

The sixty-five successful candidates have been registered as *Students R.I.B.A.* Their names, which follow, are given in order of merit, as placed by the Board of Examiners:

D. W. Ayre, Cork.	R. F. Burguan, Strand, W.C.
S. H. B. Iker, Clapham Common, S.W.	R. H. P. Bevis, Lambeth, S.W.
J. L. Denman, Brighton.	A. H. Boss, Victoria Park, N.E.
H. Boddington, jun., Pinner, Wilmslow, Cheshire.	H. H. Christie, Anfield, Liverpool.
E. R. Green, Bloomsbury, W.C.	F. W. Conmian, Exeter.
S. A. Neave, Bloomsbury, W.C.	H. Edmonds, Wolverley, near Kidderminster.
C. R. Merrison, Stoke Newington, N.	W. Goodchild, Ipswich.
G. E. Hunter, Gosforth.	C. F. Gurney, Headington, Oxford.
E. W. Wray, Lennox-terville, S.W.	P. H. Hawkins, London.
W. H. Mann, Leicester.	N. Heppenstall, Milnsbridge.
D. N. Dyke, London.	C. Hollins, jun., Newcastle, Staffs.
J. B. Richardson, Shotley Bridge, Co. Durham.	R. J. Hughes, Tony Pandy, Glamorgan.
A. E. Widdowson, Leicester.	C. M. Jones, Salford.
H. W. Hallas, Huddersfield.	H. F. Kohler, Strand, W.C.
F. L. W. Cloux, Herne Hill, S.E.	C. E. G. Leith, London.
F. H. Healey, Heaton Bradford.	C. J. Mole, Plymouth.
F. C. Mason, Lee, S.E.	N. S. Paddfield, Cardiff.
W. H. Louw, Paarl St., Cape Colony.	H. W. Parnacott, Penge, Kent.
H. Savage, Camden-road, N.	T. J. Patten, London.
J. G. Martin, Oldham.	A. J. Peir, D. J. de St.
J. A. Davidson, Knuck, Co. Down.	N. A. Rev. Great Berkhamstead.
G. B. Selleck, Plymouth.	A. E. Robinson, Edinburgh.
O. White, Edgbaston.	B. Gibson, Southampton.
A. G. Wainman, London.	D. E. J. Sax, Leeds.
W. H. Brazier, Addlestone.	E. D. Sherlock, Fallowfield, Manchester.
S. Fleming, Erith, Kent.	L. A. D. Shiner, Grays, Essex.
A. W. Fulton, Liverpool.	R. G. P. Smith, Reading.
W. F. Higgins, Stony Stratford.	E. A. Taylor, Chelsea, S.W.
E. E. S. Munt, Balham.	A. Wainman, Haslingden.
J. W. Moore, Newport, Mon.	J. L. Warr, Ilford.
J. G. Allen, West Hampstead.	H. West, Chislewick, W.
	J. E. Whitehead, Sheffield.
	J. H. Wyeth, Epsom.

Exemptions from the Intermediate Examination.

In accordance with the new regulations, the following probationers have been exempted by the Council from sitting for the Intermediate Examination, and have been admitted as *Students R.I.B.A.*:

L. K. Adams, B.A., Birkdale, Lancs.	H. B. T. Morgan, London.
H. Bernutt-Benjamin, London.	R. H. Scott-Willey, Sonarsfield, Reigate.
B. H. Collett, Willesden, N.W.	F. Thorp, B.A., Southport.
D. M. Goodwin, Croydon.	A. Welford, Cricklewood, N.W.

The Final Examination.

The Final and Special Examination was held in London from November 15 to 23, with an interval of one day between the written and oral examination. Of the ninety candidates examined, fifty passed, and forty were relegated in various subjects. The following are the names of the fifty passed

candidates, the \dagger prefixed to a name signifying that the candidate entered for the Special Examination designed for architects in practice and chief assistants exempted by the Council from the Preliminary and Intermediate Examinations and from submitting testimonials of study:—

A. J. T. Abel, Tooting, S.W.	A. S. Millar, London.
† W. T. Armstrong, Lancaster.	P. Minor, West Didsbury.
T. S. Attie, Putney, S.W.	† C. L. T. Morgan, London.
G. S. H. Bradford, London.	† A. E. Munby, M.A. Can- tah, London.
E. B. Crossley, Sherwood, Nottingham.	N. T. Myers, Walford.
T. L. Dale, Bedford Park, W.	G. Noth, Leicester.
H. A. Dalrymple, Grays, Dawson, Chelmsford.	C. H. Perkins, Carlisle.
† A. C. Denny, Dumbarton.	A. P. H. Pierce, Hamp- stead.
C. M. Drewitt, Southport.	† J. C. Reid, Glasgow.
P. M. Fraser, London.	H. P. Roberts, Horsham.
J. L. Halliday, Southport.	† P. T. Runtun, Hull.
J. H. Hargreaves, Manchester.	† W. T. Sadler, Strat- ham, S.W.
D. P. Hayworth, London.	I. T. Sifton, St. John's, S.E.
J. E. Hobson, Clevedon, New Eltham.	J. M. Smith, Chelsea.
W. A. Hodges, London.	D. L. Solomon, B.S. Lon- don, St. John's Wood, N.W.
J. N. Horsfield, Jun., Westminster, S.W.	A. K. Tasker, North Chields.
S. E. Howitt, Sherwood Rise.	R. W. Thorp, West Hamstead, N.W.
C. Jaques, Forest Gate.	F. J. Toon, South Lam- beth, S.W.
N. Jones, Southport.	J. I. Tweddie, Kelhead Aman, N.B.
P. H. Keys, Uxbridge.	C. P. Wade, Yoxford.
H. Langman, Southport.	F. Wade, Bradford.
L. A. Lander, Wexford.	S. J. Wearne, Leicester.
R. A. Lovett, Darford.	A. E. Wickenden, Maid- stone.
C. E. Lovell, Gravesend.	W. B. Wyllie, Kenning- ton, S.E.
W. G. Milburn, Wimbles- ton.	

The following table shows the number of failures in each subject among the forty relegated candidates in the Final Examination:—

I. Design	30
II. Mouldings and Ornaments	24
III. Building Materials	13
IV. Principles of Hygiene	17
V. Specifications	12
VI. Construction, Foundations, etc.	15
VII. Construction, Iron and Steel, etc.	21

The Ashpitel Prize.

On the recommendation of the Board of Examinations the Council propose to award the Ashpitel Prize to Mr. James Theodore Halliday, of Stockport, "as having most highly distinguished himself" in the current year's examinations.

ST. IVES "ORATORY," CORNWALL.
"A PROJECT is on foot," according to an evening paper, "for the restoration of the ruined monastic oratory on the island at St. Ives, Cornwall."

This simple and brief announcement, which was possibly passed over by many readers of the paper in which it appeared, as it had no "heading," draws our attention to a little known, but interesting structure, but with little history. According to particulars we have been able to gather we find the following building is still with us, but it is very brief:—

"Within the memory of man" (*vide* Lyson's *Magna Britannia*) "were the remains of a chapel near the Quay. There were chapels also formerly at Brunian and Higher Tregenna, the foundations of which are still visible. In Holinshed's *Chronicle* is mention of a chapel of St. Nicholas, on the very point of a peninsula called Pendinas, which had belonged of late to Lord Brooke, and then to Lord Mountjoy. This chapel, of which there are still some remains, is mentioned in the *Liber Regis*. It must have been appertenant to the Manor of Ludgvan—Lees."

Dr. Borlase says that in June, 1770, a chapel called St. Leonard's, not far south of the pier [was] then turned into a smith's shop. Nevertheless, it might have been that of St. Ante als Ansa prope ripam maris, in which was a guild or fraternity, as appears by the Registers of Exeter See, anno 1495."

From the foregoing it would appear to be the Chapel of St. Nicholas that it is intended to restore, as "there are still some remains," and, owing to the action of the sea and the accumulation of sand and silt, so quaintly referred to in Lyson's, the peninsula has probably by now become an island.

We find no trace, however, of any of the chapels being of a monastic origin or monastic property—unless, indeed, the writer of the

note at the head of this article has in mind the "smith's shop," and has confused the guild with a monastery—which is highly improbable. J. A. R.

COPARTNERSHIP HOUSING CONFERENCE.

A LARGELY-ATTENDED Conference, convened by the Copartnership Tenants' Housing Council, was held at the Westminster Palace Hotel on Thursday, December 6. Sir John Brenner, M.P., was in the chair, supported by Sir John Dickson Poynder, M.P., Messrs. Philip Morell, M.P., F. Maddison, M.P., H. Vivian, M.P., Councillor J. Nettlefold (Birmingham), and representatives of various local authorities.

The Chairman said he believed the founders of the Housing Council had hit upon a scheme for the improvement of the housing of the people, which had many merits. First and foremost, it attracted good tenants. He spoke as a man of very considerable experience in this matter, and as a house owner on a very large scale. He became a house owner as a member of a business organisation many years ago, and since then his investments in house property had become very much larger. Therefore it was not without some warrant that he spoke, and not without some authority that he said to them that, given good tenants, houses were an extremely safe investment. Every one of these tenants was to all intents and purposes the owner of the house, and he was irresistibly induced to keep it in good order. When, many years ago, he got married on a modest income he was his own carpenter, cabinet maker, glazier, and whitewasher, and he felt humiliated when he had to call in a plumber, because that was a kind of work he could not do himself. That was the kind of tenant they would get under this copartnership housing scheme.

Sir John Dickson Poynder, M.P., proposed: "That this meeting recognises the merits of the copartnership tenant system of housing, especially in regard to (1) the encouragement of self-help and mutual help in the provision of houses for the working classes; (2) the mobility given to the worker who is thus enabled to own shares instead of a house; (3) the limitation of the return to capital, and the crediting of any surplus as shares to the tenant members; (4) the better planning of areas; (5) the social intercourse and bringing together of various classes of tenants which ensues." He said that in rural districts the wide and ample powers given under the Public Health Act had not been administered in that satisfactory way which should redound to the sanitary condition and comfort of those who had to live in such districts. If it could be shown in future that by neglect or any other cause by those who were now given that vital power Parliament should take upon itself as one of its first duties to legislate which would carry out those powers to the satisfaction of those districts. He did not hesitate to say that municipalities could only deal with the problem of housing to a partial degree. For municipalities to attempt to deal with housing in an adequate manner would impose upon those municipalities responsibilities and duties which would become a burden to them to discharge. That was where the copartnership system stepped in. If the municipalities owned the houses, the tenant had no feeling of possession in the house. What was wanted was to get a larger number of the people interested in the possession of land, and this scheme largely solved that problem. It seemed to him that public authorities might greatly help such schemes by buying land cheap and leasing it to housing associations. In districts where land could not be obtained the local authority ought to be able to purchase under compulsory powers, which ought to be made easier, less dilatory, and less expensive.

Mr. H. Vivian, M.P., who seconded, remarked that by laying out large estates in a co-operative way they were able to provide for individual needs and for the community in which the private individual was not able to provide. They were able to lay out the estate as a whole. The usual way of developing estates for building was to crowd as many houses as possible on the land. Their movement was going on in a most satisfactory way. Their Ealing estate was

worth between 50,000l. and 60,000l., and on the previous night they passed plans for a further development of the estate by the building of 400 more houses. Then they had their Garden City at Letchworth, Sevenoaks, Bourneville, and the estate at Hamptonstead, where they hoped to erect 700 or 800 houses. A number of other societies—Oldham and Manchester—had been formed, and proposals were made for forming another twenty societies. Then there was a great future for these societies in connexion with small holding villages. In rural housing there would have to be the minimum of expense at every stage and the maximum of land to enable the labourer to add to his low wages.

The resolution was adopted unanimously. Councillor John Nettelfield, Chairman of the Birmingham Corporation Housing Committee, moved: "That this meeting trusts that the promised Government Housing Bill will make more capital available for lending to these 'societies of public utility' at the lowest market rates, and at the same time will give public authorities greater scope in planning new districts and acquiring land, so that they may co-operate with such societies." He said houses had been built for sale, and not for use. The scheme before them had already succeeded so far as it had gone, and in his opinion it was so inherently sound that it might go far to solve the housing problem. Town planning would do something to restrain land speculation, and so provide cheaper land. By restricting the number of houses put upon an acre the earning power of the acre of land would be reduced, and therefore its value would not rise in the magical way it had been doing round large cities in recent years. He lived in a well-to-do suburb, and the land was not worth more than 500l. an acre. Next door to him there was a poor neighbourhood, not near so pleasant a place to live in, and so it was a place where small houses for working men had been built. The houses were put on the land as thick as could be, and the land was now worth 2,000l. per acre. That pointed to one way in which town planning would restrict land speculation. Local authorities should have power to purchase land on the outskirts of big cities, and should go sufficiently far out to buy it at about agricultural value. His idea was that they should go to the belt where the land was worth about 200l. per acre.

Mr. P. Morell, M.P., said that local authorities had paid 1,000l., 2,000l., and even 3,000l. per acre in buying land in suburban districts for the erection of houses. The poor rural authorities were not quite so bold as that, and the result was that in many rural parishes where there was a demand for cottages it was impossible to get houses built because they could not buy land. He strongly supported Mr. Nettelfield's plea for cheaper money. The Public Works Loan Commissioners had power to lend money to societies of this kind at 2½ per cent., and did so for a short time in 1897. The rates now charged were 3½ per cent. for a twenty years' loan, 3½ per cent. for thirty years, 4 per cent. for forty years, and 4½ per cent. for fifty years; and yet the Public Works Loan Commissioners got their money at 2½ per cent., and could well afford to lend it at 2½ per cent. The difference between 2½ per cent. and 4½ per cent. in the case of a house which cost 200l. was 1s. per week on the rent.

On the proposition of Miss Sybella Gurney, a resolution was passed thanking the Chairman for a generous donation of 500l. to the funds of the Council, and expressing the hope that all who are interested in the housing question will assist by subscriptions, or work, or investments of capital.

PROPOSED RECONSTRUCTION OF THE CITY HALL, PERTH.—The Perth Town Council, on the 28th ult., met in committee to select one of the three premium plans for the reconstruction of the City Hall. Dean of Guild Barlas moved that plan No. 2 (Messrs. Mainart & Jarvie) be selected, and this was seconded by Mr. Thomson. Mr. Rollo moved that plan No. 1 (Mr. James Sibbald, Dundee) be adopted, Mr. Calderwood seconded. Discussion followed as to whether the plans if adopted would be taken in their entirety, but ultimately it was understood that either adopted would be subject to modification, alteration, or addition, as the Council might think fit. Four members voted for plan No. 1, and ten for plan No. 2, while twelve declined to vote. The matter will, therefore, ultimately rest with the ratepayers.

THE SURVEYORS' INSTITUTION.

AN afternoon meeting of this Institution was held on Monday at No. 12, Great George-street, Westminster, Mr. G. Langridge, President, in the chair, when Mr. Leslie S. Wood read a paper on "The Improvement of our Woodlands." He said that those of them who were looking forward with hope to a time of greater interest in, and better appreciation of, the British woodlands had marked with satisfaction the revival that had taken place within the past few years in public attention to the subject of forestry. The Departmental inquiry of the Government held in 1902, which was a powerful factor in helping forward the movement, was really the outcome of a prior "agitation." Although few in number, those men were bold enough to set an example for a new school of thought, and were so far convinced of the soundness of their arguments that they did not hesitate to condemn much that had always been held as sound doctrine. It was a significant fact that no one had ever seriously attempted to combat the arguments of the modern foresters. It would be saying too much to assert that they had met with no opposition, but their opponents based their objection, not upon the principles, which they admitted, but upon the application of those principles, which, they considered, had a foreign origin, and were not suited to the conditions of our island woodlands. This objection was a great danger, because it contained an element of truth, and gave an opportunity to many to decry any modern effort and to continue in the old ways where ignorance was bliss. It was true that the Continental forester worked amid conditions which gave him every opportunity of reaching a standard of excellence to which we, as a nation, could hardly expect to attain. He was dealing with far larger areas than were customary in Great Britain, and consequently managed them with far greater system and economy. The forests from which he derived his reputation were largely the property of the Government or of municipal bodies, and he was consequently free from individual caprice; he was not hampered by the evil effect of death duties and thoughtless extravagances or sporting enthusiasm. Moreover, the Continental forester was a man of education, especially trained for his work, and had the advantage of records and statistics of the past. He knew that he was working for posterity, and, as his good work would be carried on, it was worthy of his best effort. All these advantages and the consequent result were held up to them to prove the hopelessness of any effort to establish our woodlands upon the same sound footing, and there was always a danger that the rising enthusiasm of a would-be student of the subject would be damped down by the over-confident pessimism of those who knew but little and seek to know but little more. The opponent of the modern school of forestry was essentially narrow in his views. He rejected *in toto* what he denounced as the Continental method, and looked askance at any sylivicultural treatment that was not supported by a considerable precedent. Such an attitude no doubt saved trouble, but we needed a more forward policy than this, if we were to improve our British woodlands. If we allowed that the Continental method was not suitable as a whole, we must not lose sight of the fact that it was not a rigid principle. We were very well able to adopt such details as applied to our own circumstances and omit others that were not suitable. The adoption of the former was by no means restricted by the omission of the latter, nor was the good work of the former minimised by the fact that a part of the complete system was applicable only to large areas, and must therefore be discarded. The active opposition to any modern scheme of improvement was at least satisfactory, in that it showed some interest in the subject and aroused discussion and interchange of opinions. A far more serious obstacle was to be found in the utter apathy of a large proportion of those who were responsible for the woodlands of Great Britain. They wished to be left alone; they had carried on a definite system to the satisfaction of the owner for a long period of years, and, whether it be good or bad, it was, in their opinion, unnecessary to make a change, and possibly inconvenient. They had a silent contempt for anything new, or in any sense

scientific, and they judged every man according to his ability in making and measuring timber. They looked upon these two acquisitions as the sum and substance of forestry, which they treated merely as an art, and not a science. We must recognise the essentiality of these two branches of the work, but we must not give them undue importance, simply because they were the part with which we were most familiar, or comprised in knowledge which was acquired by practical usage, rather than by any study of cause and effect. Whatever the practical attainments of the old school of forestry, it would be admitted that for the most part the present condition of our woodlands might be termed chaotic. This condition was not universal, for there were bright exceptions in many parts; but, taking the woodlands as a whole, those who were responsible for their management had not, as a rule, any system of cultivation. We might find methodical cutting of underwood, felling of timber, and also planting. These were an excellent basis for future good management, and were also beneficial to the owner, because they ensured in some measure a regularity of income, but they were not necessarily a progressive policy. We needed to go further in revising our method of culture if we would produce good marketable timber, and so improve our woodlands that they yield a better financial result.

The author then dealt with the question of planting, thinning, financial risk, etc., and with woods that were (1) purely artificial, such as exist in the form of plantations of larch; (2) those that were purely natural, as seen in our beech-woods; and (3) those that were partly natural and partly artificial, such as our coppices with standards.

A vote of thanks having been accorded to the author, it was announced that the next meeting would be held on January 14, when the adjourned discussion will be resumed on Mr. E. H. Blake's paper on "Sanitary Law."

The meeting then terminated.

THE LONDON COUNTY COUNCIL.

THE usual weekly meeting of the London County Council was held on Tuesday in the County Hall, Spring gardens, S.W., Alderman Spicer, Chairman, presiding.

Loans.—On the recommendation of the Finance Committee it was agreed to lend Stoke Newington Borough Council 9,500l. for street widening and 1,000l. for electricity supply.

Closure of Unsuitable Schools.—The Education Committee recommended:—

"That the managers of the undermentioned schools be reminded of the Council's decision of May 30, 1905, and directed to hold a statutory meeting at once; that they be asked whether they intend to carry out the necessary improvements forthwith, and informed that if a definite reply is not received by December 15, 1906, the Council will cease to maintain the schools. Clapham, St. Mary's R.C. (B); Finsbury, C. St. Peter's and St. Paul's R.C.; Hackney, C. St. Joseph's R.C.; Hackney, S. St. Mary of the Immaculate Heart and St. Dominic's R.C. (B); Holborn, Holy Family R.C.; Hoxton, St. Monica's R.C.; Kennington, St. Mary-the-Less N. (C.E.) (G. and I.); Kensington, S. St. George's N. (C.E.); Lambeth, N. Archbishop Sumner's Memorial (St. Philip's) (C.E.); Lambeth, N. Archbishop Tenison's C.E. (G); Marylebone, W. Emanuel G.E. (B and G); Peckham, Camden N. (C.E.); Rotherhithe, Christ Church N. (C.E.); Strand, St. Edward's R.C. Finsbury, E. St. Mark's N. (C.E.); St. Pancras, W. Holy Trinity N. (C.E.); Greenwich, St. John's C.E. (G and I); Greenwich, Holy Trinity N. (C.E.); Holborn, Christ Church N. (C.E.); Islington, W. St. James N. (C.E.); Islington, W. St. Mary Magdalene's (C.E.); Marylebone, W. Christ Church N. (C.E.); Paddington, S. St. John's N. (C.E.); Greenwich, St. John's C.E. (B); Hackney, C. St. James N. (C.E.) (G); Hackney, N. West Hackney N. (C.E.); Kennington, St. Barnabas N. (C.E.)."

The recommendations were carried after discussion.

Paddington Technical Institute.—The Education Committee recommended, and it was agreed, that the tender of the Electric Construction Company, of Wolverhampton, amounting to 1,990l., for the supply and fixing of electric generating plant at the London County Council Technical Institute be accepted.

District Surveyors' Districts.—The Building Act Committee reported as follows, the recommendations being agreed to:—

"With a view to continuing the work begun by the Council on November 19, 1901, we have had under consideration the question of adjusting the limits of several more District Surveyors' districts in order to make them, so far as may be possible and convenient, coterminous with the boundaries of the electoral areas, constituted under or in pursuance

of the London Government Act, 1899. The present time is particularly favourable for such alterations, as, owing to deaths and resignations, a considerable number of districts are vacant. Sect. 139 (3) of the London Building Act, 1894, provides that the Council may, subject to the payment of compensation to any District Surveyor who is thereby deprived of his office, alter the limits of the district of any District Surveyor or unite any two or more such districts, and place any such altered district under the supervision of any District Surveyor. Broadly speaking the effect of our recommendations, if adopted by the Council, will be the reduction of the three Islington districts to two, viz., Islington (South) and Shoreditch, and Islington (North) and St. Pancras (North); the reduction of the four districts into which the City of London is divided to three, viz., City of London, East, South, and West; the union of the two districts of Fulham, North and South; the division of the existing district of Lewisham into two districts, and the modification in other respects of the boundaries of nine districts. In the event of our recommendations being adopted, we propose to invite applications for the appointments of District Surveyors for the several vacant districts by advertisement, and to submit recommendations with regard thereto as soon as possible. We have negotiated with the District Surveyors concerned, and we recommend:—

(a) That the Islington portion of the district known as Clerkenwell and part of Islington be severed from that district and be added to the adjoining district of Islington (South), Shoreditch, and Norton Folgate.

(b) That the portion of the vacant district of Islington (South-West), St. Luke, Old-street, and the Parish of Glasshouse-yard, within the Metropolitan Borough of Islington, southward of the railway through Highbury Station and Maiden-lane Station, be added to the adjoining district of Islington (South), Shoreditch, and Norton Folgate.

(c) That Norton Folgate be severed from the district known as Islington (South), Shoreditch, and Norton Folgate, and added to the adjoining district of Whitechapel, Spitalfields, Mile End New Town, and Tower Liberty.

(d) That the district of Islington (South), Shoreditch, and Norton Folgate, readjusted as outlined in the foregoing resolutions (a), (b), and (c), be designated Islington (South) and Shoreditch.

(e) That the portion of the vacant district of Islington (South-West), St. Luke, Old-street, and the Parish of Glasshouse-yard, within the Metropolitan Borough of Islington, northward of the railway, through Highbury Station and Maiden-lane Station, be added to the adjoining district of Islington (North) and St. Pancras (East).

(f) That the portion of the district of St. Pancras (West), northward of the railway, through Camden Town Station and Chalk Farm Station, be severed from that district and added to the adjoining district of Islington (North) and St. Pancras (East).

(g) That the portion of the district known as Islington (North) and St. Pancras (East), southward of the railway, through Highbury Station and Camden Town Station, be severed from that district and added to the adjoining district of St. Pancras (West).

(h) That the district of Islington (North) and St. Pancras (East), readjusted as outlined in the foregoing resolutions, (e), (f), and (g), be designated Islington (North) and St. Pancras (North).

(i) That the portion of the district known as Holborn, East Strand, and part of St. Pancras, within the Metropolitan Borough of St. Pancras, be severed from that district and added to the adjoining district of St. Pancras (West).

(j) That the district of St. Pancras (West), readjusted as outlined in the foregoing resolutions, (f), (g), and (i), be designated St. Pancras (South).

(k) That the portion of the district known as Holborn, East Strand, and part of St. Pancras, within the Metropolitan Borough of Finsbury, be severed from that district and added to the adjoining district of Clerkenwell and part of Islington.

(l) That the portion of the vacant district known as Islington (South-West), St. Luke, Old-street, and the Parish of Glasshouse-yard, within the Metropolitan Borough of Finsbury, be added to the adjoining district of Clerkenwell and part of Islington.

(m) That the district known as Clerkenwell and part of Islington, readjusted as outlined in the foregoing resolutions, (a), (b), and (c), be designated Finsbury.

(n) That the portion of the district known as Holborn, East Strand, and part of St. Pancras within the City of Westminster, be severed from that district and added to the adjoining vacant district of Bloomsbury, St. Martin-in-the-Fields, Soho, and Covent Garden.

(o) That the portion of the vacant district known as Bloomsbury, St. Martin-in-the-Fields, Soho, and Covent Garden, within the Metropolitan Borough of Holborn, be severed from that district and added to the adjoining district of Holborn, East Strand, and part of St. Pancras.

(p) That the district of Holborn, East Strand, and part of St. Pancras, readjusted as outlined in the foregoing resolutions (i), (k), and (o), be designated Holborn.

(q) That the vacant district of Bloomsbury, St. Martin-in-the-Fields, Soho, and Covent Garden, be readjusted as outlined in the foregoing resolutions, (n) and (o), be designated Strand.

(r) That the Queen's Park Ward of the Metropolitan Borough of Paddington be added to the district of Paddington, and that the late detached portion of St. George, Hanover-square, on the north side of Bayswater-road, be severed from the district of St. George, Hanover-square (North) and added to the district of Paddington.

(s) That the detached portion of the vacant district known as City of London, Western Division (viz., Chesham Ward), be added to the vacant district known as City of London, Eastern Division.

(t) That so much of the vacant district known as City of London, Northern Division, as is situate westward of a line running north and south along the centres of Moor-lane, Fore-street, Aldermanbury-postern, Aldermanbury, and Milk-street, be added to the vacant district of City of London, Western Division.

(u) That so much of the vacant district known as City of London, Northern Division, as is situate eastward of a line running north and south along the centres of Moor-lane, Fore-street, Aldermanbury-postern, Aldermanbury, and Milk-street, be added to the vacant district of City of London, Eastern Division.

(v) That the district known as City of London, Western Division, readjusted as outlined in the foregoing resolutions, (s) and (t), be designated City of London (West).

(w) That the district known as City of London, Eastern Division, readjusted as outlined in the foregoing resolutions, (s) and (u), be designated City of London (East).

(x) That the district of Lewisham be divided by a line along the South-Eastern and Chatham Railway, through Lewisham-road and Catford stations, and that the two districts so constituted, be designated Lewisham, East, and Lewisham, West.

(y) That the district of Fulham (South), when vacant, be added to the district of Fulham (North), and that the district so constituted be designated Fulham.

(z) That where alterations in the limits of districts are approved by the Council, the solicitor do take such steps as may be necessary to secure the carrying-out of such alterations, which shall be

modern methods, with steel construction, thin brick or reinforced concrete walls, or even corrugated iron to enclose them, the roofs being supported on steel trusses, and having large skylights. He then dealt with materials in detail, steel being the principal one, which he said should be mild, made by the open hearth acid process, and having an ultimate tensile strength of 28 to 32 tons per square inch of section and an elongation of at least 20 per cent. in a length of 8 in. He then spoke of forces due to cranes and the capacity of electric travelling cranes, giving tables of each, after which he went at length into the question of wind pressure. There are no Board of Trade regulations with regard to this, except in the case of loaded railway bridges, and for these a pressure of 56 lb. per square foot is specified. But during the construction of the Forth Bridge careful records of wind pressures were kept, and he gave the following table of these:—

Records of Wind Pressures on Inchgarvie During Violent Gales.

Year.	Date.	Pressure in lbs. per square foot.					Direction of Wind.
		Revolving gauge 1-5 sq. ft.	Small fixed gauge 1-5 sq. ft.	Large fixed gauge 300 sq. ft.	In centre of large gauge 1-5 sq. ft.	Eight hand top of large gauge.	
1884	October 27 ...	29	23	15	—	—	S.W.
1884	" 28 ...	29	29	19	—	—	S.W.
1885	March 20 ...	30	31	17	—	—	W.
1885	December 25 ...	25	27	19	—	—	S.W.
1886	March 31 ...	36	31	19	25.5	27.0	W.
1887	February 4 ...	26	41	15	—	—	S.W.
1888	January 5 ...	27	16	7	—	—	S.E.
1888	November 17 ...	27	35	41	—	—	W.
1889	" 2 ...	27	34	12	—	—	S.W.
1890	January 19 ...	27	28	16	—	—	W.
1890	" 21 ...	26	35	15	—	—	S.W.
1890	" 25 ...	27	34	18	23.5	22	S.W. by W.
Average		27.6	29.8	16.9	—	—	—

subject to the conditions that any works in progress, and any proceedings in progress relating to any dangerous or neglected structure, or any other building or structure in areas surrendered by a District Surveyor shall, notwithstanding the transference of those areas from his supervision, continue to be supervised by him until the completion of such works and proceedings, and that no District Surveyor shall claim compensation for any diminution of income which may hereafter arise by reason of such adjustments of limits.

(aa) That, unless otherwise specified, and subject to the conditions mentioned in the foregoing resolutions, the alterations of district limits do take effect on and after January 1, 1907, and that the solicitor do take such steps as may be necessary with reference thereto.

Surplus Land, Holborn to Strand.—The Improvements Committee recommended, and it was agreed:—

"That, subject to the result of the usual inquiries proving satisfactory, a site at the junction of Kingsway and Sardinia-street, having an area of about 10,500 sq. ft., and shown by a purple colour on the plan, be let on the Council's usual conditions, to the Kingsway Exchange, Ltd., for ninety-nine years, at a rent of 2,000, a year, with one year's peppercorn, the rent for the succeeding six months being 500."

Fire Protection in Soho.—Colonel Probyn asked the Chairman of the Fire Brigade Committee if anything had yet been done to afford further fire protection to Soho.—Mr. Lewin Sharp said the valuer was searching for a site on which the Committee could provide an additional fire-station.

Widening of Blackfriars Bridge.—Mr. Gilbert asked the Chairman of the Highways Committee when it was likely that the widening of Blackfriars Bridge would be taken in hand and the circular route of tramways completed.—Captain Hemphill said that he was informed that the City Corporation was taking all possible steps, but he believed that the minimum time before the widening was complete would be three years.

The Council adjourned after taking unopposed business.

THE ARCHITECTURAL ASSOCIATION DISCUSSION SECTION.

The fourth meeting was held, at the invitation of the Junior Institution of Engineers, at Westminster Palace Hotel on Monday, December 3, when a paper was read by Mr. Adam Hunter, Assoc. M. Inst. C.E., on "The Structural Design of Engineering Factories."

Mr. Hunter commenced by drawing a comparison between former methods of heavy brick-built and badly-lighted factories and

From this he considered that an average steady wind pressure of 30 lb. per square foot would be found sufficient in factory design. For general principles of design he mentioned, amongst other points, that the main columns should always be carried up to the underside of the roof trusses, and the roof girders fixed between the columns, and not on the top of them. Foundations should be deep enough to be beyond the influence of frost or drought. In this country a depth of 3 ft. will be sufficient for soils of a porous nature and about 4 ft. in clayey soils. For the steel construction in the best practice it is considered desirable that flat bars and rods and adjustable members should be avoided. In roofs it is usual for the whole to be of glass, and putty glazing may be used, and gives satisfaction, though there are different forms of patent glazings. For side coverings, if corrugated iron is used, the thickness should not be less than No. 18 W.G. where durability is desired. If brick filling is adopted it should not be less than 9 in. and laid in cement mortar. For floors Canadian rock maple is sometimes used. Wood block flooring is common for machine and erecting shops. In smithies and boiler shops furnace ashes well rolled is the usual floor. Steelwork is painted one coat of red lead before leaving the yard and one coat of oxide paint after it is erected. Mr. Hunter concluded by saying an ordinary factory of, say 1,000 ft. cube could be constructed for 1d. to 1½d. a foot cube, and one 1,000,000 ft. cube for 3d.

Mr. Lishman (Chairman of Discussion Section) opened the discussion, and, after commenting on the question of foundations, wind pressure, and painting, said, from an architectural point of view, he thought engineering factories should be designed to show their character.

Mr. F. R. Durham (the Chairman) said he believed the present paper gave the first publication of the wind pressures taken at the time of the building of the Forth Bridge. He also noted the expression "legitimate" use of reinforced concrete, and, as Mr. Hunter had not mentioned this for foundations which were below ground, he presumed he would not use reinforced concrete there, to which he would heartily concur. Finally, he thought the architect and engineer should be brought more together, as the engineer is accustomed to handle his materials from a different point of view; he tries to dispose

of his materials in the most economical manner, and if they worked more together he could help the architect in this respect.

Mr. S. Cutler, jun., said he knew of a factory which had stood well with only half-brick panel enclosures.

Mr. Lovegrove said he believed rain would come through if half-brick panels were used, and also thought putty glazing would not last, and if it was used patent glazing would have to be finally substituted for it. Mr. Walden drew comparison between an engineer's factory as described by Mr. Hunter and one like that at Queensferry, illustrated in the *Builder* for December 1 last, and designed by Mr. H. B. Creswell. The Queensferry buildings would cost at least 6d. to 8d. per foot cube, so that the extra cost of architectural stability was a consideration. With regard to regulations, he said the Royal Institute of British Architects in February, 1904, suggested regulations for plain buildings.

Mr. Porter referred to the Admiralty regulations, which gave slating for roofs.

Mr. Bryan said he had seen ferro-concrete works near Paris, where walls 4 in. thick were used, but they were rendered both sides with pure cement.

Messrs. Billing, Bishop, J. H. Pearson, and Eade also spoke, after which Mr. Hunter replied, and the meeting terminated.

APPLICATIONS UNDER THE 1894 BUILDING ACT.

THE London County Council at their meeting on Tuesday dealt with the following applications under the London Building Act, 1894. The names of applicants are given between parentheses:—

Lines of Frontage and Projections.

City of London.—A projecting shelter in front of the Blackfriars station of the Metropolitan District Railway, Queen Victoria-street, City (Mr. C. H. King for the Metropolitan District Railway Company).—Consent.

Kensington, South.—The retention of wood and glass screens at the sides of a projecting porch in front of No. 17, Queen's-gate, Kensington (Mr. J. W. Rostler).—Consent.

Levensham.—That the application of Mr. E. C. Christmas for an extension of the period within which the erection of three houses with one-story shops in front, on the site of No. 63, Dartmouth-road, Forest-hill, and the erection of additional stories over the existing shops at Nos. 65 and 55A, Dartmouth-road, were required to be completed, be granted.—Consent.

Marylebone, East.—A porch and two balconies in front of De Walden-court on the northern side of New Cavendish-street, St. Marylebone (Mr. D. Joseph for Mr. F. Britton).—Consent.

Strand.—An iron and glass addition at the first-floor level in front of the Alhambra Music Hall, Leicester-square (Mr. W. M. Brutton for the Alhambra Company).—Consent.

Westminster.—Retention of a projecting sign in front of No. 121, Victoria-street, Westminster (Mr. P. Russell & Co.).—Consent.

Wandsworth.—Porches in front of nine houses on the southern side of Putney Heath-lane, Wandsworth, eastward of Duncannon cottage (Mr. H. Bignold for Mr. W. Tucker).—Refused.

Width of Way.

Kensington, South.—Buildings at the rear of No. 58A, Earl's-court-road, Kensington, at less than the prescribed distance from the centre of the roadway of Pembroke-mews (Mr. A. E. Nares for Messrs. A. Roberts & Co., Ltd.).—Consent.

Width of Way and Projections.

Hampstead.—An iron and glass veranda in front of a motor garage at "The Logs," Well-road, Hampstead (Mr. W. A. Hudson for Mr. F. C. Pasinelli).—Consent.

Waltham.—A forecourt fence in front of No. 144A, Trafalgar-street, Waltham, at less than the prescribed distance from the centre of the roadway of such street, and to the erection of a projecting one-story porch in front of the said building (Mr. R. J. Dickens for the Right Hon. the Lord Langatock).—Consent.

Width of Way and Construction.

Fulham.—A wood and iron building, of a temporary character, at the side of No. 39, Munster-road, Fulham (Mr. J. Cable for Mr. J. H. Neave).—Consent.

Lines of Frontage and Construction.

Newington, West.—The retention of a photographic showcase in front of No. 194, New Kent-road, Newington (Mr. M. B. Olley).—Consent.

Space at Rear.

St. Pancras, West.—A modification of the provisions of sect. 41 with regard to open spaces about buildings, so far as relates to the proposed erection

of buildings on the northern side of Longford-street (Mr. P. B. Tabbs for Mr. H. B. James).—Consent.

Space at Rear and Construction.

Kennington.—A modification of the provisions of sect. 41 with regard to open spaces about buildings, so far as relates to the proposed erection of No. 152, Lower Kennington-lane, Kennington, and do also approve the erection of external iron staircases and balconies on the open space at the rear of Nos. 142 to 152 (even numbers only) inclusive, Lower Kennington-lane (Mr. C. Barker for the Duchy of Cornwall).—Consent.

Dwelling-houses on Low-Lying Land.

Bermansley.—That a licence be granted to Mr. G. Brenner for the erection of a building on low-lying land situated at Baffin's-place, Bermansley.—Consent.

Rotherhithe.—That a licence be granted to Mrs. Portlock for the erection of six cottages on low-lying land situated at Nos. 74 to 79, George-row, Bermansley.—Consent.

The recommendation marked + is contrary to the views of the local authorities.

Architectural Societies.

MANCHESTER SOCIETY OF ARCHITECTS.—At a students' meeting held on Tuesday, the 4th inst., at the rooms of the Society, Mr. Basil Pendleton read a paper entitled "Stories of Our English Homes." The lecturer gave a short description of some of our early castles, a view of Conisborough Castle being shown as an example, after which he proceeded to the monasteries and abbeys, and showed how the mode of living caused the development of the different rooms, the Abbots of Fountains and Kirkstall being very fully illustrated to show the various points. One of the earliest examples of a house shown was the Jews' House at Lincoln. The lecturer then dealt with private manor-houses which were fortified by Royal licence. Among the examples shown on the screen were Stokesay Castle, Aydon Castle, and Little Wenham Castle. The next period took them to a time when it was no longer necessary to make a home which would stand a siege, but one which must be capable of withstanding any marauding expedition. The hall had now become one of the principal features of the plan, and had a raised dais at one end and at the other a screen which shut off the entrance and offices. Numerous slides were shown of Haddon Hall, it being considered one of the best examples of mediæval house. Slides of Hardwick Hall were also shown, and the finely-proportioned windows noted. Among other examples were Hampton Court, Blenheim Palace, and Chatsworth. Mr. Paul Ogden occupied the chair, and, in referring to the finely-proportioned windows of Hardwick Hall, explained the different rules for proportioning the widths and heights of windows.

LEEDS AND YORKSHIRE ARCHITECTURAL SOCIETY.—At the rooms of this Society on Thursday, the 6th inst., Mr. C. Howdill read a paper on "Stained-glass." The President, Mr. H. S. Chorley, occupied the chair. The lecturer first dealt with the discovery and early history of glass, and afterwards described in detail the method of making glass, both stained and enamelled. He also explained the process of making ecclesiastical figure windows from the first cartoon and cutting of the glass onwards through the painting to the leading and fixing. The different periods of mediæval glass were explained, and illustrated in unique manner by many fine natural colour slides of famous historic windows at York, Ripon, and Oxford, the slides having been made by the lecturer himself. It was John Thornton, of Coventry, the glass painter of the XVth century, who glazed the great east window of York Minster, and was paid about 900l. of our money for a window which according to modern values would cost about 2,000l. The old craftsmen of the XIVth century, however, drove a harder bargain and secured better pay for their work. In the XIVth century the rate of pay was 9s. (modern money) per foot for plain glass and 18s. per foot for coloured glass. That this was exceedingly good pay is shown by the fact that the cost of such work to-day would be roughly estimated at from 25s. to 30s. per foot. Some examples of the famous Fairford windows were also exhibited, and some of the windows were shown in detail and their meaning elucidated. Various

phases of modern glass were illustrated, including some of the earlier and also late work of Burne Jones at Christ Church, Oxford. The influence of Botticelli on glass painting was pointed out.

Archæological Societies.

ST. PAUL'S ECCLESIOLOGICAL SOCIETY.—"Wells Cathedral: an Idyllic Minister of the West Country" was the subject of a lecture delivered before the St. Paul's Ecclesiological Society at the Chapter House, St. Paul's, on Wednesday, December 12, by Mr. E. W. Harvey Piper, the Rev. Lewis Gilbertson, F.S.A., in the chair. A young photographer and student, the lecturer suggested, consulted an older friend, asking where he could find a typical English minister, charming in grouping, harmonious in proportions, and enriched by quaint carving within and without; it should be complete in all its adjuncts of chapter-house and cloister, and enshrined in a setting of ancient buildings, gates, and towers, with hill-sides, abundant trees, and verdant meadows for an outer framework. Such an ideal, idyllic minister, feminine rather than masculine in its characteristics, was to be found at Wells. To the objection that its story was hackneyed the reply was made that only within the last twenty years, thanks to the investigations of Canon Church and the late Rev. J. A. Bennett, had the chronology and evolution of the cathedral been determined and the building of the central mass been correctly assigned to the days of Bishop Reginald de Bohun (1174-1191). The friends agreed to visit Wells together, and the result of their inspection was thrown on the screen in the form of over 100 lantern slides. The exhibition of a number of exterior views from various standpoints was followed by an analysis of the distinctive features of the ground plan, the development of the existing building being treated in detail. The west front, the widest cathedral façade in England, was eulogised and criticised. It was shown that the feature of the extension of the western towers beyond the outer walls of the north and south nave aisles gave to it its unique breadth, and the front, as a framework for statuary, was compared with Salisbury and contrasted with those of Lincoln and Peterborough. The forms of saints and kings standing above the cathedral porch were dealt with in detail, attention being called to the grace, self-restraint, and simplicity of treatment which distinguish these, the finest works of English sculptors of the XIIIth century. The carving was contrasted with the figure-work of Northern France and that of Winchester, Gloucester, and Westminster. Typical kings, queens, statesmen, bishops, priests, deacons, and knights in chain armour were shown on the screen, and the lecturer suggested the value of those matchless sculptures—fair, untouched blossoms still on the branches for which they were conceived—to the student of regal and ecclesiastical costume. A quatrefoil group, introduced as a family portrait graven in stone, of an undoubted ancestor of every member of the audience, carved six and a half centuries since, proved to be Noah labouring as a shipwright. The solemnity and dignity of the nude figures in the Resurrection groups were dilated upon, and the high technique of the anatomy and drapery of the whole series was emphasised. In a rapid survey the lecturer passed round the exterior of the cathedral, visiting the vicar's close, the chapter-house and its undercroft, the cloisters and library, finally the palace, and, following views of the quadrangle and ruined hall, a portrait of Thomas Ken was projected on the screen as a reminder of the five years' bishopric of that sturdy non-juror and saintly hymn-writer. In summarising the external treatment, Mr. Harvey Piper contended that nowhere was the ornament overdone; nothing at Wells was too rich or florid, but everything harmonised in a beauty that never became ostentatious or gaudy. Entering the nave the peculiarities of its construction were referred to. The huge relieving arches at the east end and across the transepts were designed as a structural work of reinforcement, carried out with the consummate skill of a great engineer and the precision of fit of a dentist's set of teeth.

The stopping of the vaulting shafts at the string course over the continuous triforium was shown to contribute greatly to the horizontality of effect, whereby the low pitch of the vault was more than compensated for. The chantries, the XIII century font, Peter Lightfoot's clock, and the transepts, their chapels and monuments, were described in turn, and a series of illustrations of the quaint and often humorous carvings of the pier capitals was shown on the screen, including the martyrs to the toothache, the old woman removing a thorn from her foot, the pedlar and his pack, the farmer chasing the fox, the cobbler and the fate of the fruit stealers told in four acts. A visit to the Lady chapel, choir, and aisles completed the survey, the author concluding with a description of the desecration of the choir and the defence of the altar by Lord Grey of Wark and Sir Gervase Jevone during the Monmouth rising of July, 1685.

Engineering Societies.

THE JUNIOR INSTITUTION OF ENGINEERS.—On Saturday, the 8th inst., on the invitation of the President, Mr. W. B. Bryan, Chief Engineer to the Metropolitan Water Board, a large number of members of this Institution paid a visit to the Honor Oak reservoirs, which are in course of construction for the Board under the direction and supervision of Mr. J. W. Restler, by whom they were designed. Mr. Bryan, assisted by Mr. F. Melhuish and other members of the staff, conducted the party over the extensive works, pointing out the features of special interest. The reservoir will contain nearly sixty million gallons of water, and will probably be the largest covered reservoir in the world. The construction generally is of brickwork and concrete, with walls separating the reservoir into four divisions. A middle wall 3 ft. in thickness extends all round the outer walls, and is keyed into the clay. At the centre of the four reservoirs will be the central well, from which the charging and

emptying will be directed. The bricks used have all been made from the excavated clay on the site, sixteen million bricks so far having been produced. The existing engine-house and well-pumps were also seen.

SOCIETY OF ENGINEERS.—The fifty-second annual general meeting of the Society of Engineers was held on Monday, the 10th inst., at 17, Victoria-street, Westminster. The chair was occupied by Mr. Maurice Wilson, President. The following gentlemen were duly elected by ballot, as the Council and officers for 1907, viz.:—As President—Mr. Richard St. George Moore; as Vice-Presidents—Messrs. Joseph William Wilson, William Henry Holtum, and George Abraham Goodwin; as ordinary members of Council—Messrs. John Aird, Joseph Bernays, Francis George Bloyd, Alexander Graham Drury, George Green, John Kennedy, Edward John Silcock, and Diego Andrew Symons; as Honorary Secretary and Treasurer—Mr. David Butler Butler; as Honorary Auditor—Mr. Samuel Wood. F.C.A. The President announced the death, on November 30, of Sir Edward James Reed, K.C.B., who was elected an honorary member of the Society in 1877. The President announced that the following premiums had been awarded by the Council for papers read during the past session, viz.:—The President's gold medal to Mr. Frank Latham for his paper on "Harbour Exigency Works"; the Bessemer premium of books to Messrs. W. Pollard Digby and Henry C. H. Shenton for their joint paper on "The Prevention of the Bacterial Contamination of Streams and Oyster beds"; a Society's premium of books to Dr. David Sommerville for his paper on "The Chemistry and Bacteriology of Potable Waters"; and a Society's premium of books to Mr. Gerald O. Case for his paper on "Submarine Groyning."

PUBLIC LIBRARY, BURNISLAND.—The erection of the new free library in the High-street is now nearing completion. Mr. Williamson, architect, of Kirkcaldy, prepared the designs.

Fifty Years Ago.

FROM THE *Builder* OF DECEMBER 13, 1856.

THAMES BRIDGES.

We wished to urge that not one of two bridges, but three, are required for carriage traffic between Waterloo and Vauxhall. It is a false system, and one that is injurious to London in many ways which may appear to have no immediate connexion with the subject, to stifle the means of communication between different parts of a metropolis, as in London would seem to have been done. Looking to mere area, the very heart of London is that portion of the plan which is cut off by the curve of the river between the Blackfriars-road and Westminster Bridge road. Yet sites for dwellings for the poor are wanted; and some public buildings, notwithstanding the low level, might be advantageously placed in the locality, were the freedom of access perfect, and divested of a tax. The question of provision of dwellings is one with which London has dallied much too long; some energetic meeting of the evil is required; and, as a large number of the poorer inhabitants of the neighbourhood of Parliament street may suffer grievously by the proposed improvements there, Government may fairly be asked to promote the erection of dwellings of a different class to those which now exist on the Lambeth side—such as combine a more economic use of the ground with better distribution of plan—and to provide the requisite direct communication to them. Indeed, so strongly does this argument of the utilisation of the Lambeth district prevail with the writer of the article in the "Companion to the Almanack" which we lately referred to, that he seems to rely upon it as his main argument for increase in the number of Thames bridges.

Illustrations.

DESIGN FOR A THEATRE CEILING.

THIS design, by Mr. A. C. Conrade, was intended as an essay in what might be termed symmetrical figure-work, the design consisting of pyramidal groups, with the apexes converging towards the centre.

It would be suitable for a theatre in the Renaissance style, with perhaps a leaning towards the Adam treatment.

This particular design has not been as yet carried out. Mr. Conrade has, however, already painted ceilings in several theatres in England, the Theatre Royal at Brighton among others, with a design illustrating Spring, Summer, and Autumn.

HOUSE, KENSINGTON PALACE GARDENS.

THE materials externally are red brick and Portland stone and Westmorland green slates. Internally the hall and corridor and main stairs and billiard-room are panelled in oak.

Mr. E. J. May is the architect. The drawing was exhibited at the last Royal Academy exhibition.

VILLAGE HALL AND READING-ROOM, SHORNE.

THIS hall has recently been built by the Shorne Parish Council with funds which came to them as compensation for the closing of a public footpath by the British Uralite Company, whose works are in this parish.

The actual cost of the building was 495l. Drains and water supply insisted on by the Strood District Council, including a stretch of drain down to the public road, cost 28l. extra; gates and fencing cost 11l., and about 50l. was spent in furniture, such as tables, chairs, benches, platform steps, curtains, lamps, copper, etc. The tables were made of such sizes and of sufficient strength that they could be fitted into the end of the hall and form a stage when so required.

The roof construction was worked out so as to be done in the most economical way, and is built up entirely out of 5 by 2 scantlings bolted together. There are no rafters, but 1-in. boarding runs vertically from eaves to ridge, and is fixed to the cross purlins; this boarding forms the ceiling of

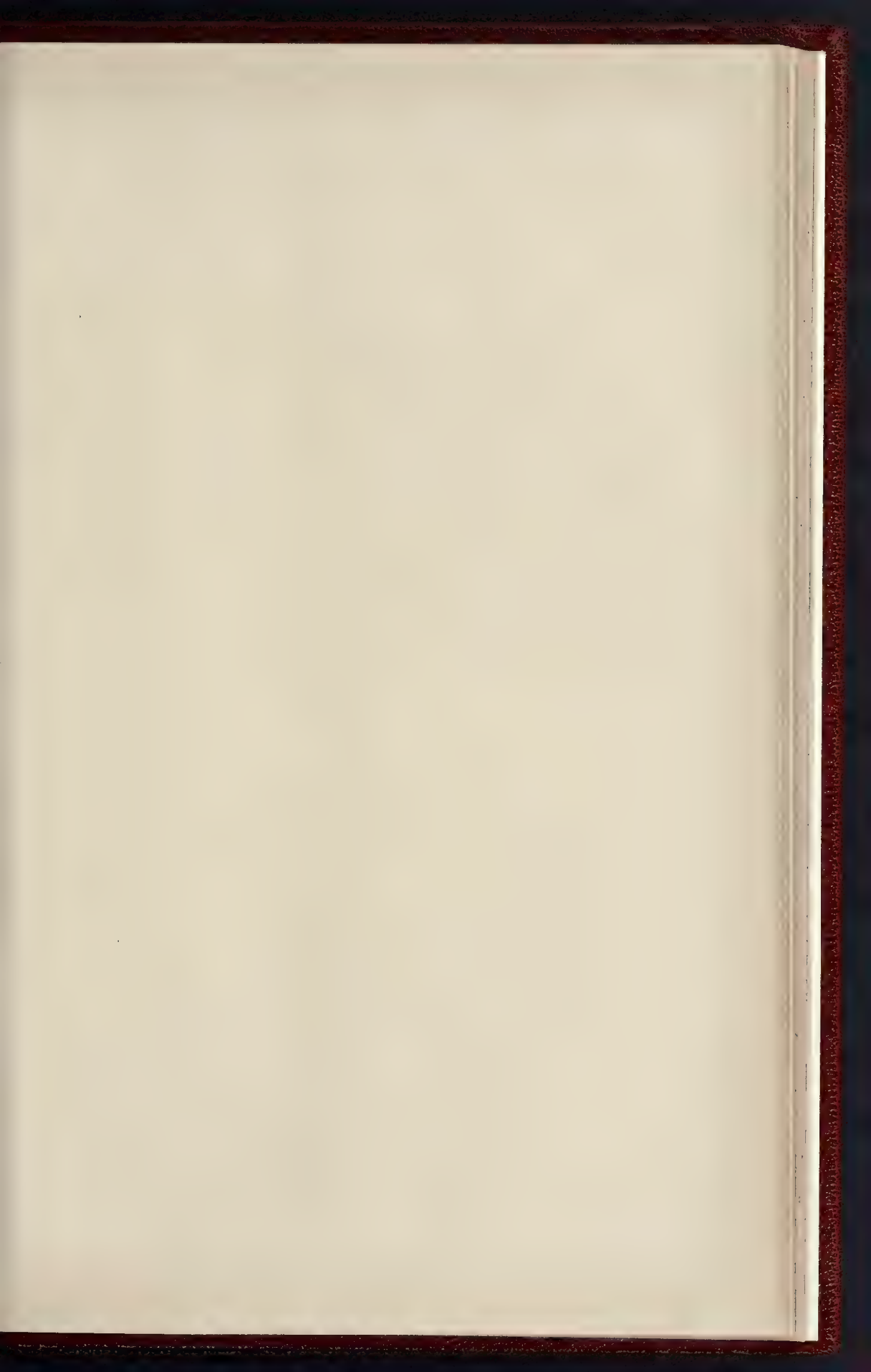


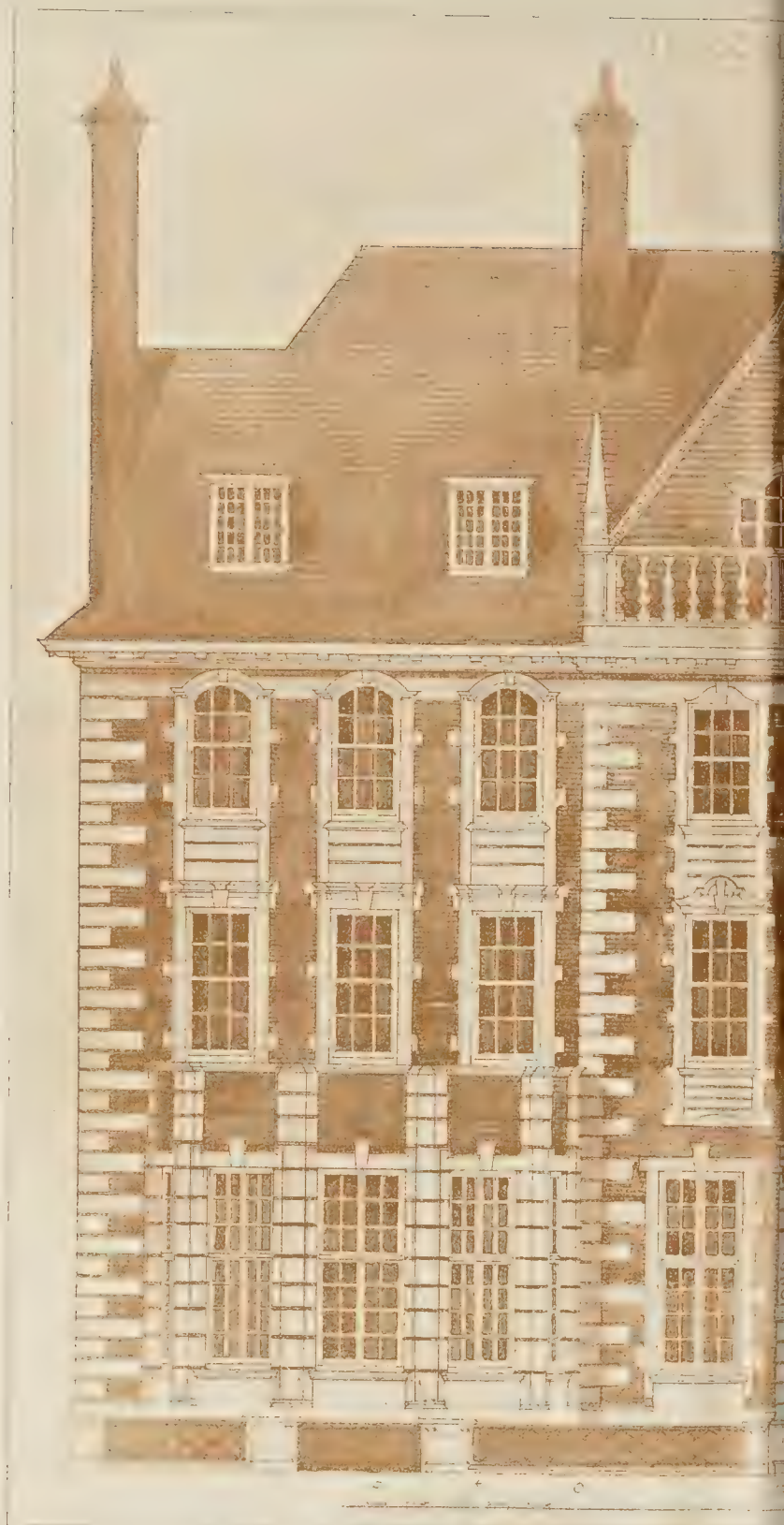
House, Kensington Palace Gardens. Plan.







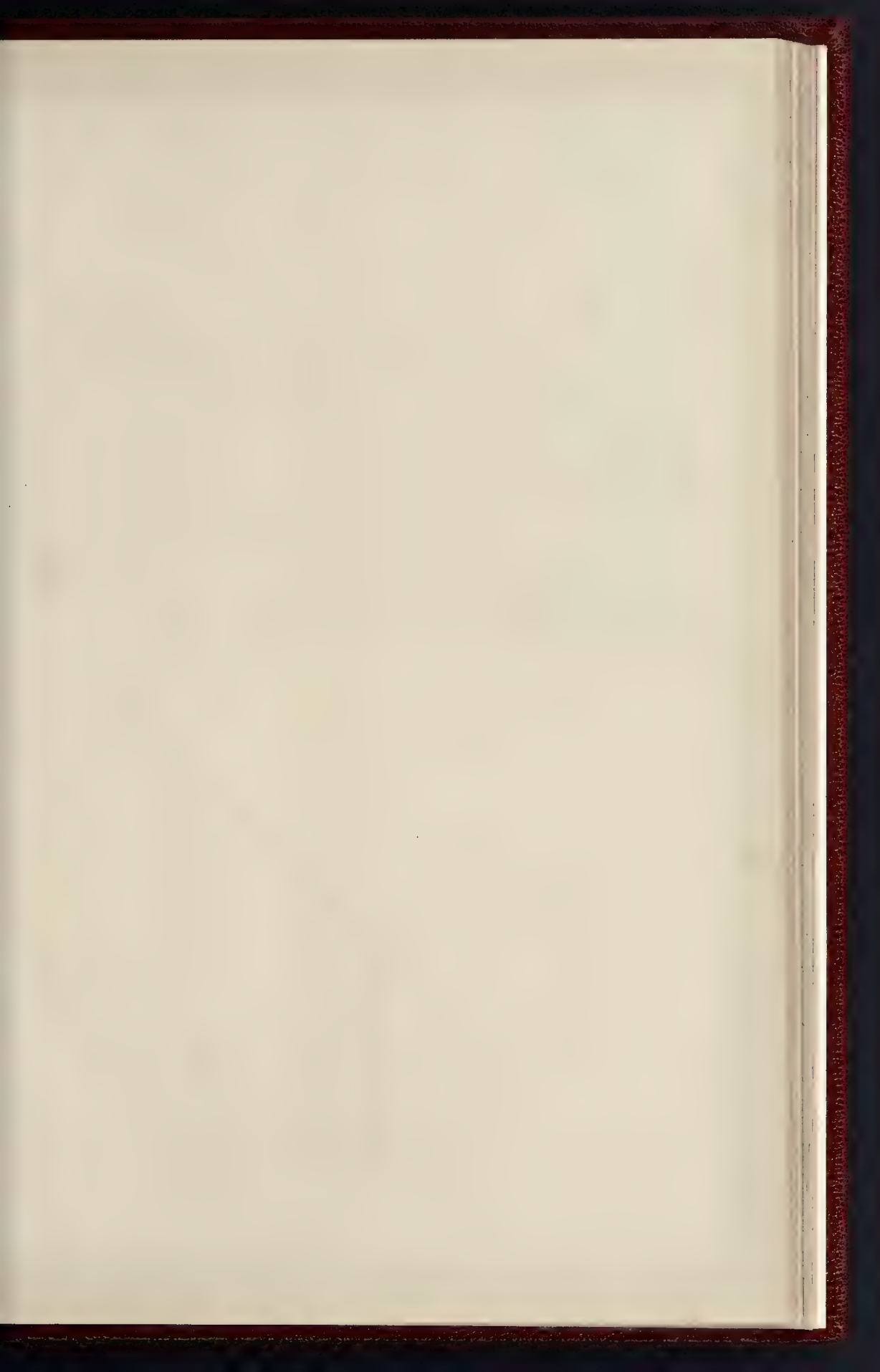


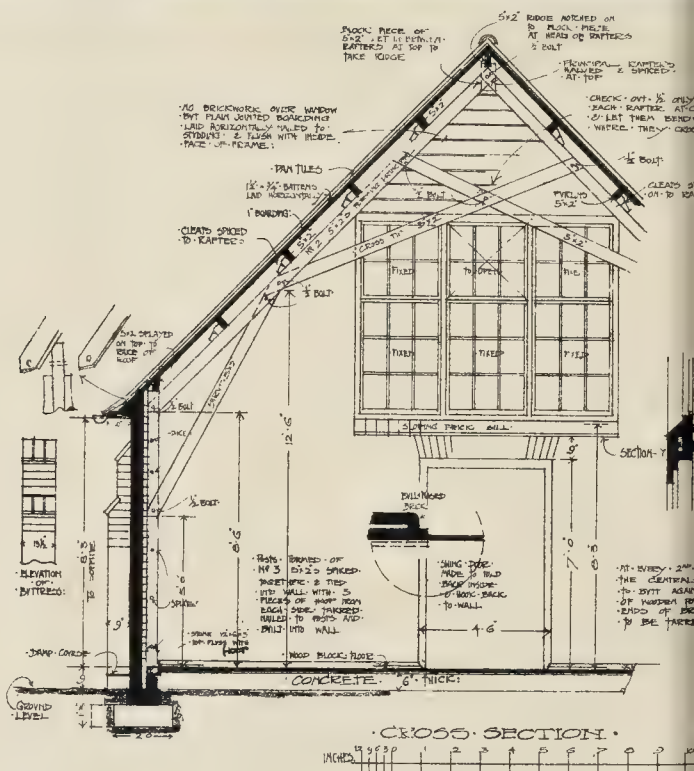


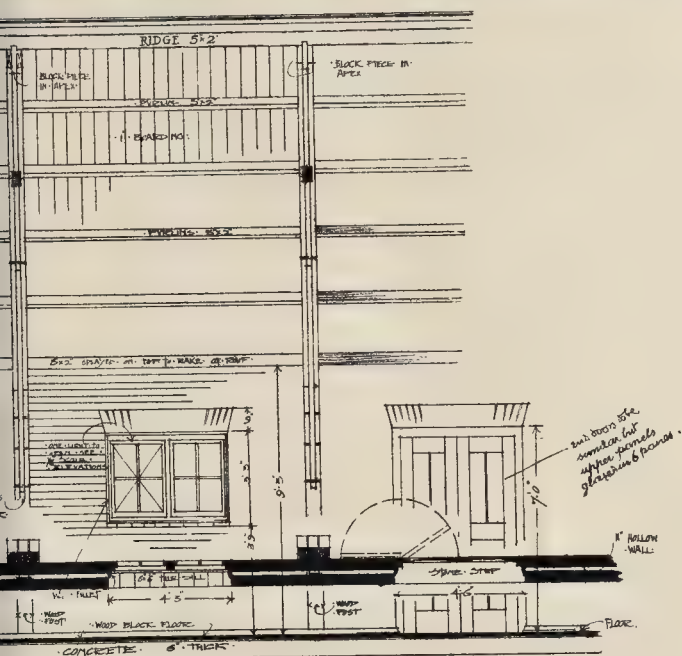


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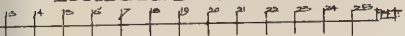
ARCHITECTURAL DRAWING OF A BUILDING FACADE



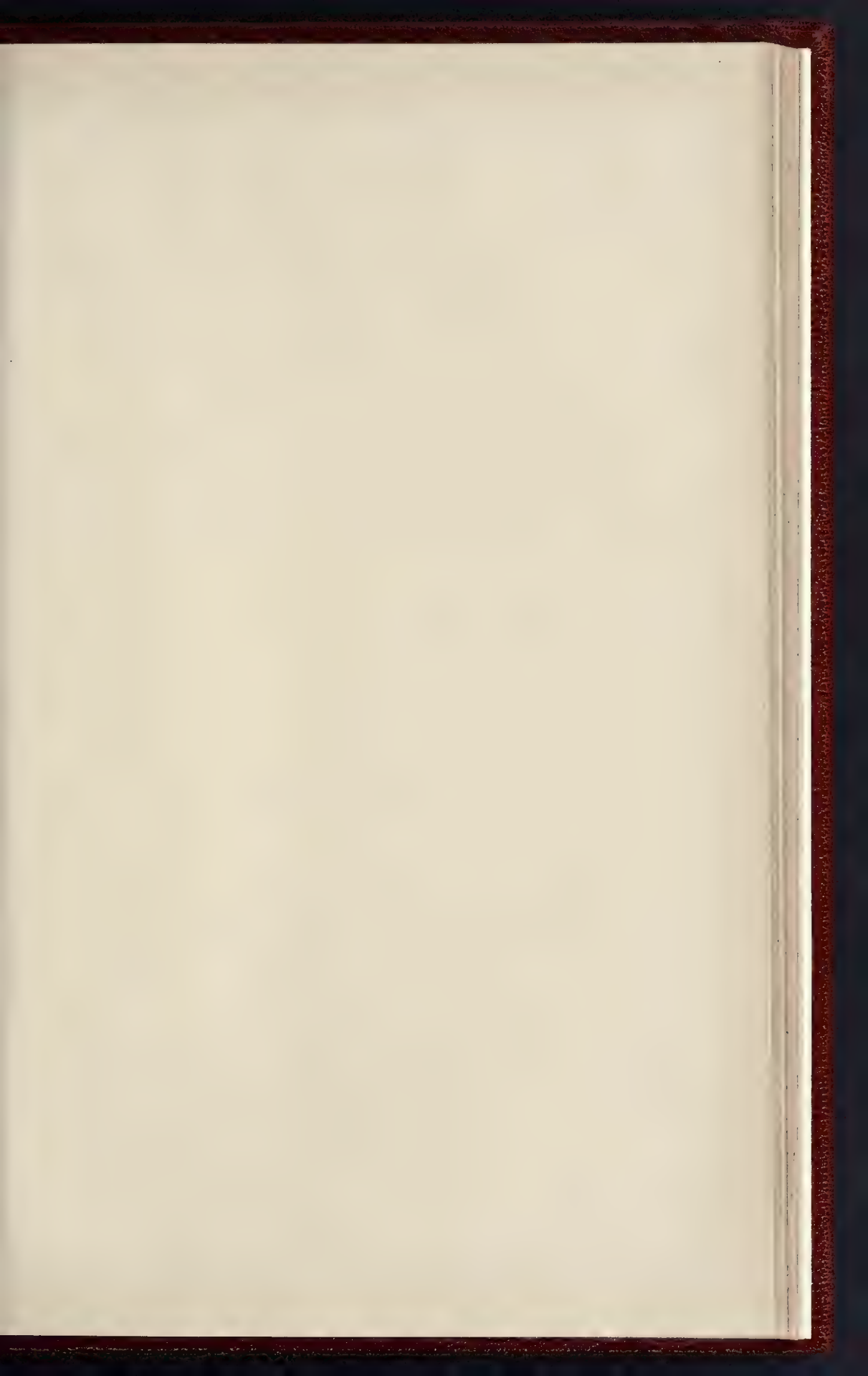




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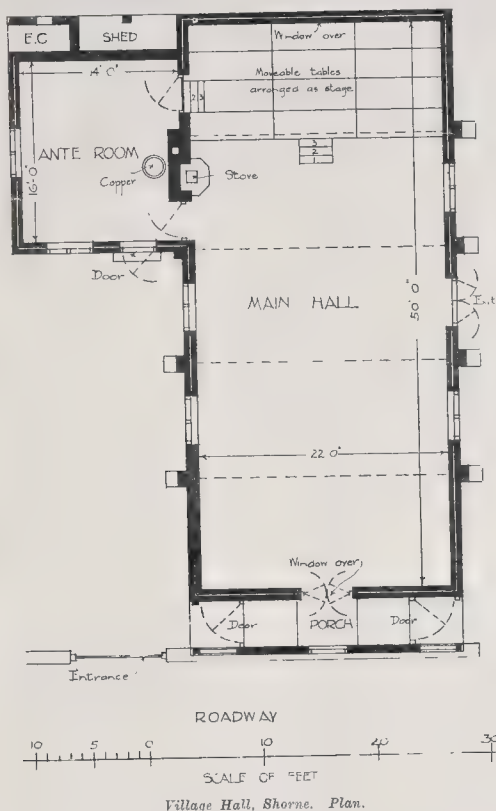
INK PHOTO, SPRAGUE & CO., 174 & 5 EAST HARRIS STREET FETTER LANE E.C.







BY PHOTOGRAPHIC C. L. A. S. EAST-WINDING STREET FETTER LANE E.C.



Village Hall, Shorne. Plan.

the hall. The bricks were supplied at cost price from Lord Darnley's brickfield, and sand and gravel were supplied by Lord Darnley from his pits for the digging. The site was presented by Mr. George Arnold, Mayor of Gravesend. Three estimates were obtained from local builders, the difference between the highest and lowest being 6d.

The work was carried out by Mr. J. Martin, builder, of Meopham, who submitted the lowest estimate. The architect was Mr. R. Weir Schultz.

SOME "PUGIN" SKETCHES.

We have not been able to get a reply from Mr. G. Drysdale in regard to these sketches, which we believe were made in competition for the Pugin Studentship, or were sketches made afterwards in the capacity of Pugin student. However, they are good and interesting sketches, which is the main point, and speak for themselves.

Trade Catalogues.

The Birmingham Guild of Handicraft send us their illustrated price-list of electric radiators. As might be expected, the simple but well-designed metal-work of these offers a refreshing contrast to the style of the so-called "ornamental" radiators offered by most of the shops dealing in these articles.

The Chicago Pneumatic Tool Company send us a pamphlet of more than 100 pages describing and illustrating various types of their Franklin air compressors, specially suited to the operation of pneumatic tools and machinery. The greater part of the book is devoted to the structural details, dimensions, and capacities of the compressors made by this firm. Our readers will probably be more interested in two or three pages dealing with the air-lift method of pumping water by the direct application of compressed air in artesian and bored wells,

and the direct-displacement method of moving or raising water from dug wells, streams, or rivers.

We have received from "Simplex Conduits, Ltd." a carefully-arranged price-list of their screwed conduits. It also contains a complete list of all necessary accessories. The Company issue three pocket price-lists. The "red book" contains a catalogue of light gauge conduits and fittings for "socket" junctions. The "blue book," which they now send us, describes screwed conduits, and the "grey book" describes the Simplex continuity system with socket junctions. Each of the lists is quite complete in itself, and so estimates can be rapidly made on any of the three systems, and the difference in the price will often enable the architect or electrician to decide which system is the most desirable to adopt in the given circumstances. We call attention to the Simplex flush mounting-boxes for switches, wall-sockets, ceiling-roses, etc. They are very suitable for sunk work in plaster, and reduce the necessary channelling out of the brickwork to a minimum.

Messrs. Nicholls & Clarke have sent us a copy of their new "Ironmongery Catalogue, No. XI." It is a well-bound quarto volume of 535 pages, fully illustrated and priced, and contains a complete index. The contents are divided into twenty sections, including ranges and range-boilers; mantelpieces of cast iron, wood, slate, and marble; fire-grates of many kinds, including tiles and curbs; stoves for coal and gas; radiators for gas, steam, and hot water; boilers and fittings for heating apparatus; cast-iron gates, railings, gutters, manhole-covers, etc.; metal casements and sashes; stable-fittings; tools; garden furniture, balusters, etc.; builders' ironmongery and brasswork; electric bell and light fittings and crank bell fittings; wire netting, corrugated iron, etc.; and some tables giving the weights of bolts and nuts, coach-screws, bar-iron, sash-weights, steel joists, angles, channels, etc. A large number

of the illustrations are from half-tone blocks, and many of the designs for mantelpieces and mantel registers and for door-furniture are decidedly above the average. We have pleasure in recommending the catalogue to architects and to builders.

Messrs. Barford & Perkins (Peterborough) have sent us a copy of their latest catalogue of "Steam Cooking, Heating, and Laundry Appliances and Disinfectors." It contains many excellent illustrations, some of which are drawn to scale. About fourteen pages of the catalogue are occupied by copies of testimonials received from the officers of public institutions and from the owners or managers of hotels and factories in which the firm's appliances have been used. The catalogue contains seventy-nine pages, and in addition to the apparatus mentioned in the title includes some heating and ventilating appliances suitable for use in kitchens, laundries, and other buildings.

We have received from Messrs. Johnson & Phillips (Charlton, Kent) a copy of their circular entitled "Paterson's Bitumen Dampcourse," and also a sample of the dampcourse itself. The material is about $\frac{1}{8}$ in. thick, and appears to consist of coarse canvas coated thickly on both sides with bitumen. It is very pliable, and waterproof joints are (it is said) easily made, so that the material can be used for covering roofs and lining walls.

Messrs. W. G. Cannon & Sons have sent us a copy of their catalogue of 122 pages, containing illustrations and prices of gas, steam, hot-water, and other fittings. It is divided into a number of sections, including sterilisers and body racks for hospitals and mortuaries; radiators and valves, cold and hot water supply fittings, kitcheners, steam-cooking apparatus, boilers for ranges and for heating apparatus, incandescent gas-fittings, etc. Attention may be drawn to the firm's horizontal copper gas-boilers, and to their tubular "back-boiler and flue combined" for fixing behind an ordinary fire for the purpose of warming other rooms by means of pipes and radiators.

From the well-known firm of Messrs. Hartley & Sugden (Halifax) we have received a copy of their new catalogue of boilers, cylinders, calorifiers, radiators, valves, and other fittings for heating apparatus, including low-pressure hot water and low and high pressure steam. A special feature is the series of illustrations of their "White Rose" sectional cast-iron boiler, which is now made in sizes calculated to heat from 250 sq. ft. to 6,700 sq. ft. of radiating surface. The catalogue contains two short illustrated articles by Mr. Frederick Dye on "Warming Buildings by Low-pressure Hot-water and Steam," and also some useful tables for heating engineers. Reference would be facilitated by a proper index.

We have received from the Carron Company (Carron, Stirling) three leaflets, which describe and illustrate three of their new productions—namely, (1) the "Carron" electric radiator, which consists of four luminous heating lamps in a neat cast-iron body; (2) the "Carron" interior grate, with low front bars and "Teale" back; and (3) the "Carron" register grate, which is fitted with a bath-boiler at the back and a firelump above, and has a damper, so that the draught can be made to pass under the boiler.

From the same firm we have received a copy of their large catalogue of 140 pages, which contains a comprehensive series of illustrations of the "Carron" cooking apparatus for gas, steam, and coal. Cooking appliances of nearly every kind are illustrated and described from the "fish and potato fryer" to the elaborate fittings for a large asylum. The steam and gas apparatus are particularly interesting, and the catalogue as a whole will be very useful to architects and engineers.

The Carron Company have also sent us a copy of their catalogue, entitled "Select Designs in XVIII. Century Fire-grates." The designs are adapted from original carvings executed at Carron over a century ago by William and Henry Haworth, students of the Royal Academy, under the presidency of Sir Joshua Reynolds. Among the designs are interiors (arranged now with modern fire-backs), hob-grates, and dog-grates; the detail is almost invariably refined, and many of the designs are of great merit.

It was a happy idea to adapt the designs to modern requirements, and the catalogue is well worth the attention of architects.

The Phoenix Electric Heating Company claim that in the successful application of electricity for many industrial and domestic purposes they have made a distinct advance, and the catalogue of 104 pages which they have sent us appears to bear out their claim. Among the fittings illustrated are ovens and cookers of many kinds, cooking utensils, radiators, sterilisers, electric baths, vulcanisers, drying tables, and cylinders, etc. The catalogue contains a full index and is bound in a well-designed red-cloth cover with white ornamentation.

Mr. John Jones's new catalogue of "Sanitary Fittings" is an excellent production of about 530 pages, clearly printed on smooth paper, fully illustrated, and well bound in green cloth. It consists of three sections, the first (ninety-nine pages) comprising cast-iron traps, inspection-chamber bottoms and covers, sewer valves, ventilating shafts, soilpipes, rainwater goods, etc.; the second (forty-four pages) dealing with stoneware drain-pipes, traps, gullies, etc.; the third (fifty-eight pages) including baths, lavatories, water-closets, sinks, urinals, hospital and laboratory fittings, etc.; and the fourth (twenty-six pages) containing illustrations and particulars of testing and flushing appliances for drains and sewers, sanitary and water carts; sewage-pumps, etc. The drainage by-laws of the London County Council are printed as an appendix. The catalogue contains a good index, and can be recommended as a useful and up-to-date work of reference.

We have received from the Farringdon Works (H. Pontifex & Sons) a copy of their "1906 Sanitary Supplement"—a catalogue of forty pages, containing half-tone illustrations of high-class baths, lavatories, and other sanitary fittings, nearly all of which are made by the J. L. Mott Ironworks, New York. The catalogue also contains illustrations of the Farringdon "Cupride" casements and frames, which are made of wrought-iron entirely covered by a heavy electro deposit of a non-corrodible alloy resembling gun-metal.

BOOKS RECEIVED.

HOUSES AND GARDENS. By M. H. Baillie Scott. (Geo. Newnes, Ltd. 31s. 6d.)

BUILDING CASES: BEING A DIGEST OF REPORTED DECISIONS. By F. St. John Morrow, LL.D. (Butterworth & Co.)

REINFORCED CONCRETE. By Charles F. Marsh, M.Inst.C.E., and William Dunn, F.R.I.B.A. (Archibald Constable & Co. 31s. 6d.)

THE ANCIENT CROSSES AND HOLY WELLS OF LANCASHIRE. By Henry Taylor, F.S.A. (Sheratt & Hughes, Manchester. 2l. 2s.)

Correspondence.

SAN CLEMENTE. ROME.

SIR,—May I be allowed to call your attention to the appeal which has just been issued to the public for the preservation of the Basilica of San Clemente in Rome? Below the present church is an earlier one, erected in the IVth century A.D., and below that remains of structures of the Republican and Imperial periods, the former consisting of two massive walls of tufa, forming a right angle, and the latter, at a slightly higher level under the apex of the lower church, of three chambers of brickwork, which perhaps belong to the house of the saint himself, one of which is a shrine of Mithras. These structures, owing to the infiltration of water, have been inaccessible for some thirty years (they, with the lower church, were excavated by Prior Mullooly in 1858-69), and it is certain that considerable damage is being done to the foundations; the damp, too, is destroying the frescoes of the lower church, which extend over a long period (Vth to Xth centuries), and are of great interest and importance. The upper church, too, is one of the best preserved christian basilicas of Rome, the apse containing interesting mosaics of the XIth century, fine choir screens and pulpits from the lower church, and some fine frescoes by Masaccio. It will thus be seen that it would be a real disaster if the church were

allowed to collapse—an event of which there is considerable danger if measures to prevent it are not shortly undertaken. It is proposed to permanently drain the structure; but the technical difficulties of the scheme are considerable, as the nearest point with which the drain can be connected with the municipal system is near the Colosseum, a distance of nearly a quarter of a mile. The drain, too, must run some 30 ft. to 40 ft. below the surface of the road, so that tunnelling instead of cutting will have to be resorted to. The committee, bearing in mind the probable difficulties of keeping such a tunnel clear of water during construction, are of opinion that, including all probable contingencies, a sum of 1,500l. will be necessary for carrying out the work. Two committees have been formed a local committee in Rome, and another consisting of those who have promised to use their influence in the British Empire and the United States. As a member of the former, which is under the Presidency of His Excellency the British Ambassador, and includes representatives of all nations and denominations, I beg to appeal to your readers for support to the scheme.

Donations may be sent to the Bank of England, Western Branch, Burlington-gardens, W.; or to Mr. C. C. Morgan, H.B.M.'s Consul, 20, Via Condottio, Rome.

THOMAS ASHBY,
Director of the British School
at Rome.

THE INSTITUTE MEETING ON THE 3RD.

SIR,—I am sorry to see that your account of last Monday's meeting at the Royal Institute of British Architects is absolutely inaccurate as far as my resolution is concerned.

That resolution contained no qualifying clause, which latter was added and passed as an amendment proposed by Mr. Riley.

I, in common with most architects who have considered the matter, am of the firm opinion that (as a broad principle) the employment of officials whether qualified or not is detrimental to the interests of architecture, and whatever may be the decision of any one meeting I believe that that opinion will in the end prevail among architects.

HERBERT W. WILLIS.

. We are not responsible for the report. The press are not admitted at the business meetings; the report is only what the Institute furnishes officially. —Ed.

RECONSTRUCTED LIMESTONE.

SIR,—In your issue of November 24 (page 595) there appeared a short article under this heading. Will you kindly allow me to make a few comments on the subject.

This invention seemed to be another of the many processes for the manufacture of artificial stone and marble which during the last half century have produced amongst others the following patents:—Bousfield's, 1856; Ransome's, 1860; Barff's, 1861; Owen Stone Co., 1890; Moreau-Rae, etc. The majority of these, however, appear to have sunk into obscurity and are now seldom heard of.

The process of making this new material appears to be very subtle and complex, infinite pains seem to have been taken to produce an imitation stone that must at the best appear unnatural, and the supposition that the chemical elements will enter into union with the constituent parts of the stone may sound correct in theory but doubtful in practical value. For with our limited knowledge of how Nature works in her wonderful and mysterious combinations, especially in the formation of stratified rocks, that have taken countless ages to produce, it would seem impossible to make successfully an artificial stone in a few days, and, when made, to depend upon its lasting properties.

Definite statements have been made as to the properties of this new material—for instance, its "possessing greater strength and density than the natural stone"; but we are absolutely ignorant of its essential characteristics, such as its power of absorption—a most important factor in enabling us to estimate its comparatively durability.

Some information also should be forthcoming as to the resistance to crushing of this new stone; a considerable pressure is sometimes concentrated upon certain points in a building, hence this data is important. Its weathering properties—this would be hypothetical; and, lastly, is it cheaper in price? Good building limestones can be obtained at the quarries from 1s. per ft. cube, so that it would be necessary to produce it as cheaply as this in order to compete with the natural stone.

It may, however, be stated that the harder and denser the stone, the more costly will be the working.

It is also stated that this artificial stone can be moulded "to any size or shape during manufacture," but, as in the process of making this material is subjected to hydraulic pressure, it is presumed the moulds or matrices are of cast iron, or of a similar composition, to resist the stress; if so, would not the cost be prohibitively high, as there were a great number of blocks prepared from one mould? This repetition, moreover, would not often commend itself to the present-day architect.

As before stated, this artificial stone in one form or another has been used sparingly for the last half-century, and it may be safely said with little or no success; some buildings having dressings and balustrading of this material have of recent years come under my observation (erected about twenty-five years since) and they have weathered badly, the arrises and mouldings being now scarcely discernible, and the appearance when contrasted with natural stone is extremely poor, for it has not the inherent qualities, nor does it show the nice, delicate weathering associated with natural stone.

In the Moreau-Rae imitation marble a block of chalk, Bath, or Portland is immersed in tanks containing coloured pigments and sulphates of various kinds, and afterwards immersed in hot water which assists in the absorption of the sulphates into carbonates. It is then indurated, which process, it is said, is not confined to the surface but penetrates the interior of the stone, and when completed a block of marble has been produced.

The change the stone undergoes is mainly a chemical one, but how far this material has been a success is not generally known.

The method here employed in converting chalk and limestone into a harder material like marble is simplicity itself in comparison to the complex course disclosed in this new imitation stone.

The question naturally arises, is there any need for these artificial stones? And what advantage is gained by their use?

There is no scarcity of limestones, but, on the contrary, there is an unlimited supply, the durability and weathering qualities of which have been tried and are well known, and the price can, or should at any rate, compare favourably with any manufactured stone, and therefore bearing in mind the maxim, "Better bear the ills we have than fly to those we know not of," would seem to apply suitably to this new material.

W. R. PURCHASE.

THE LETCHWORTH EXHIBITION AND CHEAP COTTAGES.

SIR,—In view of the statements made at the examination in bankruptcy of a builder at Luton who had erected a cottage at the Letchworth Exhibition which was represented to have cost 180l., which in reality cost 240l., and your remarks thereon, I must say a word as to the possibility of erecting such at an actual cost of 180l. and less. This, in my experience, is no matter for surprise, having had such cottages—containing six rooms—built from my design both in red brick and rough-cast on brickwork, and covered with flat tiles, with solid frames and lead eazing, and in which the pairs of doors were used, for 180l. each in pairs and 180l. detached, including outbuildings and distemper-painting to walls, ready for occupation. Besides which I have at the present time a bungalow in course of erection with similar accommodation and covered with best Broseley tiles, for which the contract is only 198l. I felt impelled to write this, as I feared the public might be led to think that all "cheap cottages" are frauds, but I am prepared to prove my figures by actual estimates from respectable and reliable builders.


Ipwich.

H. STEWARD-WATLING.

The Student's Column.

ROOFS: STRUCTURALLY CONSIDERED.—XXI.

21. The Complete Design of a Timber Truss (continued).

O determine the requisite thickness of the base-plate for transmitting the horizontal strain from the point of application to the two projecting ribs settled last week, we must take into account the compressive and tensile resistance of the material. Data as to the strength of cast-iron are given in Tables XLIV. and XLV.

Next, as the diagonal force 34,500 lb. is applied at the centre of the base-plate, its horizontal component, 28,700 lb., may be considered as being divided over the two halves of the plate, one of which will be in compression and the other in tension.

Taking the safe tensile strength of cast-iron at $18,000 \div 6 = 3,000$ lb. per square inch (see

able XLIV.), the area of metal required to resist the force of $28,700 \div 2 = 14,350$ is

$$\frac{14,350}{3,000} = 4.78 \text{ sq. in.}$$

Let us take the minimum depth of the sides of the housing just above the downward projecting ribs at $\frac{1}{2}$ in., the thickness of the sides in., and the width of the base-plate at 6 in.

The two sides of the housing represent the cross-section of $2 (0.75 \times 0.5) = 0.75$ sq. in., and the sectional area of the base-plate must be $4.78 - 0.75 = 4.03$ sq. in. As the width of the plate is 6 in., the required thickness is $4.03 \div 6 = 0.67$ in.

Therefore, the base-plate would be made in. thick.

TABLE XLIV.—ULTIMATE TENSILE STRENGTH OF CAST-IRON.

Pounds per Square Inch.			Authority.
Highest.	Lowest.	Mean.	
9.76	6.0	7.37	Holckinson
10.5	4.9	6.83	Woolwich
15.3	4.2	10.4	Wade
	—	13.7	—
	—	9.1	—
15.7	4.75	15.3	Turner
18.2	6.5	—	Rosebank F'ndry

TABLE XLV.—ULTIMATE COMPRESSIVE STRENGTH OF CAST-IRON.

Pounds per Square Inch.			Authority.
Highest.	Lowest.	Mean.	
52,902	25,198	38,525	Ordinary
70,837	53,329	59,532	Stirling's (C.I. & W.I. maked)
51.50	36.50	44.30	Cold Blast
61.90	36.90	45.80	Hot Blast

At the compression end the resistance offered by a base-plate $\frac{1}{2}$ in. thick and by the upper part of the shoe is far more than sufficient, for, in accordance with the figures in Table XLV., we may take the permissible compressive stress at $90,000 \div 6 = 15,000$ lb. per square inch, or five times that of the metal in tension.

Turning to the rafter, we find on reference to Fig. 163 that the toe is completely housed in the cast-iron shoe, the abutment consisting of an angular thrust-block with the area of $6 \times 5 = 30$ sq. in. perpendicular to the axis of the rafter.

This being also the effective area of the rafter toe, the safe resistance to crushing is $1,600 \times 30 = 48,000$ lb.

which is far greater than 34,500 lb., the compression to be resisted, and actually only involves the strain upon the timber of

$$34,500 \div 30 = 1,150 \text{ lb. per square inch.}$$

The next thing to consider is whether the tie-beam is safe against crushing across the fibres of the timber.

The vertical component of 34,500 lb. is $34,500 \cos 56^\circ 20' = 19,100$ lb. (see Fig. 162) and as by par. (a) the permissible stress is 350 lb. per square inch, the bearing surface to be provided by the base-plate of the shoe is

$$19,100 \div 350 = 54.6 \text{ sq. in.}$$

Without reckoning the two downward projecting ribs, the base-plate measures 2 ft. long and is 6 in. wide. Wherefore it provides so ample an area that compressive stress in the timber is reduced to

$$19,100 \div (24 \times 6) = 133 \text{ lb. per square inch.}$$

The two bolts passing through the base-plate and the tie-beam are merely required to hold the shoe in position, and need not be of more than $\frac{1}{2}$ in. diameter. But it should be remembered that these bolts also serve a useful purpose in guarding against the gradual opening of cracks in the timber. For this reason they should be provided with washers of ample area, so that the nuts may be screwed up tightly without unduly crushing the fibres of the timber.

Fig. 164 is another modification of the shoe generally illustrated in Fig. 160 to suit the case of a tie-beam terminating practically at the point of intersection of the axes of the rafter and the tie-beam.

Here the plane along which shear takes

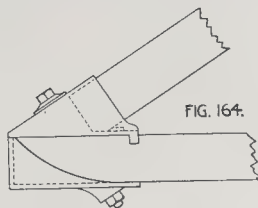


FIG. 164.

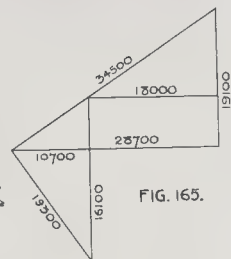


FIG. 165.

place is 1 ft. 8 in. long by 6 in. wide, and the safe resistance to shear is

$$150 \times 20 \times 6 = 18,000 \text{ lb.}$$

The rib projecting $\frac{1}{2}$ in. downwards from the base-plate of the upper shoe must have the thickness necessary to withstand the bending moment due to this force, the resistance being calculated as before, but, as there is only one rib, the entire force of 18,000 lb. (see Fig. 165) is taken into account.

Then, considering the rib as a cantilever in which (d) = the thickness of the rib,

$$M = 18,000 \times 1.5 = 13,500 \text{ in.-lb.}$$

$$R = \frac{6,000 \times 6 \times d^2}{8}$$

$$= 6,000 d^2$$

whence, the required thickness

$$d = \sqrt{13,500 \div 6,000} = 1.5 \text{ in.}$$

The resistance of the rib to shear must be more than the safe shearing stress of the metal, say, $15,000 \div 6 = 2,500$ lb. per square inch, as in Article XX.

The force to be resisted is 18,000 lb., and the area of metal is $6 \times 1.5 = 9$ sq. in. Hence the stress per square inch is only $18,000 \div 9 = 2,000$ lb., which is perfectly safe.

The thickness of the base-plate to transmit the horizontal force of 18,000 lb. from the point of application to the downward projecting rib may be $\frac{1}{2}$ in. as before.

The rafter toe is amply secure against crushing, but the effective strength of the joint is limited by the resistance of the tie-beam against shear.

If the lower shoe could be relied upon to press against the end of the tie-beam, we should have at hand a simple means of providing for the balance of the horizontal component of the thrust along the rafter. But shrinkage of the timber and the effects

of various forces acting on the tie-beam tend to pull it away from the end of the shoe. Hence we have to provide in some other way for withstanding the horizontal force of 28,700 — 18,000 = 10,700 lb.

As shown in Fig. 165, the component of 10,700 lb. in a direction perpendicular to the axis of the rafter is 19,300 lb., which can be calculated thus:—

$$10,700 \div \cos 56^\circ 20' = 19,300 \text{ lb.}$$

To withstand this a bolt can be applied, as in Fig. 164, with the net sectional area of

$$19,300 \div 16,000 = 1.208 \text{ sq. in.}$$

Reference to Table XL. shows that a $\frac{1}{2}$ -in. diameter bolt is necessary for this area.

If preferred, a horizontal loop could be passed round the end of the tie-beam holding in place a bearing-plate near the upper surface, so as to take the balance of the horizontal force 28,700 — 18,000 = 10,700 lb.

Making the loop of a round steel bar with screwed ends passed through lugs on the shoe base and secured by nuts, the necessary cross-sectional area would be

$$10,700 \div 16,000 = 0.67 \text{ sq. in.}$$

By Table XL. the diameter of the loop would have to be $\frac{1}{2}$ in., so as to provide the requisite area of metal at the bottom of the screws.

Compression across the grain of the tie-beam must be limited by the bearing surface of the base-plate.

The vertical component of 19,300 is $19,300 \cos 33^\circ 40' = 16,103$ lb. (See Fig. 165.)

The length of base-plate being 20 in. and its width 6 in., we have

$$16,100 \div (20 \times 6) = 134 \text{ lb. per square inch,}$$

which is much less than the permissible unit stress of 350 lb.

At the under surface of the tie-beam the timber is so obviously safe against undue compression that no calculation is necessary.

TABLE XLVI.—VALUES OF THE COEFFICIENT OF FRICTION.

Surfaces in Contact.	Disposition of Fibres.	Condition of Surfaces.	Coefficient of Friction.
Oak on oak	Parallel	Dry	0.48
Do.	Perpendicular	Dry	0.34
Do.	On end, on side	Dry	0.19
Oak on other timber	Parallel	Dry	0.36 to 0.4
Wrought-iron on oak	Parallel	Wet	0.62
Do.	Parallel	Dry	0.26
Cast-iron on oak	Parallel	Wet	0.49
Do.	Parallel	Dry	0.22
Wrought-iron on elm	Parallel	Dry	0.25
Cast-iron on elm	Parallel	Dry	0.20
Timber on stone	Parallel	Dry	0.40
Metal on metal	—	Dry	0.15 to 0.2
Do.	—	Wet and clean	0.30
Do.	—	Damp and slimy	0.13

TABLE XLVII.—COMPARISON OF TIE-BEAM AND RAFTER JOINTS DISCUSSED IN PAR. (j).

No.	Fig. No.	Horizontal Thrust Taken by		Remarks.
		Timber.	Metal.	
1	123 and 157	14,400	14,900	All stresses within permissible limits.
2	124 and 158	28,700	—	All stresses within permissible limits providing double abutment acts as intended.
3	125 and 160	28,700	—	Do.
4	125 and 162	14,400	14,300	Compression across rafter and tie beam excessive.
5	126 and 163	14,400	14,300	Do.
6	127	12,900	15,800	Compression across rafter and tie-beam excessive.
7	127 and 164	12,900	15,800	Compression across tie-beam excessive.
8	128	14,400	14,300	Dimensions of screws for bridge-plate too unwieldy.
9	129 and 165	28,700	—	All stresses within permissible limits.
10	129 and 166	18,000	10,700	Do.

(k) *Friction*.—No account has been taken in any of the foregoing calculations of friction, but it ought to be realised how important a factor this is as an element of safety in roof construction.

Three main points to be borne in mind with regard to the friction of solid bodies are—

(1) That it is directly proportional to the force with which the surface of the bodies are pressed together.

(2) That it is independent of the area of the surfaces in contact.

(3) That it is proportional to the nature of the surfaces in contact.

Therefore the friction (F) between any pair of surfaces is computed by multiplying the force (P) pressing them together by a factor (f) termed the *coefficient of friction*; or, expressed algebraically,

$$F = P f \quad (32)$$

Some values of the coefficient of friction are given in Table XLVI., where the constants refer to the *friction of motion*, which should always be taken into account instead of the *friction of repose* in dealing with structures liable to vibration.

Example (1): Find the total friction between the foot of a rafter and the top of a tie-beam, the foot of the rafter being pressed against the tie-beam by the force of 20,000 lb.

By Table XLVI.

$$\text{Then } f = 0.19$$

$$F = 20,000 \times 0.19 = 3,800 \text{ lb.}$$

Example (2): Find the friction between a wrought-iron bolt-plate and the upper surface of a rafter, the tension in the bolts being 40,000 lb. and the value of f by Table XLVI. = 0.62.

Then

$$F = 40,000 \times 0.62 = 24,800 \text{ lb.}$$

Example (3): Find the friction between the base-plate of a cast-iron rafter shoe and the upper surface of a tie-beam, the vertical component of the rafter thrust being 20,000 lb.

In this case $f = 0.49$, and

$$F = 20,000 \times 0.49 = 9,800 \text{ lb.}$$

(l) *Comparison of Joints Discussed in Par. (j)*.—With the object of facilitating a decision as to the most suitable form of joint for the present roof, we give in Table XLVII. a brief comparison summarising the main characteristics of the joints previously considered.

There is no theoretical objection to No. 1, but, owing to the number of bolts employed, the joint is somewhat costly.

Nos. 2 and 3 are inadvisable, because of the general unreliability of double abutment joints.

Nos. 4, 5, 6, and 7 cannot be recommended, owing to excessive stresses.

No. 8 is objectionable for practical reasons.

No. 9 is satisfactory and economical. No. 10 is also satisfactory, but, being intended for a special case, is less economical than No. 9.

For our present purpose, therefore, choice lies between Nos. 1 and 9, and it does not require much reflection to realise that the latter is the more suitable joint, being more simple and, taking all things into account, less costly than the other. It has the further recommendation that no holes are required through the rafter and only two small holes through the tie-beam.

METROPOLITAN WATER BOARD.

At the sitting of the Metropolitan Water Board, last week, it was resolved to wharf with creosoted timber about 2,813 ft. of the New River banks at Anwell-hill, Carterhatch-lane, Highfield-row Bridge to Hornsey, at an estimated cost of 662l. It was also resolved to expend 394l. on constructing an unchurnable oak palisade fencing along the New River between Barrowell Green-lane to Hazlewood-lane, Southgate.

Honour Oak Reservoir.—In connexion with the acceptance of the tender of Messrs. Moran & Son for additional work at the Honour Oak Reservoir, rendered necessary by the nature of the subsoil, the contractors had written stating that they had misinterpreted the terms of the contract with regard to the brick-facing of concrete, and asking that the amount of their contract should be increased by 692l. 17s. 1d. The engineer was

of opinion that it was a case of genuine misinterpretation, and that the request was fair and reasonable, and it was resolved to allow of the alteration in price.

Building at Heston.—The General Purposes Committee reported that the Standard Land Company were about to develop Sutton Farm, Heston, and it was recommended that the company be granted an easement over the Board's land adjoining on payment of 500l.—Agreed.

METROPOLITAN ASYLUMS BOARD.

THE usual fortnightly meeting of the Metropolitan Asylums Board was held last Saturday.

Loan Requirements.—In compliance with the request of the London County Council the Finance Committee submitted their estimate of loan requirements for 1907, amounting to 250,000l. This included the following loans for which sanction has been given:—Leavesden Asylum—irrigation work, 670l.; Tooting Bee Asylum—additional buildings, 16,250l.; Chelsea Asylum—electric lighting and telephones, 450l.; South-Eastern Hospital—reconstruction, 11,678l.; Southern Hospital—buildings, furnishing, etc., 54,312l.; total, 93,380l. The following was the estimated cost of works approved but for which sanction to borrow has not yet been received from the Local Government Board:—Belmont Asylum—new premises at Peckham, 18,000l.; Bacteriological Laboratories—ditto, 9,090l.; Darenth Asylum—industrial workshops, 3,500l.; Joyce Green Hospital—cottages, reception station, etc., 7,030l.; Belmont Asylum—adaptation of boys' school (architects' approximate estimate for building works, 69,600l.; Engineer-in-Chief's approximate estimate for engineering works, 22,600l.; to the former amount commission, clerk of works' salary, etc., fall to be added), 100,000l.; total 137,620l. After some discussion the estimate was agreed to.

Architects' Commission.—The Works Committee reported at some length the negotiations which have taken place with Messrs. T. Dinwiddie & Sons, the architects who prepared the plans for adapting part of Belmont Asylum for the accommodation of male imbecile patients. The first scheme was abandoned, and the question arose as to the amount of the architects' commission. It was now reported that a settlement had been arrived at on the terms of the Board paying 1,750l. to the architects.

LIGHTNING CONDUCTORS.

On the 6th inst., Mr. Alfred Hands, F.R.Met.S., delivered a lecture before the Royal Engineers at Chatham on "The Protection of Buildings from Lightning." He showed the extent of damage by lightning by means of a chart of England and Wales on which the positions and nature of objects damaged during a period of about nine years were indicated by coloured spots. This included 2,486 buildings, of which 148 were churches. He criticised the Report of the Lightning Research Committee which he said, by its contradictory recommendations and incorrect statistics, had caused a great deal of scepticism as to the utility of lightning conductors. He showed by diagrams and reproductions on models of buildings of cases that had occurred some of the more complex lightning effects that had to be guarded against, and the means of protection that had to be employed. These included fires caused by the surging effect of a discharge and cases in which damage is caused to a building by lightning striking an object half a mile away.

The lecturer showed the impossibility of protecting buildings efficiently by means of set rules: each case had to be studied separately, and the system of protection applied which the complications of metal in and about the structure showed to be necessary. Hitherto too much importance had been attached to the form and composition of the conductor and too little to the fact that its efficiency depended almost entirely on the way in which it was applied and very little on what it was. He regarded the subject as somewhat analogous to the work of a medical practitioner. The conductors in the hands of an expert were comparable to the drugs a physician might find it necessary to prescribe according to his diagnosis of the case. No one could claim infallibility, and anyone might overlook some factor that might have an important bearing on the case; but the fact remained that the possession of knowledge, experience, and an ability to discriminate as to the importance of details should enable a man to protect a building effectively, while absence of these would very probably result in a failure. At all events, it was in this direction he thought we should strive to improve our methods and not in trying to devise theoretically perfect, but practically impossible mechanical ones.

As regards the relative value of iron and copper for conductors, he considered the matter, so far as concerned conductivity and in relation of energy, to be of such trifling importance that it sank into insignificance in comparison with considerations of durability. A lightning

conductor was expected to last for a long time, and iron was unfortunately too perishable for the purpose. As regards cost, an iron system, if of sufficient size to be fairly lasting, would be more costly than an ordinary copper tape one.

Mr. Hands said that vagaries or freaks of lightning were an impossibility, and the belief in such was due only to the cases being wrongly reported. There were laws governing all natural phenomena, and lightning, like every other force in Nature, must be amenable to law. When they appeared at first sight inexplicable we should try to clear up the mystery and not dismiss the matter by saying that in one respect Nature was erratic.

TESTS OF FIRE EXTINGUISHERS.

A REPORT issued by the British Fire Prevention Committee contains particulars of the first tests undertaken by that useful organisation of a portable hand fire-extinguisher, and it is interesting as showing the efficiency of the particular apparatus under examination in quenching fires in the instances stated. Fifteen tests were made in all with the object of observing the effect of the appliance upon fires started at a dressing-table with curtains above; in a crate of loose wood wool; in a heap of rubbish consisting of hay, straw, and chips of wood; in wood sprinkled with spirit and petrol; and in other readily inflammable substances. The extinguishers tested were of a type consisting of a tube filled with a dry powder which has to be thrown with as much force as possible into the base of the flame. The powder is of secret composition, but the makers state that its effect is to generate a gas in which combustion cannot be maintained. Whether this gas is of special character, or whether it is simply CO₂, we cannot say, but judging by the recent tests it is very efficacious in subduing flame. In the case of loose materials such as wood wool, hay, and straw, the powder was unable to prevent smouldering, which, as shown by some of the tests, resulted in fresh outbreaks of fire after the lapse of short periods of time.

Obituary.

MR. E. L. TARBUCK. We regret to announce the death of Mr. Edward Lance Tarbuck, which took place at Brixton, S.W., on the 22nd ult. He was a Silver Medallist of the Institute of British Architects, and in his younger days an assistant in the offices of Sir Charles Barry, Sydney Smirke, R.A., and other eminent men of that time. Some years ago he was a contributor to this journal on the (then) "Present State of Architecture," and other subjects. He was editor of some works on building, and the author of a "Handbook of House Property," now in its seventh edition.

General Building News.

RESTORATION OF THE ABBEY CHURCH, NUNEATON.—The rebuilt chancel of this church was recently consecrated by the Bishop of Worcester. From designs prepared by Mr. H. S.A., the chancel has now been built on the old foundations, and all remaining portions of the old walls have been incorporated with the new work.

CONGREGATIONAL CHURCH, SHEFFIELD.—A new Congregational Church has been erected at Crookes, Sheffield. The building stands on a triangular site at the junction of Springfield and Western roads, and is octagonal in plan. One of the eight sides is taken up by the rostrum, pulpit, and choir seats, and a space behind hereafter to be filled by the organ; round the remaining seven sides runs a continuous balcony, giving seating accommodation for more than 200 persons, in addition to the 500 who can be seated in the choir on the floor of the church. There are windows on seven of the eight sides. The dome-shaped roof is supported on eight pillars, which also serve to sustain the weight of the balcony. The building is lighted by electricity, with gas as a stand-by. The cost was 5,600l., exclusive of the organ. The architect was Mr. W. J. Hale.

CHAPEL EXTENSION, PONTYPRIDD.—The new hall and classrooms connected with the Congregational Church, Pontypridd, was opened a short time ago. The new building has been erected from plans prepared by Messrs. Pott, Son, & Hemmings, Manchester. The total cost will be 3,000l., and the contractors are Messrs. Smith-Jones & Sons, Pontypridd.

SUNDAY-SCHOOL, PLYMOUTH.—New Sunday-schools have been opened in connexion with St. Jude's Church, Plymouth. The buildings adjoin the church-room. They consist of a room for infants, 40 ft. by 25 ft., two classrooms for Bible-class work, each 19 ft. by 18 ft., with separate entrances, a four-roomed caretaker's

ottage, and improvements to the old offices, together with a new boiler-house. Mr. B. Priestley Shiros was the architect. The contract was for 1,545*l*.

GRAMMAR SCHOOL, ASHBURN.—The grammar school at Ashburn, which is superseding the old structure in Church-street, will be situated near the Green-road. Plans have now been prepared by Mr. E. M. Longsdon, architect, of Bakenell, and have been approved by the Board of Education. The buildings will have a south-east aspect, and owing to the contour of the ground the school is planned with a long frontage, and has as little depth from front to back as practical to avoid undue excavations. The front will be faced with gritstone, wallstone, and dressings, and the roof will be in brimled red tiles. The second store staircase give access to the classrooms—four classrooms for twenty-five each, two for thirty, and one for twenty students. The main entrance-doors open into a vestibule and thence into the entrance-hall, from which the corridors for the boys' and girls' entrances connect. The boys' entrance is by a set of stairs, and the assembly-hall, which is 55 ft. by 27 ft., and first floor rooms, the former being planned behind the main line of the buildings, and is lighted on three sides. There are separate emergency exit doors, and on the ground floor are also rooms for the headmaster, clerk, assistant teachers, governors' board-room or reference library. In addition, there is a fireproof strong room for the valuable documents in possession of the governing body. On the first floor are the art-room, lecture-room, and laboratory. At each end of the main building are detached blocks, connected by a veranda, on the ground floor of which are the cloak-rooms for boys and girls respectively, also common-rooms for the pupil teachers, and separate staircases give access to the cookery-room and workshop. A living-room, two bedrooms, pantry, etc., are provided for the caretaker on the third floor of the tower. In the basement is situated the low-pressure hot-water boiler, drying-rooms, and general stores. All the rooms are provided, in addition, with open fireplaces.

TECHNICAL INSTITUTE, DUNDEE.—A site has been acquired in Bell-street by the Technical Institute Committee for the erection of the new school, for which 45,000*l*. has been subscribed. Mr. Robert Gibson, C.E. and architect, has been appointed general architect for the scheme. The buildings will comprise an administrative building, lecture-hall, with suites of lecture-rooms, laboratories, and trade workshops to the rear. At the meeting of the Institute committee it has resolved to afford local architects an opportunity of submitting designs for the elevation of Bell-street, and conditions for these will be arranged as soon as the preliminary scheme has been completed.

GLASGOW SCHOOL OF ART. The proposal for the completion of the building of the Glasgow School of Art has, according to the *Glasgow Herald*, now taken definite shape. Details have yet to be considered, but a movement has been started for securing subscriptions for the purpose in view. Of the original plans for the school, fully one-half has been built and foundations laid for the remainder. Since the organisation of the Glasgow School of Architecture, the character of this building has been in number and importance, and more and better accommodation is urgently needed. The accommodation for the sculpture and modelling department is meagre and in many respects unsuitable, while the technical studios are housed in a temporary shed. There is no lecture theatre in the school, and the library is situated in a part of the school museum, the remaining portion of which is used as a classroom. Sir R. Rowand Anderson, LL.D., H.R.S.A., architect, in a report made to the Scotch Education Department, says:—

"Although the building is a very large one, it is now too small. Many of the rooms are overcrowded and inconvenient to work in, and much moving about of furniture has to be done. The library is too small, and is not sufficiently isolated. At present it is little more than a recess off the main corridor." Mr. Pittendrigh MacGillivray, R.S.A., sculptor, reports:—"Increase of accommodation is very desirable for this (modelling) section, especially is there wanted a suitable workshop for casting and plaster work generally." The cost of the erection of the present building was 29,131*l*., towards which subscriptions to the amount of 28,397*l*. were then obtained. The estimated cost of the proposed completion of the building is as follows:—Western extension, including furniture, fittings, etc., 22,000*l*.; new service stair in east portion of school, 600*l*.; clockrooms and lavatories, 500*l*.; architects' and measurer's fees and sundry charges, 1,820*l*., making a total of 25,000*l*.

MISSION-ROOM, THE GREENWAY, UXBRIDGE. A new mission-room has been erected in the Greenway, in connexion with St. Andrew's, Hillingdon, by Messrs. Farnside & Son have carried out the work, under the direction of Mr. J. Freebairn Stow. The room is built of stock bricks, with red brick facings and Bathstone dressings. The large hall is 75 ft. by 35 ft., with accommodation for 350 persons. There is a

chancel, 20 ft. by 16 ft., and a vestry. The walls in the interior are of plaster, with dado and red brick facings, and the flooring is of wood blocks. The hall is lighted with electric light, and is heated by a high-pressure heating system, the work for which was carried out by the Thames Bank Iron Works Company.

CHAURCH INSTITUTE, PENARTH.—The opening of St. Augustine's Church Institute Hall, Penarth, took place a short time ago. The hall, which has been erected at a cost of 2,300*l*., is situated in Albert-road, and is capable of seating about 600 people. The present building, which is only part of a larger scheme which is to be undertaken later on, consists of one main room and stage which, by means of shutters, forms a large hall divided into three by means of revolving screens. The cost of these additions will amount to 1,500*l*. The architect is Mr. H. Snell, and the contractor Mr. John Jones, Penarth.

BUILDING IN EDINBURGH.—From one cause or another, Edinburgh this year has established a record in the number of its unlet houses (says the *Scotsman*). Statistics just made up by the burgh assessor show that there were 4,179 houses at May last which had failed to find tenants. The most notable feature of the figures is that, contrary to the experience of most large cities, the "unlets" are distributed over both suburbs and centre. Of the total houses unlet there is a proportion of over 70 per cent., or nearly four-fifths, of which the rents are under 20*l*. In 1,284 cases, or a little over 30 per cent. of the total, the rents are under 10*l*. There are 1,677 houses whose rents are between 10*l*. and 20*l*., and in 1,218 cases the rents are 20*l*. and upwards. There is another exceptional feature about the figures which have been made up by the assessor. The over-crowded part of the city does not appear to lie in the central districts. The "unlets" are distributed over both suburbs and centre; and the central districts provide some of the most outstanding cases of under-letting. The total valuation of the unoccupied houses is returned at 121,261*l*. 13*s*.—the total valuation of the city, exclusive of items under railways, tramways, gas, electric-lighting, water, telegraphs, and telephones, which are entered at 346,888*l*., being 3,191,803*l*. The total number of unlet houses at the same date last year was 3,820, of which 1,871 were of 20*l*. rent or upwards; 1,658 were between 10*l*. and 20*l*.; and 1,191 were under 10*l*. The total for 1904 was 3,200.

YOUNG MEN'S CHRISTIAN ASSOCIATION PREMISES, LEEDS.—On the 3rd inst. the memorial-stone was laid of the new premises of the Leeds Young Men's Christian Association in Albion-street. The builders are Messrs. T. Hannam & Sons, Mr. W. H. Thorp being the architect. It is estimated that, leaving out of account the sum of 2,000*l*. paid for interest and rents, the cost of the land and building will be about 44,500*l*.

SWANSEA DOCKS.—In conjunction with Mr. Schenk, the local engineer, Mr. Meik, consulting engineer, to the harbour Trust, has framed proposals, which the authorities have adopted, for extending the dock accommodation under the existing scheme by using the water to be enclosed within the artificial embankment outside the new dock which is being constructed. The estimated cost of enclosing the water with a lock amounts to 30,000*l*.

POST-OFFICE, ABERDEEN.—The new post-office in Crown-street is now practically completed. The building was designed at His Majesty's Works Office, Edinburgh, and was erected under two contracts; the first comprising the excavations and the walls from the basement flat to the street level, and the second the superstructure. The building is of granite, the dressing being of white Kennam granite and the ashlar work of Rubislaw granite. The extreme length is 220 ft., and the breadth 140 ft., and it comprises the Deeside block, the Crown-street block, and a connecting block. The entrance to the public office is from Crown-street. One of the features of this department is the vestibule entrance, with its Austrian oak wainscot. The walls of the public office are lined with marble to a height of about 9 ft. The marble is surmounted by a wainscot cornice. The floor behind the counter is of maple wood blocks, while the part to be used by the public is of mosaic. A public telephone-room is provided to the right of the public office, and the inquiry office can be reached from the public office, or by a separate door. The sorting office is immediately behind the public office, and measures 114 ft. by 100 ft. There are three entrances to the Deeside-block, the central one being to the telegram delivery office. South of the telegram delivery office is the bicycle-room. In the Deeside-block also there are the postman's retiring-room and lavatory accommodation. The basement flat is principally utilised for store-rooms, battery-room furnace-room, etc. In the furnace-room are two boilers, used in connexion with the heating arrangements. The

building will be heated by a low-pressure hot-water system. The upper floors are reached by a circular stair made of Ashbroth stone in the south-east tower. All the floors are of concrete, hung by steel beams, the major part being covered with wood blocks. In the Crown-street block, on the first floor, there are two entrances, one to the surveyor's department, and the other to the postmaster's department. The surveyor's department consists of a suite of six rooms, and the postmaster and his staff take up three rooms. In this part of the building there are also the telegraph engineer's department, the medical officer's suite of rooms, women's waiting-room, men's waiting-room, returned letter branch, a room proposed to be utilised as a boys' institute, reading-room, telegraphists' retiring-room, and a spare room. In the Deeside-block, on the first floor, there are the sorters' retiring-room, the dining-room, and pantries and kitchen. On the second floor in the Crown-street block are the women's retiring-room, private telephone room for official use, mechanics' work-room, and apparatus-room, telephone battery-room, telegraph school, and lavatory accommodation. In the connecting block between the Crown-street and Deeside-blocks is the telegraph instrument room, measuring 114 ft. by 40 ft. In the Deeside-block on this floor are a suite of rooms which will be occupied by the Great Northern Telegraph Company's staff. The whole of the building will be lighted by electricity. It is estimated that the total cost, apart from the site, will amount to 52,000*l*. The contract for the whole of the work was put into the hands of Messrs. P. Bisset & Sons, Aberdeen. Mr. J. Reid has acted as clerk of works.

CENTRAL FIRE STATION, DUBLIN.—The new Dublin Central Fire Station, at Great Brunswick and Tara streets, is approaching completion, and will shortly be ready for occupation. Mr. Spencer, the City Architect, prepared the plans for the work.

BLEACH WORKS, ABERDEEN. New bleach works are being erected near the Bridge of Dee for Messrs. Richards, Ltd. The buildings take ground measuring about 308 ft. by 246 ft. The walls are of granite and the roofs will be slated. The contractors are:—Mason work, Mr. Leslie Smith; carpenter work, Mr. George Jamieson; slater work, Messrs. Merson & Stewart; ironwork, Mr. George Thomson; plumber work, Messrs. Thom & Strachan; plaster work, Messrs. Scott & Son; painting, Messrs. Gordon & Watt. The architects are Messrs. Wilson & Walker, and Mr. Thomas L. Kay is clerk of works.

ENGINE-HOUSE, ETC., ALTHAM BRIDGE.—The Accrington District Gas and Water Board have accepted the tender of Messrs. George Cunliffe & Sons, of Accrington, amounting to 5,449*l*. 7*s*. 6*d*. for the building of engine and boiler house at their pumping-station at Altham Bridge. The buildings will be of local red plastic bricks, with York stone dressings, and the architects are Messrs. Haywood & Harrison, of Accrington.

PROPOSED MEMORIAL HALL AND SUNDAY-SCHOOL, NORWICH.—Plans have been prepared by Mr. H. Chatfield Clarke for the Metneue Memorial Hall and Sunday-school, which it is proposed to erect at Norwich. The contract for the work amounts to 4,187*l*.

BLACKFRIAR BRIDGE.—Twelve firms have been asked to send in tenders for the widening of the bridge from the existing total width of 75 ft. so as to provide a roadway 73 ft. from kerb to kerb, and two footpaths 16 ft. apiece, giving room for a double tramway line, with a wider road and wider footpaths than at present. That will be done by reconstructing the upstream side of the structure, the existing materials being utilised, and laying extended foundations for the abutments and piers. A curve will replace the pedestal at the north-west corner, and a subway, 10 ft. by 8 ft., is to be made from the terrace on Victoria-embankment to the steps in front of Bridge House-building. The Thames Conservancy have agreed to a proposed enlargement of the steps and the construction of a causeway on the Surrey side conditionally upon the extension of the causeway to low-water mark and the retention of the old stairs until the new ones are ready for use. The specified period for the completion of the works is thirty-six months; the contractors will be penalised to the extent of 20*l*. for each additional day, and will be allowed a bonus of 20*l*. for each day within the stipulated limit of time. A widening instead of an entire rebuilding of the bridge has been adopted by the Corporation upon the advice and recommendations of Sir Benjamin Baker.

THEATRE, CARDIFF.—The New Theatre has just been opened at Cardiff, in Park-place, Messrs. Runtz & Ford, London, were the architects. The internal decorations, which have been carried out by Mr. E. Bell, London, are in the "Empire" style. The erection of the theatre has been carried out by Messrs. James Allan & Sons, the furnishing by Messrs. James Howell & Co., and the saloon fittings by Mr. W. I. Vaughan, plumber and bar-fitter.

BUILDING TRADE, EASTBOURNE.—The following plans have been approved by the Buildings Committee of the Eastbourne Town Council:—C. Miller & Son (P. D. Stonham, architect; C.

Miller & Son, builders), six houses, Green-street.—S. A. Stratford (P. D. Stanham, architect), laundry and stable, Bourne-street.—Grand Hotel Company, Ltd. (Hunt & Steward, architects; Holland & Hannon, builders), addition to Grand Hotel, Compton-street.—John White (Mitchell & Ford, architects; John White, builder), five houses, Victoria-drive.—Miller & Selmes (Mitchell & Ford, architects; Miller & Selmes, builders), detached house, Ashburham-gardens.—Rev. H. W. Wakefield (P. D. Stanham, architect), alterations at Temple-grove, Compton Place-road.—J. Cullingford, petrol store, 92, Tidewell-road.—The New Eastbourne Hippodrome Company, Ltd. (Peelless Dennis & Co., builders), internal alterations at the Hippodrome, Sesside-road.—The Trustees of Oaklynge Gospel Mission (F. G. Collins, builder), mission-room, Victoria-drive.—Stephen Bindon (Peelless Dennis & Co., builders), alterations and additions to premises, Ashford-road.—James Vine, three pairs houses, Prentice-road.—Rev. A. Allen (M. Hookham, builder), detached house, Sesside.—E. J. Miller (Mitchell & Ford, architects), warehouse building, Langney-road.—W. H. Cornwell (Mitchell & Ford, architects; W. H. Cornwell, builder), ten houses, Prentice-road.

POST-OFFICE EXTENSION, LONDON.—On the former site of Christ's Hospital new post office buildings are to be erected by the Treasury, to be called King Edward VII. Building, covering an area of 2½ acres, without a single brick or block of stone. From top to bottom the construction will be of Hennebique ferro-concrete. The whole site is to be excavated to a depth of 30 ft. and about 110,000 cubic yds. of dirt taken away. The new building will have 11½ acres of floor surface. The designs have been prepared by Sir Henry Tait, the architect to the Office of Works.—*Standard*.

INSTITUTE PREMISES, SUTTON-IN-ASHFIELD.—The temperance café, institute, and public hall which have been erected in this town were recently opened by the Duke of Portland. Mr. Percy B. Houlton, architect, prepared the plans for the work, the cost of which has been £3,750.

THE UNION JACK CLUB.—The erection of the Union Jack Club for soldiers and sailors in Waterloo-road is now nearing completion. The building, which is being constructed by Messrs. W. Johnson & Co., of Wandsworth, from the designs of Mr. H. B. Measures, director of barracks construction, is of red brick, with terra-cotta dressings. On the ground floor is the great hall, 100 ft. by 30 ft., with a height from floor to ceiling of 17½ ft. Beyond the hall is a library, the main dining-room and overflow dining-room. In the basement there is a billiard-room, where six tables will be placed. The bedrooms occupy four floors. At present there are 206 in number, but with the extension of the premises there will be 350. Most of them are rather less than 9½ ft. by 8½ ft. in extent. The cost of building and fitting up the club will be \$5,000.

Stained Glass & Decoration.

REERDOS, UPTON CHURCH, TORQUAY.—The new reerdos in the parish church of St. Mary Magdalen, Upton, Torquay, was unveiled on the 2nd inst. The original portion of the reerdos is formed in red and yellow Devonshire marbles, with three large panels filled with sculptured alabaster. The central panel, which is the largest, contains a representation of the Crucifixion. The side panels represent incidents in the life of St. Mary Magdalen, to whom the church is dedicated. The superstructure just completed consists entirely of Caen stone. The principal and central feature is a large figure of our Lord. On either side are smaller figures in tiers placed in richly-canopied niches. Above these figures the reerdos rises in a series of pinnacles grouped around central spires. To the top of the central finial the height is 35 ft. from the level of the altar step, and about 40 ft. from the level of the nave. The reerdos stands across the chancel of an octagonal apse, which allows access on all sides, and is connected with the side walls of the chancel by richly-perforated screens with doorways in the centre. The architect was Mr. Temple Moore, of Hampstead, the sculptors being Messrs. Blackler, of St. Marychurch.

Sanitary and Engineering News.

LOWESTOFT HARBOUR.—New works have just been completed for the construction of the Hamilton Dock, at the instance of the Great Eastern Railway Company, proprietors of the harbour. The dock, having a water area of 10 acres, with quays 1,827 ft. long, and a large covered market, is to the north of the Waveney Dock, which was made twenty-two years since, the total water area being thus increased to 22 acres, and the total quay length to 3,260 ft. An electrical pump supplies sea-water for cleansing the markets and quays, which are lighted with

incandescent gas, and an auction mart for fish sales has been built to serve the old and new docks. The water area of the outer and inner harbours did not exceed previously 36 acres, and for the fishing and general shipping trades combined.

A CANAL FROM THE BALTIC TO THE BLACK SEA.—The Russian Government have deputed Mr. Jackson, an American engineer, to make initial surveys, with a view to join the two seas, at a cost of 200,000 roubles. The arrangement is that, so far as possible, Mr. Jackson shall employ Russian engineers for his staff, and that, failing the grant of a concession for the undertaking, he shall be recouped for the outlay upon the survey, but not in excess of the sum of 200,000 roubles.

VICTORIA EMBANKMENT TRAMWAYS.—The tramways are being constructed by Messrs. Dick, Kerr, & Co., Ltd., who have contracted for double tracks of about 2,640 yds. of route along the Embankment and 264 yds. of route across Westminster Bridge. The effective width of the lines ranges from 18 to 19 ft., affording an average of 47 ft. for the Embankment for the general vehicular traffic; the tracks are to be paved with sets of Aberdeen granite, extending 18 in. along the outer rails. The girder rails, 45 ft. in length, weigh 105 lbs. to the yard; the conduit is enclosed in yokes spaced at distances of 45 in., and each alternate yoke has arms on which the rails are carried, at a distance of less than 3 ft. from the kerb to the nearest rail. To clear the roof of the railway tunnel which is close to the surface at Whitehall and near Waterloo Bridge (see the plans in the *Builder* of January 6 last) a special form of conduit has been adopted. The route from Kensington via Kingsway will be extended through a subway to join the new route at Waterloo Bridge.

ROYAL SANITARY INSTITUTE.—At an examination in hygiene in its bearing on school life, held in Manchester on November 30 and December 1, 1906, four candidates presented themselves for the whole examination. Miss M. Richardson (Southport) was awarded a certificate. At an examination in sanitary science as applied to buildings and public works, held in Manchester on November 30 and December 1, 1906, three candidates presented themselves, and Mr. Trimbak J. Pitre was awarded a certificate.

Appointment.

EDINBURGH.—The Edinburgh Town Council have, on the recommendation of the Lord Provost's Committee, appointed Mr. J. M. Dick Peddie as architect for the new Municipal Art School.

Foreign.

FRANCE.—The jury of architecture at the Ecole des Beaux-Arts for the competition of the first class in architecture, have awarded medals to MM. Pépin, Ford, Wynkoop, and Madeline.

—M. Redon, architect to the Louvre, has been entrusted with the work of preparing for the installation of the Minister of the Colonies in the large house in Rue Oudinot, formerly occupied by the "Frères des Ecoles Chrétiennes." This alteration will permit of a further arrangement of the contents of the Louvre in the Pavillon de Flore, at present occupied by the Colonial Department. A monument to Gérôme is to be placed in the Jardin de l'Enfance, at the Louvre, not far from the monument to Meissonier. The monument, the work of the painter and sculptor M. Aimé Morot (Gérôme's son-in-law), represents the artist standing at work on a sculptured group of "The Retiarius and Mirmillon," which figured in the Salon of 1878, where it attracted much attention. —M. Pijakowski, architect, of Sens, has been elected honorary President of the "Société des Architectes de l'Yonne" for 1906-7, and M. Tantot acting President. —The Association Provinciale des Architectes Français has opened a competition, of which the subject is "A hotel near a town in the hills." —A new archeological museum has been organised at Bordeaux, in the old building called "Porte du Palais" or "Porte Royale," built in 1496, and which once served as a residence for the Dukes of Aquitaine and "Sénéchaux d'Angleterre." —M. Rachon, curator of the Museum of Toulouse, has been appointed Director of the Art School in the same city. —MM. Vidal and Eberdy, architects, have been commissioned to carry out at Lézignan (Hérault) a hospital and asylum at an estimated cost of 256,000 francs. —M. Julien Gadet, member of the Institute, has been elected President of the Société Centrale des Architectes Français. —M. Moutier, architect, has been commissioned to carry out new alterations at Bayeux, at a cost of 100,000 francs. —The Chamber of Deputies has voted for the purchase of the railway system of the Company de l'Ouest, which will therefore become a State

railway. —The death is announced, at the age of 80, of M. Gustave Lecomte, architect. He was a member of the Société Centrale, and an expert adviser to the Tribunal Civil de la Seine.

GERMANY.—The new station at Wiesbaden was opened on the 1st inst. The three existing railway stations could not meet the requirements, as since 1873 the passenger traffic has increased 75 per cent. and the goods traffic 130 per cent., while the small country town has expanded into an international watering place. The station buildings are the design of MM. Klingholz & Rüdell, and cost 2,900,000 marks. Barely three years ago the suggestion was made that Munich should build a museum in which to collect masterpieces of technique and science. Such zeal has been displayed that the necessary funds have been collected and the suggestion carried out, and Munich will soon boast a National Museum equal in interest to that of Nuremberg, while far superior to it in architectural merit. The building, designed by Herr Gabriel v. Seidl, is situated on an island in the Isar, which at present is connected by two bridges with the town. The plans include a double bridge which will connect the island with both embankments, the traffic between them passing through the central court of the Museum. Thus the building will at once be incorporated in the landscape, and in the life of the town. The most noteworthy feature of the design is the harmonious way it fits in with its surroundings, and the expressive manner in which each of its parts reveals the purpose to which it is assigned. The German Emperor laid the foundation-stone on the 13th ult., dedicating the building "To the memory of past scientists, to the recognition of those living, to the encouragement of those to come."

ITALY.—The new Victor Emanuel Bridge in Rome, which forms the continuation of the Corso Vittorio Emanuele, is built just below the bridge of St. Angelo. It is built in three spans, the central one being 61.2 metres, while the two lateral ones are 17.2 metres wide. The key-stone of the centre arch is about 11 metres and those of the side arches 9.6 metres above the water level. In order to partially mask the segmental constructional arches the elevations of the bridge bear elliptical decorative arches, which spring at a considerable height above mean water level, and consequently will form a pleasing outline at high water. The greatest care was taken to insure a large enough coefficient of safety, the masonry being calculated for as granite, though tufa was used, the spandrels taken as solid throughout, though they are lightened by internal chambers, and the roadway considered as laden with traffic throughout its length. In order to ease the foundations the piers, above the springing of the arch, are hollow for a length of 18 metres. It was not considered necessary to carry down the foundations to solid ground, which is difficult to find in that neighbourhood, and the size of the water-way makes it unlikely that undermining will take place. For the sake of adding apparent lightness to the design the parapet carried by the large centre arch is an open balustrade, while a solid wall forms the parapet of the smaller side arches. At either approach to the bridge stand two sculptured groups, trophies, composed of emblems, arms, and standards, representing the four historical periods of Rome—regal, republican, imperial, and Italian. The statues standing on the central piers represent the four important rivers of the geographical sub-divisions of Italy—the Po, the Arno, the Tiber, and the Volturno. Apart from the sculpture, the architectural lines of the bridge are simple and quiet and give an impression of mass and strength. The cost amounted to 3,000,000 lire.

AUSTRALIAN BUILDERS' ASSOCIATION.—At the Inter-State Convention of the Federated Master Builders' Associations of Australia, recently held at Melbourne, a motion "That the memorandum of agreement prepared by the New South Wales Association for a system of apprenticeship be adopted by the Master Builders' Associations" was carried. Under the agreement referred to the masters undertook to instruct, or to have instruction imparted, to apprentices in a complete manner in the space of five years in the trade of carpentry, joinery, plumbing, or such other trades as might be desired. The first four months were to be regarded as a probationary stage, during which either party might cancel the contract. Provision was made for the payment of a bonus or premium by the parent or guardian, and the master on his part agreed to pay such wages as might be fixed. During the first two years the apprentices were to attend the trade schools at the available Government technical college or private school two nights a week, the master paying the fees. The apprentice was to give faithful service to his master, and not join any trade society without the master's authority. Disputes were to be submitted to a joint board of employers' and employees' representatives.

LACOS (SOUTHERN NIGERIA).—According to the Government Blue-book for 1905, just received at the Colonial Office, the year was notable for

the completion of several important buildings and works, and the following may be mentioned in particular (figures in brackets representing total costs).—New Courts of Justice, built in Tinububu square, on the site of the old Court-house, which had served its purpose since 1877, but which was quite inadequate for current requirements (11,948*l.*); new quarters for officers and new offices and stores for the West African Frontier Force (4,782*l.*); new ice factory (4,093*l.*); quarters for the Director of Public Works (2,212*l.*); quarters for the principal medical officer (1,775*l.*); four new market sheds (1,838*l.*); new quarters for Public Works Department, European staff (1,268*l.*); extensions, electric light station (1,268*l.*). Additions to the printing-office (costing 378*l.*) and to the lands office (282*l.*) were made during the year, and a considerable amount of minor work was done both at headquarters and at out-stations. The work of reclamation of swamps, etc., was actively continued in various parts of Lagos Island, and over 50,000 cubic yds. of soil were used in filling in the areas reclaimed. The appearance of the northern and southern points of the island has, in consequence of these operations, undergone a complete change as compared with, say, four years ago, and the prospects of good health in these parts of the town have been greatly enhanced. A portion of the reclaimed area to the north has already been sold on terms which recoup the Government for its outlay.

Miscellaneous.

THE ARCHITECTURAL ASSOCIATION: A CORRECTION.—Mr. A. Saxon, in his notice in your report of the late remarks I made in supporting a vote of thanks to Mr. Woodward. I said 'Democracy had not yet learned the art of government, i.e., government without fuss.' The words attributed to me in place of the above are strong and rather offensive.

'SURVEYORS OF THE FABRIC,' WESTMINSTER ABBEY.—Mr. W. R. Lethaby, F.S.A., has been appointed by the Dean and Chapter of Westminster to the office of "Surveyor of the Fabric" of Westminster Abbey, vacant by the death of Mr. J. T. Micklethwaite. Mr. Arthur G. Walvo has been appointed Assistant Surveyor. He was for many years with the late Mr. Micklethwaite.

MEMORIAL TO THE LATE SIR BORRAIDALE VANDERBILT.—The committee formed to erect a memorial of the late rector of St. Bartholomew-the-Great, have, in view of the late rector's aversion to mural tablets being placed on the ancient walls of the building, and his opinion that memorials should consist of something to beautify the church, decided to protect the sanctuary of the church by a low screen, in a portion of which is to be incorporated the personal memorial in bronze; and, if the funds are sufficient, to replace the present temporary altar rails with two short rail panels in bronze. Sir Aston's plans were adopted. The total cost is estimated at 300*l.* In order to test the effect of the proposal, a model is to be constructed in one of the bays of the apse, which the committee will be invited to inspect.

OXFORD UNIVERSITY.—At a sitting of Convocation on November 29th and of 700*l.* was voted the installation in the Bodleian Library of the "expansion pneumatic automatic fire-alarm," and a sum of 250*l.* for three successive years to defray the cost of iron book-cases for the storage of library books in the basement of the examination schools.

TRADE UNIONS.—In Part A. of the Reports of the Chief Registrar of Friendly Societies for the year ending December 31, 1905, just issued, a list is given of the leading trade unions—that is, unions that have more than 20,000, funds or income, or more than 20,000 members. The following are included in the list: United Operative Bricklayers, funds, 116,137*l.*; income, 60,350*l.*; members, 35,488. Amalgamated Carpenters and Joiners, funds, 116,526*l.*; income, 180,450*l.*; members, 70,763. National Amalgamated House and Ship Painters, funds, 44,410*l.*; income, 39,098*l.*; members, 16,056. United Operative Plumbers, funds, 41,170*l.*; income, 26,236*l.*; members, 11,479. National Operative Plasterers, funds, 33,033*l.*; income, 14,172*l.*; members, 8,732. Friendly Operative Stone Masons, funds, 25,854*l.*; income, 23,618*l.*; members, 18,834. Amalgamated Brass Workers, funds, 20,245*l.*; income, 14,120*l.*; members, 6,716.

MEMORIAL TO THE LATE VIRIANI JONES, CARPENTER.—On the 1st inst. the Viriani Jones statue, which has been lodged temporarily in the entrance chamber of the City-hall until the new college buildings in Cathays-park are ready to receive it, was unveiled. The statue is of marble, and was executed by Mr. Goscombe John.

THE SCOTTISH NATIONAL EXHIBITION IN EDINBURGH.—A meeting of the Executive Council of the Scottish National Exhibition, which it is proposed to hold in Edinburgh in 1908, was held on the 28th ult. A preliminary

Building and Construction Committee was appointed, with instructions to prepare the necessary conditions to be observed by architects in submitting competitive plans for the exhibition.

INTERNATIONAL SOCIETY OF SCULPTORS, PAINTERS, AND GRAVERS.—At the last election the following artists were elected as Associates: Mr. Henry M. O. de Bonzanis, Miss Cecilia Beaux, Messrs. Simon Bussy, Walter Crane, P. Dupont, A. Jamieson, A. E. John, Elizabeth Shippen Green, G. W. Lambert, J. Kerr Lawson, Sydney Lee, D. McGill, A. Maillol, Harrington Mann, J. Oppenheimer, W. Orpen, Charles Rickets, Allen W. Seaby, H. le Sidoux, Ch. Storm-van's Gravesande, Harvard Thomas, A. G. Walker, and H. Wolf. Monsieur A. Bartholomé was elected an honorary member.

PROPOSED MODEL-OUTCOTTAGE EXHIBITIONS.—It is proposed to hold exhibitions of model cottages, next year, at Newcastle-on-Tyne, for the north of England, and at Sheffield for Yorkshire and the North Midlands, under the auspices of the National Housing Reform Council. In both cases the exhibitions will be held on municipal land, and the average number of houses will not exceed twelve persons. It is hoped that the exhibitions will provide civic object-lessons in regard to the value of proper planning of new housing areas. Surveyors and architects will be asked to send in competitive designs for the planning of the site of the exhibition. This is a new departure in the arrangement of model-cottage exhibitions. Great care has been taken to ensure that the maximum prices fixed for cottages competing shall (a) permit a proper combination of cheapness and goodness of construction, and (b) cover architect's fees, and builder's profits, as well as the cost of construction. As the cost of building is greater in the Newcastle district, the maximum prices there fixed are higher than in the case of Sheffield. Each cottage will be provided with a bath. Both committees recognise that no effort must be spared to avoid mis-statements of cost, and have decided on a condition of entry an agreement that each competitor shall, if called upon to do so, (a) sell the cottage to the local authority on whose land the exhibition is being held, at the price stated in the catalogue; and (b) if called upon to do so by the local authority, within a month, build not more than twelve cottages on the adjoining municipal estate at a similar price.

FRAMES-SIDE PICTURES BY SAMUEL SCOTT.—On December 1st were sold, at Christie's rooms, some interesting pictures by Scott, depicting, from the river, Whitehall, on a narrow meander, 29 in. by 47 in., and in a group of four, each about 23 in. by 41 in.—Westminster, Lambeth Palace, Chelsea, and London as seen by one looking north-eastwards towards the Strand. The five paintings were purchased for an aggregate amount of 438 guineas, the last-named realising 100 guineas, the Whitehall view 88 guineas, and the three others 90 guineas apiece.

THE NATIONAL COLLECTIONS.—The late Mr. Alfred Beit has bequeathed to the National Gallery Sir Joshua Reynolds's portrait group of "Lady Cockburn and her Children." Mrs. Furze has lent to the Gallery of British Art at Millbank the large version of the equestrian portrait of Lord Roberts and his staff reviewing British troops during the Afghan campaign, painted, but not quite finished, by her husband the late Mr. C. W. Furze, A.R.A.; and the National Art Collection Fund have given to the nation Mr. W. Strang's pencilled "Portrait of Henry Newbolt" (at Millbank), and M. Eugene Boudin's "Harbour of Trouville" (at Trafalgar-square).

DUFF HOUSE, N.B.—It is announced that the Duke of Fife has presented Duff House and its grounds to the burgh of Banff. The principal portion of the house, which contains some seventy rooms in all, was built by, it is believed, William Adam, father of the four brothers Adam. It is ascribed to him by Woolfe and Gandon in vol. V., with three plates, of the *Vitruvius Britannicus*. In the *Vitruvius Scoticus*, published in parts in 1720-40, and in a collected form in 1810, it is also attributed to William Adam, an ascription which is corroborated by the style and manner of execution of the design, as well as by the signature upon the illustration, which is taken to be that of William Adam.

Sr. GEORGE DAVIS CREAKY SCHOOLS.—The Board of Education have framed a scheme whereby the governors of the foundation will effect with the London County Council an exchange of the school buildings and the site of about 4,600 sq. ft. in Stanhope-street, Drury-lane, for a site of some 11,200 sq. ft., having a frontage of 128 ft. to Drury-lane. An amount of 12,303*l.* will also be paid to the governors, to include sums of 11,450*l.* by way of equality of exchange to be applied to the erection of new schools, and 873*l.* in respect of architect's fees. This parochial charity schools, established in 1700 in "the upper churchyard" on the south-east of the Hall of Clement's Inn, were erected in Stanhope-street by Messrs. Scrivenor and Co., twenty-five years ago after Mr. C. W. Reeve's plans and designs, having a facade of red and yellow brick with red brick pilasters and

mouldings, for 183 infants and 147 girls on the ground floor, and 163 boys on the floor above.

HATTON GARDEN.—Consequently upon their prospective amalgamation with the Royal National Orthopaedic Hospital, the trustees of the City Orthopaedic Hospital have resolved to dispose of their present hospital building in Hatton-garden. The freehold property consists of the two houses, Nos. 26-7, at the corner of Charles-street, having a frontage of 43 ft. to Hatton-garden and covering an area of some 4,600 ft. superficial. The premises form one of the fine old residential houses which are now rapidly disappearing from that locality; the house contains a handsome gallery staircase of oak, some contemporary firegrates and chimney-pieces, and carving after the school of Grinling Gibbons.

PRESENTATION TO A CONTRACTOR.—A public presentation was recently made at Carrphilly to Mr. Tom Taylor, contractor, of Pontypridd, in recognition of his efforts for the development of the coal resources of the locality. Mr. Taylor was responsible for the construction of the Taff Vale Railway subway at Penarth; the extensive works in connexion with the Rhyminny and Aber Gas and Waterworks Company, and he is at present engaged on the Western Valleys trunk sewer, to be carried out at a cost of a quarter of a million.

GLASGOW MASTER WRIGHTS' ASSOCIATION.—The annual general meeting of this Association was held in the Building Trades' Exchange on the 3rd inst. Mr. David Dick, President, occupied the chair. The directors' annual report, which was submitted and adopted, showed that the improvement in the building trade hoped for in last year's report had not been realised, and that from a report of the Scottish Building Trades' Federation all branches of the building trade throughout Scotland had been extremely dull during the year. Reference was also made to the formation of a Conciliation Board, consisting of an equal number of employers and operatives, to adjust in future the working conditions, and to deal with any differences which might arise from time to time between employers and operatives. The report further stated that the working rules for the current year had been adjusted by the board without the need of bringing in any outside arbitrator. Two important alterations in the by-laws were referred to—viz., the definite delimitation of what is known as the "Glasgow district," and the date of signing the rules as at July 1 instead of April 15. The treasurer's financial statement was also submitted and approved. Of the following officers—Messrs. Stewart, Dawson, & Co., were asked to mention that the Scagliola columns in Irish green, two on each floor, were made by Messrs. Bellman, Ivey, & Carter, and are fixed round iron stanchions without showing joint.

BATH MASTER BUILDERS' ASSOCIATION.—A special meeting of this Association was held on the 30th ult. to consider a communication from the Secretary of the Bath Carpenters and Joiners, submitting to the master builders new regulations governing all branches of the building trade in Bath and district. They embody new working rules, the shortening of hours, and increase of wages. As regards hours the request is for a reduction of half-an-hour a day. The wages asked are—For masons, carpenters and joiners, bricklayers, plasterers, and plumbers, 8d. per hour; for labourers, 6d. per hour; and scaffolders, 6d. per hour. The allied trades mentioned have not all received the same rate of pay, and a uniform scale is now proposed. There are also regulations as to overtime, walking-time, with provisions for railway fares, and proposals as to apprentices. A Board of Conciliation is suggested, composed of four employers and an equal number of members of the trade, with two arbitrators where necessary, who may call in an umpire. Simultaneously the Bath branch of the National Amalgamated Society of Operative House Painters and Decorators are moving to like effect. It is suggested that the new rules should come into force on June 1, 1907. The Masters' Association have referred the whole question to a sub-committee to consider and report.

ROSSENDALE AND DISTRICT MASTER BUILDERS' ASSOCIATION.—The second annual dinner of this Association took place on the 27th ult. at the Queen's Arms Hotel, Rattenstall. Mr. W. T. Watson, of Waterfoot (President of the local Association) was the Chairman, and he was supported by Mr. G. Macfarlane, of Manchester (President of the National Association of Master Builders), Mr. W. Johnson, of Wigan (President of the Lancashire, Cheshire, and North Wales Building Trades Federation), Mr. R. Hall, of Bury (Secretary to Rossendale and District Association), and many others. Mr. Constatine

proposed "The Lancashire, Cheshire, and North Wales Building Trades Federation." Mr. Johnson, of Wigan, said that there was no doubt the Federation had done good work in the past for the building trades of this neighbourhood. It was still doing good work, and if they could only get all building firms associated as they were in this district the work the Association had done would be as nothing compared with what they would be able to accomplish. He understood there were forty members in that Association, and, in view of the short time the society had existed, this was very creditable. He felt thankful that they adopted the inter-trade rule which had put their Association on a good financial footing. An important matter which had been dealt with was the P.C. amounts and quantities. Some architects took these P.C. out of the builder's hands, but the Association had made arrangements with the architects that in all P.C. amounts the builder was allowed 5 per cent. Mr. J. E. Tinline, Bury, proposed "The Rossendale and District Master Builders' Association." Replying, the Chairman said that he was very glad to hear nine members in the three Rossendale boroughs, covering an area of about ten square miles, were members of the Association. Mr. Ormerod Ashworth, Crawshawbooth, next proposed the toast, "The National Association of Master Builders." Mr. Ashworth spoke of the damage done to new buildings by the weather, which was a great hardship on builders who had contracted. It was a very difficult matter when contracting to say they would allow so much for repointing because of damage by the weather, and he thought architects ought to leave out this clause when builders could not put a price on. Mr. Macfarlane responded for the National Association. He said the building trade was a good test of the quality of the man. No trade made greater demands on a man's mental and physical strength than the building trade. Unfortunately it was owing to industrial life of the present time that masters and men should seem to be in two armed camps, while there appeared to be on the part of some people a desire to make the cleavage still more pronounced as time went on. This was a great mistake. The prosperity of one was the prosperity of the other. It ought to be the desire of employers to do the best they could for their workmen, and a good master would always get a good workman. The remaining toasts were "Our Visitors," by Mr. J. H. Hale, read by the surveyors of Bacup, Haslingden, and Rawtenstall, and Mr. R. Neill; and "The President and Officers of the Association," proposed by Mr. Joseph Stansfield, and responded to by Mr. J. Ormerod.

THE CARPENTERS' COMPANY.—The Worshipful Company of Carpenters held an examination in sanitary building construction on November 29 and December 1. The following is a list of successful candidates in order of merit:—*Silver Medals* to Messrs. George Arnall and Wm. Green; *bronze* to Messrs. H. E. Gibbs, E. E. Hunt, P. J. Luxton, John Lewis, H. E. Fairchild, Arthur Crews, and Alfred Golds. *Certificates* were awarded to Messrs. H. S. Granfield, A. E. Rees, Wm. Bell, G. B. Hardwick, J. L. Wheatley, H. N. Royston, A. E. Keen, J. C. Morrison, A. Sharpless, W. Ambrose, J. E. Moorey and G. Mould (equal), W. H. Chetham and D. Williams (equal), G. McCorquodale, E. Sudds, E. H. Wise, and J. W. Brown. The number presenting themselves this year was the same as in 1905. The candidates included men from Scotland, Sunderland, Yorkshire and Lancashire, Norfolk, Devon, Southampton, Bordon Camp (Hants), and Tunbridge Wells.

NEWCASTLE AND DISTRICT BUILDING TRADE.—The Tyne and Blyth District Association of Building Trade Employers held its annual dinner on the 11th inst., at the Royal Turk's Head Hotel, Newcastle. There was a large attendance, presided over by Councillor Stephen Easton. The Chairman was supported by the Lord Mayor (Mr. J. M. Oubridge), the Sheriff of Newcastle (Mr. Jno. Fitzgerald), Mr. R. Heslop, Mr. J. W. White (President of the Northern Counties Federation of Building Trades Employers), Councillor J. T. Armstrong (President of South Shields Association), Mr. J. Simpson (President of Blyth Association), the Mayor of South Shields (Councillor J. Martin), and others. After the loyal toast had been honoured Mr. R. Heslop gave "The National Federation of Building Trades Employers." He said the Federation, though young, was in a healthy and robust condition. Various circumstances had brought the federation into being. Pressure of the operatives and oppression of what he might call unscrupulous architects were among the causes. He did not mean all architects of course, but those who could all remember that many of the clauses in their contracts were equivalent to a sentence of death, a sentence which too many of them through competition were often obliged to accept. Now, however, through the efforts of the federation, they not only had a fair basis of contract, but were on the best of terms both with the architects and surveyors and with their operatives. He defended such a body as their federation upon the ground of the vast

interests involved. The building trade with its wage-sheet of 117 millions a year was, he thought, only next in importance to the agricultural industry. The toast was responded to by Mr. A. G. White.—Mr. J. W. White gave the toast of "The Tyne and Blyth District Association of Building Trades Employers." He said the need for this association was patent to anyone who had any connexion with the building trade. It was not their purpose to keep down wages; it was the desire of the building trade to pay the highest wages possible with fair competition with other districts. Still, until the formation of this association there was a disposition in that district to take advantage of the want of organisation among the employers; and they might thank their President and others who had formed the association that the present year had been free from those disputes which had so often proved so disastrous. He was glad to say, too, that for the future they had adopted different methods of dealing with these crises. They had formed a Conciliation Board from which, he hoped, with patience they might secure the best results. The Chairman (Councillor J. T. Armstrong) responded. He said the Tyne and Blyth District Association consisted really of four separate associations, viz., those of Newcastle, South Shields, North Shields, and Byth, and their amalgamation was brought about by a generally expressed desire for a better feeling to exist between the builders and the employees. He was pleased to think that the machinery of their federation was such that a dispute could only be entered upon after grave consideration. In fact it was almost impossible that a dispute could take place in the building trade if builders were members of their federation. As to business prospects, he thought they had hope of a revival. Councillor J. T. Armstrong, of South Shields Association, Councillor W. Simpson (President of the North Shields Association), and Mr. J. Simpson (President of Blyth Association) also responded to the toast. Mr. W. H. Hope gave "Our Municipal Authorities," and the Lord Mayor responded. Other toasts followed.

WALPOLE ST. PETER, NORFOLK.—It is proposed to raise contributions to a sum of 2,000l. for the restoration, upon strictly conservative principles, of the roofs of the parish church, one of the finest in the county. The existing lead will be melted and utilised, and the oaken work will be retained as far as possible in its original position. The church, which was built in the thirteenth century, has a high embattled tower, a south porch of beautiful design, and a range of clear-storey windows, thirteen along each side. As at the churches of St. Gregory and St. Peter Mancroft, in Norwich, the church presents a notable example of a raised presbytery floor, with a flight of steps leading to the choir stalls, giving access to a passage beneath, so that the roof-screen, now destroyed, was unusually high in order not to obstruct a view of the elevated altar. An illustration of the front-cover will be found on page 191, Vol. LXXXIII. of *The Builder*.

CAMBRIDGE UNIVERSITY.—The Antiquarian Committee direct attention in their annual report to the overgrown condition of their galleries and to the pressing needs for a new building to contain many objects which are now stored in a hired warehouse. The Director, Baron von Hugel, has collected and promised a contribution of 1,500l. to a building fund, and a suitable site would be supplied by the authorities. Steps are being taken for the acquisition of a parcel of ground for an enlargement of the Chemical Laboratory, and for an extension in Free School-lane of the Cavendish Laboratory. A list of subscriptions, just issued by the Vice-Chancellor, towards the building fund of the Department of Agriculture includes contributions by the Drapers' Company, 5,000l.; by the Duke of Devonshire, the Duke of Westminster, Lord Rothschild, Lord Strathcona, Lord Iveagh, and Sir Ernest Cassel (conditionally), 1,000l. each; and Lord Tredegar, 500l.

Capital and Labour.

GLASGOW PAINTERS.—A mass meeting of Glasgow painters was held in the Waterloo Rooms on the 8th inst., under the auspices of the local branch of the Scottish Amalgamated Society of Painters. Mr. James Quinn, who presided, reported that the conference party had had a meeting with the employers, and that the working agreement for 1907 had been signed. This was the same as that of 1906, with the exception of one small alteration. A clause dealing with apprentices stated that they should be bound for six years. In the agreement for 1907 the word "bound" had been altered to "serve." Although the employers had agreed to the same conditions as last year, they stated that in the following year they would bring forward a proposal with regard to the boundary-line, and the speaker urged that all workmen outside the society should become members, so that it might be as strong as possible to oppose the proposal.

Legal.

BUILDER'S ACTION AGAINST SURVEYOR.

THE case of *Wiltshire v. Telfer* came before the Court of Appeal, consisting of Lords Justices Vaughan-Williams, Moulton, and Buckley, on the 10th inst., on the appeal of the defendant from a judgment of a Divisional Court of King's Bench, composed of the Lord Chief Justice and Justices Wills and Darling.

Mr. Montagu Lush, K.C., and Mr. Fernington appeared for the appellant; and Mr. Duke, K.C., and Mr. Thorn-Drury for the respondent on the appeal.

Mr. Lush, in opening the case, said the defendant appealed from the order of the Divisional Court reversing the judgment of the County Court judge who tried the action and who gave judgment for the defendant. The point in the case was an extremely short one, and turned really on the construction of a couple of letters. The defendant was a surveyor and was a member of the firm of Walter Lovejoy & Telfer, and the plaintiff was a builder and contractor. The plaintiff brought the action to recover the cost of some work done at a hotel called the Rose Hotel, of which a Mrs. Wilkins was the tenant and occupier. The freeholder had served notice on his lessee to do certain repairs on the premises, and the lessee served a like notice on his sub-lessee, Mrs. Wilkins, to do them, and Mrs. Wilkins asked the defendant to get two or three tenders for the work, and the defendant accordingly sent to two or three builders a specification. He (counsel) submitted that the notice at the head of the document was quite conclusive as to whether the defendant was or was not liable to the builder for the work. At the head of the document was the following: "Repairs to be done at the Rose Hotel for Mrs. Wilkins." He submitted that was a clear indication by the surveyor that he was asking for tenders for the tenant of the hotel. The surveyor enclosed the specification in a letter asking for an estimate for the work required to be done. On March 24 the defendant wrote to the plaintiff addressed to the defendant's firm, in which he said he would do the work according to the specifications for 88l. The plaintiff's tender was accepted, and after the work was finished plaintiff wrote to the defendant's firm and asked to whom he should send the account. Defendant replied that he had not sent the account to Mrs. Wilkins, and added: "I will get a cheque from Mrs. Wilkins and pay you." The end of the story was that Mrs. Wilkins was unable to pay, and then the plaintiff commenced the action against the defendant in the County Court, alleging that the defendant had made himself liable for the account. The County Court judge held that the defendant had not contracted to personally bind himself to pay the account, and entered judgment for him with costs, but the Divisional Court reversed that decision and entered judgment for the plaintiff. The learned counsel submitted that the judgment of the learned County Court judge was unsatisfactory and should be reversed. He contended that the defendant knew that the defendant was only the agent for the principal.

After hearing Mr. Duke on behalf of the respondent in support of the judgment of the Divisional Court,

Lord Justice Vaughan-Williams, in giving judgment, held that the defendant was the person who had made the contract with the plaintiff. In his opinion the correspondence and the contract clearly excluded the liability of the defendant as a principal because it showed as plain as could be that the repairs were to be done for Mrs. Wilkins.

Lords Justices Moulton and Buckley concurred, and the appeal was accordingly allowed with costs both in that Court and in the Court below.

2 ACTION BY BUILDERS FOR BONUS.

THE hearing was concluded on the 11th inst., in the Court of Appeal, before the Master of the Rolls and Lords Justices Cozens-Hardy and Farwell, of the case of *Bywaters & Son v. Curnick & Co.*, on the appeal of the defendants from a judgment of Mr. Justice Bigham in the King's Bench Division.

Mr. Morton Smith (with him Mr. Montagu Lush, K.C.), in opening the case for the appellants, said the learned judge had given judgment for the plaintiffs for 360l., the amount alleged to be due in reference to certain building operations executed by the plaintiffs, a firm of builders and contractors, for the defendants in Glasshouse-street, Regent-street. The defendants owned premises which adjoined the County Fire Office, and in January, 1903, the plaintiffs tendered for the pulling down for the defendants of an existing building, and amongst other alterations for the erection of a party wall between the defendants' premises and the premises of the County Fire Office, and the plaintiffs' tender for 12,395l. was accepted. The question in the case was whether in the circumstances the plaintiffs were entitled to a bonus offered or contracted to be paid by the

defendants if they completed the works on the ground floor and basement within a certain specified time, so as to enable a restaurant to continue its business. The defendants' case was that the plaintiffs did not complete the work within the time agreed upon. The plaintiffs, on the other hand, alleged that the reason they did not complete the work within the time agreed upon was because the defendants had neglected to have a party-wall award made before the date when they were ready to commence the work, and that as the defendants were not in the position to give them clear possession of the site at the time they should have started work they were released altogether from building within the specified time, and that they were thus entitled to the 360*l*. The plaintiffs alleged that the time for earning the bonus ran against them from a date in March after the party-wall award was made, and that the commencement of their work had been delayed owing to their having to erect certain screens in order to screen off certain of the County Fire Office rooms when the work on the party wall was commenced. Mr. Justice Bigham held that as the party-wall award was not made by February 12, the date the plaintiffs were ready to begin the work, they were entitled to the 360*l*. No formal contract was drawn up, the plaintiffs' tender being accepted verbally, and to it were attached the drawings, plans, specifications, bills of quantities, and a letter dated February 4, 1903. The point was taken on the other side that the two sums of 12,395*l* and the 360*l* formed the contract price, and that if anything had to be deducted from it it became a penalty, and was not a bonus. It appeared that on December 8 the defendants served on the County Fire Office a party-wall notice under the London Building Act. But for the delay in making the award, the defendants were entitled to the bonus. The County Fire Office, however, did not assent to the notice, and therefore a "difference" having arisen according to the Act, an award had to be made before anything further could be done. It was the duty of the plaintiffs under the contract to give all necessary notices to the District Surveyor and the local authorities. The plaintiffs did not obtain the consent of the District Surveyor to the building going on until February 20. In the meantime the County Fire Office objected to the work on the party wall being done until the party-wall award was made, which was not until March 3. On that date orders were given to commence work on the party wall. Plaintiffs, however, had then erected the screens before the party wall was pulled down. The award was not finished before March 16, and the plaintiffs' case was that as the screens were extras the time for earning the bonus did not begin to run against them until that date, and that as they completed the work within nine weeks from that date they were entitled to the 360*l*. The defendants' case was that the screens were in the contract, and were not extras, and that, therefore, the time commenced to run against the plaintiffs from March 3. The learned counsel contended that in the circumstances the learned judge was wrong in holding that the plaintiffs were entitled to the 360*l*. Mr. Justice Bigham held that the screens were part of the work the plaintiffs had to do in the nine weeks to earn the bonus.

Mr. Lush followed on the same side, and said it was common ground that the time the plaintiffs gave possession of the basement and ground floor was outside the nine weeks, counting from March 4.

Mr. C. A. Russell and Mr. A. A. Hudson having supported the judgment of Mr. Justice Bigham in the Court below on behalf of the plaintiffs.

The Master of the Rolls in giving judgment, after stating the facts, said the plaintiffs' claim was really in effect for damages by reason of being prevented from earning the money in question by the defendants. Mr. Justice Bigham had come to the conclusion that the plaintiffs were right in saying that the reason they had not completed the work in the time was because they were prevented from doing it by the defendants. He saw no reason to interfere with the decision of the learned judge, and he thought that the appeal should be dismissed with costs. The Lords Justices concurred.

ACTION BY BUILDING OWNER AGAINST VENDORS.

MR. JUSTICE SWINFEN-EADY, in the Chancery Division last week, decided the case of *Holmes v. Wenham* and Others, an action brought by the plaintiff, one of the purchasers at a sale by auction in July, 1903, of the Channel View Building Estate, at Pevensey Bay, Sussex, to recover damages for alleged breach by the vendors of an agreement to complete certain roads.

It appeared that the estate consisted of seven or eight acres of beach, and the building plan, which had been approved by the local authority, comprised certain roads which were described on the plan as to be macadamised on chalk foundation. These roads were called the parade, and three others connecting the parade with the

road from Eastbourne to Boxhill. The four lots which the plaintiff purchased were situated at the corner of the parade, and on one of the lots he was authorised to build a hotel. The particulars of sale stated that no charge would be made to purchasers for the formation of new roads, and that the roads were being constructed under a contract with a well-known contractor. The purchaser, being dissatisfied with the condition in which the roads remained after the sale, declined to complete his purchase unless he got the vendors' undertaking, which was given on August 24, 1903, to the effect that if the new roads were not then already completed they should be forthwith finished at the vendors' expense as provided by the particulars. The contract provided for the formation of the roads, in accordance with plans and specifications, at a cost of 575*l*, payable in certain instalments on certificates from the architects of the vendors, and the specifications required the roads to be filled in with chalk, brick rubbish, and other hard material to be approved by the architects. The contractor had also to pull down a Martello tower, and could use the materials for the roads as he considered suitable by the architects. The road made so as to be fit to cart building materials over them, and that as he had thus been unable to commence building on his plots they were of no value to him. The defendants denied that they were bound by the contract, and that they completed the roads at their own cost, and they alleged that they had carried out their undertaking. They contended that as the road contract had been carried out with the approval of their architects they had satisfied the undertaking, and that they could not be compelled to put the roads in condition fit to be taken over as was suggested by the sums estimated by the plaintiff. They attributed the delay of the plaintiff to begin building to the fact that there had been delay by the local authority in deciding on a drainage scheme.

After hearing the evidence and the addresses of counsel his lordship, in giving judgment, after stating the facts, said the plaintiff's case was that the roads delineated on the plan annexed to the particulars were not formed on August 24, 1903, the date of the undertaking, nor had they been to that day. The defendants' case was that they were finished on July 31 as provided by the contract. In his opinion they were to be made fit for the immediate purpose for which they were required. It was suggested in the pleadings that they were to be made up in such a way as to be fit to hand over to a local authority, but that, his lordship considered, to be justified, nor was it attempted so to be. They were only to be "forthwith finished." The question was, were they so finished? In his opinion they never were. It was common ground that the bricks from the tower were excellent as solid material; but with regard to the binding material, and it was quite clear that none such was used beyond the mortar dust and fine particles from the tower, except so far as the surface of the beach could be so considered. These in time percolated through the bricks, and leaving them on the surface in the condition of the roads rough and unrideable. The plaintiff's witnesses said that the roads had never been rolled, and that they required at least 9 in. of chalk to bind them together before they could be in anything like working order. In his opinion they might have been left exceedingly rough and the loose rubbish used was not a sufficiently binding material. He estimated the damages the plaintiff had suffered at one-fourth the cost of the lots, and gave judgment for him for 75*l* and costs.

Order accordingly. Mr. Eve, K.C., and Mr. Micklethwait appeared for the plaintiff; and Mr. Dickens, K.C., and Mr. E. P. Hewitt for the defendants.

Patents of the Week.

APPLICATIONS PUBLISHED.*

18,465 of 1905.—R. C. HARRISON (O. W. ALSTON): *Stone Sawing and Similar Machines.*

This relates to a stone sawing and similar machine, and consists of a crank shaft, a pitman rod and pitman plate, a rock shaft, a prime sector rigidly connected therewith, means for connecting the pitman plate with the sector to oscillate the latter and rock the shaft, a vertically movable transmitting sector oscillated by the rock shaft, and means for connecting said sector with the saw carrier. The invention also consists of recoil mechanism comprising recoil springs to which are connected suitable rods pivoted to the track or face plate of the saw sash, and protruding through an aperture in the face of the supporting sectors.

24,016 of 1905.—W. PERL: *Taps, Valves, and Cocks.*

This relates to a fluid pressure tap, valve, or cock

* All these applications are in the stage in which opposition to the grant of Patents upon them can be made.

in which a hollow plug is adapted to be partly rotated by a fold-down handle attached to the plug and adapted to be moved in a segmental slot formed in the body of the tap so as to cause an orifice in said plug to move into or out of register with a discharge passage.

26,145 of 1905.—A. B. STOKES: *Domestic Stoves or Grates.*

This relates to a domestic stove or grate in which the space above the grate has no direct communication with the chimney, so that air supplied to the stove above the incandescent fuel will cause the products of combustion to be siphoned through said fuel, and thence through the closed ashpit to the chimney or shaft.

26,567 of 1905.—S. TAYLOR: *Machinery for the Manufacture of Stepped Metallic Sheets and Caps or Strips for Roofing and other purposes.*

This relates to machinery for the manufacture of stepped metallic sheets and sheet metal caps or strips for roofing and other purposes, and consists essentially of a pair of feed rollers, inclined guides in front of the rollers, and stepping tools at the rear of the rollers, mechanism and gearing for giving to the feed rollers an intermittent rotary motion, and mechanism for giving to the vertical sides of the machine by which the movable tool of the pair of stepping tools is carried a vertical reciprocating motion on the end standards.

908 of 1906.—W. H. BAILEY: *Apparatus for Ventilating and Regulating Temperature in Ships, Buildings, Mines, and the like.*

This relates to an apparatus for ventilating and regulating temperature in ships, buildings, mines, and the like, comprising a rotary frame mounted on a suitably-erected support and containing a centrally-disposed fan, two wind wheels geared to the shaft of the fan, and other wind wheels adapted to act as rudder-wheels to the frame, and also when desired as additional motive power.

1,263A of 1906.—G. G. BRODIE and A. B. COLEMAN: *Kitchen or Cooking Ranges.*

This consists in regulating the draught in the flues of kitchen or cooking ranges by making in the main flue, preferably immediately over the hood or canopy of the range, a ventilating opening and providing an adjustable hinged flap for regulating the said opening. The invention also consists of a loop on the back of the hinged flap and a projecting rod or arm on the hood, whereby on the opening of the canopy or hood the hinged flap of the ventilating opening is automatically closed.

2,284 of 1906.—F. G. BLOTT: *Window Sash and the like.*

This relates to a noiseless window sash, rendered self-acting and silent by having small hove or spiral springs recessed in the extreme side front edge of a window sash, the said springs resting and sliding up and down with the sash on a metal bead and inside lining of the window frame groove, thus stopping all side play and loose-fitting, and making said window sash noiseless.

2,805 of 1906.—G. B. JOHNSON: *Machinery for Corrugating Metal Sheets.*

This relates to a machine for corrugating sheet metal, comprising pairs of rolls each consisting of an arbor having spaced upon it a number of sections normally held apart by spring pressure, and consists in the arrangement for determining a normal distance apart of said sections in a roll of slots slidably upon the arbor, and leading screws journaled in bearings carried by the arbor, successive portions of the length of each leading screw having threads of progressively varying pitch, which engage in threaded apertures in the respective stops, so that by the rotation of the screw the positions of all the stops wherewith it engages may be simultaneously adjusted.

2,808 of 1906.—J. FOSTER: *Hinged Gates, Doors, Windows, and the like.*

This relates to a support for preventing the sagging of the front ends of gates, doors, and the like, and consists of a lever mounted to oscillate on the gate or post, and turned from an inclined into a vertical position when the gate is closed, during which movement the lever, by engaging a suitable projection, tends to raise the free end of the gate and takes the weight.

4,066 of 1906.—G. F. HIRST: *A Combined Tension and Bracket Joint for Gates, Railings, and the like.*

This relates to the preparation of metal bars for the construction of gates, railings, and the like, and consists of a mode of forming or cutting the end of a flat bar with two parallel slots so as to leave a straight centre tongue serving as a rivet or tenon of any desired size. The two end parts thus separated from the tenon are then turned down at right angles, so as to form vertical legs or stays which serve as brackets to keep undue strain from the tenon. In the usual and cross such side parts are cut off and removed, the entire strain of the weight falls on the tenon.

PATENTS.—Continued on page 707.

List of Competitions, Contracts, etc.

For some Contracts still open, but not included in this List, see previous issues. Those with an asterisk (*) are advertised in this Number: Competition, —; Contracts, iv. vi. viii. x.; Public Appointment, xvi.; Auction Sales, xxvi. Certain conditions, beyond those given in the following information, are imposed in some cases, such as: the advertisers do not bind themselves to accept the lowest or any tender; that a fair wages clause shall be observed; that no allowance will be made for tenders; and that deposits are returned on receipt of a boni-fide tender unless stated to the contrary.

Competitions.

JANUARY 5.—Guisley.—SCHOOL. Proposed dual secondary school for Guisley District (near Leeds), for an estimated accommodation of about 250 scholars. Names and addresses not later than January 5, to Mr. M. Renard, Secretary to the Governors, Guisley, near Leeds.

JANUARY 12.—Cain.—HALL.—The Committee of the George Edwards Memorial Hall offer a prize of 10l. for the best design (including plans and elevations) of the hall. The successful competitor will have the option of carrying out the work upon terms, which, together with full particulars, may be obtained from Mr. W. Ryland Jones, Secretary, High-street, Cefn, Rhyl, near Llandudno. Designs, etc., to be in hand on or before January 12.

FEBRUARY 6.—Galway.—HOSPITAL. Galway Board of Guardians invite plans and estimates of a fever hospital proposed to be erected at Galway. A premium of 25l. will be given, but in the event of the Guardians deciding to give the supervision of the building to the architect or engineer whose plan has been accepted, this premium will be merged in his fees. The selection will be made by an architect or engineer having no interest in the business. Particulars as to hospital accommodation, etc., required, will be furnished by Mr. Robt. P. Mullery, Clerk of Union, Galway. The plans will be received up to 11 o'clock a.m. on February 6.

Contracts.

BUILDING.

DECEMBER 17.—Blackpool.—ALTERATIONS TO POLICE STATION. Blackpool Watch Committee invite tenders for proposed alterations and extensions to police station, South Shore. Bills of quantities, etc., obtained on application to surveyor. Deposit of 10s. 6d. Sealed tenders, addressed to the Chairman of the Watch Committee, care of Mr. John S. Brodie, Borough Surveyor, Town Hall, Blackpool, endorsed "South Shore Police-station," should be delivered not later than 10 a.m. on December 17.

DECEMBER 17.—Marshfield.—HOUSE.—The building of a house at Marshfield, Mon., near Cardiff, for the Rev. T. Harries. The plans and specification may be seen at the office of the architect, Mr. W. H. D. Cople, 2, Church-street, Cardiff, from whom copies of the quantities may be obtained on deposit of 1l. 1s. Sealed and endorsed tenders to be delivered to the architect before 5 p.m. on December 17.

DECEMBER 18.—Crewe.—OFFICES AND STORES.—The Crewe Town Council invite tenders for the erection of new offices and stores at the electric light works. Quantities and conditions of contract on application to Mr. G. Eaton-Shore, Borough Surveyor, Municipal Offices, Earle-street, Crewe. A deposit of 1l. must accompany each application. Tenders to be sent to Mr. Frederick Cooke, Town Clerk, Municipal Offices, Crewe, not later than December 18, at 10 o'clock a.m., endorsed "Tender for Offices and Stores."

DECEMBER 18.—Durham.—ALTERATIONS AND ADDITIONS TO COLLEGE. Proposed alterations and additions to St. Hild's College, Durham, etc., from Messrs. Joseph Potts & Son architects and surveyors, 57, John-street, Sunderland, and quantities can be obtained on payment of 2l. 2s. Tenders to be sealed, endorsed, and delivered to architects not later than December 18.

DECEMBER 18.—Salsaire.—HOUSE.—A house at Salsaire. For quantities apply, from December 12 to December 18, to Messrs. Walker & Collinson, architects, Chapside-chambers, Bradford.

DECEMBER 19.—Alnwick.—HOUSE.—For a proposed dwelling-house in Lisburn-street, Alnwick (joiner work excepted), for Mr. Wm. Graham. Plans and specifications may be seen at the office of Mr. M. Temple Wilson, M.R.S.L., architect and surveyor, Alnwick, to whom sealed and endorsed tenders are to be delivered on or before December 19.

DECEMBER 19.—Morley.—WEAVING-SHED.—The erection of weaving-shed at Crank Mills, Morley, for Mr. J. H. Smith. Plans and specifications may be seen, and quantities obtained, at Morley offices of Messrs. T. A. Buttery & S. B. Birds, architects, Queen-street, Morley; and at 1, Basinghall-square, Leeds. Sealed and endorsed tenders to be sent to the offices of Mr. J. H. Smith, Crank Mills, Morley, on or before December 19.

DECEMBER 20.—Atrincham.—COTTAGES.—The Atrincham U.D.C. invite tenders for the erection of cottages on Hale Moss for working class. Bills of quantities may be obtained, and the plans inspected, on application at the Surveyor's Office, Town Hall, Atrincham, during office hours. A charge of 1l. 1s. will be made for quantities. Sealed tenders, endorsed "Tender for Workmen's Cottages," and addressed to the Chairman of the Housing Committee, Town Hall, Atrincham, must be sent in not later than 12 o'clock noon on December 20.

DECEMBER 20.—Golcar.—ADDITIONS TO MILL PREMISES.—The excavators, masons, carpenters and joiners, plumbers, and glaziers, patent glaziers, slaters, cast and steel founders, concreters, plasterers, tilers, and painters works required in

additions to mill premises, engine-house, etc., at Heathouse mills, Golcar. Plans may be seen, and quantities obtained, at Millbridge offices of Messrs. Lunn & Kaye, architects and surveyors, Millbridge and Huddersfield, until December 20, on which date sealed and endorsed tenders are to be delivered not later than 5.30 p.m., free of charge.

DECEMBER 20.—JANUARY 14.—Gosforth. SCHOOL. Northumberland Education Committee invites tenders for the work of erecting a new Council school to accommodate 400 scholars at Gosforth, near Newcastle-on-Tyne. Name and address to Mr. C. Williams, Secretary to the Education Committee, Pearl buildings, Newcastle-on-Tyne, not later than December 20, together with a deposit of 2l. 2s. Plans of the work may be inspected at the Committee's Offices, and tenders, endorsed "Tender for Gosforth Council School," must be forwarded to the Secretary not later than 5 p.m. on January 14.

DECEMBER 21.—Derby.—POWER-STATION.—Derby Corporation invite tenders for the erection of new electric power-station, St. Mil-lane. Plans may be seen, and form of tender, etc., obtained on or after December 13, on application at the office of Mr. John Ward, M.Inst.C.E., Borough Surveyor, Ralston-lane, Derby, and upon the deposit of 1l. 1s. Tenders, endorsed "Power-station," are to be delivered, in the special envelope provided for the purpose, at the office of Mr. G. Trevelyan Lee, Town Clerk's Office, 10, Town-street, Derby, not later than 10 a.m. on December 21.

DECEMBER 21.—Maesteg.—CHAPEL ALTERATIONS.—For re-roofing, reseating, and various other works and alterations to Carmel Chapel, Maesteg, for the trustees. Plans and specifications may be seen at the office of architect, Mr. E. W. Burnett, M.S.A., architect, St. Michael's-road, Maesteg, from whom bills of quantities may be obtained upon payment of 1l. 1s. Sealed tenders, on form which will be supplied, to be sent to the Secretary, Mr. Jacob Jenkins, 13, Bank-street, Maesteg, on or before December 21, and endorsed "Chapel Alterations."

DECEMBER 22.—Lichfield.—NEW WARPS. The Guardians of the Lichfield Union invite tenders for new warps for the infirm and for children at the Union Workhouse, Lichfield in accordance with plans prepared by Mr. R. J. Barnes, architect, City-chambers, Lichfield. Contractors desirous of tendering are requested to send in their names to Mr. Barnes not later than December 22, together with plans which may be seen at the office of the architect as above, and quantities will be forwarded as soon as possible.

DECEMBER 22.—Tredreag.—ALTERATIONS, ETC., TO 1st. Extensive alterations and additions to The Bush Inn, Tredreag, for Messrs. The Hereford and Tredegar Brewery Company, Ltd. Plans and specifications can be seen at The Bush Inn, and copy of bill of quantities obtained from Mr. Osborne Newcombe, architect and surveyor, Tredreag, on deposit of 1l. 1s. Sealed and endorsed tenders to be sent to Mr. A. D. Briscoe, Tredreag and Hereford Brewery, Bewdree-street, Hereford, on or before December 22.

DECEMBER 24.—St. Neot.—HOUSE.—For erecting a dwelling-house at St. Neot. Plan and specification can be seen at Mr. Kitch's St. Neot. Tenders to be sent on or before December 24 to Mr. Fred Kitch, The Esplanade, Fovey.

DECEMBER 25.—Talgarth.—COTTAGES. Brecon and Radnor Asylum (Talgarth, R.S.O.) Visiting Committee invite tenders for the erection of two semi-detached cottages on the Asylum estate. A plan and specification of the work to be done may be seen, and any particulars obtained, upon application at the Clerk's office in the Asylum. Tenders, sealed, and endorsed "Tender for Cottages," must be delivered, addressed to Mr. A. J. Astbury, Clerk to the Visiting Committee, not later than noon on December 25.

DECEMBER 25.—Worcester.—WAREHOUSE AND OFFICES.—Builders desirous of tendering for new warehouse and offices at Worcester, for Messrs. Ray's, Ltd., should apply to Messrs. Simpson & Ayton, architects, 3, Verulam-buildings, Gray's-inn, W.C., on or before December 25. Plans may be seen, and bills of quantities obtained, for which a deposit of 2l. 2s. will be charged.

DECEMBER 27.—Penygraig.—SCHOOL ALTERATIONS.—Rhonda I.D.C. invite tenders for alterations and improvements to the old school at Penygraig. Plans and specifications may be seen, and quantities obtained, at the office of the architect, Mr. Jacob Rees, Hillside Cottage, Pentre, Rhonda, on the deposit of 2l. 2s. with the accountant at the Council Offices, Pentre. Sealed tenders, endorsed "Tender for Penygraig School Alterations," accompanied by the priced quantities under separate cover, must reach Mr. C. W. Berry, Director of Education, Council Office, Pentre, Rhonda, not later than the first post on December 27.

DECEMBER 29.—Leicester.—FARM BUILDINGS.—The Committee of Visitors of the Leicester Asylum and Rural County Lunatic Asylum, Leicester, invite tenders for erection and completion of farm buildings at the new asylum, together with farm buildings, house, etc., at Narborough, near Leicester. Conditions of contract, drawings, and form of tender may be obtained from the architects Messrs. Everard, Son, & Pick, 6, Millstone-lane, Leicester, on payment of 2l. 2s. Sealed tenders, on the form supplied, to be sent to Mr. W. T. Green, 10, New-street, Leicester, before 10 a.m. Decem-

ber 29, addressed to "Chairman of the Asylum Committee," and endorsed "Tender for Farm Buildings."

DECEMBER 29.—Rhosneigr.—CHAPEL, ETC.—The erection of a Congregational chapel and schoolroom at Rhosneigr. Plans and specifications may be inspected at office of Mr. Jos. Owen, F.R.I.B.A., architect, Exchange-chambers, Holyhead. Tenders, sealed, and endorsed "Chapel, Rhosneigr," to be sent in to the Rev. S. B. Jones, Bry Hyrhyd, Holyhead, by not later than December 29.

DECEMBER 29.—Seacombe Ferry.—WORKSHOPS.—The Fisheries Committee of the Walsley U.D.C. invite tenders for the erection of new ferry workshops at Seacombe Ferry. Drawings, etc., may be seen, and form of tender and bill of quantities obtained, on application to Mr. W. H. Travers, Engineer and Surveyor, Palmers, Station Road, Litheridge, on payment of a deposit of 1l. Tenders, in sealed envelopes, endorsed "New Workshops, Seacombe Ferry," to be addressed to Mr. H. W. Cook, Clerk and Surveyor, Seacombe Ferry, in sealed post paid delivery at the Public Offices not later than December 29.

JANUARY 5.—Edmonton.—ADDITIONS TO SWIMMING-BATHS. The Edmonton U.D.C. invite tenders for alterations and additions to the Council's swimming-baths, and the covering-in of the open swimming-bath. Names to be sent to Mr. W. Francis Payne, Town Clerk, Edmonton, on or before December 17, when quantities, by Messrs. Young & Brown, will be forwarded as soon as may be convenient. Plans can be inspected at the architect's office, Mr. J. H. Lister, Edmonton. Sealed tenders, endorsed "Tender for Baths," to be delivered to the Clerk before 12 noon, January 3.

JANUARY 12.—Gateshead.—CLASSROOMS, ETC.—For the erection of additional classrooms, laboratory, etc., at the secondary schools, Durham-road, Gateshead, etc., can be seen, and bill of quantities obtained, at the office of Mr. N. Percy Pattison, Borough Engineer, Town Hall, Gateshead, on payment of 1l. 1s. Tenders, sealed, and endorsed "Tender for Additions to Secondary Schools," to be sent in on or before January 12.

JANUARY 12.—Loughrea.—ADDITIONS, ETC., TO CHURCHES.—For additions and improvements to the churches of Abbey and Duniry, Loughrea, Co. Galway. Plans, etc., can be seen at Duniry, and office of Mr. W. A. Scott, A.R.I.B.A., 45, Mountjoy-square, Dublin, architect. Sealed tenders, marked Abbey and Duniry Churches, to be sent to the Rev. P. Egan, P.P., Duniry, to arrive on or before January 12.

JANUARY 15.—Enfield.—SCHOOL.—Enfield Education Committee invite tenders for the erection of junior mixed school at Bush Hill Park, Enfield. Application for bills of quantities to be made to the architect, Mr. G. E. P. Laurence, 22, Bucking-ham-street, Adelphi, W.C., before December 29. Sealed tenders, on form supplied must be delivered at the Clerk's Office, Public Offices, Enfield, not later than January 15.

JANUARY 22.—Eltham.—REFRESHMENT HOUSE.—The London C.C. invite tenders for the erection of a refreshment house at Avery Hill, Eltham. Full particulars and bills of quantities, and the conditions will be given in the *London C.C. Gazette* of December 17, to be obtained from Messrs. P. S. King & Co., Great Smith-street, Westminster (price 1d. per copy). Tenders must be upon the official forms, and no tender will be received after 10 a.m. January 22.

NO DATE.—BELFAST.—PLASTERING, ETC.—For plastering and stone finishing premises in course of erection, 119 and 121, Peter's-hill, and 1 and 3, North Boundary-street. For instructions apply Messrs. E. & J. Byrne, architects, 4, Waring-street, Belfast.

NO DATE.—BELFAST.—REMODELING PREMISES.—The remodelling of the licensed premises, University-road, Belfast. Plans, specification, and particulars of the work may be obtained at office of Mr. J. V. Brennan, C.E., architect, Belfast Bank-chambers, Belfast.

NO DATE.—BRIDDLINGTON.—THEATRE.—The erection of a theatre on the New Spa, Bridlington. Names to Messrs. Brodie, Leach & Walker, architects, at York-chambers, 77, Lowgate, Hull, together with a deposit of 2l. 2s. Bills of quantities and further particulars will be sent to such depositors only.

NO DATE.—CRESSWELL.—SHOPS.—Erection of Cresswell of five shops with houses attached, also two private dwelling-houses. Names to Mr. H. Stockton-Judd, F.R.S.A., architect and surveyor, Shirebrook Mansfield.

NO DATE.—Huddersfield.—PAVILION.—The erection of a brick pavilion, 53 ft. by 26 ft. on the ground of the Marsh United Bowling Club, Ltd., Cross-lane, Huddersfield. Plans and specifications may be seen by appointment with the Secretary, Mr. J. K. Braumner, 19, Church-street, Paddock, Huddersfield.

NO DATE.—NEWLAY.—GALVANISED BUILDING.—For pulling down and re-erecting galvanised building about 50 ft. by 28 ft. at Newlay. Apply Messrs. Tunstall & Co., Ltd., Leeds Bridge or Newlay.

NO DATE.—NOTTINGHAM.—HERSAGE.—Erection of three houses, Wells-road, Nottingham. Names to Mr. Fred. Mitchell, architect and surveyor, 9, Upper Fountain-street, Albion-street, Leeds, at once (standing trade), and quantities will be duly forwarded to them.

No DATE. **Ponthenry.**—ENGINEHOUSE. For putting in foundations and building fan engine house at Ponthenry Colliery, near Llanelli. For particulars write to the Barrow Coal Company, Ltd.

* No DATE. **Woolwich.**—SOLDIERS' QUARTERS. Tenders are invited for the erection of forty "B" type married soldiers' quarters at Woolwich. Plans, specifications, and conditions of contract may be inspected at the office of Mr. Harry B. Measures, F.R.I.B.A., War Office, Grosvenor-road, Atherfield, S.W., on December 15, 19, and 21, and bill of quantities and form of tender obtained on those days only.

ENGINEERING, IRON, AND STEEL.

DECEMBER 15. — **London.**—FISHPLATES. The Secretary of State or Civil in Council invites tenders for the supply of fishplates for 90 lb. rails. The conditions of contract may be obtained on application to the Director-General of Stores, India Office, Whitehall, S.W., and tenders are to be delivered at the office by 2 o'clock p.m. on December 18.

DECEMBER 15. — **Manchester.**—PERMANENT WAY. Manchester Corporation Tramways Committee invite tenders for the supply of permanent way points, tongue, and hardened steel centres. Specifications and forms of tender may be obtained on application to Mr. A. McKillop, Assistant Manager, Tramways Department, 55, Piccadilly, Manchester, on deposit of 10 s. Drawings may be inspected at the office of Mr. McKillop, Manchester, on production of the specification. Tenders are to be addressed to the Chairman of the Tramways Committee, 55, Piccadilly, Manchester, endorsed "Tender for Points," and must be received not later than 10 a.m. on December 18.

DECEMBER 15. — **New Sarum.**—BOILER, ETC. New Sarum T.C. invite tenders for supplying and fixing a boiler and two radiators, etc., at the new fire station, Salt Lane. A specification can be seen at the office of the City Surveyor, Endless-street, on and after December 10. Tenders by December 18. Mr. Francis Hoddling, Town Clerk, Municipal Offices, Salisbury.

DECEMBER 15. — **Malden.**—DEEPENING WELL. Malden T.C. invite tenders for the deepening a well at their Wantz Road Pumping Station. Plan and specification may be seen at the office of Mr. T. R. Sculley, Borough Surveyor, London road, Malden. Tenders, endorsed "Tender for Well," to be delivered to Mr. F. H. Bright, Town Clerk, Town Clerk's Office, High-street, Malden, on or before December 19.

DECEMBER 15. — **Scalby.**—WIDENING BRIDGE. North Riding of Yorkshire C.C. invite tenders for rebuilding and widening of New by Bridge (stone), at Scalby, near Huddersfield, on the M.R. of 1, North-south main road. Plans and specification may be seen, and bills of quantities obtained, at the County Surveyor's Office, North-south main, North-south, from December 10 to 19 inclusive.

DECEMBER 15. — **Trenholme Bar.**—BRIDGE WORKS. North Riding of Yorkshire C.C. invite tenders for rebuilding and strengthening bridge station, near Trenholme Bar, on the Thirsk and Yarm main road. Plans and specification may be seen, and bills of quantities obtained, at the County Surveyor's Office, County Hall, North-south, from December 10 to 19 inclusive.

DECEMBER 22. — **Portsmouth.**—SEA WALL, ETC. Portsmouth U.D.C. invite tenders for the construction of a concrete sea defence wall at the Esplanade, Portsmouth, in length 215 ft., according to the plans (enclosed), prepared by Mr. R. Jones, the Council's Engineer, and strengthening bridge station, near Trenholme Bar, on the Thirsk and Yarm main road. Plans and specification may be seen, and bills of quantities obtained, at the County Surveyor's Office, County Hall, North-south, from December 10 to 19 inclusive.

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JANUARY 7. — **Scarborough.**—RAILWAY SIDINGS. The North-Eastern Railway Company Directors invite tenders for the construction of a group of carriage sidings (about four miles in length) at Scarborough, on the west side of the Scarborough and Whitby Railway. Plans may be seen, and specification, detailed quantities, and form of tender obtained, on personal application to the office of Mr. W. C. Cudworth, the Company's Engineer, at York. Sealed tenders, marked "Tender for Carriage Sidings, Scarborough," to be sent to the Secretary at York, later than 10 a.m. on January 7.

JANUARY 9. — **Worthing.**—WELL-SINKING. Worthing Corporation invite tenders for the various works required in the sinking of a well, 115 ft. deep, with iron cylinders, and the driving of heating and other works in connexion therewith. Plan, etc., may be seen, and form of tender obtained, on application to Mr. Frank Roberts, M.Inst.C.E., Borough Water Engineer and Surveyor, Sealed tenders, endorsed "Tender for Well," to be sent to Mr. W. Verrall, Town Clerk, Municipal Offices, Lymington-road, Worthing, not later than 12 noon on January 9.

JANUARY 10. — **Swansea.**—CRANE. Swansea Harbour Trustees invite tenders for a 2-ton portable high pedestal hydraulic crane with a radius of 40 ft. Further particulars can be obtained on application to the Trustees' engineer, Mr. A. O. Schenk, M.Inst.C.E., at the Harbours Office, Swansea. Tenders, sealed, and marked "Hydraulic Crane," should be delivered to Mr. Talbot Strick, Clerk, Harbour Office, before 10 a.m. on January 10.

JANUARY 11. — **Aberystwyth.**—EQUIPMENT OF NEW DAVIDS MEMORIAL CHEMICAL LABORATORIES AT ABERYSTWYTH. Drawing sent, and specifications obtained, of Mr. A. W. Cross, University College, Aberystwyth, or the architect, Mr. A. W. Cross, 40, New Bond-street, London, W., after December 18. Tenders to be in hand on January 10.

JANUARY 11. — **Waste.**—SALFORD. Salford Corporation invite tenders for new sewage pumps to two large pumping engines at the Salford Sewage Works. Plans and specifications may be seen, and bills of quantities obtained, at the Borough Engineer, Town Hall, Salford, on payment of 10 s. Tenders, endorsed "Sewage Pumps," and addressed to the Chairman of the Rivers Committee, Town Hall, Salford, must be delivered at office of Mr. L. C. Evans, Town Clerk, Town Hall, Salford, not later than 12 noon on January 30.

APRIL 2. — **Bombay.**—RECLAMATION. Bombay Port Trustees invite tenders for the construction of a reclamation between Mazagon and Sewri. The contract will include the reclamation of a suitable masonry quay wall, about 12,600 ft. long, on piled foundations, and the reclamation of about 518 acres of the foreshore, such reclamation to be effected by silt or mud, and the reclamation of 1,500 acres of the harbour, and covered with a layer of good earth. Copies of the specification and drawings of the work can be obtained from the Chief Engineer, Bombay Port Trust, Ballard-road, Bombay, or from the Trustees' consulting engineers, Messrs. Sir J. Wolfe Barry & A. J. Barry, The Sanctuary, Westminster, up to noon on April 2.

No DATE. **Westminster.**—BOILER. For building a 25 ft. by 8 ft. boiler, materials supplied. Brand & Co., Westminster.

No DATE. **Ynysybwl.**—WEIGHBRIDGE. For fixing a railway weighing machine and engine office, etc., at the Ynysybwl Colliery, Ynysybwl, near Pontypridd. Plans and particulars may be obtained of the Manager at the Colliery.

MISCELLANEOUS.

DECEMBER 15. — **Chorley.**—DISINFECTING LIQUID. — Chorley Corporation invite tenders for two months' supply of disinfecting liquid, from January 1 next. Forms of tender may be obtained from Mr. J. H. Hills, Town Clerk, Town Hall, Chorley, on or before December 15.

DECEMBER 18. — **London.**—SCAVENGING. The Council of the Metropolitan Borough of St. Marylebone invite tenders for the removal of houses refuse from the whole of the houses and premises in the south district of the borough, in covered vans or carts, for one, two, or three years, commencing April 1, 1907. Particulars of the district, for the purpose of this contract, with the printed form of tender, and conditions of contract, may be had on application to the Clerk by the Borough Council, and must be delivered sealed and endorsed "Tender for Removal of House Refuse," to Mr. James Wilson, Town Clerk, Town Hall, Marylebone-lane, Oxford-street, W., on or before 10 a.m. on December 18. The contractor will be required to enter into a bond with two approved sureties in sum of 1,000 l.

DECEMBER 18. — **Marylebone.**—SCAVENGING. The B.C. of St. Marylebone invite tenders for removal of house refuse from the whole of the houses and premises in the south district of the borough, in covered vans or carts, for one, two, or three years, commencing April 1, 1907. Particulars of the district, for the purpose of this contract, with the printed form of tender and conditions of contract, may be had on application to Mr. James Wilson, Town Clerk, Town Hall, Marylebone-lane, Oxford-street, W., on or before 10 a.m. on December 18. The contractor will be required to enter into a bond with two approved sureties in sum of 1,000 l.

DECEMBER 18. — **Barton-upon-Humber.**—SCAVENGING. Barton-upon-Humber U.D.C. invite tenders for the scavenging of the town from February 1 next. The town is divided for this purpose into six districts, and separate tenders may be sent for each district. Forms of tender and of the specification may be had on application to Mr. D. Houghton, the Inspector, there also a plan of the districts may be seen. Tenders to be sent to the Inspector, endorsed with the number of the district, so as to

reach him not later than 12 o'clock on or before December 19.

* DECEMBER 19. — **Hampstead.**—REMOVAL OF STORM. The Hampstead B.C. invite tenders for (1) removal of sloop from roads and gullies, (2) horsing carts, for one or three years, at the option of the Council, from April 1 next. Full conditions are contained in the form of tender, which may be had and further particulars obtained on application to Borough Engineer at the Town Hall. Tenders to be delivered to Mr. Arthur P. Johnson, Town Clerk, Town Hall, Havestock Hill, N.W., before 4 p.m., on December 19.

DECEMBER 19. — **Malden.**—DEEPENING WELL. Malden T.C. invite tenders for deepening a well at their Wantz Road Pumping Station. Plan and specification may be seen at the office of Mr. T. R. Sculley, Borough Surveyor, London road, Malden. Tenders, endorsed "Tender for Well," to be delivered to Mr. F. H. Bright, Town Clerk, Town Clerk's Office, High-street, Malden, on or before December 19.

DECEMBER 19. — **Salford.**—BRUSHES. Salford Lighting and Cleansing Committee invite tenders for the supply of new sweeping brushes and cleaning brushes of sweeping and machine brush stocks. Samples may be seen, and all information obtained, on application to the Superintendent of the Lighting and Cleansing Department, Willoughby-street, Salford. Tenders, endorsed "Brushes," must be delivered at the Superintendent's office not later than December 19, 1906.

* DECEMBER 20. — **Kilmarnock.**—DEMOLITION. Kilmarnock U.D.C. invite tenders for the demolition of old post-office at Kilmarnock, and for the foundations of new one. Drawings, specifications, copy of conditions, and form of contract may be seen on application to Messrs. R. Scott & Son, 115, Wellington-street, Glasgow. Bill of quantities and forms of tender obtainable from Mr. W. T. Oldrieve, H.M. Office of Works, Edinburgh. Tenders, endorsed "Tender for Foundations," etc., must be delivered to the Secretary, H.M. Office of Works, etc., Storey's Gate, S.W., must be delivered before December 20.

DECEMBER 20. — **Salford.**—FURNITURE. Salford Lighting and Cleansing Committee invite tenders for the removal of house refuse from St. John's Ward, Cherry-hill, and Newnham Court, Grand-street, for twelve months from Christmas next. Tenders must be sent to Mr. John F. Symonds, Clerk, 5, Bene-street, Cambridge, not later than December 22, and may be for one or both districts.

DECEMBER 22. — **Chesham.**—SCAVENGING. Chesham U.D.C. invite tenders for the removal of house refuse from St. John's Ward, Cherry-hill, and Newnham Court, Grand-street, for twelve months from Christmas next. Tenders must be sent to Mr. John F. Symonds, Clerk, 5, Bene-street, Cambridge, not later than December 22, and may be for one or both districts.

DECEMBER 28. — **Lancaster.**—HOSPITAL FURNITURE. For furniture for new hospital for County Lunatic Asylum, Lancaster. Samples may be inspected at the Asylum on Wednesday and Saturday days from December 5 to 19. Tenders, endorsed "Tender for Furniture," will be received on or before December 28. Address: Medical Superintendent.

PAINTING, ETC.

DECEMBER 17. — **Leeds.**—PAINTING, ETC.—Leeds Corporation invite tenders for cleaning down, painting, etc., at the Union-street, Holbeck lane, and Kirkstall road Baths. Forms of tender, specifications, and all particulars may be obtained, and copies of the documents forming the contracts may be inspected, at the City Engineer's Office, on payment of a deposit of 10 s. Tenders, properly endorsed, should be received at the Town Clerk's Office not later than 10 a.m. on December 17.

DECEMBER 28. — **Mickleover.**—PAINTING. — Derby County Asylum (Mickleover, near Derby) Committee invite tenders for painting, etc., at the Asylum. Copies of specifications and any information required can be obtained on application to the Engineer at the Asylum. Tenders, marked "Painting," to be sent to Mr. B. Scott Curry, Clerk to the Visiting Committee, St. Michael's Churchyard, Derby, not later than December 28.

ROADS, SANITARY, AND WATER WORKS.

DECEMBER 17. — **Halifax.**—STREET IMPROVEMENT WORKS. Halifax Highways Committee invite tenders for the execution of private improvement works in the street leading from Burnley-road to Old Willow Hall. Plans and specifications may be seen, and forms of tender obtained, on application to Mr. James Lord, M.Inst.C.E., Borough Engineer, Town Hall, Halifax, upon payment of the sum of 10 s. Tenders, endorsed "Street off Burnley-road," must be sent to Mr. Richard Walton, Town Clerk, on or before December 17.

* DECEMBER 17. — **Hendon.**—DRAINAGE AND ROADS. — The Hendon U.D.C. invite tenders for storm-water drainage works, Edgware-road, along with kerbing, channelling, and stone-paving works in the Edgware-road, West Hendon. The drawings and specification may be seen, and form of tender obtained, of Mr. S. Slater Grinley, Engineer and Surveyor, at the Council Offices, The Burroughs, Hendon, N.W., on deposit of 10 s. Sealed tenders, endorsed "Edgware-road Storm-water Drain and Paving Works," addressed to the Chairman of the Council, to be sent to Mr. H. Humphries, Council Offices, The Burroughs, Hendon, N.W., not later than 5 p.m. on December 17.

DECEMBER 17. — **Cymmer.**—STREET WORKS. Glyn corge U.D.C. invite tenders for private street improvement works at Margam-street, Cymmer, and giving names of two sureties who will join in bond for the due performance of the work, to be

sent to Messrs. Cuthbertson & Powell, Clerks, Water-street, North, not later than December 18.

* **December 18.—Willesden.**—Roads, etc.—The Willesden D.C. invite tenders for certain road-making and paving works in various roads. Plans and specification may be seen, and all further particulars obtained, on and after December 10, on application to Mr. O. Claude Robson, Engineer to the Council, Public Offices, Dymchurch, Kilburn, N.W. The tenders, upon printed forms, and endorsed "Private Streets," to be delivered at the offices of the Council not later than 4 p.m., December 18.

December 19.—Carshalton.—Roadworks.—Carshalton U.D.C. invite tenders for the making-up of Lavender-road, within their district (Mr. William Willis Gale, A.M.Inst.C.E.). Bills of quantities and all particulars can be obtained on application at office of Mr. C. P. Lovelock, Clerk, U.D.C. Offices, High-street, Carshalton, and on deposit of 5 sealed tenders, accompanied by a priced bill of quantities, addressed to the Chairman, and endorsed "Tender for Lavender-road," to be delivered at office of Clerk before noon on December 19.

December 19.—Chiswick.—STREET IMPROVEMENTS. The U.D.C. of Chiswick invite tenders for street improvement works (including demolition of buildings and making good of adjacent premises, erection of walls, etc.) at (a) Back-lane and (b) Bolton-gardens. Forms of tender, etc., on application to Mr. John Barclay, Surveyor of the Council, at the Town Hall, Chiswick, where they may be inspected. Tenders are to be made on the prescribed form, and to be delivered, in a sealed cover, endorsed "Tender for Street Improvements at Back-lane or Bolton-gardens," together with schedule of prices to Mr. Ernest F. Collins, Clerk of the Council, Town Hall, Chiswick, W., not later than 8 p.m. on December 19.

December 19.—Ilford.—SEWER.—Ilford U.D.C. invite tenders for providing and laying about 720 yds. lin. 27-in. concrete tube sewer, with manholes complete, along Sunnyside-road and Loxford-lane, from Hampton-road to the Outfall Works. Plans, etc., may be seen, and form of tender obtained on application to Mr. H. Shaw, A.M.Inst.C.E., Engineer and Surveyor to the Council, at the Town Hall, Ilford, on payment of a deposit of 2s. Tenders, endorsed "Tender for Sewer," must be delivered to Mr. John W. Benton, Clerk to the Council, Town Hall, Ilford, not later than noon on December 19.

December 21.—Carlisle.—WATER MAINS, etc.—For providing and laying water mains, branches, and fittings for the supply of Rickerby Mansions, and Estate, Carlisle. Names and addresses to Mr. John Little, Civil Engineer, 1, Egglefield Abbey Road, Carlisle, sent on or before December 21. Quantities and form of tender will be supplied when ready on receipt of 1s. 18. deposit.

December 26.—Edinburgh.—SEWER.—The Governors of Trinity Hospital invite tenders for the construction of several works required in execution of proposed pipe sewer at Trinity Hospital, Dean Park, and Rinkhony drainage. Schedule of quantities, and form of tender, may be obtained on application to the Borough Engineer, Police-barracks. Tenders must be sent to Mr. Thomas Hunter, W.S., Town Clerk City-chambers, Edinburgh, not later than 10 a.m. on December 26. Tender to be delivered at Rinkhony Drainage.

* **December 27.—Chipping Ongar.**—TAR AND WOOD-BLOCK PAVING. The Guardians of the Wood-block Paving, invite tenders for executing tar and Hackney Union invite tenders for executing tar and wood-block paving, erection terrace wall, entrance gates, and sundry other works, at the Children's Homes at Chipping Ongar, Essex. The specification, conditions of contract, and plans (as prepared by Mr. W. A. Finch, architect, 76, Finsbury-pavement, E.C.), may be seen at office of Mr. Frank R. Coles, Clerk to the Guardians, Hackney Union, Homerton, N.E., and bills of quantities and form of tender will be supplied on deposit of 10s. 18. sealed tenders, endorsed "Paving, Buildings, etc., at Ongar," must be delivered to the Clerk before 2 p.m., December 27.

December 28.—Clontarf, Dublin.—SEWERAGE WORKS.—The Improvement Committee of the Corporation of Dublin invite tenders for the construction of about fourteen miles of pipe sewers, ejector stations, rising mains, transmission mains, air compressing station, together with the supply and erection of various machinery and auxiliary works connected therewith, chiefly in the East Clontarf and West Clontarf Wards of the City of Dublin. The plans, specifications, bills of quantities, and forms of tender may be inspected at the office of the City Engineer, City Hall, Dublin, and at the office of the consulting engineer, Mr. George Chatterton, M.Inst.C.E., 6, The Sanctuary, Westminster, and a limited number of copies of the said documents may be obtained on payment of the sum of 5s. 6d. (crossed cheques only will be received in payment). No copies of the documents will be sent to contractors until they have been inspected by a representative of the firm. Tenders, sealed, and endorsed on the envelope "Tenders for Clontarf Sewerage Works," must be addressed to the Chairman of the Improvement Committee, City Hall, Dublin, and delivered before 12 o'clock noon on December 28. With each tender must be submitted the names of two sureties (jointly or severally) to be approved by the Council, who will be prepared to execute a joint and several bond for the due performance of the contract in a sum of 10,000.

December 31.—Leyton.—STREET WORKS.—Leyton U.D.C. invite tenders for the making-up, kerbing, and paving certain private streets within their district. The paths are to be paved with Patent Victoria Indurated and Patent Aberdeen Adamant stone, and certain passages are to be paved with blue Staffordshire paving bricks. Specification, form of tender, etc., may be obtained on application to Mr. William Dawson, M.Inst.C.E., the Council's Surveyor, at his offices, Town Hall, Leyton. Sealed tenders, in special endorsed envelopes supplied with the forms, must be delivered at the meeting of the Council to be held on December 31, at the Town Hall, Leyton, at 7 o'clock p.m.

JANUARY 2.—Ashwell.—SEWERAGE WORKS.—Ashwell R.D.C. invite tenders for sewerage works for the parish of Ashwell. The works comprise about two and a half miles of stoneware pipe (chiefly 12 in. and 9 in.), with manholes and other appurtenant works; also small sedimentation tanks, and laying-

out 9 acres of land for filtration. Plans and specifications can be seen at the offices of the Engineers, Messrs. Elliott & Brown, Burton-buildings, Parliament-street, Nottingham. The bills of quantities and form of tender obtained on deposit of 2s. (by cheque). Sealed and endorsed tenders to be delivered to Mr. Arthur Sharpe, Clerk to the Council, Roxton, Hertis, on or before the first post of January 2.

JANUARY 3.—Mountain Ash.—SEWER.—Aberdare R.D.C. invite tenders for the laying of about 600 lin. yds. of 27-in. concrete sewer, and the lifting and relaying of about 470 lin. yds. of 27-in. concrete sewer, and the lifting and relaying of about 230 lin. yds. of 27-in. concrete sewer, with all necessary manholes, chimneys, etc., at Cwm Cynon, Mountain Ash, Glamorgan. Plans, specifications, and specification may be inspected at the Surveyor's Office, Town Hall, Sealed tenders, endorsed "Outfall Sewer," must be delivered to Mr. Thos. Phillips, Clerk, Town Hall, Aberdare, on or before January 3.

* **JANUARY 3.—Paddington.**—WOOD PAVING.—Paddington B.C. invite tenders for contracts in connection with wood paving Clifton-gardens, Watwick-avenue (part of), Watwick-avenue (part of), Porchester-gardens (part of), and Amberley-road (part of). Bills of quantities, form of tender, and further particulars can be had on application, between 10 a.m. and 4 p.m. (Saturdays, 10 a.m. and 2 p.m.), to the Borough Surveyor. Sealed tenders, endorsed as instructed, and addressed and delivered to Town Clerk, Town Hall, Paddington, on or before January 5.

JANUARY 5.—Batley.—Roadworks.—Batley T.C. invite tenders for the developing, paving, flagging, and vitreous tiling of each of the following streets, namely:—Borough-road, Fleece street, Cooper-street, Ambley-place, Fox-place. Plans, etc., may be seen, and forms of tender together with bills of quantities and other particulars, obtained at the office of the Borough Engineer, Mr. Oscar J. Kirby, Town Hall, Batley. Sealed tenders, on the forms provided, endorsed "Tender for Roadworks," must be delivered to Mr. J. H. Craik, Town Clerk's Office, not later than January 7.

JANUARY 7.—Ilford.—WOOD PAVING.—Chelmsford B.C. invite tenders for laying about 140 sq. yds. of footpaths with concrete flags, and paving with wood blocks and concrete at road junctions, New-street, Chelmsford. Plan and specification may be seen at the office of the Borough Surveyor, Mr. Cuthbert Brown, A.M.Inst.C.E., 16, London road, Chelmsford. Tenders, endorsed "Wood Paving," must be delivered at the office of Mr. Thos. Dixon, Town Clerk, Town Clerk's Office, 16, London-road, Chelmsford, not later than January 12.

JANUARY 13.—Kettering.—SEWERAGE DISTRICT. Kettering U.D.C. invite tenders for the provision of distributing apparatus on rectangular percolation filter beds. Full particulars of requirements may be obtained from the Council's Engineer, Mr. Thos. R. Smith, Engineer and Surveyor, Surveyor's Office, Market-place, Kettering, not later than January 15.

JANUARY 22.—Sowerby Bridge.—SEWERAGE WORKS. Sowerby Bridge U.D.C. invite tenders for the underpinning works at the Sewage Works, Milner Road, Sowerby Bridge, viz., the supply, delivery, and filling the remaining (i.e., 9,000 cubic yds.) with filtering medium; quantity, about 9,000 cubic yds. Conditions and samples of filtering medium, etc., may be seen at the Engineer's Office, Hallings Mill-lane, Sowerby Bridge, by application to Specification and quantities may be obtained on application to the engineer, Mr. C. L. Whitehead, C.E., M.E., 10, Finsbury-square, London, E.C. 2. Tenders, endorsed "Sewerage Works," on payment of a 5s. Bank of England note only, to be delivered to Mr. R. W. Evans, Clerk and Solicitor to the Council, Council Chambers, Sowerby Bridge, in sealed envelopes, not later than January 22.

STONE, MATERIALS, AND STORES.

December 15.—Aberdeen.—MATERIALS. The Town Council of Aberdeen (Police Department) invite tenders for supplying the following articles and work, as required for the year 1907, viz.:—(1) cast-iron pipes; (2) lead and tin pipes and plumber work; (3) tinsmith work, timber, painter and glazier work, freelay pipes, bricks; (4) gasking and rope yarn, brushes, Portland cement, oils, etc. Schedules of quantities, conditions of contract and information regarding the various articles required can be had at the Borough Surveyor's office. Tenders for, and samples of, brushes are to be lodged with the cleansing inspector, Poynerhook-road, and tenders for other articles or work are to be lodged with Mr. Wm. Dyack, Borough Surveyor, Borough Surveyor's Office, Aberdeen, not later than December 15, at 10 o'clock a.m.

December 17.—Aberdeen.—STORES.—The T.C. of Aberdeen invite estimates for supplying the following articles for one year, from January 1, 1907, to December 31, 1907:—Cast-iron work; malleable iron, steel rods, and ironmongery; brass, lead, and tin work; brushes; ropes, rope yarn, tow, etc.; painter and glazier work; timber, carling, felling, and drapery, etc. All according to schedules, etc., which will be delivered to intending contractors at the Gas Engineer's Office, Cotton-street. Sealed tenders, addressed to the Town Clerk, Mr. J. Hestley, such, to be delivered on or before December 17, at Gas Works, Aberdeen.

December 17.—Halifax.—STORES. Halifax Waterworks Committee invite tenders for the supply of (1) cast-iron pipes; (2) lead piping and pig lead; (3) gun-metal fittings, required during the fifteen months ending March 31, 1908. Further particulars may be obtained on application to Mr. J. Hestley, A.M.Inst.C.E., Waterworks Engineer, Gibbet-street, Halifax. Tenders, endorsed "Waterworks," together with the names of the articles tendered for, must be sent to Mr. C. L. Whitehead, C.E., M.E., 10, Finsbury-square, London, E.C. 2, not later than 12 o'clock noon on December 17.

December 17.—Hastings.—CEMENT.—Hastings Corporation invite tenders for the supply and delivery to Hastings Railway Station of 1,000 tons of Portland cement. Specification and form of tender may be obtained at the office of the Borough Engineer,

Mr. P. H. Palmer, M.Inst.C.E., Town Hall, Hastings. Tenders, under cover, endorsed "Tender for Portland Cement," to be delivered to Mr. Ben. E. Woodcock, Clerk, Town Hall, Hastings, at 12 o'clock noon on December 17.

December 18.—Sunderland.—MATERIALS.—Sunderland R.D.C. invite tenders for the following work and materials in their district for one year from January 1 next, viz.:—(1) Street lamps, are hydrants, and road gutters; (2) manhole covers, frames, and dirt pans; (3) lamp glass, and lamp oil; (4) asphalt, freestone kerb, and sanitary pipes; (5) hardware; (6) oils, paints, and glass; (7) disinfectants; (8) repair work. Drawings and patterns may be seen on application to the surveyor. Tenders, accompanied by samples of certain specified articles, are to be sealed and addressed to the Clerk to the Council, and delivered at his office not later than noon of December 18. Forms of tender may now be obtained on application to Mr. J. C. Wilson, Clerk to the Council, Offices, 17, John-street, Sunderland.

December 19.—Halifax.—STORES.—Halifax Gasworks Committee invite tenders for the supply of (1) ironmongery; (2) steel goods; (3) fireclay goods; (4) condensed gas, etc.; (5) iron valves, and condensing valves; (6) wet and dry gas meters, required during the year ending December 31, 1907. Forms of tender and further particulars may be obtained on application to Mr. J. Hestley, A.M.Inst.C.E., Engineer, Gasworks, Halifax. Tenders, endorsed "Gasworks," together with the names of the articles tendered for, must be sent to Mr. Kenchley Walton, Town Clerk, Town Hall, Halifax, not later than December 19, at 10 o'clock a.m.

December 19.—Handsworth.—MATERIALS.—Handsworth U.D.C. invite tenders for supplying the under-mentioned goods and materials during the year ending December 31, 1907, viz.:—(1) Portland cement and sells; iron slag; bricks; fireclay; cement and lime; drain pipes; iron castings; glass; brushes, shovels, picks, and other tools; pitch, tar, and asphaltum. Bills of quantities, and forms of tender, may be seen, and forms of tender obtained, on application to the Surveyor, Mr. H. Richardson, A.M.Inst.C.E., at the Council House, Handsworth. Sealed tenders, endorsed as instructed, and addressed to be delivered at the office of the Surveyor, Council House, Handsworth, Birmingham, on or before December 19.

December 20.—Belfast.—LEAD. The Belfast City and District Water Commissioners, invite tenders for the supply of 15 tons soft bar lead suitable for pipe jointing to be run in moulds. Tenders to be delivered to Mr. H. Hamilton, Secretary, Water Office, Belfast, on or before 11 o'clock a.m. on December 20.

December 20.—Belfast.—STORES.—The Belfast City and District Water Commissioners invite tenders for supplying the following stores:—(1) Hardware; (2) paints, oils, etc.; (3) timber; (4) Portland cement; (5) ropancum, etc.; (6) iron castings, etc.; (7) zinc, lead, and copper, caps, and flanges; (8) iron, brass, and steel, etc.; (9) oilskin clothing and rubber boots. Tenders (on office forms only) to be delivered before 11 o'clock a.m. on December 20, and to be endorsed "Tender for Stores," to Mr. H. Hamilton, Secretary, Water Office, Belfast.

December 20.—Hull.—LEAD, GLASS, etc. Hull Corporation invite tenders for the lead, glass, etc., required by the Property Committee during the ensuing year. Forms of tender for lead, glass, etc., may be obtained at the City Engineer's Office. Tenders, endorsed "Tender for Lead, Glass, etc.," are to be addressed to the Chairman of the Property Committee, and delivered at the Town Clerk's Office on or before December 20.

December 20.—Lambeth.—KERO.—Lambeth B.C. invite tenders for the supply of 5,000 lb. of 12-in. grey Norwegian edge-slab kerb and 500 lb. of 8-in. by 12-in. Norwegian corner kerb of various radii, to be delivered as directed to either of the Council's depots, Bristol Road, or Clontarf-street, Clontarf, Stockwell, or Clontarf-street, Clontarf. Further information may be obtained upon application to the Borough Engineer, No. 10, Clontarf-street, Clontarf, S.E. Forms of tender, and specifications, may also be obtained. Sealed tenders, endorsed "Tender for Norwegian Kerb," to be delivered at the Town Clerk's Office, Clontarf-street, S.E., not later than 12 o'clock noon on December 20.

December 22.—Wingate Grange.—STORES.—Tenders are invited by Wingate Grange Colliery for the ensuing year's supply of castings, pit timber, jointer's timber, cement, oils, grease, brattice cloth, firebricks, fireclay goods, and iron. Form of tender, with conditions, may be obtained from Mr. Wm. Fleetman, Cashier, Wingate Grange Colliery. Applicants for forms must state the kind of stores they wish to tender for. Tenders must be addressed to the Owners of the Wingate Grange Colliery, and will be received up to December 22.

December 24.—Garforth.—STORES. The owners of Garforth Colliery invite tenders for colliery stores for the year 1907, viz.:—Iron, steel, iron and steel castings, nails, brattice cloth, india-rubber, timber, and other goods. Forms of tender may be obtained on application to the Owners of Garforth Colliery, near Leeds, to whom they must be returned not later than December 24.

December 27.—Bury.—MATERIALS.—Bury Corporation Tramways Committee invite tenders for the supply and delivery of the following materials:—Tramway rails and fishplates; tie-bars, fish bolts and nuts; points and crossings; sole or anchor plates; copper rail ends; granite setts; cement. Specifications, etc., can be obtained on application at the office of Mr. Arthur W. Bradley, A.M.Inst.C.E., Borough Engineer and Surveyor, on payment of 2s. 6d. per copy. Sealed tenders, endorsed "Tramway Rails, etc.," or as the

case may be, are to be forwarded to Mr. John Haslam, Town Clerk, Municipal Offices, Bank-street, Bury, and addressed to the Chairman of the Tramway Committee, so as to be received not later than December 29.

JANUARY 1.—Norwich. BRICKS.—100,000 red bricks, equal in all respects to the sample which may be seen at office of Mr. Arthur E. Collins, M.Inst.C.E., City Engineer, Guildhall, Norwich, delivered as, when, and in such quantities as are required, alongside the sewage works in progress between Old Lakenham and Hall road, Norwich. Tenders, on the forms supplied, enclosed in envelopes sealed with sealing wax, endorsed "Bricks," and addressed to the Chairman of the Sewerage Committee, must be delivered at office of Engineer not later than 10 a.m. on January 1.

Reading.—ROAD MATERIAL.—Berkshire C.C. ask for tenders for the supply of broken road materials, sets, channels, and kerbs for the twelve months ending March 31, 1907, delivered at railway stations and wharves in the county. On the receipt of a stamped addressed envelope forms of

tender, list of stations and wharves, and full particulars will be forwarded by the County Surveyor. Tenders, endorsed "Tender for Materials," to be sent to Mr. J. Fred. Hawkins, County Surveyor, Bank-chambers, Cross-street, Reading, by January 1. A specimen form of contract may be seen at the office of the Clerk of the County Council, 28, The Forebury, Reading.

JANUARY 7. Wandsworth. WORK AND MATERIALS.—The Wandsworth Borough Council invite tenders for the execution of works and the supply of materials from March 31 next for one, two, or three years, as per terms of tender, at the option of the Council. Specifications and forms of tender may be obtained, and form of contract seen, at the Council House, Wandsworth, S.W. Tenders (each enclosed in a separate envelope) are to be delivered under seal at the Council House, endorsed "Tender for —," on or before January 7.

JANUARY 14.—Poplar. WORKS AND MATERIALS.—The Works Committee of the Poplar B.C. invite tenders for hire of horses and harness, lugging away road sweepings, and for supply of stoneware sewer

and drain pipes, etc., iron castings for sewerage and drainage works, scavengers' brooms, rotary machine sweeping brushes, and refilling oil stocks. Forms of tender, specifications, and all particulars may be obtained on application to Borough Surveyor, Mr. Harley Heckford, at the Council Offices, on payment of 11. 18. in cash. Tenders, endorsed with the description of work tendered for, to be delivered to Mr. Leonard Potts, Town Clerk, Council Offices, High-street, Poplar, before noon, January 14.

JANUARY 21.—Camberwell. STORES, ETC.—The Camberwell B.C. invite tenders for the supply of stores, materials, etc. (for particulars see advertisement) to commence April 1, 1907, and terminate March 31, 1908. Forms of tender obtainable from Mr. William Ostby, Borough Engineer, Town Hall, Camberwell, S.E., specifying section desired. Samples can be inspected at Grove Vale Depot, opposite East Dulwich Station, between 10 a.m. and 12 noon and 1 p.m. to 4 p.m. Monday to Friday (Saturday to 1 p.m.). Tenders must be delivered at the Town Hall not later than 5.30 p.m., January 21.

Public Appointment.

Nature of Appointment.	By whom Advertised.	Salary.	Applications to be in
*DEPUTY SUPERINTENDENT AND STOREKEEPER.....	Walthamstow U.D.C.	21. 10s.	Dec. 28

Auction Sales.

Nature and Place of Sale.	By whom Offered.	Date of Sale.
*BUILDERS AND CONTRACTORS' PLANT—On land Millbank-street and Wood-street	T. J. Skelding	Dec. 17-18
*CONTRACTOR'S PLANT AND STOCK—At 155, St. Thomas-road, Finsbury Park, N.	Fuller, Horsey, Sons, & Cassell	Dec. 18

PATENTS.—Continued from page 703.

10,579 of 1906.—A. DEUSSEN: *Windows*. This relates to a window or casement with a protective lattice or other screen through which air can pass and which comes into place in the window-opening when the ordinary glazed window is opened, and consists of two frames of which one receives the window and the other a protective screen, which frames are rotatably mounted on a bar or studs in a double wall frame, which may be made of angle iron. The glazed window frame is arranged at a right angle to the screen frame. Metal strips twisted at the ends may be employed to secure the frame of the apparatus to the wall. When the window is raised or opened, owing to the rigid connexion of the two frames, the protective screen is turned about the common pivot, and brought into place about the window-opening, so that while the room is ventilated the window-opening is nevertheless provided with a protective screen.

11,964 of 1906.—E. COFFIN: *Tiles*. This relates to a tile having a hook or projection manufactured internally therewith on each side of the tile and symmetrically in relation to the vertical axis, and holes adjacent to the said projections to receive fixing means.

12,341 of 1906.—J. KITCHEN and H. C. BROWN: *Range Boilers*.

This relates to range boilers composed of end chambers connected by horizontal cross tubes, through which the water passes two or more times in series in its passage from the inlet to the outlet. One of these end chambers is divided into two compartments, and these two compartments are connected to the undivided chamber by horizontal cross tubes.

12,553 of 1906.—W. FRASER: *Joints for Pipes and Tubes*.

This relates to a pipe joint in which an automatically bevelled spigot fits within an inwardly bevelled fauet, and the joint is made by packing overlapping the bevels of spigot and fauet, and held in place by a divided ring, and consists of means for preventing leakage, consisting in forming stepped joints upon the ring or in superposing two rings in such position that they break joint.

12,789 of 1906.—HATTERSLEY BROTHERS, LTD., and W. H. TAYLOR: *Domestic Fireplaces*.

This relates to fireplaces having a canopy capable of angular adjustment, and consists in constructing the side cheeks of the canopy to pass through slots in the sides of the fireplace outside the brick cheeks, a guide or a sliding blower bracket retaining it in its raised position within the canopy, and for retaining it in its raised position within the canopy, and handles or equivalents by which the blower can be released and drawn downwards in front of the fireplace to serve as an extension of the canopy, or to completely close the front of the said fireplace.

14,940 of 1906.—J. LEA: *Stairs*.

This relates to a stair having a tread made with hollow beads and means such as bolts passing through the hollow beads for mounting the treads in position and securing the stringers together and to the treads.

12,930 of 1906.—W. TURNBULL: *Regulator Flushing Valve for Closets and the like*.

This relates to a flushing valve comprising in combination a valve chamber, a down pipe cap secured to the bottom of the valve chamber, a seating upon the cap and entering the valve chamber, a regulating chamber secured to the valve chamber, a perforated bottom to the regulating chamber, a valve rod having a recess in its upper end and radial holes communicating with the recess, the said rod passing through the valve chamber and the regulating chamber, a stop valve within the valve chamber integral with the valve rod, a perforated plunger fitting loosely upon the upper end of the valve rod and resting upon a shoulder formed on the valve rod, a valve seating upon the plunger, a regulating valve fixed to the top of the valve rod; means for regulating the flow of water through the recess of the valve rod, and means for operating the valve rod.

16,577 of 1906.—J. T. BRENT and J. B. SOUTHWORTH: *Sash and like Windows*.

This relates to a sectional weight comprising a succession of separable units slidably engaged end to end, one of said units having a curved end rib having an overbearing part and extending centrally widthwise of the unit, and the other of said units having a curved end groove in and extending centrally widthwise of that unit and conforming to, engaging, and interfitting the rib aforesaid.

19,474 of 1906.—C. HEATH: *Draught and Dust Excluders for Doors*.

This relates to a draught and dust excluder for doors, and consists of a protecting guard-plate on the door frame to guide the lever, which is fixed to one end of the hinged flap, and to positively assist the turning of the latter upon its hinge as the door is opened.

20,434 of 1906.—J. G. WALKER: *Means for Opening and Closing or Manipulating Sashes, Doors, Shutters, or the like, which may be in Places not Readily Accessible*.

This relates to an apparatus for opening and closing or manipulating doors, sashes, shutters, or the like by means of fluid pressure or suction, and consists in the combination of a fluid pump with valves to govern the flow of such fluid situated between the pump barrel and the plug valve. The invention also consists in the combination of a sliding sleeve and stop block upon a piston-rod with ratchet pawls and rack for automatically locking the sash or the like in its closed or open position, and for releasing the said locking device to admit of the sash or the like being opened or closed.

21,768 of 1906.—A. E. J. PRICE: *Scoop Particularly Adapted for Cleaning Road and other Gullies*.

This relates to a scoop comprising a receptacle shaped with a projecting blade adapted to direct material into the receptacle through an opening in the latter.

3,397 of 1906.—W. A. SMYRK: *Scaffolding*.

This relates to a foldable scaffolding supporting-bracket or the like reversible support, and consists of a horizontal rail provided with a hinged or foldable strut and a hinged standard adapted to carry a guard rail by passing the lower end of such standard through a hole in the rail, and forming a rearwardly-curved eye nearly at right angles to the body of the standard.

19,992 of 1906.—S. MASON: *Stone-breaking Machines*.

This relates to a stone-breaking machine, and consists in the combination of a stock, a renewable shoe, and a block, together with a wedge-shaped bolt for securing the said shoe.

SOME RECENT SALES OF PROPERTY ESTATE EXCHANGE REPORT.

December 1.—ERNEST J. GALE (at Burnham-on-Crouch).	
Burnham-on-Crouch, Essex.—"Little Johns," and 3 a. 3 r. 28 p., f., y. r. 251.	£290
"Little John's Farm," 15 a. 1 r. 13 p., f., p.	365
A freehold farm, 15 a. 1 r. 13 p., p.	380
Freehold pasture land, 5 a. 2 r. 20 p., p.	133
Market garden land, 10 a. 0 r. 31 p., f., p.	160
Freehold brickfield, with cottages, 6 a. 2 r. 2 p., p.	850
December 2.—By WILLIAM HOUGHTON.	
Walthamstow.—14 and 16, Copeland-rd., f., w. r. 601, 10s.	540
2, 4, 5, and 8, Church-la., (5.) f., w. r. 781.	600
1 and 2, Rose Bank-villas, f., w. r. 721, 10s.	600
December 4.—By DEENHAM, TEWSON, & Co.	
Higginate.—2, Norman-villas, u.t. 341 yrs., g.r. 34, p.	250
Cheshunt, Herts.—Russell's Ride, two enclosures of freehold land, 5 a. 2 r. 25 p., p.	900
By FISHER, STANHOPE, & DRAKE.	
Stanford Hill.—No. 148, u.t. 64 yrs., g.r. 101, 12s., p.	650
By FRITH, GARRARD, & Co.	
Haringey.—73, Chesterfield-gdns., u.t. 83 yrs., g.r. 64, 6s., g.r. 321.	270
40 Rosebury-gdns., u.t. 38 yrs., g.r. 61, 6s., g.r. 231.	280
By MARK LIELE & SON.	
Shepherd's Bush.—8, 9, 10, and 11, Coleman's-building, f., w. r. 1061, 12s.	845
Bromley-by-Bow.—116, 118, and 120, Devon's-rd., w.r. 911; also i.g.r. 84, u.t. 551 yrs., g.r. 101, 12s.	900
Hackney Wick.—38 to 78 (even), White Post-lane, u.t. 42 yrs., g.r. 701, w.r. 2931, 16s.	600
By THORNORROW & Co. (at Penrith).	
Esmond Bridge, Cumberland.—High Mill, with house, orchard, etc., f. (at a going concern)	1,425
Skelton, Cumberland.—Three freehold cottages	165

By HARRY BALL (at Bedford).	
Coldington, Beds.—"Fern Villa," f. p.	£205
Kempston, Beds.—88 and 80, Margate-rd., f., w.r. 201. 16s.	195
By SCROFIELD, EVANS, & Co. (at Masons' Hall Taver).	
Pinchoc.—Grosvenor-rd., The "Morpeth Arms" p-h, improved rental of 100l. for 191 yrs.	970
December 5.—By JOHN BOTT & SONS.	
Brickton.—64, Salton-rd., n.e. 661 yrs., g.r. 6l. 6s., w.r. 60l. 6s.	325
By STOKES & PINDER.	
Marylebone.—17, Harcourt-st. (Chapel House), l. y.r. 70l.	1,400
26, Harcourt-st. (s.), f. y.r. 54l.	850
27 and 28, Harcourt-st. (s.), with workshop in rear, f.	1,810
By WILCOX & SONS, & CALLOW.	
Ratcliffe.—143, Brook-st. (s.), f. y.r. 30l.	325
December 6.—By BRIANT & SONS.	
Kensington.—60, Upper Kensington-lk., f., y.r. 45l.	400
32 and 33, Esher-st., l. w.r. 72l. 16s.	750
By CHESTERTON & SONS.	
Baywater.—Pennington-vale, s. 40s., f.g. rents 55l., reversion in 361 yrs.	2,150
By ELLIOTT, TOMBS, & CO.	
Edgeware Road.—Queen-st., f.g.r. 36l., reversion in 40 yrs.	800
41, Queen-st., f. y.r. 80l.	800
By NEWBON, SHEPHERD, & EDWARDS.	
Ilkington.—7, Adlington-sq., u.t. 20l. yrs., g.r. 6l. 6s., g.r. 45l.	270
Clerkenwell.—11, 12, and 13, Amwell-st., y.r. 130l.; also f.g.r. 14l., u.t. 5 yrs., g.r. 8l. 10s.	305
Horsley.—Ferret-rd., f.g.r. 7l. 10s., reversion in 84 yrs.	185
Lausanne-rd., f.g.r. 6l. 10s., reversion in 87 yrs.	160
Hartingey.—Wigman-rd., f.g.r. 8l., reversion in 69 yrs.	195
Duckett-rd., f.g.r. 7l., reversion in 90 yrs.	170
Muswell Hill.—Colney Hatch-lk., f.g.r. 10l., reversion in 91 yrs.	245
Kensal Green.—Hazel-rd., f.g.r. 6l., reversion in 89 yrs.	140
Herne Bay, Kent.—Canterbury-rd., f.g.r. 10l., reversion in 91 yrs.	210
By STIMSON & SONS.	
Hackney.—Bridge-st., f.g.r. 50l., reversion in 69 yrs.	1,050
Lambeth.—31 and 33, Barwell-st. (s.), u.t. 30 yrs., g.r. 1l., g.r. 80l.	400
New Kent Road.—3 to 21 (odd), Gurney-st., u.t. 361 yrs., g.r. 175l., w.r. 370l.	300
Peckham.—Avenbury, a freehold building site, area 12,000 ft.	600
Dulwich.—62, 64, 66, and 68, Thurlow-hill, u.t. 691 yrs., g.r. 24l., w.r. 154l. 14s.	700
Ilkington.—5, 6, and 7, Crossley-lk. (s.), u.t. 30 yrs., g.r. 25l. 10s., y.r. 167l. 10s.	1,090
Camden Town.—24, Rochester-pl. (stabling), u.t. 25 yrs., g.r. 175l., y.r. 75l.	400
Battersea.—167, Battersea Park-rd. (s.), u.t. 50 yrs., g.r. 8l., y.r. 50l.	345
December 7.—By BEDFORD & CO.	
Chelsea.—Santon-st., f.g.r. rents 234. 10s., reversion in 418, 460, and 65 yrs.	550
Stockwell.—46, Andalus-rd., u.t. 68 yrs., g.r. 6l., y.r. 32l.	305
By H. CHAPMAN & CO.	
Covent Garden.—32, Wellington-st. (s.), area 950 ft., f. y.r. 110l. (coll. free)	4,650
By CHADWICK & SONS.	
Southall, Middlesex.—37 to 47 (odd) Northcote-av., c.r. 138l.	1,750
By MARTIN, WHITE, & CO.	
Dulwich.—196, Barry-rd., u.t. 72 yrs., g.r. 7l., y.r. 32l.	245

Contractions used in these lists.—F.g.r. for freehold ground-rent; l.g.r. for leasehold ground-rent; l.g.r. for improved ground-rent; g.r. for ground-rent; r. for rent; f. for freehold; c. for copyhold; l. for leasehold; p. for possession; a.r. for estate rental; w.r. for weekly rental; q.r. for quarterly rental; y.r. for yearly rental; u.t. for unexpired term; p.a. for per annum; yrs. for years; la. for lane; st. for street; rd. for road; sq. for square; pl. for place; for. for terrace; cres. for crescent; av. for avenue; gals. for gardens; yd. for yard; gr. for grove; h.h. for house; p.h. for public-house; o. for office; s. for shop; c. for court.

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MEETINGS.

FRIDAY, DECEMBER 14.

Architectural Association.—Mr. W. Howard Seth-Smith on "Architecture of Sicily," illustrated by lantern views, 7.30 p.m.

Glasgow Architectural Craftsmen's Society.—Mr. Colin Sinclair on "The Philosophy of Art," 8 p.m.

Institution of Civil Engineers (Students' Meeting).—Mr. A. Carmichael on "Mechanical Improvements in the Drainage of the Bedford Level," 8 p.m.

The Institution of Mechanical Engineers.—(1) Conclusion of discussion paper on Mr. Thomas Clark's paper on "Steam as a Motive Power for Public Service Vehicles"; (2) It then permits, Mr. H. Fowler on "Lighting of Railway Premises: Indoor and Outdoor," 8 p.m.

MONDAY, DECEMBER 17.

Royal Institute of British Architects.—Mr. W. J. Dibdin on "The Strength and Composition of Mortars," 8 p.m.

University of London (Imperial Institute-road).—Mr. Banister Fletcher on "Greek Theatres, Tombs, Propylaea, etc.," 8 p.m.

Builders' Benevolent Institution (31 and 32, Bedford-street, Strand, W.C.).—Committee meeting, 8 p.m.

TUESDAY, DECEMBER 18.

Northern Architectural Association.—Mr. S. Addison Smith on "Stresses and Strains," 7.30 p.m.

Architectural Association Camera and Cycle Club.—Mr. C. Wootton Smith on "Thatched and Neighbourhood," 8 p.m.

Institution of Civil Engineers.—Mr. H. W. E. Le Fanu on "Mechanical Considerations in the Design of High-tension Switch-gear," 8 p.m.

WEDNESDAY, DECEMBER 19.

Architectural Association Discussion Section.—Mr. L. Stanley Crosbie on "The Responsibilities of Style," 7.30 p.m.

Builders' Foremen and Clerks of Works' Institution.—Annual meeting of the directors, 7 p.m. Ordinary meeting of the members, 8 p.m.

Edinburgh Architectural Association.—Mr. A. Hay Lamont on "The Seventh International Congress of Architects," 8 p.m.

Royal Meteorological Society (at the Institution of Civil Engineers, Great George-street, Westminster, S.W.).—(1) Admiral J. P. Malet, F.R.G.S., on "The Guildford Storm of August 2, 1906"; (2) Mr. Richard Inwards, F.R.A.S., on "The Metric System in Meteorology," 7.30 p.m.

THURSDAY, DECEMBER 20.

Institution of Electrical Engineers.—Mr. H. G. Brown on "The Track Circuit as Installed on Steam Railways," 8 p.m.

TO CORRESPONDENTS.

H. C. P. (Amount should have been stated). NOTE.—The responsibility of equal articles, letters, and papers read at meetings rests, of course, with the authors.

We cannot undertake to return rejected communications; and the Editor cannot be responsible for drawings, photographs, manuscripts, or other documents, or for models or samples, sent to or left at this office, unless he has specially asked for them.

Letters or communications (beyond mere news items) which have been duplicated for other journals are NOT DESIRED.

All communications must be authenticated by the name and address of the sender whether for publication or not. No notice can be taken of anonymous communications.

We are compelled to decline pointing out books and giving addresses.

Any communication to a contributor to write an article, or to execute or lend a drawing for publication, is given subject to the approval of the article or drawing, when received, by the Editor, who retains the right to reject it if unsatisfactory. The receipt by the author of a proof of an article in type does not necessarily imply its acceptance. The Editor cannot undertake to read and consider articles offered for acceptance unless they are type-written.

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Williams & Co. 105 12 8
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The Builder.

VOL. XCI.—No. 3333.

DECEMBER 22, 1906.

ILLUSTRATIONS.

Interior of Church of St. Rémy, Dieppe.....From a Painting by Mr. A. C. Conrade.
Design for a Town Church (Awarded the Royal Academy Travelling Studentship).....By Mr. William Harvey.
1. South Elevation.
2. Section and Plan.
3. Elevation of West End and Interior Elevation of East End.

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S. Giovanni degli Eremiti, Palermo Page 724

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Recent Architectural Developments in Jerusalem.—I.



HE visitor to Jerusalem in this XXth century still experiences the sensations of the ancient pilgrims on approaching Jaffa. He still

runs the risk of drowning, and being sent to a celestial Jerusalem without seeing the terrestrial prototype. All idea of making a port of Jaffa seems now to be finally abandoned, and the project for uniting the short Jerusalem-Jaffa railway with the new Haifa-Damascus line (recently opened) will come about in due course, and future pilgrims and tourists will be landed either at Beyrout or Haifa and approach the Holy City in a somewhat more civilised manner than at present. In course of time Haifa may be provided with a port, but in any case, as soon as the short line to join on to the Jaffa railway is completed, Jaffa itself will cease to be of any importance for passenger steamers.

Jaffa has been but little altered of recent years—since the days of the early German Colony. It remains as filthy as ever, and the only additions of importance are on the outskirts near the railway station. The famous German Colony founded by Hofmann, the Christian Socialist, has not increased, but it has been decorated with a small Lutheran church—presented by the German Government. This new church has a

poor little tower and spire 90 ft. high, which serves as a landmark of the colony and the German hotels. The building is entirely without any architectural character.

The Turks have also added on the north side of the town a few buildings in the usual coarse style imitative of European work—a batch of misunderstood and misapplied architectural detail. These consist of a new Serai and police offices and a singular-looking clock tower, about 60 ft. high, crowned with a large bell, on which the hours are struck according to the Arabic calculation of time. This clock and bell suggest the fact that the times are changing; a generation back the Eastern mind could not tolerate the sound of a bell, and the call of the Muezzin was a sufficient indication of the passage of time. The idea that "time is money" has, however, penetrated Turkey at last.

As the traveller leaves Jaffa (in a train said to have been constructed for the Panama Isthmus—the engines and carriages are at least marked "America") he is carried for several miles through most flourishing orange groves and olive plantations. These seem to have been much extended during the past few years. Amongst this verdure the tower of a new Russian church is discernible to the east of Jaffa. It seems a commonplace whitewashed building, designed on the principle by which a child builds a tower of toy bricks. At the station of Ramleh, the future junction for Haifa, anyone who knew Palestine ten years ago will rub his eyes with

astonishment at another staring white-washed church (Latin), with a high tower and spire, appearing amongst the palm trees, the prickly pear hedges, and the minarets of the old Arab town. The minarets and the famous old square tower of Ramleh seem quite dwarfed and insignificant by the side of this glaring white rival, which has appeared on the scene during the past two or three years. This tower from its elevated position looks very imposing, although it is not perhaps more than 100 ft. high.

The new suburbs around Jerusalem—especially on the southern side near the railway—are spreading with the rapidity of an important European town. The Plain of Rephaim, a tract of barren stony ground which stretches from Jerusalem half-way to Bethlehem, is getting covered with houses and gardens. The supply of water, which formerly was supposed to be non-existent, seems now to be sufficient for the purpose. Here the houses are being built in some cases by German workmen, although the majority of the occupants are the indefinable "Levantine." The German Colony, which until a few years ago was a settlement in the wilderness outside the walls of Jerusalem, is now fading into a mere portion of this vast suburb. Soon the houses—and amongst them several manufactory chimneys are visible—will have reached the ridge which separates Jerusalem and the Plain of Rephaim from Rachel's Tomb and Bethlehem.

The southern suburb of Jerusalem does not afford very much of interest to an architectural student, although the



method of building is of a substantial kind, and the amount of carved and moulded stonework ought to be of sufficient importance to give a certain style and character to the buildings. But unfortunately the only perceptible characteristic of these new buildings is the way in which they have all been copied, after a fashion, from European designs of the poorest quality. There is a singularly depressing effect produced by the clumsy attempts at carving the well-worn motifs of the classical or "Italian" Renaissance; when the effort has evidently been to impart the "Gothic style" to a building the depth of modern dulness seems to have been reached.

Turning from this modern suburb the visitor, as he approaches the old Jaffa gate of the city, is astonished by the prodigious monument now rising slowly on Mount Zion—the immense church of the Cenaculum, or of the House of the Virgin

Mary. The ground on which the new church stands was formerly the cemetery of the American Presbyterians. This society sold the site to the committee of the new German church about the year 1899, and since that time the new buildings have been in progress. Part of the site seems to have been occupied by a plague-pit of ancient times, and of course there were the usual traces of ancient foundations always met with near Jerusalem. Surrounding the site are the immense cemeteries of different Christian sects inhabiting the Holy City, Armenian, Orthodox, Roman Catholic, and not least important that of the English Protestants.

As will be noticed in the sketch (Fig. 1) the new church almost completely hides from view the old mosque of Nebi Daoud which contains the "Upper Chamber" of the Cenaculum. The new building is evidently intended to be the

latest in a long succession of monuments which have crowned the summit of Mount Zion as memorials of the house where the institution of the Sacrament of the Lord's Supper took place. Perhaps one of the most interesting features about this new church is that it should be built under the patronage of the present German Emperor, whilst the fragment of its immediate predecessor still surviving within the walls of the mosque adjoining may very possibly include the work of Cypriot masons employed by the Emperor Frederic II. in about 1230. In this connexion it may be interesting to give some account of the ancient building of the Cenaculum, which is illustrated in Figs. 2 and 3.

Fifty years ago De Vogüé gave the first architectural description of the Cenaculum in his "Eglises de la Terre Sainte." He states, "All the churches successively built on this site have preserved the traditional idea of a two-storied building to serve as a commemoration of the upper chamber of the Cenaculum. The present remains date from 1342, when the Franciscans were permitted to first occupy the site. They consist of an upper and a lower church, each measuring 14 metres by 9 metres. Each story is divided by an arcade of three arches, carried on two columns, with semi-columns on the side and end walls. The capitals of these columns in the upper chamber are carved with elaborate XIVth century foliage, and they receive the arches and ribs of the six cross vaults. Three windows exist on the south side of each story. A staircase in the south-west corner affords communication between the stories. It is apparently the only example of the "Gothic style" in Jerusalem, and was perhaps built by Cypriot masons. The building has suffered much from ill-usage and the additions made by the Moslems during the last few centuries. At the east end of the monument on each floor is a small chamber called the Tomb of David.

The traditional founder of the Franciscan Convent of Mount Zion was no less a person than S. Francis himself, whilst on his pilgrimage in Egypt and Palestine at the beginning of the XIIIth century. Another legend attributes the building of a Gothic church on the site to King Robert of Naples and Sicily, in the year 1313.

As will be noticed in the sketch (Fig. 4)* of the remaining fragment of a mediæval church called the "Upper Chamber," the style of art is much more suggestive of the XIIth century than of the XIVth. De Vogüé's description of it as of the latter period is evidently erroneous. A greater probability seems to be that these remains may have belonged to the period of Frederick the Second (1225), in fact they possibly survive from the first Franciscan church built on the site, under the initiative of the great founder of the Order and the protection of the famous Emperor.

It must be remembered that the Gothic style reached its full and even last development in the south of Italy and Sicily early in the XIVth century, when, for instance, King Robert and

* This sketch is part of another block, and will appear in the next issue.

Queen Sancia were building the vast church of Santa Chiara, Naples, in the southern "flamboyant" manner, with even the early Renaissance element in its tower. The existing remains of the Cenaculum look very much older than such a period.

Externally there is very little to be seen of anything mediæval about the buildings. It can only be suggested that the northern external wall of the "Upper Chamber" is probably the southern wall of a church which occupied the site, as shown on Fig. 3. This church would probably be a nave and chancel, with the two-storied aisle of the "Upper Chamber" on its south side. There appear to be two of the nave wall-shafts still surviving from this ancient nave, visible in the sketch, Fig. 2. They have lost their capitals. These traces of the Middle Ages are now so buried amongst the accretions of Moslem times that it is almost impossible to see anything either inside or outside the collection of little rooms, thickly plastered internally, which now fills up the space where once the church stood. Possibly ere long the Moslems, to whom the property belongs, may take it into their heads to restore the "Tomb of David," and during such a process a totally different and unexpected historical evidence may come to light.

The new German church of the "Virgins House" (another name for the "Cenaculum") is a domical structure of cruciform plan, the general idea of which can be gathered from the sketch-map of the site, in Fig. 3. The architect of the new church is Herr Dombaumeister Renaud, of Cologne. The buildings are still too unfinished to admit of criticism.*

IRISH GRANITE AND MARBLE.

AS everybody knows, very little has been done in the past to develop the great mineral wealth of Ireland. So far as iron, lead, silver, and copper are concerned, there may be good reasons for lack of enterprise, but there are none that should be allowed to interfere with the production and supply of the excellent building stones that are to be found in various parts of the island.

One of the most promising centres for the encouragement of export trade in Irish building stones is the town of Galway, near which granite and marble quarries and works have been in existence for a number of years.

We have recently received several samples of granite and marble from an association that has been formed with the object of promoting the use of Irish stone by purchasing certain quarries, and the granite and marble works at Galway, so that by the introduction of modern machinery and appliances it may be possible to undertake the execution of large orders, such as have been repeatedly refused in the past owing to inadequacy of equipment and organisation.

The samples to which we refer comprise three varieties of granite—red, grey and red, and blue and red respectively—and three examples of marble—light and dark green, and black.

The red granite—from the Shantallow quarry, Galway—is a stone of exceptionally fine quality, very much resembling Aberdeen granite. This stone takes a remarkably high polish, is free from iron nodules and other defects, and exhibits closely aggregated crystals of quartz intimately mixed with coloured feldspars, giving a mottled surface of uniform appearance and texture. The grey and red granite—from Bushy Park quarry—has also a mottled surface, but red occurs in patches of fairly large size, while the texture and general quality of the stone are distinctly inferior to that from the Shantallow quarry. The blue and red granite—from Barna quarry—is mottled with red in fairly small patches, and is almost equal in quality to the Shantallow stone.

The two green marbles are samples of the rock termed "ophicalcite"—a combination of green serpentine with crystalline limestone—commonly known to architects as "Irish green" or "Connemara marble." The darker of the two samples is a beautifully-veined stone capable of taking a high polish, and particularly adapted to decorative work. The black marble—from a quarry in the neighbourhood of Galway town—is a stone of fine texture and uniform colour, also taking a good polish.

From a report made by Mr. A. McHenry, of H. M. Geological Survey of Ireland, it appears that the Shantallow granite exists in practically inexhaustible quantities, and that, although only small openings have been made in the locality, stones of excellent quality, of large size and free from joints, have been obtained and manufactured into polished columns for churches and other architectural works. Mr. McHenry adds the opinion that if quarries were opened up on a suitable scale it would be possible to obtain solid masses exceeding 100 cubic feet in bulk.

A similarly favourable report has been made upon the same property by Mr. Thomas Jones, M.Inst.C.E., of Westminster, who states that surface openings show the rock to be exceptionally solid, free from joints, and capable of yielding blocks of the largest size and of the best possible quality and grain for architectural and engineering purposes.

We understand that the Shantallow granite quarry is within easy distance of the Galway docks and railway station, thus affording convenient facilities for transport both by sea and by rail, and that the Galway Harbour Board have expressed their readiness to give shed accommodation and wayleave for a railway connecting the quarry and works with the docks. The works appear to be of small size and altogether of most primitive character, but as they occupy a site on the River Corrib, whence an unlimited supply of water power could be derived, it would be easy to lay down modern plant on an extensive scale for dealing with all kinds of stone in an adequate manner.

With granite and black marble quarries close to the works, and green marble quarries within a few miles, there is no reason why a properly equipped establishment should not be financially successful. One thing, however, is lacking—that is the capital necessary to give the

enterprise a fair start. So we come to the great need that stands to-day, as it has stood for years past, in the way of industrial progress throughout Ireland, with the solitary exception of Belfast and the surrounding district.

Great as the mineral resources of Ireland may be, Irish capitalists do not seem eager to develop them, and are still less eager to invest money in so doing. While this attitude prevails it cannot be expected that the support of English investors will be secured. We should be glad to witness the advent of a better state of things, for it is clearly undesirable that foreign countries should be supplying products that might just as easily be supplied from within our own shores, and be drawing money that would do incalculable good to the Sister Isle if it could be caused to flow in that direction.

NOTES.

The Trades
Deputies Bill.

THE Trades Disputes Bill passed through the House of Lords with very slight amendment. Clause 4, which is the clause which gives Trade Unions immunity from civil process, was allowed to go unamended, although resolutions were moved limiting the clause to matters arising out of trades disputes—a limitation which would have been most desirable. Words were introduced into the picketing clause which would have caused the attendance to peacefully persuade to be peaceably and reasonably conducted, as well as the act of persuasion itself. These words were in the Bill when it was introduced, and it is most significant of the attitude of the present Parliament that when the Bill came back to the House of Commons the House declined to approve even this restatement of a principle originally advocated by the Government itself. The House of Commons will require a reminder that this country is not governed by a single chamber which represents but a small majority in the country. It is true that as long as clause 4 remains unamended, detail in other clauses is of limited importance, since if the Unions the solvent and governing bodies—are placed outside the law, remedies against irresponsible men of straw are illusory in the case of civil procedure; but this Bill, by rendering legal certain acts, will also affect the criminal procedure against the actual perpetrators of acts detrimental to others.

Labour
Returns.

THE Labour Returns for November are disappointing in that although the general improvement in trade continues, the building trade still does not share the improved conditions which are affecting other industries. The general wages bill improved in November to the extent of 3,600*l.*, and 160,000 workpeople participated in this, which averaged gives about 5*d.* a week per head. The proportion of unemployed is only slightly less than in the same month last year, but trade disputes have much to do with this, for 32,828 more workpeople were affected this November by trade disputes than in last November, and 348,000 more working days have been lost.

* To be concluded in our next issue.

Railway Rates Again.

THOSE who followed closely the events leading up to the passing of the Railway Rates Acts of 1891 will have read the remarks made last week by the President of the Board of Trade with apprehension. The interminable proceedings—Commissions and inquiries, conferences and deputations, resulted, it was fondly hoped, in a more or less satisfactory settlement of a vexed question. It is very disquieting, therefore, to learn that "we shall possibly have to consider the whole question of railway rates again from beginning to end." The particular subject which called forth this remark was one not at present dealt with by legislation—viz., the question of "Owner's Risk." At a very early stage in the railway rates controversy this matter was dealt with at some length in our columns,* and, as the companies were left with a free hand in this respect, the conditions are much the same now as they were at that time. Such alterations as have been made are all for the worse. Concessions wrung from them in other directions caused the companies to combine their forces for the purpose of exacting their pound of flesh, as far as possible, where they were unfettered. Thus we find that the list of articles which they will carry at "Companies' Risk" only when packed to their satisfaction—which was quite small in 1884—had risen to 82 in 1895, and now numbers 180. The President of the Board of Trade intimated that a short Bill might be introduced next session to deal with the points in question. Should this suffice without reopening "the whole question from beginning to end," it would assuredly dispel a veritable nightmare from both railway and Board of Trade officials, and, probably, be quite a relief to the majority of the manufacturing and trading community as well.

Lighting of Railway Premises.

A PAPER on this subject, read before the Institution of Mechanical Engineers on Friday last week by Mr. Henry Fowler, is of general interest to all who have to deal with the lighting of fairly large interiors and of outdoor spaces. The lighting installations of a railway system are necessarily of most varied character, not merely because different kinds of buildings require different treatment, but also for the reason that illuminants which are readily obtained or produced in large towns are not available or cannot be produced economically in outlying country stations. As the same considerations apply to hospitals and other buildings, for the design and illumination of which architects are responsible, the contents of Mr. Fowler's paper should be of interest to our readers. The author deals fully and in a generally satisfactory manner with lighting by means of oil, petrol vapour, acetylene, gas, and electricity, and gives numerous illumination curves showing the efficiency of the several systems of lighting used on the Midland Railway. Nothing is said relative to the lighting of railway carriages, a subject which is of paramount importance, because it affects the safety of the public far more than the lighting of

* See the Builder for October 18, 1884, p. 515.

railway buildings. The omission is possibly due to the fact that the Midland carriage department is quite distinct from the locomotive department, to which the author is attached. We hope, however, that the question of carriage lighting will be brought forward in the adjourned discussion of the paper, and that members of the Institution will unite in expressing disapproval of the perpetuation of oil and gas in any form as materials of illumination for railway carriages.

The Efficiency of Refuse Destructor.

AS MANY of our readers are doubtless aware, competition among makers of destructor furnaces is particularly acute. Each patentee, as a general rule, misses no opportunity of trying to prove the marvellous superiority of his own apparatus over that of his rivals, and various statements that are not the whole truth and nothing but the truth are put forward from time to time with the obvious intention of misleading prospective buyers. One very popular device of the kind is to compare different types of furnace in terms of "water evaporated per pound of refuse burned," without differentiating between the calorific value of the refuse and the efficiency of the boiler plant, and without stating how much of the steam raised is used unproductively for boiler feed and forced draught appliances. Another is, to compare different types of furnace in terms of "electrical units generated per ton of refuse burned," without stating the efficiency of the generating machinery. The calorific value of refuse varies greatly; the efficiency of the steam-raising plant depends largely upon the presence or absence of economisers and other auxiliaries for the utilisation of heat, and in some plants nearly 18 per cent. of the total steam raised is consumed in the production of forced draught. These are points upon which the wily circular writer preserves discreet silence, but they should receive close attention from intending purchasers. Again, the number of units generated per ton of refuse depends absolutely upon the efficiency of the generating plant, and especially upon the weight of steam required by the steam engine per brake horse-power. As the efficiency of steam engines varies by as much as 300 per cent., it is clear that comparisons on the basis of "units per ton of refuse" may be misleading in the extreme.

New Traffic Facilities.

THREE new routes across London were opened to the public on Saturday last. The most important of these is the railway between Hammersmith and Finsbury Park, destined within a short time to constitute a connecting-link between an extensive system comprising the Metropolitan and District, the City and South London, the Waterloo and City, the Waterloo and Baker-street, and the Charing Cross, Euston, and Hampstead Railways. The ramifications of these several lines extend over the chief districts of Central London and stretch out into outlying suburbs on the north, south, east, and west. The opening of the London County Council tramway route along the Embankment is the first instalment of a useful scheme

for enlarging the scope of the southern tramway system, and for placing north and south London in direct communication. The establishment of an electric tramway service between Poplar and Aldgate also deserves notice, especially in view of its approaching extension to Bloomsbury. In addition to these new electric routes, the inauguration of the through-bookings system on the London United Electric Tramways, the District Railway, and the new Piccadilly Tube marks a distinct advance towards the co-ordination of traffic facilities in the metropolis.

The Thames Steamboats.

THE inhabitants of London have two reasons for regretting the unfavourable result that has attended the efforts of the London County Council to popularise the River Thames as a main highway for business and pleasure. In riverside districts generally there is a strong feeling in favour of the services being continued throughout the year, and the opinion is also entertained that the usefulness of the services could be enlarged if developed in such a manner as to provide ferry facilities. A very sensible proposal made by the Rivers Committee on Tuesday last was to the effect that the control of the steamboat services, together with the Woolwich Ferry, should be transferred to the Highways Committee, so that they might be worked in conjunction with the tramway traffic of the Council. There is clearly a good deal to be said on behalf of such an arrangement, which would place the Highways Committee somewhat in the same position as that occupied by various railway companies who find decided advantage from the establishment of steamship services in connexion with their land traffic.

The Heating of Dynamos.

THE paper read last week by Mr. G. A. Lister to the Birmingham Local Section of the Institution of Electrical Engineers on the heating of dynamo coils is deserving of study by electrical engineers. Most manufacturers take special pains to ventilate the windings of the dynamo by utilising the fan action of the rotating parts. But, as a rule, little attention is paid to the problem of the cooling of the field coils, or, as they are now generally called, the magnet coils of the machine. Mr. Lister points out the importance of properly designing the cooling surface of the coils, so as to enable them to get rid of the heat unavoidably generated as readily as possible. The price of a dynamo depends on the maximum permissible output of the machine, and this output is governed mainly by the maximum permissible rise of temperature in the armature. It has been found that overheating has a very deleterious action on many insulating materials, and so it is highly probable that the permissible heating will be considerably lowered in the immediate future in this country, as it already has been in America. This will make the study of the methods of cooling even of greater importance to the electrical engineer, and a study of the laws of thermal radiation and conduction will be absolutely essential. Mr. Lister's experimental results show the considerable

effect produced by the covering wrapped round the coil on its temperature rise when a given current is passing through it. These coverings, therefore, ought to be as thin as possible, and in addition the varnish used ought to be a good conductor of heat. In America the tapes generally used for covering magnet coils are now being replaced by rope, the heat escaping readily between the interstices of the rope, and a new class of "heat dissipating" varnishes are being placed on the market. Electro-enamel, which was originally produced by a Continental firm as a material suitable for coating accumulator-boxes as acids had no effect on it, has been found useful for dissipating heat. Coils coated with it keep decidedly cooler, and so the insulating materials employed do not deteriorate so rapidly.

MOTOR-CAR OWNERS should

have their attention drawn to a case recently brought before the Highgate Bench. The owner of a car was summoned for not having notified the London County Council of a circumstance affecting the particulars entered in the registration of the car, viz., a change effected in its colour. The owner pleaded ignorance of the fact that a change in the colour the car was painted was a matter requiring notification, and probably his ignorance on this point may be shared by many others. The Statutory Rules and Orders made under the Motor Car Act, 1903, provide in Art. II. that the owner of a motor-car desiring to register the same shall furnish the County Councils with the particulars set out in the terms in the third schedule to the Order. This schedule contains a space in which "the type and colour of body of car" must be set out. Then Art. V. provides that "If any circumstance . . . occurs in relation to any motor-car which affects the accuracy of any particulars entered as respects that car in the Register of Motor-cars, the owner of the motor-car shall forthwith inform the Council with whom it has been registered . . ." No fee is chargeable for making the amendment in the Register."

THE proprietors of the

Goupil Gallery have now enlarged their exhibition space by a whole range of rooms upstairs, which they have opened with a special exhibition of some interest. It is almost needless to say that the bulk of the works exhibited are in that broad and almost splashy ultra-modern style which generally prevails at this gallery. But if there is no finish (which is now considered a weakness in painting), there is much fine composition and suggestive work to be seen. The contempt for accuracy of detail is unfortunately illustrated in Mr. Fowler's otherwise fine snow landscape, "The Morning Express" (11), which faces one on entering the room, in which the train coming round the curve is running in the "six-foot" instead of on the proper track; it does not affect the picture as a landscape, but it is an irritating piece of carelessness which might easily have been avoided. There is poetry of feeling and composition in Mr. Chappell's and

Mr. Duff's two landscapes, both called "The Flock" (16, 18); Mr. Matthews's "Burgos Cathedral" (31), with the sunset sky behind the towers, is a fine effect; Mr. Oliver Hall's "The Glamour of the Forest" (32) is too glamourish, and Mr. Moffat Lindner's "The White Cloud" (35) is *too, ours per dix*. In the second gallery we may notice especially Mr. Aumonier's "Sunlight on the Downs" (45), Mr. Weiss's white houses and a bridge in "Sunny October" (47), Mr. Montague Smyth's "November Evening" (57), which reminds one of Corot, and Mr. Laidlay's reposeful coast scene, entitled "Twilight" (59). In the third gallery a large, bold, coarse portrait by M. J. Blanche (71) occupies the central place, and does not attract us. There are good examples of the work of M. Israels, M. Le Sidaner, Mr. Weiss, and other well-known painters. In the fourth gallery, on another floor, there is an interesting collection of mostly slight water-colour studies, among which the small landscape sketches by Mr. A. E. Vokes, a new artist, are of considerable promise.

The Fine Art Society.

At the Fine Art Society's Gallery a collection of French water-colours of French Towns and Dutch Dykes, by Mr. A. Romilly Fedden, contains some admirable pictures both of town scenes and landscape. The author does not seem to have quite settled on a style; the two first things in the catalogue seem to be in two different styles, but this impression may result partly from the great difference of the two subjects. "The Washing Place" (24), the largest of the drawings, shows a much bolder manner of handling than any of the smaller ones. Of the latter, "A Village on the Zuyder Zee" (15), "A French 'Place' in Sunlight" (17), "The Lonely Farm" (78), and "Top o' the Hill" (19) are among the best. In another room is a small collection of oil paintings and water-colours of Holland by Herr Gruppé, a good painter of the modern Dutch school: restful pictures of flat landscapes and large grey skies, somewhat after the manner of Maris. There is also a special collection, in glass cases, of table glass and ornaments, intended apparently to tempt the purchasers of Christmas presents, who may find some good things there.

An American Gold Medal.

The fiftieth anniversary of the American Institute of Architects is to be held at Washington on January 7, 8, and 9. In celebration of the occasion, the American Institute has decided on the presentation of an annual Gold Medal, on similar lines to that of the Royal Institute of British Architects, and they are offering the first presentation of it to an English architect, Sir Aston Webb. Nothing could have been more graceful on their part than this resolution to offer their first Gold Medal to an architect from the old country, and no choice could have been better and more suitable than the one they have made. Sir Aston and Lady Webb leave England, we believe, to-day (the 22nd) to be present at the meeting at Washington, and all their friends will wish them a fair passage

and a safe journey; no other wish is necessary, for once arrived at Washington we have no doubt that they will receive an American welcome and American hospitality, which means all that could be said or wished for in that connexion.

THE PICCADILLY TUBE.

By the opening on Saturday last of the Great Northern, Piccadilly, and Brompton Railway another important link has been added between the north-east and west of London, or, put in another way, between the west central district and the north-east and west respectively. This line represents the realisation of two distinct schemes—the Brompton and Piccadilly-circus Railway, authorised in 1897, and the Great Northern and Strand Railway, authorised two years later. The two projects were taken over in 1901 by the Yerkes Syndicate, now the Underground Electric Railways Company, by whom powers were obtained to connect the Brompton and Piccadilly Railway with the Great Northern and Strand Railway by a line between Piccadilly-circus and Holborn Stations. Thus the original central London terminus of the Great Northern and Strand Railway was left out in the cold, and when opened in May, 1907, will be at the end of a short branch joining the main line at Holborn. As at first projected, the Great Northern and Strand Railway was intended to start at Wood Green, but the proposed construction north of Finsbury Park has been abandoned. Consequently the new tube commences beneath the Finsbury Park Station of the Great Northern Railway, and proceeds through Holloway, St. Pancras, Holborn, and thence westward to Kensington and Hammersmith.

With a total double-track mileage, including the Strand branch, of 932 miles, the new tube is the longest railway of its kind hitherto constructed, and, in addition to serving twenty-two stations, it affords most useful opportunities for the interchange of traffic with other railways.

At Finsbury Park passengers have means of access to the main line and suburban trains of the Great Northern Railway, and at King's Cross there is a station which, in addition to facilitating the exchange of traffic with the Great Northern, will be of almost equal convenience as a connexion with the Midland, Metropolitan, and South-Eastern and Chatham systems. Moreover, a subway now under construction will afford communication with the King's Cross Station of the Euston branch of the City and South London Railway, which will shortly be completed.

At Holborn there is a junction with the Strand branch, but, unfortunately, no attempt has been made to establish a direct connexion with the Central London Railway. Passengers desiring to change for that line will have to perform a double lift journey and walk across two main streets to the British Museum Station. Whether this inconvenient arrangement is due to the fact that the Central London Railway is a rival rather than a feeding line we do not know, but it is certainly a serious defect of a kind that will not be permitted when London is provided with a central traffic authority. Leicester-square Station will be an important point on the completion of the Charing Cross, Euston, and Hampstead line of the same company, and here we are glad to find provision is being made for the interchange of traffic by means of subways.

Piccadilly-circus is another point where two lines of the company meet, and consequently where adequate connexion is made enabling passengers on the Piccadilly and the Waterloo and Baker-street Railways to pass from one system to the other without inconvenience.

At South Kensington the station of the new tube is alongside that of the District Railway—also controlled by the Underground Electric Railways Company—thus enabling the entire traffic of the Inner Circle service to be tapped. Similar facilities are provided at Gloucester-road, Earl's Court, Baron's Court, and Hammersmith. The terminus at Hammersmith is in close touch with the system of the London United Tramways Company, with whom an arrangement for through bookings has been made. The

studious care displayed by the company to provide for the interchange of traffic with their own and feeder lines is in sharp contrast with the apparent indifference exhibited for the convenience of the travelling public at Holborn.

From Hammersmith to a point between West Kensington and Baron's Court the new line runs on the surface alongside the District Railway. Then, dipping down, it passes beneath the District Railway as far as South Kensington, and beyond that station enters the London clay as a low-level tube, the depth varying between 29 ft. and 123 ft.

The tunnels are of circular cross-section, the diameter being 11 ft. 8 in. on the straight, 12 ft. on curves of more than ten chains radius, and 12 ft. 6 in. on curves of less than the same radius. The station tunnels are of about 22 ft. internal diameter, and enlarged tunnels are provided for cross-overs at Hyde Park-corner, Covent garden, York-road, and Finsbury Park.

With the object of reducing vibration to a minimum, the concrete bed at the bottom of the tunnel does not extend to the full width of the permanent way. Therefore the ends of the sleepers overhang, and are supported by a loosely compacted bed of crushed granite, which permits the elasticity of the timber to be developed to a certain extent.

A new feature of the tunnels is that the concrete lining is carried to the height of 2 ft. above the ballast of the permanent way, for the purpose of affording a safeguard against accidental contact between the live rail and the flanges of the cast-iron lining.

As on the Baker-street and Waterloo line, all the stations are tiled in distinctive patterns in accordance with designs prepared by Mr. Leslie W. Green, the architect to the company. The general arrangement of the stations also resembles that on the Baker-street and Waterloo Railway, except that the platforms measure 350 ft. long instead of 291 ft. At the Strand Station, however, the platforms measure only 250 ft. long. The system of ventilation is practically identical with that of the Baker-street and Waterloo Railway, which was described in our article of March 17, 1906. On the new tube nineteen exhaust fans are installed at different points, each extracting 18,500 cubic ft. of air per minute from the tunnel and stations and discharging through outlets on the station roofs.

The architectural features of the Hammersmith terminus are somewhat unusual in British railway practice. The roof is of light steel and glass construction, and the three platforms are of concrete. The layout of the station seems to be well adapted for dealing with traffic, as there are only two lines of rail to the three platforms, thereby permitting outgoing passengers to step out on one side of the train while incoming passengers get in at the other side. This system of separating the two streams of passengers has proved very successful in connexion with the lift services on the Baker-street and Waterloo Railway, and deserves to be copied by other lines.

Power for operating the line is supplied from the generating station of the Underground Electric Railways Company at Lots-road, Chelsea, whence also current is drawn for the District and the Baker-street and Waterloo Railways. Three-phase alternating current is there generated at 11,000 volts, and conveyed to sub-stations at Hyde Park corner, Russell-square, and Holloway, where it is transformed to 550-volt continuous current for use by the train motors and in the lift and lighting installations.

All the stations are lighted by Maxim arc lamps and incandescent lamps, the latter being used throughout the tunnels, where they are spaced at intervals of 42 ft. apart. The incandescent lighting circuits are independent of the traction circuits, and, as an additional precaution against accidental darkness, the company have installed an independent system of station lighting, to which current is supplied by the local supply companies.

Signalling is conducted throughout the line on the Westinghouse electro-pneumatic system, and one quite novel feature is the introduction of an automatic fog-signalling machine for the section of the line between Baron's Court and Hammersmith.

All the passenger cars are built of steel, with an internal lining of non-flammable mahogany mounted on asbestos millboard, and all the lifts but those at Finsbury Park are built with steel cages having Karri non-flammable floors. No lift is provided at Gillespie-road Station, where the line is near the surface, and at Holloway-road a double spiral moving track travelling at the rate of 100 ft. per minute has been installed as an experiment in one of the lift-shafts.

Taken all round, the construction and equipment of the new tube give ample evidence of the desire to place at the disposal of the public a railway designed on the most approved principles and providing as far as is humanly possible for the safety, comfort, and convenience of passengers. We need only add the remark that these aims appear to have been adequately realised.

THE ROYAL INSTITUTE OF BRITISH ARCHITECTS.

The usual fortnightly meeting of the Royal Institute of British Architects was held on Monday at the Rooms, 9, Conduit-street, when the chair was taken by Mr. T. Colclutt, President.

The Secretary reported that the following gentlemen had been elected that afternoon honorary corresponding members of the Institute:

R. Baker (Imperial Society of Russian Architects), Moscow.	G. Harmand (Avocat à la Cour), Paris.
L. Bonnier (President of the Société des Architectes diplômés par le Gouvernement), Paris.	Ludwig Neher, Frankfurt-on-Main.
F. M. Day, Philadelphia, U.S.A.	G. B. Post, New York.
Jean Joseph Caluwaerts, Brussels.	J. M. Poupinet (Architecte diplômé par le Gouvernement), Paris.
M. E. Cazzavato, Rome.	A. van Gize Austerlitz, Vienna.
U. H. Richter, Vienna.	V. Terni, Lisbon.
Vezel Nagy (Building Committee to the Kingdom of Hungary, President of the Hungarian Technical University), Budapest.	Don Fernando Arbois y Toranzo (Minister of the Academy of Fine Arts, Inspector General of Works at the Ministry of Fine Arts), Madrid.
	G. Wickman, Stockholm.

Sir Aston Webb's Portrait.

Sir Wm. Emerson said it was his pleasurable duty to ask them to accept, on behalf of the subscribers, the portrait of their Past-President, Sir Aston Webb. His activities were well known to all of them, and nothing he could say would be new. Sir Aston Webb commenced by taking an interest in the Architectural Association, and his activities took various forms in connexion with that Association, ending in his being President of it. He then became a member of the Council of the Institute, was afterwards Hon. Secretary, and later on President. During the greater part of Sir Aston's connexion with the Council he (the speaker) had the pleasure of working with him, and could testify to the very great ability he brought to bear on every question which came before it, and to his unflinching courtesy, thoughtful consideration of every detail, and tact and judgment on all questions. They knew as well as he did what a successful term his Presidency was. Sir Aston had since been elected A.R.A., and very shortly afterwards R.A., and his activities in connexion with the Academy were as great as, if they did not exceed, those he showed in the Institute. It might seem superfluous for him to say anything about Sir Aston Webb's work, but there were a few things he would like to mention. There was the large hall of the Birmingham Law Courts, which was magnificent in proportion and as beautiful in detail, and as successful a modern work as any which could be pointed to. Then there was the charming life assurance company's office in Moorgate-street, the Victoria and Albert Museum, which was being gradually disclosed to view as the scaffolding came down, and the central figure of which had fair to become quite a unique landmark in London; the Royal College of Science; Christ's Hospital; the Birmingham University; and the Queen Victoria Memorial, in regard to which Sir Aston was responsible for the laying out of the fine Processional-road. Sir Aston Webb's capacity for hard work, his industry, his constant kindness to the junior members of the profession, and his genial fellowship, had won his way to a place in all their affections. He asked them to accept, on behalf of the subscribers, the beautiful

portrait which had been painted by Mr. Solomon, R.A.

The Chairman said it was a great privilege to occupy the chair on such an occasion, and to be the recipient of a great work of art on behalf of the Institute. It was an added pleasure when the work of art portrayed one of their most talented and distinguished Past-Presidents. They all knew Sir Aston Webb and his distinguished career, but beyond that he would like to add that all those who knew him felt that there was something more than his talents and career and that was the personality of the man. He regarded Sir Aston Webb as an old friend, and as being a man who inspired affection in all those who had to deal with him. He endorsed all that had been said, and was sure the meeting would receive that valuable and beautiful work of art with acclamation. He had a letter from Sir Aston Webb that morning in which he regretted that he was unable to attend that evening. It seemed to be part of the programme, as it were, that the originals of the portraits presented should not attend on the occasion of the presentation, but he did not know why that should be so. At any rate, he would like to read a portion of the letter he had received, *i.e.*:—"I must say to you how much I appreciate the compliment (which the fact that it is a usual one to Past-Presidents in no way diminishes) that my portrait should be hung in such distinguished company on the walls of the Institute meeting-room where I have spent so much time, sometimes in friendly conference, and sometimes in friendly combat, but always enjoyably, and my only regret is that I have reached the stage when I must leave the arena, make my bow, and hang lifeless upon its walls. It is the fate of all, and quite right it should be so, and from our place of vantage on its walls I trust and believe we shall watch fresh and vigorous generations carrying on the work of the Institute with ever-increasing success, not weakly giving in to the clamour of every passing whim, but wisely steering a middle course with justice and foresight. Perhaps I may be allowed to say how admirably I think Solomon has fulfilled his task, and the obligation I feel under to him."

The Composition and Strength of Mortar.

Mr. W. J. Dibdin then read a paper on this subject, of which the following is an abstract:—

The author said that the composition of ordinary lime mortar in relation to the resisting strength is in the highest degree important. The by-laws of the London County Council regarding the composition of mortar merely specify that it shall be composed of freshly burned lime and clean, sharp sand and grit without earthy matter, in the proportions of 1 of lime to 3 of sand or grit, but contain no reference to strength, leaving it to be inferred that, if the composition is within the strict definition, the strength must necessarily be practically constant—quite apart from the particular purpose for which the mortar is to be employed. Further, no "factor of safety" seems to have been considered; so that, whether the mortar is used for a 10 ft. wall or one of 100 ft. in height, the by-laws equally apply without any precautions.

The author proceeded to describe a series of experiments he had carried out on briquettes and blocks specially made for the purpose, the results of which clearly indicated the danger of mere composition safeguards. These results were discussed under the following headings:—(1) Effect of washed sand of varying degrees of fineness; (2) effect of varying quantities of clay added to the sand; (3) effect of washing out the clay naturally present in sand; (4) effect of varying the time when the mortar was used after being first made; (5) strength of raw materials employed; (6) effect of the variation of the percentage of voids in the sand used; (7) effect of composition on spalling.

The results of the tensile and crushing tests were shown in diagram form, the details being set out in a number of elaborately prepared tables. Diagram 1 showed that mortar made with the proportions of one volume of sand to one volume of lime with the sand unwashed as received had a crushing strength of 150 lb. per cubic inch. When the sand was increased to two volumes the

strength fell to 92 lb. per inch. With three volumes sand it was only 52 lb., and with four volumes 55 lb. This experiment clearly indicated that an arbitrary limit of 3 to 1 is unsatisfactory, as it would prevent the use of the "excess" of lime, which, in this case, gave three times the crushing strength of that obtained when the by-law proportion of 3 to 1 was employed. In all the subsequent sets of this series the sand was used washed and graded. The illustrative diagram clearly brought out the fact that when the proportions were from one or two of sand to one volume of lime the strength was greater than when three volumes of sand were employed in all those cases in which the sand was coarser than 1.50 in.; but when the grading was from 1.50 in. and below, the strengths of the various makes were practically equal viz., from 58 lb. to 66 lb. per inch.

The tests for tensile strength were in the same ratio, and clearly indicated that with these particular sands an excess of lime in contravention of the by-laws was a distinct advantage.

The results given in a further series of tests showed the effect of time, up to eleven days, between the moment when the mortar was mixed and that at which the briquettes and blocks were prepared. From these it would seem that up to seven days there is an increase in strength, but after that time—that is to say, after the mortar had once set—the effect of a second breaking up was distinctly detrimental, although better results were even then obtained than at any time before the first setting. The strength at one month gradually rose to 116 lb. per square inch with mortar which had been mixed for seven days, and fell when the mortar had been standing for eleven days to 83 lb.

Summing up, in conclusion, the results of a fairly exhaustive series of tests, so far as the limits of the experiments extended, the author said it seemed certain that the strength of a mortar depends far more upon the physical character of the materials employed than has hitherto been fully realised. If the usual prescription of 3 to 1 be rigidly adhered to the mortar may have, in certain cases, only one-third of the strength of that which might be obtained with as widely varying proportions as five of sand to one of lime; and it would appear to be desirable that the strength as ascertained by crushing should be the criteria rather than by arbitrary proportions. The tests can be made with great facility, and should be employed in all cases. The author said he must not be taken to suggest that any and every admixture should be sanctioned; but where the materials are clean and sound and free from dirt (such as unwashed road sweepings, dustbin refuse, old mortar, etc.), no unreasonable objection should be taken to their use, provided that they yield a mortar having strength sufficient for the work in hand. If a factor of safety of five were sufficient for any work it was obviously unnecessary to ask for one of ten, as the strength upon that basis must necessarily increase with the increment of the load. On the other hand, care should be exercised to secure such factor of safety as may be required in any particular case.

It was a common practice to add to the sand hard clinkers crushed in a mill, sometimes in even equal quantities. Experiments conducted on the same lines as those described by the author confirmed the general conclusions in regard to fineness—varying quantities of sand and grit to lime, etc.—and show that mortars made with good hard clinker and sand may be used with safety.

Mr. Searles Wood, in proposing a vote of thanks to the reader of the paper, said that so far as he could gather from the American experiments, the addition of clay to the sand in 1 to 1 mortar, but that in mortars of 1 to 3 in the mortar, but that in mortars of 1 to 3 and 1 to 4 there had been an improvement. But the general results of Mr. Wheeler's experiments were that it was impossible to make a general statement, either to the effect that clay was beneficial or detrimental to cement mortar. Mr. Dibdin said that 1 to 3 was an absolutely arbitrary proportion, but he believed that it was the minimum proportion, and no one would be prosecuted for an excess of lime. He had carefully examined Mr. Dibdin's tables, and in the

second series which dealt with crushing strength at one month they would find that the 3 to 1 mortar gave a fairly regular line. If they looked over the other series—the 2 to 1 or the 4 to 1—they would see that he came to $\frac{7}{8}$ per cent. of added clay, and instead of going in a regular curve there was a serious drop and then a rise to 10 per cent. He could not help thinking that in that series of experiments there must have been some accidental conditions which had interfered with the results, for it was not in the course of nature to have a sudden drop in that way. With all due deference to Mr. Dibdin's experiments, he felt he would like to have another series.

With regard to the question of the admixture of clay with sand he was very glad Mr. Dibdin had made such a special insistence on the fact that it was pure clay which he added, because there was another class of experimenters—the jerry-builders—who made their mortar with more or less dirty sand and carried out experiments in bulk. They would all agree in saying that the result of this class of experiment had been disastrous. Before giving his adherence to Mr. Dibdin's experiments he would like to see them carried a great deal farther. They were, however, greatly indebted to Mr. Dibdin for bringing the matter before them, because it was one they had very much at heart, but in order to get anything like confidence in the use of these materials they must have a little more assurance on the point. It seemed to him that Mr. Dibdin did not consider that the addition of clay gave any chemical difference to the mortar, so that really the only value of the added clay would be to increase the density of the particular mortar, and the density of the particular mortar. It really hence give additional strength. It really came back to this, that the whole value was to have the aggregate they mixed with their lime of a sufficient variety of sizes. There were one or two other interesting points he would like to have drawn attention to, and one was Mr. Dibdin's very clear description of the means of measuring voids in sand. He did not know whether any of them had tried experiments on the subject, but it was extremely difficult to accurately gauge what the voids in sand were. From the description which had been given he thought in the future they would be able to carry out their own experiments on that subject. Mr. Dibdin suggested that the by-law should be drawn with regard to compressive strength of mortar rather than to the proportions.

The drawback was that it necessitated a separate experiment every time they questioned the strength of the mortar on the job, and that meant a delay of at least eight days. Another thing was that the specification was the direction to the contractor, and the contractor handed the specification to the foreman, who gave instructions from that specification to the particular labourer who was to mix the batch of mortar, and he would not have the slightest idea of what was meant if he was told it was to have a compressive strength of so many lbs. to the square inch. At the same time, they were indebted to Mr. Dibdin for bringing the matter before them, and they hoped he would carry on the experiments further. As that was a question which was of interest to all of them, it seemed to him it should be an obligation on the part of the London County Council or the Borough Councils to instruct a chemist like Mr. Dibdin to conduct a series of experiments on the local materials in the various districts, so that the results might be available for those who went to any district to carry out building operations. It might take the nature of a sort of bureau of information, and when a person went to get the what the nature of the local sands was. Then he might be able to obtain the analysis of the amount of clay in them, and be able to gauge the proportion of lime which would be wanted. It appeared to him that no properly constituted ratepayer could object to such an expense as that. Mr. W. Dunn, who took great interest in the matter, had sent him a communication in which were some very valuable results, and with the Chairman's permission he handed that in, so that it might appear with Mr. Dibdin's paper.

Mr. W. Woodward, in seconding the motion, said that any proposition which would destroy the cast-iron effect of an Act of Parliament commended itself to him, and

therefore when Mr. Dibdin told them that in place of the hard-and-fast 3 to 1 of the London County Council by-law they might speak of 5 to 1; when he told them, what he had often seen in his own experience, that the addition of clinkers added to the strength of mortar; and when he told them that it was not so much the admixture of the mortar as its ability to resist compression—these were things which must commend themselves to every practical man in the room. He sincerely wished that Mr. Dibdin or some member of the Institute would experiment not too much with briquettes, for such experiments he did not think were sufficiently practicable for architects to place sufficient reliance upon. He would like to see experiments made on walls, and they might find out the effect of the strength of mortar with washed sand, with unwashed sand, when it was made in a mill, when mixed with slack lime, when mixed with unslaked lime, the strength of the mortar on various thicknesses of joints, the effect of mortar on wire-cut bricks and other bricks, the effect of frost on various mortars, and so on. If they could get experiments of that sort in walls, and each took note of the effect of mortar as they found it in their own experience, then he was sure that information would be of a great deal more value to them than tests made on briquettes. He knew the difficulty of doing it, but every member of the Institute might contribute most valuable information. If he would take the trouble in his architectural experience to note the effect of the strength of mortar in the various ways he had referred to.

Mr. Max Clarke said the paper appeared to him to be just what was wanted at the present time. They had been from their grandfathers' and great-grandfathers' time using the 2 to 1 or 3 to 1 proportions of lime and sand as the right and proper proportions, without knowing exactly why, but simply feeling that that which their ancestors did was right and proper. He would like to add his quota of thanks to Mr. Dibdin, because it was a matter in which he had taken more or less interest for a considerable time. It appeared that the average architect when he put the clause into the specification satisfied himself with that, and did not exercise that supervision which was essential for good work. It was one of the essentials, at any rate, that mortar should not be made so hard and stiff as the bricklayer was so fond of using, and it was also essential, and more particularly with cement work, that the bricks should be properly wetted. He took it that the experiments of Mr. Dibdin were more or less the outcome of the case which was in the police-court some time ago. Although he was aware that Mr. Dibdin had been diving into the subject before that case, yet he had dived into it now with such effect that the by-laws, in London at any rate, would have to be revised. He was sorry to contradict Mr. Searles Wood, but it was equally against the law to make mortar in the proportion of 2 to 1 as it was to make it in the proportion of 4 to 1—that had been decided in the court. One thing in the tests under consideration which struck him somewhat, was that they had a series of tests carried out by one of the most expert chemists in that line, and the results showed such remarkable variations that one was naturally made to think that the average material in actual use varied, which was a difficulty they had to contend with on the works as well as in a laboratory. But if they had laboratory tests carried out with the greatest possible care showing such variations, what must they expect in a building where no care was exercised at all, because they must remember that was really the case? They had a man who was absolutely ignorant, and he was set to work to make mortar. He did it according to his instincts, and the result, of course, was what one might anticipate. He would like to know what Mr. Dibdin meant by his "time of setting." Of course, experts in cement had a recognised method of dealing with what they called "setting," but it would be extremely interesting to find out what Mr. Dibdin meant by the time of setting. Mr. Searles Wood told them that to ensure the best results they must get a variable size of sand. This was all very well for the laboratory again, where they could screen

and sift these things and add a proportion of one size and a proportion of another size, and by that means they could avoid interstices altogether; but that was a practical impossibility on a works. Only that day he had on a work three consignments of sand—one was extremely coarse, one a sort of intermediate, and one extremely fine. He thought how nice it would be to mix the three samples up together and use them for mortar, but he firmly believed that if he had done so the coarse stuff would allocate one place to itself and the fine stuff another place, and more particularly would that be so if it was done in a mortar mill. Therefore it was one of those things one would like to think could be done, but which he was afraid upon the work was almost impossible. He would tell them why he thought it would be impossible. The building he visited that day was of considerable size, and had fire-resisting floors. He had considered the matter of fire-resisting floors very carefully for some time, and he set forth in the specification that it was to be a certain proportion of broken brick (broken to a particular size), a certain proportion of coke breeze, and a certain proportion of sand. When he got to the building he found that the man who was making the concrete had taken upon himself to make it entirely of coke breeze, because he thought the brick would be a disadvantage, as the coke breeze was rather large. That entailed taking out as much concrete as would cover the area of their present meeting-room, and would probably entail a loss of 250*l.* on the contractors. If that occurred in a perfectly simple manner, what must they expect in a matter much more complicated like mortar? Personally, for the London district at any rate, he thought Mr. Dibdin's idea about the way mortar should be tested was a most excellent one, because it was possible in London to know exactly the sort of lime and sand they were going to use, and, that being so, they should know exactly what the result would be, and so the testing would be a simple matter. To go on in the haphazard sort of way which the County Council liked them to go now was quite ridiculous. They knew that the Institute had a Mortar Committee, and Mr. Searles Wood was its indefatigable secretary, and he would like to move: "That this meeting is of opinion that the question of the composition of mortar is a matter which deserves the fullest consideration, and, with that end in view, the Council be asked to devote a sum of money for further inquiry into the subject." The paper that night had proved quite conclusively that it was folly for the architect to try and do this sort of work for himself. He could go a certain way and give the results of his experience in the work, but he could not give that absolute scientific knowledge which was at the basis of all things. If they had not got that, they had not really got to the beginning of things, and would certainly never arrive at a definite conclusion. They on the Mortar Committee were in that uncertain state; they had found out a certain amount, but without money they did not know how to find out any more.

Mr. Alan E. Munby (Lecturer on the Chemistry of Building Materials to the London County Council) said that the chief difficulty in drawing conclusions from Mr. Dibdin's interesting experiments appeared to lie in the very large number of variable factors which were involved. Looking at the thing from the rather theoretical point of view, one might classify the necessary conditions which had to be complied with under eight or nine different heads. To deal with a few of the conditions under which mortar would harden, the initial hardening of mortar depended probably for the most part on (1) the extent of compression in the mass, such as may be caused by changes of volume produced on solidification; (2) the amount of evaporation which will result in a contraction, varying with the nature of the constituents; (3) the solidification attained; (4) the character of the crystallisation decided by the nature of the crystalline constituents, the quantity of water present, the solubility of the ingredients, their initial temperature, and the thermal disturbance caused by chemical reactions; (5) on the time of setting, which put a limit to the motion of the ions in solution. Again, the final strength attained must be governed by the cohesion of

the particles, which would, of course, vary with their composition; and by the area of surfaces of different constituents in contact, their chemical nature, crystalline grouping, and interspaces—in short, by what was called adherence. Was it rational to expect that among such a wealth of variables any scientific results could be drawn directly from experiments which attempted to embrace so many simultaneously? It seemed to him that they wanted to go very much further back, and try and utilise some much simpler experiments before attempting to touch so many complex factors at one time. In the first place, they did not even know whether any chemical action took place between the lime and the clay added to the sand. They had been told that it probably did not, and on consideration it did seem improbable that clay—the last resisting remnant of disintegrated felspathic rocks which had, in a minute state of division, been suspended for so long in water (alkaline at least initially)—should be soluble enough to react with lime during the short interval before the tests. On the other hand, Dr. Alexander Scott said it was quite possible that some chemical action could take place, and by some recent experiments on American waters Mr. Headen showed that silica was much more soluble than is generally supposed. That, therefore, was a question which was not settled. What he would like to see would be some experiments undertaken on less ambitious lines to begin with. For example, the clay might be replaced by something entirely above chemical suspicion, such as platinum in a similar state of division. Again, a further effort might be made to separate chemical and physical effects by initiating experiments on adherence with fat lime mixtures. Briquettes of lime and shot in place of sand might lead to some information as to the effect of configuration and size of particles, which would then be under control. Something in the nature of a fat lime constant for subsequent deduction might possibly result. As to the setting of mortar when reworked, the supersaturation theory of Le Chatelier and Marignac might provide an explanation. These savants had shown that many bodies added in excess to water form supersaturated solutions, which deposit crystals after a small interval. As much lime remained unaltered in ordinary mortar, there seemed no reason why when ground supersaturation should not again occur on re-mixing. The subsequent loss of strength after a longer interval might be due to the formation of compounds which would be less soluble than lime, and would consequently produce less concentration in their supersaturated solutions if the rate of setting was not proportionately increased.

Mr. W. D. Caröe, in seconding the resolution of Mr. Max Clarke, said this was a subject in which he took an immense interest, and he felt that there was a vast amount of knowledge which they had yet to acquire upon the question. The paper told them all about mortar within a few days or a few months of it being put together, but he should like to know something about that mortar when it had been mixed for five, ten, or 100 years. After all, that was what concerned them. It was not what mortar was a few months after it was made, but what their buildings were going to be when they were handed down to posterity. It happened to be a considerable part of his small practice to have to do with ancient buildings, and he was constantly coming across all sorts of curious questions connected with mortar. He was bound to say that the conclusion he had arrived at was that nearly all the mortar made in the XIXth century was not to be compared for excellence to that made a good many centuries before. He could tell of numbers of instances where mortar made in the XIIIth and XIVth centuries and in the time of Sir Christopher Wren was infinitely superior in every way to that which had been added to it in the last century. Why was that? Presumably there was more science in the last century. He fancied that really the reason was that the men who made the early mortar were trained craftsmen with a tradition, and they had learned locally how the limes and sands in the local district were best put together, with the result that he had tried to describe. He would very much like to see some experiments carried out if possible upon the composition of

ancient mortars to find out why they did seem to have been used without shrinkage, which was an exceedingly important point. He happened only last week to make a careful survey of St. Paul's Cathedral, and one thing which struck him more than any thing else was that Sir Christopher Wren did manage to secure even for repairing work mortars which did not shrink and which adhered to both sides of the crack. One's experience of modern mortars, and certainly of modern cement, was that that was an almost impossible thing to secure, and he was struck with the remark of Mr. Dibdin when he said that one of the objections which there might be to the use of clay in connexion with sand was the shrinkage which took place afterwards in the mortar. He could confirm that from practical experience, because he had tried experiments on that point.

The resolution of Mr. Max Clarke was then carried.

The Chairman said that Mr. Caröe had spoken of the tradition that possibly was in the makers of mortar in the XIIIth and XIVth centuries up to the time of Wren, and possibly before that, and he personally believed that tradition had a good deal to do with it. He had lately been in the south of Spain, and had had occasion during the last few years to see mortar mixed there and to have a good deal of it pass under his inspection. He thought the Spaniards had known a good deal more about the mixing of mortar, and especially the mixing of mortar for plaster, than the English had, and that was possibly due to the tradition coming from the time of the Romans, through the Moors, and on to the Spaniards. It was their usual custom to run stone lime twice through the tubs, and then it was mixed with the sand. The sand was not washed in any way so far as he knew. It was allowed to remain at least a fortnight before it was used as a mortar for the building of walls. That was rather contrary to the usual English custom. He would also like to say a word on the question of using mortar, or lime, or cement in the way of concrete blocks. He believed, so far as he knew, that concrete blocks being used as masonry was a modern way of using it. But just outside Algeiras there was a very beautiful aqueduct believed to be built by the Moors 700 or 800 years ago. There it stood, the most picturesque aqueduct in the world. The piers were about 3 ft. 7 in. square, and they were built to all appearance of blocks of stone. He made some incisions, and he found that these blocks which he had taken to be stone were actually lime concrete mixed with the local pebble, and in a few instances bits of mortar. It was interesting to see how that had stood the weather and had answered its purpose.

The vote of thanks to Mr. Dibdin was heartily agreed to.

Mr. Dibdin, in reply, said the work had been a labour of love to him. It was not a new question with him, for he had had to do with mortars in many ways in his public capacity, and had followed the matter up with pleasure in his private capacity. The ramifications which kept showing themselves in every possible direction as one touched such a comparatively simple, unimportant subject as mortar was surprising. When they thought that they had lime varying from almost pure lime down to limes of 60 per cent., each having their own specific qualities for certain specific work, the complications which came in were simply bewildering, and the effect of using greystone lime, commonly called, with a fair percentage of soluble silica, compared with the use of fat lime, was so great that it was impossible to put the thing in the compass of such a paper. He did go into the question of how many experiments it would be necessary to make before they might hope to say they had really broken the back of the work. He saw 20,000 in front of him, and thought they had better get on with what they had. Mr. Searles Wood referred to the variable results given in the diagrams and tables, but he did not quite grasp what he said as to the results being necessarily variable. In dealing with small quantities of mortar under laboratory conditions, they must of necessity get varying conditions, and that was why he said he was glad the Institute had printed his results *in extenso*. That showed the errors which

might arise, and within what variations they might expect results, because, however excellent averages might be in their way, yet in certain cases they had to consider minimum. With regard to one point mentioned by Mr. Charles Wood as to the 7½ per cent. of clay showing a considerable drop in one of the factors, while some of the others went up, he would only say he would be pleased if he could be shown the way to make a series of three briquettes with such a thing a common mortar, and get absolutely the same results. He took Leighton Buzzard sand, and got results varying, roughly speaking, of about strength of 75 lb., but when they had got their worst results with 17½ per cent. of clay, yet they had 125 lb. of strength, which was double the strength. That was his point—that the minimum in one case was the maximum in the other. Putting laboratory results on one side, and all the varying conditions which would arise, they had the broad fact that they could get double, to say nothing of three or four times the strength. When they took 10 per cent. of clay, they got a minimum of 175 lb. instead of 75 lb., which gave a gain of 100 lb. It did not interfere with his statement of fact that they did get variable results, for the fact remained that they got a gradual increment up to the point, which was a matter which, he submitted, was worthy consideration. As to the delay on works by having such tests as he had proposed, that was not the point. If it was established by such tests as might be considered sufficient that certain materials which had hitherto been looked upon with suspicion might be used, then the architect and surveyor could say, "That is a good material and can be used." Whereas now materials might be rejected which would give better results than those accepted. As to the suggestion that an examination should be made by local authorities of materials, he could think of no more valuable suggestion. It did seem an extraordinary thing that in these days of scientific investigation there should be so many loose ideas with regard to the character and effect of using local materials. Why need they go miles and miles away to get something brought to them when they had got as suitable or a more suitable material under their feet? He had suggested in his paper that experiments should be made on brick walls. Nothing could be more interesting than the experiments which the Institute had already conducted into the strength of brick walls, but he felt at the time that there was one factor wanted which was in connexion with the character of mortar. As to the time of setting, his experiments were laboratory experiments, and they got a different time of setting when a small quantity only was made up. Probably his days with regard to that might be extended to three or four weeks on works. Mr. Munby's remarks were of extreme interest, and showed an acquaintance with the subject which he hoped to have the opportunity of discussing with him. He had already referred to the enormous number of varying conditions, and the silica reaction was one of those nice points which required a great deal of investigation, but he felt that it was altogether of too technical a character, from the chemist's point of view, to inflict upon that meeting. Even chemists were not quite agreed upon it. It was a thing which brought about all sorts of questions with regard to crystallisation and the behaviour of these crystals one to another; the question of saturation and supersaturation and resaturation of the mortar, and they got into complications which they were not in a position to discuss that night. At the same time, the importance of the question was not only admitted, but was one which he maintained required a good deal of work to be done upon it. As to the use of fat lime, he and Mr. Grant took some sand of a rather peculiar nature and heated it and used it for making briquettes, and they got double the strength. It showed a slight chemical difference, but the big difference was in the physical character. Mr. Carbé made a very interesting observation as to their knowing more about new mortar than old mortar. The question of old mortar was one which had interested him for a long time, but the difficulty was to get a large number of samples of old mortar which could be verified as really being old mortar and with regard to which an approximate date could be given.

He would be personally grateful to any members of the Institute who could send him authentic samples of old mortar, and would do his best to make as complete an examination of them as possible and summarise the result. He was sure that this would throw much light upon the whole question. The silica in these old mortars presented a feature of great interest. It was a very difficult subject, because they had silica in new mortars, and it would be well to know how far on an average number of samples the soluble silica had increased with age. He was a little sceptical on the point as to whether it was such a very large quantity after all, but at any rate it was a point for investigation.

Public Officials as Architects.

The Chairman announced that the next meeting would be held on January 7, when an election of members would take place, and Mr. H. W. Willis had given notice of the following resolutions:—(1) That the Royal Institute of British Architects considers it inadvisable in the interests of architecture that public officials should act as architects for public buildings; (2) that the Council of the Institute should obtain statistics of the sums paid to official architects, surveyors, and engineers and their staffs, with a view to instituting a comparison between such sums and the fees which would be paid to outside architects for similar work, in order that, if the latter charges compare favourably with the former, they should approach those public bodies who already employ, or are contemplating employing, officials, with a view to securing the abandonment of such a system.

The London County Hall.

Mr. Woodward said, if he was in order, he would like to ask the Secretary to afford him the earliest possible opportunity of directing the attention of the Institute to the terms of the competition for the new hall for the London County Council.

The Secretary said that if Mr. Woodward handed in his resolution the following morning it would come up on January 7.

THE ARCHITECTURAL ASSOCIATION.

The usual fortnightly meeting of the Architectural Association was held on Friday last week at Tufton-street, Westminster, Mr. Walter Cave, Vice-President, occupying the chair.

The President.

The minutes were read and confirmed, and The Chairman said he had to announce that the President, Mr. R. S. Balfour, continued to make satisfactory progress. The President was decidedly better, and he looked much stronger, and was beginning to take an interest in things general, and the Architectural Association in particular. It was early to anticipate the President's return to his work, but it was very satisfactory to have such a good report.

Elections.

The following gentlemen were then elected as members, i.e.:—
W. H. Adams, Highbury
F. R. Harris, Charing
Cross, S.W.
John Usse, Alexandria
H. A. Welch, Regent's
Park
G. H. Ledger, Epsom
C. S. Mordaunt, Cranbrook

J. H. P. Fulford, West
Norwood
B. P. Colling, Strathmore-
gardens, W.
S. P. Bush, Teddington
Sir Chas. A. Nicholson,
Bart., New-square, Lin-
coln's-inn, W.C.

Announcements.

The Chairman said he had to announce the donation of a large collection of photographs of Westminster Abbey which had been presented by Mr. S. B. Bolas, and a bust of Inigo Jones, presented by Mr. Batsford; and on his motion a vote of thanks was accorded to the donors.

The Chairman also made the following announcements:—

The first meeting of the Rifle Club in the New Year will be held on January 10.

A musical "At Home" in connexion with the Musical Society will be held on Friday, December 21, at No. 18, Tufton-street, at eight o'clock.

On the same day an exhibition of students' work will be held from 4 to 8 p.m.

The Architecture of Sicily.

Mr. W. H. Seth-Smith then read the following paper:—

"Italy, as the grave of Classic and the birth-place of Christian architecture, will naturally

be the first and most attractive influence to the architectural student, and having paid his homage to the departed Romans and Greeks, mastered the records of the infancy and adolescence of Byzantine and Romanesque from Constantine's conversion in the 14th century, and tried to unravel the tangle of styles and influences up to the Renaissance, he will be in a position to proceed systematically and thus intelligently to study the growth of Gothic art, its external formative influences, and its decline under the all-pervading force of the revival of the Classic spirit.

Nor can our travelling student intelligently enjoy this—the most delightful of his experiences—unless he has a sufficient grasp of general European history from the earliest Greek to the end of the XVIIIth century.

The loveliness of Sicilian scenery and climate is too well known to need description. Most travellers visit it for these reasons. These qualities will surely be no less enjoyed by the architect whose trained eye for colour and form and whose field of interest is made so much wider by the pursuit of his speciality. Sicily is beautiful indeed.

The rugged barrenness of the mountainous interior is in striking contrast to the undulating luxury of the sea coast along which, on the north and east of the island, the railways wind amid dense and continuous groves of lemon, orange, and almond trees, harmonising with the bluish-green sea. There are no fairer spots in the world than Taormina and Palermo.

Sicily may not be the best destination of a young student of architecture, on account of the very intricate problems its post-classic architecture presents. To the older architect, however, all this only intensifies the interest, and sets him to work till his mind is as tolerably clear as to the origin as his sense of beauty is awake to the charm of its wondrous buildings of the XIIIth century.

May I add a warning to the student as to accepting even the best guide-books as authorities on the origin, history, or description of architectural works? In this instance let him read beforehand, and again on the spot, such works as C. A. Cummings's "History of Architecture in Italy," Ferguson's "History of Architecture," Baldwin Brown's "From Schola to Cathedral," Leader Scott's "Cathedral Builders"; and consult in the Institute Library such works as Gravina's "Il Duomo di Monreale," Delhi, Gally-Knight, Hittorf, Mothes, Sabazaro, Dauter, etc. I am, however, specially indebted to Cummings; I have not hesitated to quote freely from him where I could not pretend to his historical research nor improve on his terseness of general description. Mr. Banister F. Fletcher and others have also kindly allowed me to reproduce some of the plates from their well-known works, and Messrs. Walter Millard, Gerald C. Horsley, Phénix Spiers, and J. J. Joass have lent their colour sketches.

My object to-night is to give you, if possible, some views and particulars (without, alas! the wealth of colour) which, when you visit Palermo, may make it somewhat easier for you to pursue your studies.

The Early History of the Island.

Situated in the direct and only sea route from the east to west and northern Europe, Sicily was naturally among the earliest lands to be colonised. Moreover, its great beauty, its fertility, and good climate and strategical position made it the envy of all nations from the earliest Grecian era to modern time. It is not difficult, therefore, to explain why it has been termed "The Battlefield of the Nations."

Phoenicians, Etruscans, Greeks, Romans, Byzantines, Saracens, Normans, and Spaniards in succession have struggled in long and deadly conflict for supremacy over the fair and unhappy island, only, in most cases, to enjoy a brief or partial occupation.

If we expect to find many monumental evidences of these successive occupations we shall be disappointed, for with the exception of those of the Greek, Roman, and Norman periods scarcely any traces remain.

The classic Greek period of 500 years extended from 755 B.C. to 210 B.C., when the Romans finally conquered the island. Notwithstanding the obliteration of the vast city of Syracuse, we have important remains still standing of two fine temples (of Concord

and Juno Lacinia) at Girgenti and one at Segesta, all, however, bereft of their setting as the central or foreground objects in great and beautiful cities, and of the fine white plaster coating once adorned no doubt with colour. In their now dilapidated and fragmentary character, and with their coarse yellow stone facing, it requires a good deal of imagination to restore their primitive magnificence. To my mind the vast desolation of recumbent ruins of Selinunte are still more eloquent of the chequered history of these early Grecian colonies.

Of the scale of some among these temples an idea can be formed when I remind you that the cast of an abacus of a capital in the Palermo Museum is 12 ft. 6 in. square, and that the caryatid of Jupiter in his temple at Girgenti measures more than 24 ft. in height.

Fewer still are the evidences of the Roman dominion, which lasted 600 years, namely, from 210 B.C. to about 400 A.D. The Romans plundered Sicily of all its treasures of Greek art. The great theatre at Taormina is, however, mostly Roman. From Roman times until 535 A.D. the northern tribes held sway, when it was made subject to the Byzantine emperors, who retained it till they in their turn were conquered by the Arabs.

The Saracens.

In 827 Euphemius, the Byzantine Governor of Sicily, revolting against the Emperor, called to his aid in an evil hour a force of Mussulmans, whose predatory fleets had long infested the Mediterranean. Seizing their opportunity, they conquered Palermo four years later, and promptly established themselves as masters of the whole western half of the island, and before the end of the IXth century all Sicily lay under Mohammedan domination. The Arabs had thus an admirable base of operations for attacks on Italy, but, notwithstanding their rule of more than 200 years, almost the only genuine Arab monuments remaining are, I believe, the Baths at Cefalà and the gate of the town of Ortigia (Syracuse).

The Normans in South Italy.

In 1016 forty Norman knights, returning from Palestine, stopped at Salerno in South Italy, then in the hands of the Lombard rulers, and found the town hotly attacked by Saracens. Encouraged by their aid, the Lombards took heart and the Saracens were driven to their boats.

The Normans, ambitious of conquest in this fair land, made several expeditions which resulted in 1040 in their establishment at Melitè, and in 1053 they were confirmed in their possession of most of South Italy, under Robert Guiscard, one of the many sons of Tancred de Hauteville, of Normandy, and received the Pope's pardon. These rude warriors, who had not blushed in the beginning of their career to follow the trade of highwaymen, and were absolutely illiterate, here became the enlightened promoters of knowledge and progress, encouraging with enthusiasm at their Court and throughout their territories letters, arts, and science, without regard to differences of race or religion.

Sicilian Architecture.

We have very briefly outlined the history of the island of Sicily from its first colonisation by the Greeks of classic times to the fall of the western Roman dominion. From that time for about 400 years under the Byzantine rulers a close connexion existed between this island and the eastern part of the Empire. Count Roger, the brother of Robert Guiscard, finally completed the work of conquering the Saracens and inaugurated, in 1090, the most brilliant period in the history of Sicily. The population he found there was, as in South Italy, composed of Greeks, Lombards, Italians, Arabs, and Jews, who had enjoyed under Saracen rule an extraordinary measure of liberty, each race retaining its own language, and to a great extent its civil and religious customs. The official languages were Greek and Arabic. This tolerance was imitated by the Norman conqueror. The Greeks were still allowed to adhere to the code of Justinian, the Lombards to that of Rothario, the Saracens still took their official oaths on the Koran, and the Normans brought in the Frankish laws and customs. Roger set himself to work to pacify and develop Sicily as his brother had done in South Italy. He created the

beginning of a civilisation which had no equal in Europe. He had as a foundation the Arab fineness and intelligence consolidated by 200 years of continuous enlightened administration. "Christians and Northmen adopted the habits and imbibed the culture of their Mussulman subjects. Nor did these Scandinavian sultans of Palermo cease to play an active part in the affairs, both civil and ecclesiastical, of Europe. As hereditary benefices and assumed the Mitre and Dalmatic, together with the Sceptre and the Crown. The commander of Roger's navy was styled Emir or Ammiraglio. The workers in his silk factories were slaves from Thebes and Corinth. His charters ran in Arabic as well as Greek and Latin. His jewellers engraved the gems of the Orient with Christian mottoes in Semitic characters. His architects were Mussulmans who adapted their native style to the requirements of Christian ritual, and inscribed the walls of cathedrals with Catholic legends in Coptic language. The predominant characteristic of Palermo is Orientalism. The Saracens had their own quarters in the towns, and their mosques and schools. Count Roger found a machinery of taxation in full working order—a whole bureaucracy, in fact, ready to his use. In applying this machinery he became the richest potentate in Europe. In this Court life men of letters played a first part three centuries before Petrarch taught the princes of Italy to respect the pen of a poet."*

It is estimated that the Normans never formed more than one per cent. of the population, and these almost wholly a feudal aristocracy. Palermo had then a population of about three hundred thousand. Count Roger died in 1101, and was succeeded by his son Roger, the first King, who continued for fifty years the noble work of his father. During his reign peace prevailed and the arts were encouraged.

This tolerance, of the Saracens especially, is all the more remarkable when one recalls the fact that the Crusades, with all the animus they implied towards Mohammedans, were contemporary, but it also suggests the long and close contact of East with West which may explain in some degree the phenomena we are about to examine. Another point to bear in mind is that the second great period of Byzantine art was co-existent with the creation of these Sicilian monuments, that the mosaic decorations of such churches as S. Mark's, at Venice, were not yet completed, and those of the Church of the Saviour, Constantinople, and others at Jerusalem and Bethlehem, and the Church of S. Front, at Perigueux, were in progress.

The Early Churches.

The first Norman church, S. Giovanni dei Lebbrosi, was built outside the walls of Palermo as early as 1071 by Robert Guiscard during his long siege of the town. It is a basilican plan with arcades of round arches over octagon piers, fully developed transept, not projecting beyond the aisle walls, but rising as high as the nave; the central bay is covered by a dome.

The adhesion to the Roman basilican plan in this early case is explained by the fact that the Normans were, on the whole, loyal throughout to Papal authority and to the traditions of the Western Church.

When Roger, the first King, was firmly established and was crowned in 1130 churches began to rise all over the island. Those of most interest as illustrating this brilliant episode of European history are all in or near the capital city of Palermo. They group themselves into two divisions, according as their founders followed the traditions of the Continental architecture to which they were accustomed, or were governed by those of the native races forming the population. Several of the earlier churches are modified transcripts of smaller monuments in Syria, Greece, and South Italy—a Greek cross in a square with central dome, sometimes repeated in the adjacent bays, and with three apses on the eastern side.

The little church of La Martorana, commenced about 1129, well illustrates this type. From the roughly measured plan I made on the spot its original form is seen. Its author was George of Antioch, High Admiral of King Roger. The interior is a Greek cross

divided into nine bays, the centre one covered by a high dome on an octagon drum with pointed windows, the transition from the square to the octagon being made by arched squinches. The four oblong bays are covered by pointed barrel vaults, the four square angle bays are lower and covered by groined vaulting.

Comparing this and other Palermo plans with some of the early Christian churches of Syria and Greece we can hardly doubt the source of their inspiration.

Here, again, are the three eastern apses, in the angles of which openings are set small columns of porphyry and Verde antique. The walls and vaults are covered with mosaics, many of them contemporary. One, probably the oldest in Sicily, shows the founder prostrate before the Virgin, who exhibits to Christ a scroll bearing these words, "O, Son of God, protect ever from all harm George, the first of princes, who has raised this temple to me from the foundations." The prevailing tints of the mosaics are blue-greys, greens, madders, and white. The aisle vaults are of a rich indigo blue starred with gold, a fine combination giving profundity and strength to the colour composition. The pavement is of beautiful mosaic in Opus Alexandrinum.

The tower is probably older, and is detached by about 50 ft. from the original church. It is in four stages, the lower two square and plain, the upper with round angle turrets, which may have suggested those of the Cathedral towers, and it was originally crowned with a hemispherical dome. The ornament, such as the bullet or cushion moulding, is clearly Saracenic.

Close by is S. Cataldo, about contemporary. It is also a Greek cross in plan, the side bays being narrower, and the three bays of the nave are all covered by domes. The drums are pieced by eight simple pointed windows, and four small windows are set at the base of the dome itself. The domes, as in all the Eastern examples, and like all their fellows in Sicily are simple hemispheres without ribs or lantern. There is little or no abutment to these domes, and we may assume their builders followed the usual Oriental construction in which the joints are horizontal as far up the height as possible, and the material is reduced in thickness to a minimum at the apex. The side bays are all covered by groined vaults. Four serpentine columns with free Corinthian caps and varied bases divide the interior into bays. The aisle apses are formed in the thickness of the wall. Two steps lead up to the tribune.

S. Giovanni degli Eremiti, finished, like La Martorana, in 1132, has a different plan altogether. It is T-shaped and without aisles. The nave consists of two square bays opening into a square tribune. The transept arms, as well as tribune and the two nave bays, are covered by domes. The dividing arches are partly round and partly pointed.

The exterior is thoroughly Oriental, although not Saracenic. The domes are formed over squinch arches exactly like those of S. Cataldo. The tower is of the same date as the church itself. The plan is thoroughly Byzantine. Some of the windows are closed by bare plates of marble perforated with an Arabic pattern. The cloisters are small but beautiful—arcades of pointed arches on coupled twisted columns.

Another and most remarkable example of Byzantine arrangement and construction is the little chapel at Malvagna, near Randazzo. It is only 18 ft. square, and from three sides open semi-circular apses, covered, as usual, by semi-domes, which abut against and buttress the central dome, repeating upon a small scale that of Santa Sophia, at Constantinople.

In all these instances the Normans allowed their monuments to be built in the style and with the decorations familiar to the peoples they governed. The pointed arch here first introduced to them became general, but it was the arch of the Saracens, broad, high-stilted, and without mouldings, and had no relation whatever to the use of the pointed arch of the North of Europe, which was even then beginning to be introduced into the Monastic architecture of Italy. Nowhere in Sicily is there any instance dating from this period of an interior which has any hint of a structural Gothic system. The use of the intersecting vault is confined entirely to the small bays of the aisles or porches, while the naves, where not domed or covered by the equally

* John Addington Symonds.

Oriental stalactite ceiling, are invariably covered with an open timber roof.

The Capella Palatina.

At the same time King Roger was building in the Royal Palace of Count Roger, his predecessor, a chapel whose general plan was more in harmony with the tradition of Italy, and which furnished the type of most of the later churches of the Normans. The Capella Palatina is, as we see it to-day, substantially the chapel King Roger consecrated in 1140, and is one of the most interesting and valuable monuments of the splendid architecture of the Norman kings. The chapel is entered from the arcaded gallery surrounding the court on the second story of the palace. Its plan is divided into nave and aisles, with transept as high as the nave, but with no projection beyond the walls, and three apses, as in all the earlier churches, the crossing covered with a Byzantine dome like many of the Romanesque churches in both the north and south of Italy. It is only in the treatment of its details, in the use of the pointed arch, and in its sumptuous decoration that we feel the influence of the mixed Orientalism which coloured all the art of Sicily at this period. The nave arcades are of highly-stilted arches with columns alternately of polished granite and marble, with Corinthian capitals. The height of the arch is nearly as great as that of the column, and the still nearly half its height.

The four columns which support the dome are of unequal diameter, and form not a square, but a rectangle, longest by about 4 ft. in the direction of the nave; the base of the dome at two points thus falls some 2 ft. inside its supporting arches, the wall being corbelled forward to carry it. The shadow thus produced as seen from the nave and softened by the rounded surface of the corbel is very effective. The dome resembles many of the smaller churches, and has a ring of small windows at its base. The transept aisles have barrel vaults, and the nave aisles are covered with wood ceilings following the line of the nave roof. The nave has a carved wood ceiling of the richest Moorish character, similar to those in Granada and Seville, and decorated lavishly with gold and colour. The interior surfaces elsewhere are flat, the arches without mouldings and the clearesty and apses without belt or cornice. But these flat surfaces are decorated throughout with the utmost splendour.

Even without their gorgeous colour the lighting of these churches would be fine. Here the windows of the clearesty and aisles, of nave and transepts, are so small as scarcely to be seen in perspective and to give depth and mystery to the ceilings and interspaces; these masses of deep dark and half-tone being repeated beneath the ambo and organ gallery and in the semi-domes of the apses, while a flood of diffused light descends from the dome windows, forming a splendid contrast and throwing into high light the clergy in their sumptuous robes and brilliant accompaniment assembled below; their forms and colours being reflected, as it were, in the series of mosaic figures of saints and angels depicted in the mosaics above.

In no other interior which I have seen is this contrast of light and shade so fine, reminding one of the Spanish cathedrals, but the prevailing gloom of a nave so decorated would not have been justifiable in the Middle Ages, except in a private chapel.

The great principle of "breadth" is carried to perfection. I need not say that the glazing of the windows is quite without colour—another most important principle. Any stained glass would have confused the scheme of wall colouring. Everywhere the effort to obtain diffused rather than direct sunlight for the decorations is apparent. There are practically only two great divisions of the composition—the upper and the lower portions of the church, the upper being entirely covered, walls, arches, domes, vaults, and even soffits of arches, with a wealth of colour, the lower kept quite quiet yet sufficiently broken by line or colour (without pattern) to harmonise with the other portions. For instance, the mosaic pavement is comparatively cool and subdued and of geometric design; so is the frieze which separates the great vertical slabs of cipolino marble, 14 ft. high, from the pictorial mosaic above; these slabs being formed into panels by bands of geometric mosaic

resembling those in the Egyptian and Spanish mosques, while the marble columns are enriched with fluting to harmonise with their richer-toned granite neighbours and other surroundings.

These wall pictures are of the greatest variety and beauty; the ground is all gold, and the figures have much expressiveness and dignity without the rigid formality of most of the Byzantine mosaics. Some are doubtless contemporary with the structure, but the greater part were added during the reign of William I., the son of King Roger, before the end of the XIIth century, and all have been more or less restored, as have also those of the Martorana and of Monreale; the madders in the daperies harmonising beautifully with the porphyry columns and discs. The inscriptions are in black, and are both in Greek and Latin, and silver tesserae are used in parts. The silver band of the cupola bears the date of 1143.

The organ gallery is a beautiful composition of porphyry and serpentine white and red marbles, with gold glass, its design closely following the examples we find in Ravello and Salerno and other South Italian cathedrals.

Cummings speaks of a paschal candlestick of great beauty standing beside the Ravello pulpit. If more beautiful than that we have here it must be beautiful indeed.

The pavement is a very rich example of Opus Alexandrinum, consisting of circular slabs of porphyry with bands of colour.

In this lovely chapel Norman architecture in Sicily came to its full flowering. In later monuments we find equal magnificence, but nowhere more typical or more beautiful expression of the genius of the place and time.

The Mosaics.

Fergusson says: "The North needed acute brilliancy (of colour) as a contrast to external greyness. The South found rest from the glare and glow of noonday in these sombre splendours. Thus Christianity both of the South and of the North decked her shrines with colour. With the Greeks colour, though used in architecture, was severely subordinated to a calculated harmony with actual nature; it did not, as in a Christian church, create a world beyond the world, a paradise of super-sensuous ecstasy, but remained within the limits of the known." ("History of Architecture.") Whatever our ecclesiastical views of the wisdom of the Emperor Leo the III's iconoclastic decree in the VIIIth century, as artists we cannot but rejoice that the Western Church retained her full freedom as to the use of colour and form.

In no spot in the world can the principles and methods of glass mosaic be more successfully studied than in Sicily; those at Santa Sophia are largely hidden from view behind Mohammedan whitewash or destroyed, and much of S. Mark's has been restored out of recognition or has given place to imitations of painter's art.

The decorators of the late period of the Roman Empire well understood pictorial mosaics in marble, and we have very beautiful examples in Rome of this work, for instance, in the apse of St. Prudenziana, executed in the IVth century.

The ground was then mostly in blue, very little glass was used, and the figures were thoroughly Roman in type. When the seat of Empire was transferred to the East in 330, Constantine's liberal patronage of the arts in Constantinople, and particularly of mosaic amongst so artistic a people, soon brought the beautiful art to perfection.

When in 402 Honorius again changed the capital to Ravenna this town produced the finest mosaics of the earlier period up to the middle of the VIth century. This century also saw the completion of S. Sophia. Although some good examples can be seen in Italy, proving its continuity with varying success, and in spite of the set-back resulting from the iconoclastic movement, it was not till the XIth and XIIth centuries that the great revival came from the East, of which S. Mark's and, a little later, those in Sicily are so eloquent. The earlier mosaic work in S. Mark's (late Xth century) is, however, hard and rigid in detail compared with that executed in the XIIth century in the same church, and at Torcello and here in Sicily.

These decorations of the Palermo churches represent the zenith of Byzantine mosaic art of the Second Period. Nothing finer had

been done before, even at Santa Sophia or S. Mark's, Venice. Nothing so fine followed, and the ambition of the Renaissance painters to reproduce their naturalistic art in this permanent form, thus divorcing it from the conventional limitations imposed by the material, was soon to destroy its traditions and its practice. It is only in our day emerging into new life by the discovery of its true principles of design and method of fixing, and by the revival of the manufacture of the enamel-glass by such firms as Messrs. Powell, while Sir William Richmond, Messrs. Crane, Anning Bell, Clement Heaton, Spence, and others are working on the right lines, and already giving us good work, both internal and external, in spite of many adverse conditions. A school of mosaic workers is thus arising in England, which we anticipate will lead the art in Europe, and we may hope that before the Westminster Cathedral mosaics are commenced the empirical stage of the revival will be passed.

These Sicilian mosaics are kept sufficiently distant from the eye to prevent an unpleasant sense of the coarseness of the material and its joints, and to blend its irregular lines and surface into a rich and harmonious whole, full of variety and accidental beauty, while the scale of the figures and geometrical ornament is large enough to be read pleasantly by the multitude worshipping in the church. The lighting is arranged with great skill to answer the latter purpose, but is not sufficient to kill the colouring, and the windows, always of plain white glass, are generally in such positions as to secure diffused rather than direct light, and low down to give profundity and richness to the surface above.

The Byzantine style is the architecture best suited to the display of this decoration, since the curved surfaces of its domical vaults produce the maximum effect in gradation of light and shade, and the greater the width of the building the better is the effect. This explains the supremacy of Santa Sophia at Constantinople.

Mr. Anning Bell contends that the stiffness of drawing is not archaic, but the expression of the material, and says, moreover, that play of facial expression and momentary gesture are out of court, and that such subjects as depend on these are unsuitable. The characters should be types and the incidents symbolic. Mosaic can be magnificent and splendid, but not humorous. A row of Popes is meant not for likenesses of individuals, but to impress the spectator with the continuity and power of the Papacy.

The method of execution employed in Sicily and elsewhere in mediæval times was as follows:—A coat of fine lime mortar was spread on the wall, upon which, when fresh, the picture was broadly painted in fresco in the proper colours. The painter was immediately followed by the mosaicist with the cubes, which were embedded in the soft mortar and pressed to an even surface.

Here, as in the interior of S. Mark's, Venice, the decorations enjoy the necessary freedom from rivalry with architectural features, such as mouldings and stone enrichments which disconnect the scheme and look poor and mechanical in juxtaposition, unless the carving is of very special delicacy to harmonise, as it does fairly well, for instance, in S. Vitale at Ravenna and in the atrium of S. Mark's, and as it does not at St. Paul's, London. In these Sicilian Norman churches the mosaics cover the entire wall surfaces, domes, and vaults, and even the angles of the archivolts are all rounded off to carry it to the soffits of the arcades. Even the wall surfaces were not flat. The ground is modern mosaics, but low-toned, soft, rich, never flashing, full of play of colour from pale lemon to rich orange (according to its lighting)—and the decorative designs are bright in tones that do not give the effect of patches of dark on a light ground.

The palette used is a very limited one—greys and grey-blues, violets, soft greens, madders, with scanty use of silver, dark reds, and russets; in fact, Nature's scheme of colour at her most beautiful and restful season of winter. A scheme deliberately adopted and perfectly adapted to the heat and glare of the climate.

The size of the cubes averages nearly 1 in. square for the larger surfaces and about $\frac{1}{2}$ in. for faces, hands, etc. The mediæval method of cutting up the cakes of enamel-

glass with chisel-like hammers produced the great irregularity in the cubes which, with their corresponding variety of joint and surface, gives such subtle charm to old work compared to the modern machine-cut cubes. It is obvious such a material must impose limitations on the drawing and texture.

Much valuable and practical information on ancient and modern mosaics will be found in three papers, by Messrs. Harrison Townsend, Anning Bell, and Clement Heaton, in the *Journal of the Royal Institute of British Architects* for March and November, 1901, and April, 1902, besides, of course, the larger standard works.

The cathedrals of Messina and Cefalù are both nearly contemporary with the Capella Palatina, both having been commenced by King Roger about 1130. Of the former only the general plan and the mosaics of the three apses remain substantially as they originally were. The basilican plan has the usual characteristics of the Norman Sicilian cathedrals. Saracenic influence is shown in the slightly horseshoe form of the nave arches.

Cefalù.

Cefalù is a church of great interest. Here is the south Italian porch in three vaulted bays between two angle towers. The nave arcades are high-stilted on columns of polished red granite, with white marble bases and varied capitals, many from older buildings. The clearstory, as at the Capella Palatina, has a single-pointed window over each arch. The transept projects beyond the aisle walls; the central bay was domed, though now ceiled by wood beneath. From the east wall of this transept open three very deep tribunes, the central one covered by groined vaults, and each ending in an apse, as usual. The Lombardic open arcaded gallery on three sides of the transept, and just beneath the vault with small round arches, is the only example of this feature in Sicily. The most striking feature of the church is the very lofty choir opening into the nave. There is nothing like it south of the Alps.

I reproduce a measured plan and elevation of the apsidal end of this church from Mr. George Hubbard's paper read before the Society of Antiquaries, and published in *Archæologia*, Vol. LVI. He has established the date of commencement as being 1132 and of the completion of the nave roof as 1160. He also suggests the interesting theory that the occasion of the marriage of the daughter of our Henry II. to William the Good, of Palermo, gives the clue to the origin of the earliest pointed arches in England, namely, those of Trinity Chapel and Becket's Crown in Canterbury Cathedral, then just commencing. The church possesses some fine cloisters, which he well describes.

The painter, Mr. A. Wallace Rimington, thus writes of the interior:—"The whole body of the church being white the eye is led up to the choir. Once there it remains there, and dwells with intense satisfaction on the glorious wealth of colour with which the chancel is enriched by mosaics. These are, on the whole, the most impressive of any I have seen in Italy. The harmonies of colour are mainly in violet and brown madder, accentuated with low-stoned green and grey. The apse is entirely dark, except for one small glazed window, which brings a small quantity of high light into contrast with the principal dark of the church, and takes the eye at once to its central interest. In its vault, and just where the play of reflected light is at its best, is a great dominant half-figure of Christ, quiet, dignified, and splendid in subdued colour. Its effect at the end of the church is most impressive. Our Lord is raising the right hand in the act of benediction. Still the same Lord that looked down upon the generations who knelt in this great church all through the Middle Ages! It is difficult to believe that any one of that multitude could have entered the church without having gained some better idea of the love and majesty of the divine Master from this noble mosaic."

Palermo and Monreale Cathedrals.

An interval of nearly fifty years seems to have elapsed between the building of the churches already described and the two great cathedrals of Palermo and Monreale, the only additional examples of the splendour of the Norman church architecture in Sicily.

These were built under King Roger's successors, William the Bad and William the Good. Palermo had a previous cathedral, begun in 1109 on the ruins of a Saracen mosque. A year or two after the accession of William the Bad Walter of the Mill became Archbishop and rebuilt the cathedral, leaving, however, some eastern parts of the old church. It was finished in 1185, and was doubtless one of the most beautiful in Sicily. The XVIIIth century transformation has, alas! left little or nothing except the general ground plan, and not all of that, a new east end having been built within the old. The plan is similar to Cefalù, without western porch and towers. The three tribunes are, however, here connected by a broad arched opening, forming them into a sort of second transept. The nave arcades were of pointed arches over four slender columns set in a square and joined by their bases and above into a singularly beautiful pier, and above the arcade the clearstory was pierced by three-light pointed windows divided by columnar mullions. The ceiling was of wood decorated with gold and colour, and the whole interior was magnificently enriched with precious marbles and mosaics.

The four slender towers, one at each angle of the church, are a unique feature, and although picturesque in general form they are unsatisfactory in detail, especially in the multiplication of coarse string courses running under each sill and at the springing of each arcade. The main angles are all shafted. Some of the stages had their surfaces inlaid presumably with black-and-white patterns in marble and asphaltum in Saracenic patterns. The incision now only remaining, and curious superficial Saracenic parapets occur over some of the string courses and dog's tooth ornament below them. The circular angle turrets commence about half-way up. The apsidal end is richly decorated with interlacing arcades of a superficial character enriched with inlaid patterns. We must not fail to visit the tombs of the kings in a chapel of the nave.

All this splendour remained till 1781, when the Royal architect, Fuga, in spite of the strenuous remonstrance of the Palermitan architects, ruthlessly destroyed it. The rigid silence of the Palladian style reigns within, simple indeed and dignified, but lifeless as the century in which it flourished.

The Cathedral of Monreale externally resembles that of Cefalù, with flanking towers at the west end and a deep porch in three bays. The southern tower has a low pyramidal spire. The external face of the south aisle shows a range of pointed windows surrounded by thin bands of mosaics, and united by broader flush arches enclosing circular patterns with horizontal bands. A frieze of inlay runs beneath the cornice. The story is absolutely plain with an arched corbel table under the eaves. In the east end the characteristic external decoration of the style is even more lavishly displayed than in the apses of the Cathedral of Palermo, and is certainly one of the most striking compositions in Italy. The entire surface is covered by a series of interlacing arcades of pointed arches. The upper stages are covered with geometrical inlay of marble and asphaltum, and the walls are further enriched by horizontal bands and circles of the same character. There are few exteriors in Europe possessing a surface decoration of equal richness.

Before passing to the interior something more should be said as to the bronze doors.

The art of casting in bronze had been a lost art in Italy for several centuries, but was revived by the Greek artists in the XIth and XIIth centuries, the earliest examples of bronze doors being those at Amalfi and Atrani, of the last half of the Xth century, and between 1066 and 1087 seven churches in Italy were thus furnished from the Byzantine capital. In most the treatment was large panels with various designs, generally simple, all executed in Niello, with incised lines filled in with silver, etc., the frame of the panels being more or less decorated. The bronze was in comparatively thin plates on a framework of solid oak. The Eastern inspiration was caught in time by the Italian workmen, the earliest being executed in Italy by Roger of Amalfi for the chapel of Bohe-mund about 1120. As subjects became more ambitious Niello decoration gave way to

reliefs cast on the plate. In 1160 Barisanus made a magnificent pair of doors for Trani Cathedral, and somewhat later for the Cathedrals of Ravello and Monreale; the panels in all three are almost identical in subject and design, and are of prodigious variety, sacred and profane.

In addition to Barisanus's pair in the north doorway, Monreale possesses magnificent bronze doors in the west or principal entrance by Bonanno, the maker of the great doors of the Pisa Cathedral and the architect of the Campanile there. Though the two makers are almost exactly contemporary the work of the Pisan architect is archaic in style—the panels without mouldings; the sculpture of the panels is in very high relief and spirited in character. The work of Barisanus is more harmonious; the foliage, though rigidly conventionalised, is appropriate to its enclosing bands and carefully subordinated to the figure sculpture of the panels.

The interior is more fully windowed than the Capella Palatina, and its decorations are of surpassing magnificence. The scheme, both in subject and in general colour, is precisely that of the Capella Palatina, but the scale of the building and its breadth of treatment immensely enhance the effect. The walls throughout are here, again, lined to a height of 22 ft. with narrow vertical slabs of cipolino grey-and-white marble framed in borders of geometric mosaic work, and with a Moorish frieze in the same material. All the smaller surfaces, including the jambs of the windows, the bull-nosed angles, horizontal and arch bands, and the soffits of the arches, are of semi-geometric patterns, and the whole of the walls and apses are covered with pictorial mosaics, the subjects being scenes from the Old and New Testaments in horizontal ranges divided by bands. The whole semi-dome of the central apse is occupied, as at Cefalù, by a gigantic half-length figure of Christ, which dominates the whole scheme.

The beautiful carved caps of the nave arcade anticipate the best Renaissance capitals, but are not so suitable to the style as those of Ravenna, for instance, as supports the heavy still-blocks from which the square soffits of the pointed arches spring. Low-toned red lines mark apparent archivolts to the arcade, the band beneath the clearstory windows and the arches being treated with semi-geometric Byzantine, patterns of green-greys and soft russets and madders with a small amount of white. In the lower range figure subjects are grouped into the spandrels of the arcade, and the gold ground is well massed round them. The figure subjects between the windows are similarly treated, while the white guilloche in a continuous band just beneath the roof is filled with busts in white, indigo-grey, and a little red and madder brown. Generally speaking, the greys predominate in the figures, broadly speaking, with the gold ground a palpitating surface of yellow and grey, than which nothing is more beautiful. The greens and blues are very grey, and the reds and browns also of a neutral tint and in small quantities to prevent a hot effect where so much yellow exists.

These greys are splendidly focussed at the east end by the indigo mantle of the colossal figure of the Christ. This mantle is thrown over a tunic of gold and madder red, the highest light being the linen wrapped about the neck and throwing up the head finely, the face being very pale and surrounded by dark hair and beard.

In these days of the universal knowledge of the Bible it is difficult to imagine the educational value to the illiterate multitude of this complete pictorial record of the evolution of revealed truth culminating and centred in this fine figure of our Lord.

The pavement of the nave is not so rich in line or colour, but only serves more effectively to concentrate the attention on the principal decorations. That of the chancel, however, more than atones for the plainness of its approach.

Little is left of the conventual buildings except the cloister, which was perhaps in its best state in respect of its mosaic and sculpture—the finest in Italy. Each alternate pair of the coupled columns have plain shafts, the others being decorated with mosaics in vertical flutes or spirals or chevrons. The capitals are infinitely varied, and wonderfully designed

and carved. At the angles of the cloister the columns are in groups of four and the shafts covered with reliefs of beautiful design rather Byzantine in character, while the capitals are still more elaborate. The arch heads are, like every other portion of this cloister, of extreme richness. The inner arch moulding, however, is the one inharmonious note, stopping abruptly, as it does, overhanging the abaci of the caps. This is evidently one of those errors which it is difficult to account for, as there is no evidence that this feature was not contemporaneous.

With the Norman work of the XIth and XIIth centuries the development of architecture in the southern provinces of Italy comes to an end. In the great Gothic movement of North Italy, in the greater Renaissance movement which followed it, the South had no part.

Of the remaining Palermitan churches S. Francesco, 1302, and the contemporary S. Agostino are, as to date, Gothic churches with many Norman details, and are worthy of more attention did time permit. Then there is the late XVth century church of Sta. Maria della Catena, of which I give a photograph of the front and a pencil sketch of the beautiful late Gothic interior. Here the columns of nave are of cipollino, black-and-white veined, red, and a grey marble, and all polished. The carved caps and bases are all white marble touched with a little gold, with good effect; the subbases are of hard limestone. The walls internally are faced with rich brown sandstone varied with yellow and grey. The effect of the three centred ribs to the barrel-vault of the aisles is exceedingly pleasing. The windows are all small and have no tracery. Grey marble bands follow the line of the arcade in the pavement, the remainder being squares of about 18 in. of greyish Sicilian marble. The triumphal arch finds its abutment in similar arches across the transept.

Renaissance.

Something might also be said of the Renaissance churches with which the town abounds, and of the rococo inlay decoration in marbles of many kinds—the whole producing a sense of ostentatious wealth and of riotous imagination totally at variance with the solemnity and dignity of public worship.

Domestic and Civil Architecture of the Norman Period.

Up to this time the only domestic architecture in Europe, with very rare exceptions, has been that of the military castles. But in Sicily the examples of the luxurious Arabs were so attractive, and the arts which had been so lavishly employed in the church were turned to account in beautifying and softening the domestic life. Palermo became a second Cordova with palaces, villas, and pleasure pavilions standing in parks and gardens, with fountains and statues. Only the Torre della Nifia remains of the Royal palace, containing a large hall which still bears witness to the interior luxury of the King's house. Even as early as the first quarter of the XIth century, the walls and the groined vault were all adorned with mosaics.

The Saracenic characteristics of the baths at Cefalà (about twenty miles south of Palermo) are, with slight modifications, those of all the Norman civil buildings in Palermo. The earliest were two pleasure palaces built by King Roger, about 1120, for use in summer and winter respectively. Of La Favara, the winter villa, little remains excepting the interesting little chapel. The palace stood within grounds planted with citrons, oranges, and palms, and the whole enclosed within a great moat in which floated the gilded gondolas of the king and ladies of his court. The summer palace, known as Minicco, was two miles west of the town.

The more familiar examples of this Norman-Saracenic style are the two palaces built by William the Good and William the Bad, the Ziza and the Cuba, in which the Normans adopted the Saracenic domestic architecture and the kindred arts, especially that of formal landscape gardening and the use of water.

The Ziza, built of ashlar brown stone with close joints, measures 116 ft. by 62 ft., and is 80 ft. high. There are three nearly equal stories marked by small string courses. The central arch of the principal front is 30 ft. high, and the inner order is carried on

coupled jambs of fine marble. In the lower half of each arch was originally a coupled pointed window with a smaller window between the arch heads. There was no seclusion of the women here as in the houses built by Arabs for their own occupation, and the wall was crowned by a parapet, the divisions of which were filled by Cufic inscriptions, and enclosed, as in the baths of Cefalà, between two horizontal bands of Byzantine carving.

The central arch leads through a vaulted vestibule into a hall about 22 ft. square, with a deep recess on each of the three sides. These recesses are covered by elaborate Saracenic vaults, as at the Alcazar at Seville, and the Alhambra at Granada, and their walls were faced with mosaics and plates of marble. These decorations remain in part. The central hall and vestibule have the height of two stories. The space on the sides of the building is divided into apartments communicating with each other by ample staircases. The palace stood in the midst of pleasure gardens. Opposite the main entrance was a fishpond surrounded by a square pavilion, which has now disappeared, like that of Cuba, which still remains.

The Arabic inscription on the parapet of the Cuba gave the date of the building as 1182. The planning of this Royal villa appears to have closely resembled that of the Ziza. Of the various pavilions adorning the grounds, La Cubola only remains.

A curious hiatus in the art of Sicily is the almost entire absence of architectural wrought ironwork of any merit, ancient or modern. The best I saw was in the screens between the chapels and the nave in the Cathedral of Ortigia (Syracuse). This is the more curious considering how beautiful is the ironwork used to adorn the axle-trees of the carts in many of the towns, notably in Palermo (where they are also profusely decorated in colour), and in Taormina.

The architecture of the Norman in Sicily covers a period of little more than half a century. Yet in that time it had exhibited a logical consistency and a wonderful union of strength and grace. Strictly speaking, the style had no development. No architecture ever expressed more fully and clearly the peculiar character of its age and people. The strength of the Norman, the fineness of the Greek, the luxury and grace of the Arabian were exhibited, not more conspicuously in the social and political fabric than in the churches and palaces the Williams left to their unworthy posterity.

Weary as we are all of the battle for the supremacy of the styles and of theories for the development of a XXth century manner of work, may there not, however, be fresh food for reflection in the cosmopolitan tolerance and studied collaboration which within fifty years resulted in the creation of the lovely architecture which has been our theme to-night? And since we have been so recently bade to "think Imperially," does not our Empire contain all the elements, if intelligently organised and sympathetically handled, for the production of something at least equally admirable? At the present moment an English architect is executing a commission in our richest eastern dependency which appears to offer a unique opportunity for combining the scientific genius of Europe with the splendour of Oriental taste in form and colour, in commemorating the reign of the best Monarch of the leading Empire of the world. It ought to rival, if not excel, the Raj Mahal."

Illustrations.

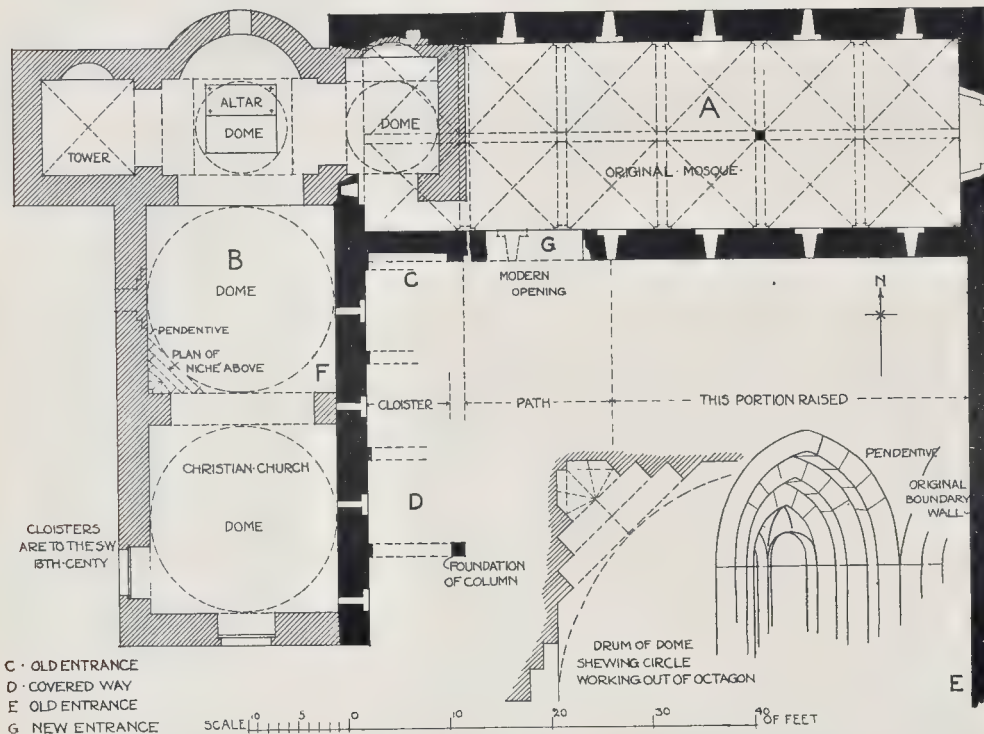
The following is a condensed list of illustrations shown by the lecturer:—Map of South Europe and of Sicily. Syracuse, Gate in Ortigia. Palermo, plan of S. Giovanni dei Lebbrosi; La Mortarana, plan, tower, interior. Cairo, Mosque of El Zahir, cushion mouldings, and zigzag. Syria, plan of Pretorium of Mousmeh. Phocis, plan of S. Luke's of Stris. Palermo, S. Cataldo, plan, interior, and exterior; S. Giovanni degli Eremiti, plan, exterior, and cloisters. Malvagna, plan, elevation, and section. Palermo, Capella Palatina, plan, interior, pulpit, Saracenic ceiling, details of mosaics. Ravello, Cathedral pulpit. Cefalù, Cathedral plan, interior, exterior of apse, and porch; S. Clemente, Casauria, plan, Palermo, Cathedral plan, exterior, general view, apsidal end, details of west and south fronts, tomb of Roger. Monreale, Cathedral,

plan, interior, general and transept views, apse, section of nave roof exterior, and of cloisters (ten views). Seville, Alcazar. Alhambra. Rome, S. John Lateran cloisters. Arles, cloisters and details. Palermo, S. Francesco, Sta. Maria della Catena, two interior views and exterior. Olivella, church tower. Torre del Nifia, exterior and King Roger's private rooms, La Ziza, palace, plans, exterior and interior of hall; La Cuba palace and La Cubola (exteriors); Palazzo Chiaramonte, window, Bridge of the Admiral, Archbishop's palace, Gothic window, Convent of the Pietà, Syracuse, Palazzo Montalto, Taormina, Baden Vecchia window. Caserta Vecchia, cathedral, transept, and lantern.

At the conclusion of the lecture Mr. Louis Ambler took the chair, Mr. Cave having to leave the meeting to keep another engagement.

Mr. R. Phené Spiers, who proposed a vote of thanks to the lecturer, said there were many present who had a closer acquaintance with Sicily than he had, but at all events there was one claim to be heard that he could put forward, though it might not be a recommendation, and that was that he visited Sicily before anyone else in that room. It was in the month of May, 1864, that he was there and he retained a very vivid recollection of what he saw because the month was a sunny one, and he had just come from Rome, where for two months it had been very cold and continually raining. He was glad to find in looking at the magnificent series of slides and drawings which the lecturer put before them, that he recollected pretty well what he saw forty-two years ago, and there were some points in the lecture which he could substantiate. The lecturer appeared to be in doubt as to the Church of S. Giovanni degli Eremiti, Palermo, and he said that he was rather astonished to be told by guides and others that the church was built as a mosque. Mr. Seth-Smith had called upon him the previous Wednesday to ask his opinion, and perhaps the best course would have been to have replied, as they do in the House of Commons, that he should like to have notice of the question. When he was asked his opinion he had a vague recollection that some time ago he had come to the conclusion that, although one of the walls belonged to a mosque, the church itself was built entirely for the Christian religion. He happened, fortunately, to find a tracing which had been sent to him of a church showing the actual present-day church and the original mosque. When he looked out the tracing he found a letter which would explain matters, and which would be listened to, he was sure, with the greatest interest, for it was written by one whose loss they regretted very much. He should explain that two of his students at the Royal Academy, who were studying there at the same time, but who were not acquainted with each other, independently asked him whether he could find someone to travel with them, and, of course, he introduced them to one another. There were two singular points, i.e., those students were both named Bedford, and their Christian name was Francis. One of the two was living, though he had given up architecture and had taken to illustrating books, and the other was the writer of the letter whose loss they all must deplore. It was Mr. F. W. Bedford who wrote him the following letter as to whether the Church of S. Giovanni degli Eremiti had any Moorish or Mahomedan construction in it. The letter was dated January, 1892, and was as follows:—"Dear Mr. Spiers, the following is a copy of the notes I have of the Church of S. Giovanni degli Eremiti, Palermo. I give a key plan on the other side, but F.D.B.'s plan [Mr. F. D. Bedford, whose plan we reproduce] will give you the details. The present church is an addition to one of the Moorish mosques of which many existed in Palermo in the time of the Moorish Dynasty. . . . The original mosque consisted of one long nave divided into two by a central row of columns. The entrance was originally at C, approached by a covered way D. On the east side of the mosque is the road, and the jambs of the gate are visible at E. The covered way D probably continued at right angles to gate E. The external wall F was originally the external wall of the mosque and cloister. The Normans turned the mosque into a chapel and built a new church. B, using the external

S. GIOVANNI DEGLI EREMITI PALERMO.



wall F of the original mosque as one of its chief walls. The columns were swept out of the mosque, together with the vaulting, and the floor was raised about 18 in., making it at about the same level as the new church. At the same time the mosque had a new wooden ceiling or roof put in about 5 ft. higher than the original vault. A door was placed at the east end into the road, and at G, the original door C being blocked up. Projecting into the old mosque, one bay of the arcade was the transept of the new church, corresponding to the tower on the west. This letter showed that Mr. Bedford gave close attention to every part of the building, and it was interesting to read the remarks in connexion with Mr. Seth-Smith's lecture. The next point was as to the plan of the Church of the Lepers, S. Giovanni dei Lebbrosi. He had a section of the church which he made from drawings furnished to him, and he had a section of another church, i.e., the chapel of la Favara, near Palermo, which Mr. Seth-Smith said was the only portion of the Palace remaining, but there was a great deal more. The lecturer had not told them whether he went over the bridge of the Admiral. [Mr. Smith: I did not.] It was an extremely interesting example, and its value was that it was built in 1113, i.e., about thirteen or fourteen years after the first Crusade. The arches were pointed, and there were two orders, the upper one projecting very slightly in front of the other, and there were square angles; all this was so exactly like what was seen in the Holy Land that he had always considered that the chief masons of the Crusaders' churches came from Sicily. They spoke Greek and Arabic, and would be able to give directions to the artisans who were there. In short, there was so much similarity between this bridge and the Crusaders' churches that he thought the pointed arch was introduced from Sicily into the Holy Land. He had two photographs taken by a brother of his which he looked up for the purpose of this discussion, and when he came to look at them he was puzzled to know what they were. He thought one was

a church in the Holy Land, but it was a church, a very early one, at Messina, i.e., S. Maria Della Scala, and it seemed to him to be one of the earliest buildings in Sicily, and the resemblance to the churches of the Holy Land put his suggestion beyond a doubt. As to the Church of S. Giovanni dei Lebbrosi, he had a photograph showing the interior of the dome, which was very similar to La Martorana. It had squinch pendentives of the same character as those which were to be found in the Eremiti church. The little chapel beyond the Church of S. Giovanni dei Lebbrosi was very interesting, and there was an astounding Palace, 150 ft. in length, still remaining, and quite ancient; but it was not easy to get at, as the place had been turned into a stable or tannery or something of the kind, and it was in a very unpleasant state. He came to the conclusion that the Palace was built after the chapel, and that when they built the Palace another dome was added on the top of the original dome. From Cumming's plan and from photographs, he had worked out the section, which showed that the chapel was thus increased in height. When he was interested in the subject of salacitae pendentives he thought that at la Zisa he might find some evidence in support of his argument, but he did not succeed. All the squinch pendentives were of Saracenic character—the form was that of the ordinary salacitae pendentives, but the squinch was different from any found in Europe. Mr. Seth-Smith had had the advantage over him in the matter of transit in Sicily. He (the speaker) had not been able to go much about the country, as it was not safe to do so at that time, whereas now the railway was available, and he hoped that many students would go there, as the attractions were so great. There was much to be learnt from the architecture of Sicily, and the scenery was very fine. The temples crowning the crest of the hill at Cefalù were of extraordinary interest and beauty. Their thanks were greatly due to Mr. Seth-Smith for his interesting paper and for the pains he had taken to illustrate it.

Mr. Ronald P. Jones, who seconded the vote of thanks, said the lecture might more properly be entitled "Medieval Architecture in Sicily," for, though some illustrations of the ancient architecture had been shown, the lecturer had not dealt with that side of the subject. And yet it was of the greatest interest. With the exception of the Acropolis nothing could give one so fine an idea of what Grecian architecture must have been like as a visit to some of the Grecian temples in Sicily. The lecturer had dealt with Syracuse in a few words, and had said there was nothing left there but the theatre; but that was one of the finest Greek theatres we have, and Syracuse seemed to him to be the one town where you can get more idea of the classic Greek period than any place outside Athens, and the whole place was full of interest. He specially mentioned the Greek side of the architecture of Sicily because students might think, listening to the lecture, that there was little besides the medieval work. That, of course, was not the case, and the classic side was of great importance. He emphasised what Mr. Seth-Smith had said as to the impossibility of showing in photographs the colour effect of these Sicily churches. The photograph of the interior of Monreale, for instance, was nothing but a diagram—a skeleton—and it conveyed nothing of the colour effects.

Mr. George Hubbard, F.S.A., in supporting the vote of thanks, said that though he had not visited Sicily as long ago as Mr. Phene Spiers in 1864, he had, perhaps, spent more time there, for he stopped nine months in the island during the year 1884. He thanked Mr. Seth-Smith for his most excellent paper, which so aptly dealt with the particularly complex period in the development of architecture in Sicily. He was grateful to Mr. Seth-Smith for having thrown upon the screen some drawings of Cefalù Cathedral which he (the speaker) made many years ago. In this Norman Cathedral of Cefalù, he considered that the earliest example could be found of the pointed arch in a purely Norman building. Sicily was conquered by the Normans in the

latter quarter of the XIIIth century. The conquerors were familiar with the pointed arch of the Sicilian Saracens, and they adopted it when building Cefalù Cathedral. The Cathedral of Cefalù was begun in 1132, and the pointed arch was used throughout, a full generation before it was adopted in any other Norman Church in Europe. In the year 1170 Henry II. of England offered the hand of one of his daughters to William the Good of Sicily. It was not, however, till 1176 that the little Plantagenet Princess, then in her twelfth year, was sent to Sicily. The wedding took place in the following year amidst unexampled rejoicings. An architect from Henry's Court would no doubt accompany the ecclesiastics and other dignitaries who joined the ceremony. But apart from historic occasions such as this, and another, less auspicious, which occurred in the following reign, when Richard I. captured Messina, there were plenty of facilities for English and Continental architects to become acquainted with the work of their brethren in Sicily. At this date, although some few pillars of the work at Canterbury had already been raised in their places, not a single arch had yet been turned, the whole of the upper portion having been executed between 1177 and 1180. This work at Canterbury is perhaps the earliest pointed Gothic to which an exact date may be assigned. It therefore seemed probable to him that Cefalù may have had a direct influence upon the introduction of the pointed arch in subsequent Gothic work. Cefalù was built by the first Norman King in Sicily, King Roger, and the subjection of the conquered race is typified, not without its pathos, by the four kneeling Saracens supporting the sarcophagus of King Roger, as was shown by Mr. Seth-Smith in one of the many and excellent slides.

Mr. A. Maryon Watson supported the vote, and said that anyone who set out to give in one lecture a history of the architecture of Sicily, would have to extend that lecture unduly, and no doubt that was the reason why Mr. Seth-Smith had confined himself to one period.

Mr. Gerald Horsley said he went to Sicily more to study colour, as an Owen Jones' student, than for any other purpose, but one could not help being interested in the architecture quite as much as in the colour. Of particular interest to the architectural student was the question of the construction of the pendentives of the domes, and Mr. Spiers had referred to the subject, and Mr. Jones had done so in a recent paper, in which he pointed out that the pendentive was formed exactly like a stalactite vault. As Mr. Spiers said, Sicily is the only place where this could be seen. A paper on the subject was read by Mr. Spiers at the Institute some years ago, in which the origin of the stalactite or honey-comb vaulting was given.

Mr. J. D. Grace said, as to the cushion enrichments round the arch, referred to by Mr. Seth-Smith, that was a notable feature in the whole of the exterior openings of the church of the Holy Sepulchre. That was a good deal earlier than the example from Cairo, which was 1270 in date, or 100 years later, so he did not think one need look to Cairo, which was only consequent; the motif was probably Sicilian. Another point was that the plan of the church of S. Giovanni dei Lebbrosi was almost exactly coincident with the plan of the little basilica at Ibreem in Nubia, and which was given in Ferguson's examples, he thought. He should say that they were as identical as two plans could be, and that was interesting, as they were so far apart.

Mr. Wallace Rimington said he was not an architect, but the paper had given him a great deal of interest. It reminded him of four months he spent in Sicily ten years ago, when he revelled in the beauty of Sicily and its architecture. One missed the colour in a paper, for what one felt more than anything else in these churches was the beauty of the colour. Another matter which struck him was the extreme interest of the mixture of Oriental colour and influence with the Norman architecture.

Mr. Theodore Fyfe said he would like to assure Mr. Seth-Smith that the impressions he had given of the colour were very satisfactory; in particular, the cool tones in the Capella Palatina, Palermo. He would like to endorse

what Mr. Seth-Smith and Mr. Hubbard had said about the very interesting church at Cefalù, which was certainly one of the finest Norman buildings in existence. It was almost inconceivable that the exterior of that church was, as Mr. Seth-Smith had said, contemporary with the Capella Palatina at Palermo. Sicily was full of such interesting contrasts. On the one hand there was the difference in size between the Capella Palatina and the cathedral at Monreale—the one a perfect gem, and the other just reaching the limit of size to which the style of architecture employed was applicable. Then, again, there was the contrast between that type of building, with its small, clear windows and wall space covered with colour, and the northern Gothic cathedral, with its plain stone wall spaces and windows filled with stained glass. Ferguson had said the latter was the best, but it was not doubtful, especially for small buildings? He had no doubt that Mr. Seth-Smith deliberately left the Classic work in Sicily out of his paper, because it was quite enough for one lecture to deal with the mediæval work; and he could not understand where Mr. Ronald Jones's sense of fitness had gone to, when he took the lecturer to task for not dealing more with the Classic work. He wished to add his tribute to supporting the vote of thanks.

The Chairman then put the vote of thanks, which was heartily agreed to.

Mr. Seth-Smith, in reply, said that if he could have put in colour with the rest, perhaps no one would want to go to Sicily, and that would be a pity. He had been particularly interested in Mr. Spiers' remarks as to the Eremiti church. He carefully studied that church, but he had not been able to understand it until he had seen Mr. Bedford's plan, which Mr. Spiers had shown. Time had not permitted his treating of the Classic period that evening, but no part of his study of the Sicilian architecture had given him greater pleasure than the Classical. Especially what was to be found at Syracuse.

The Chairman announced that the next meeting would be held on January 11, when a paper would be read by Mr. Temple Moore. The meeting then terminated.

FLUELESS GAS STOVES.

THE subject selected for discussion at the sessional meeting of the Royal Sanitary Institute on the 12th inst. was "The Advantages and Disadvantages of Heating Buildings by Gas Stoves of Various Types." The discussion, in which several prominent medical men took part, was, however, mainly restricted to the merits and faults of condensing gas stoves of the flueless description, for no one seemed to have anything but commendation to offer for modern open gas fires when properly connected to a suitable flue.

The discussion was opened by Dr. Samuel Rideal, who read a short paper based upon an investigation with flueless stoves which he has recently conducted. Briefly stated, Dr. Rideal's paper tended to show that the products of combustion from a flueless gas stove, and especially from a flueless gas stove of the condensing type, are harmless.

Some of the statements in Dr. Rideal's paper were severely criticised by some of the speakers, but we noticed that all the criticisms were based upon theoretical considerations, and that no specific case of injury to health caused by a flueless gas stove was quoted. Incidentally, striking evidence was given by one or two of the debaters which moved the absurdity of the doctrine that when the proportion of carbonic acid in air rises to five or six parts per 10,000 that air becomes unfit for inhalation. Although that was commonly accepted as a true doctrine some twenty years ago its falsity is now becoming generally recognised.

For the most part the discussion circled around the following concluding paragraphs of Dr. Rideal's paper:—

"We can therefore say that a flueless stove, although imperfectly condensing, can under such conditions be utilised, and that the only determining factor is the carbonic acid content of the room, which will be determined by the volume of the gas burnt and the natural ventilation conditions of the room itself. Pure carbonic acid contents of sixty volumes per 10,000 are not poisonous, and it is only when 300

volumes are reached that respiration becomes slightly deeper and more frequent.

Reductions of 5 to 6 per cent. in the oxygen content of the atmospheric air also do not seem to have any permanent injurious effects. Such an alteration in the content of oxygen is comparable with that in the amount of inhaled oxygen which may be caused by changes in the atmospheric pressure, and even if accompanied by a low barometer the volume of oxygen per cubic foot of air in such a room would still be greater than that at common mountain altitudes.

If the suitability of a room for habitation depends on the relation of the humidity to temperature these factors are controllable by most forms of condensing stoves.

That gaseous carbonic acid cannot be regarded as an offender is well seen in the recommendation of the Departmental Committee on the Ventilation of Factories and Workshops, where a higher limit of carbonic acid is suggested for gas-lit factories than those in which no such lights are burning. It is pointed out in that report also, "a moderate increase in carbonic acid and diminution of oxygen in the air is not in itself prejudicial to health." Since the above was written the Coal Smoke Abatement Society have published a report on twenty-five different makes of gas stoves (*Lancet*, November 17, 1906), in which it is concluded that "with plenty of ventilation the flueless condensing gas fires would be very suitable for warming rooms or passages." I am inclined to add that, from the considerations I have put before you, flueless gas stoves, especially those of a condensing type, are also indicated as an aid to defective ventilation."

Mr. T. W. Aldwinckle, F.R.I.B.A., was unable to be present, but sent notes, which were read by the Secretary. Mr. Aldwinckle agreed that flueless gas stoves were suitable for use in halls and passages; but, in spite of Dr. Rideal's figures, was dubious as to whether the products from such stoves when used in ordinary dwelling-rooms would not be detrimental to health.

Dr. Bostock Hill differed from Dr. Rideal in most of his conclusions. We must not, he said, give up sanitary principles because they happened to be inconvenient; and carbonic acid, even when not the result of respiration, will have a serious effect upon health. Further, there is no evidence that we can continue to exist with less oxygen. Dr. Rideal's figures dealt with a room of 4,000 cubic ft. capacity, but bedrooms are not usually of that size, and in smaller rooms the stove would be responsible for a greater degree of pollution.

Dr. Dece Vaux was inclined to agree with Dr. Bostock Hill that an increase in the proportion of carbonic acid in conjunction with a decrease in the oxygen in the atmosphere would be prejudicial to health.

Dr. Lyon said that in soda-water factories the operatives work in an atmosphere containing up to 5 per cent. of carbonic acid (500 volumes in 10,000) before they begin to faint. The victims in the Black Hole of Calcutta were said to have been asphyxiated, but they really died from ptomaine poisoning, or "spirotoxin" poisoning.

Dr. Hurtle said that he had worked for a considerable time in an atmosphere containing fifty-eight parts of carbonic acid per 10,000. The carbonic acid had been generated by a gas burner, yet he had suffered no inconvenience when working in that atmosphere.

Mr. Goodenough (Gas Light and Coke Company) said that the complaint that a gas fire gave a dry heat was due to the room becoming stuffy from want of ventilation. Opinions might differ as to the desirability of obtaining an increase in moisture as the temperature of the room increased, for it is well known that a dry heat is more tolerable than a moist heat.

The Chairman (Colonel Lane Nott, M.D.) considered that little attention need be paid to the amount of carbonic acid generated by the gas, but the effect of moisture in the atmosphere is a question which should receive serious consideration. In a place like Singapore, for example, the evil influence of an excessive quantity of moisture in the atmosphere is very apparent.

The majority of the speakers condemned the use of flueless stoves in bedrooms and dwelling-rooms, while admitting their usefulness and suitability for warming passages, halls, and shops. That is, we think, the reasonable view. It is easily possible to exaggerate the evil of the influence of the products of gas combustion upon health, but, taking into consideration the possibility of the presence of the products of incomplete combustion through the use of a dirty or defective stove, we think that the proper course is to discourage their general use in bedrooms and badly-ventilated dwelling-rooms.

THE POST OFFICE LONDON DIRECTORY.

We have received from Messrs. Kelly's Directories, Ltd. (High Holborn, W.C.), the Post Office London and County Suburbs Directory for the ensuing year. The work, which forms a complete and reliable directory of the City and County of London, can be had in one or two volumes, or the London Directory can be had by itself without the County Suburbs, and in any form the work is so comprehensive, well arranged, and edited that there appear to be few, if any, means by which it could be improved. Some users of the Directory no doubt find the combined work cumbersome, but they would probably readily admit the great convenience of having in one volume a directory which not only deals with the area covered by the London Post Office Directory, but which extends to the extremity of the county of London; but should the inconvenience of size outweigh the convenience of reference, the work, as already stated, can be had in separate parts.

The Directory, the present issue of which is the 108th edition, contains an excellent map, mounted on linen, which is clearly printed and reliable—as, indeed, is the whole work. The Directory is well known and indispensable to professional and business people and others, and it deserves to be.

PLANNING OF SCHOOLS.

The following report of the Education Committee of the London County Council was submitted at the meeting of the Council on Tuesday:—

We have considered the question of the general principles to be adopted in planning public elementary schools, regard being had to securing (i.) that the most economical and effective use is made of the accommodation provided in the schools, and (ii.) that the buildings shall be planned to the greatest possible advantage from an educational standpoint.

In the course of our deliberations we have been impressed with the fact that it is wasteful to provide at a cost of about 20l. per head on an average a large number of places in classrooms which, from an educational point of view, ought not to be, and, as a matter of fact, are not being fully used. We have been furnished with exhaustive reports upon the organisation of schools of various types and sizes.

In dealing with plans of new schools and enlargements of existing schools, it is necessary to bear in mind the actual number of additional places required in order to show that there is a place for every child likely to be in attendance at any one time, and also to secure that the number of places provided in each school can be distributed among the several classes consistently with a definite number of children passing annually through them during the range of age of compulsory attendance.

There are two obvious considerations which affect the maximum and minimum dimensions of class rooms, namely: (i.) The maximum number of pupils with whom a teacher can satisfactorily deal. This number varies with different teachers. (ii.) The consideration that the rooms are designed for class teaching as distinguished from individual teaching, and if the class is too small, the stimulus and consequent enthusiasm which is derived from numbers will be absent.

The minimum dimensions of a class determined by this second consideration are unfortunately considerably below those which a due regard to economy must enforce in connexion with the design of public elementary schools. The consideration may itself, therefore, be left out of account, motives of economy pointing to the necessity for designing the majority of the classrooms for the maximum of accommodation consistent with the capacity of the average teacher.

In this connexion the inspector of the Board of Education, when reporting upon a secondary school, has stated that "so long as classes exceed twenty-five or thirty in number, so long will the methods in use continue to be those which are associated with the handling of large and untidy classes in public elementary schools, in which the individual is lost in a crowd."

We consider that the time has arrived when the Council should definitely fix forty as the limit of accommodation for a classroom in the senior departments of schools to be erected by the Council in future, this being the maximum number of children who, in our opinion, ought to be taught at one time by any teacher of average capacity. This is the number to which both the late authority and the Council have endeavoured to work for some years past, and each recent school has been built to contain two or more forty-room departments.

In a two or three-story school the corresponding classrooms in the infants' department will provide accommodation, as a rule, for forty-eight children, but in a school in which the departments are built in separate blocks there will be no such necessary relation between the accommodation of the class rooms in the infants' departments and those in the senior school.

In considering the matter from an architectural point of view, we have received valuable assistance from the architect (Education), who has given us the results of his long experience—extending over a period of thirty-four years—in designing public elementary schools in the county under the late authority, and has also furnished us with a report showing the changes which have taken place from time to time

in the method of planning school accommodation. He has also submitted to us sketch plans and estimates for the types and sizes of buildings which are most likely to be required in future. These plans will be laid upon the table for the inspection of members.

Scheme "C" represents a school to provide accommodation for 840 children, viz., 270 boys, 270 girls and 300 infants. In each of the senior departments there are five classrooms each to accommodate forty children, and two classrooms each to accommodate thirty-five.

Scheme "D" shows a school affording accommodation for 968 children, viz., 310 boys, 310 girls, and 348 infants, and each of the senior departments consists of six rooms each to accommodate forty, and two rooms each to accommodate thirty-five.

Scheme "E" represents a school to accommodate 1,224 children, viz., 370 boys, 370 girls, and 484 infants, and contains in each of the senior departments eight rooms each to accommodate forty, and two rooms each to accommodate thirty-five.

The rooms in the infants' department of each of the above-mentioned types of schools will, in the event of brick division walls being provided, afford accommodation as follows—in the rooms corresponding to the rooms for forty in the senior departments, forty-eight children each, and in the remaining rooms, which will be available for babies, thirty children each.

As regards schools of the three-story type, the size of the rooms in the infants' department on the ground floor is determined by that of the rooms on the floor above, and the accommodation works out at about 9 sq. ft. a place by reason of the fact that smaller desks are used, and consequently an additional row can be placed. In our opinion, however, this method of calculating the accommodation of such classrooms is unsound in principle. The only true basis of the accommodation of a classroom appears to us to be the number of children who can properly be seated, sufficient allowance being made for teachers' desk, blackboards, etc., and if 10 ft. super. is a proper allowance in the senior departments of public elementary schools, we do not think that less space should be allowed in the infants' departments. Indeed, but for the heavy additional expenditure which would be involved, we would have recommended the Council to adopt the same basis of calculation in the infants' department.

We have referred more particularly to three-story buildings, as this is the type of school which has been erected in the majority of instances in the past, but it should be pointed out that, as the need for new schools in the future is likely to be greater in the suburbs than in the more densely populated parts of the county, it will probably be necessary to secure larger sites, thus more frequently enabling separate buildings of one or two stories to be erected. The majority of schools built during the last four or five years, however, have been of the two-story type, and the Board of Education have expressed their preference for this type of school to the type consisting of three stories.

In connexion with the general question, we have been considering the possibility of providing partitions instead of permanent structural brick division walls between the classrooms, in case it should be thought desirable at any future time either to alter the shape or reduce the size of the classrooms—such an arrangement could be carried out without incurring much expense, and we have approved a plan showing how it would be possible to obtain such elasticity in working.

The subjoined statement shows the estimated cost of erecting on suitable sites three-story schools with accommodation as follows: (i.) School for 840 places, estimated cost, main building only, 8,824l.; estimated cost, a place, main building only, 10l. 10s. 6d. (ii.) School for 968 places, estimated cost, main building only, 13,120l.; estimated cost, a place, main building only, 13l. 11s. (iii.) School for 1,224 places, estimated cost, main building only, 15,128l.; estimated cost, a place, main building only, 12l. 7s. 2d.

The difference in cost between (i.), (ii.), and (iii.) is caused by the provision of two staircases in (i.) and four in (ii.) and (iii.), as suggested by the requirements of the Board of Education.

We think it right to point out that the proposed rearrangement of structure will, in the case of most of the new schools, involve an addition to the staff of the school, consequent upon the lesser number of children which will be taught in one room. We cannot give any exact estimate, as the number must depend upon the plan finally adopted in each school. Any additional expenditure in respect of staff thus incurred will be, nevertheless, more than compensated for by the better teaching which will be given to the children, by reason of a lesser number being taught in the separate class. We recommend that, as a general rule, in public elementary schools to be erected in future no classroom in the senior departments be planned to accommodate more than 40 scholars, and no classroom in the infants' department for more than forty-eight, except in particular cases in which, in the opinion of the Education Committee, there are circumstances which render a modification in the design or character of the building desirable.

Fifty Years Ago.

FROM THE *Builder* OF DECEMBER 20, 1856.

THE CHELSEA EMBANKMENT.

A DEPUTATION from the vestry of Chelsea, consisting of Mr. Tite, M.P., Mr. Fielder (churchwarden), Mr. Perry, Mr. Slade, Q.C., Mr. Foy, and Mr. Hall, attended by Mr. C. Lahee, vestry-clerk, waited on Sir Benjamin Hall at the office of the Board of Works, Whitehall-place, on Thursday, December 11, on the subject of the Chelsea embankment.

Mr. Tite, having introduced the deputation,

said—The embankment, as originally proposed was to have extended from Vauxhall Bridge to Battersea Bridge, and to complete the work a sum of 143,000l. was voted by Parliament. It so happened, however, that it executing one-half of it the money was nearly all expended, and when the deputation urged upon Sir Benjamin the absolute necessity of completing it, he said there was no compulsory power vested in the Board, but that he would ascertain if any money were left of the sum which had been voted for the purpose. We produced on that occasion also a pledge after pledge given by former commissioners that the work should be completed.

Sir Benjamin Hall said, in reply, he had been over the whole of the works beginning at Vauxhall Bridge, and found that they had been dragging on in a very improper way. He was quite prepared to carry them out as far as the property of the Government went, but had no power to go further: our power, said he, only allows us to negotiate with the parties who possess property along the embankment, and it is permissive with them to agree to or reject the proposals. They had rejected them, and had stated that if the works go on they will resist; indeed, beyond Chelsea Hospital we have been thwarted in every possible way, and our means do not enable us to prevent it. He was anxious to carry out the work, and believed it would be one of the finest things in the metropolis.

Illustrations.

INTERIOR, ST. RÉMY, DIEPPE.

THIS illustration is reproduced from an oil painting by Mr. A. C. Conrade.

Between the cylindrical columns of main arcade are seen the curious stilted arches of the ambulatory, and the Renaissance tereos. The lighting of the picture is very effectively managed.

DESIGN FOR A TOWN CHURCH.

THIS design was prepared in competition for the 60l. Travelling Studentship at the R.A. Schools, in accordance with conditions published to the students early in the year.

A confined irregular site at the corner of two streets was given, with light partially blocked on the north and east sides. A tower, and seats for 900 people, were required to be shown.

The eastern position of the tower was adopted to provide a satisfactory stop to the houses in the street at the south east of the building, and to screen the difference in the line of the street frontages and the axis of the church. The building-line of the streets was kept by the granite base, above which the masses of the church follow the form of the interior.

The whole of the seating required was provided on the ground floor, the plan being arranged so as to avoid piers among the seats. Passage aisles at the sides of the church are practically in the thickness of the walls, which were designed solid to keep out the noise and vibration of the street traffic.

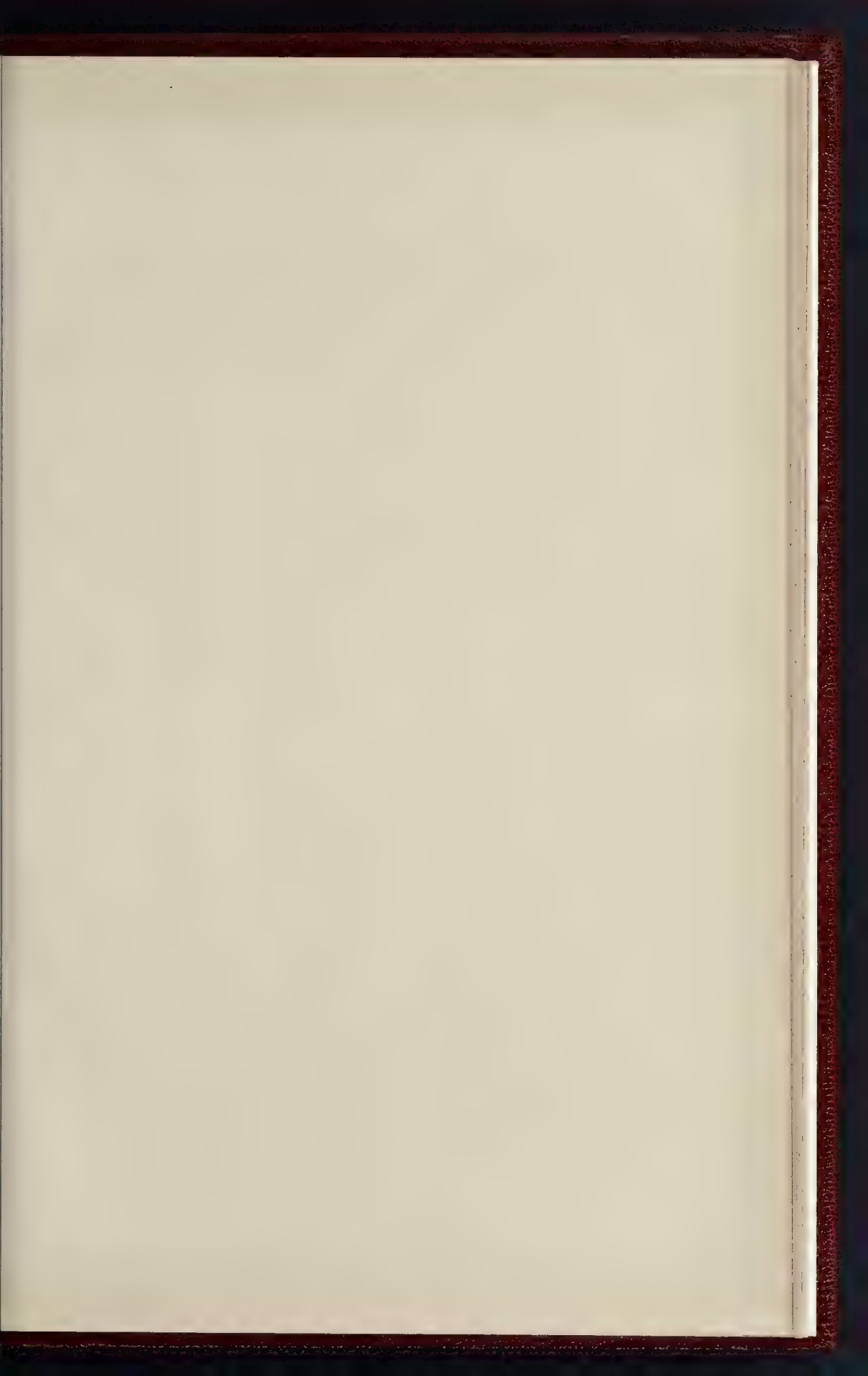
Two organs were proposed in galleries at the sides of the choir, under which is a working basement.

The materials intended to be used were granite for the base, Portland stone facings, and the domes covered with marble slabs.

WILLIAM HARVEY.

*** In regard to our criticism, in our article on "Royal Academy Students' Designs," as to the small space shown for the organ on the plan, Mr. Harvey has explained that this was only meant to provide for some of the mechanical portions of the instrument, the organ itself not being shown on the ground plan.—Ed.

SCHOOL, ACTON.—A new school building, erected in Southfield-road, Acton Green, by the Acton Education Committee, the contract price for which was 22,587l., has just been opened. Designed by Messrs. Monson, architects, the schools provide accommodation for 1,137 scholars, each floor of a three-story building having a large central hall and seven classrooms. The building is lighted throughout by electricity, and there is a cookery centre fitted with all the latest appliances.



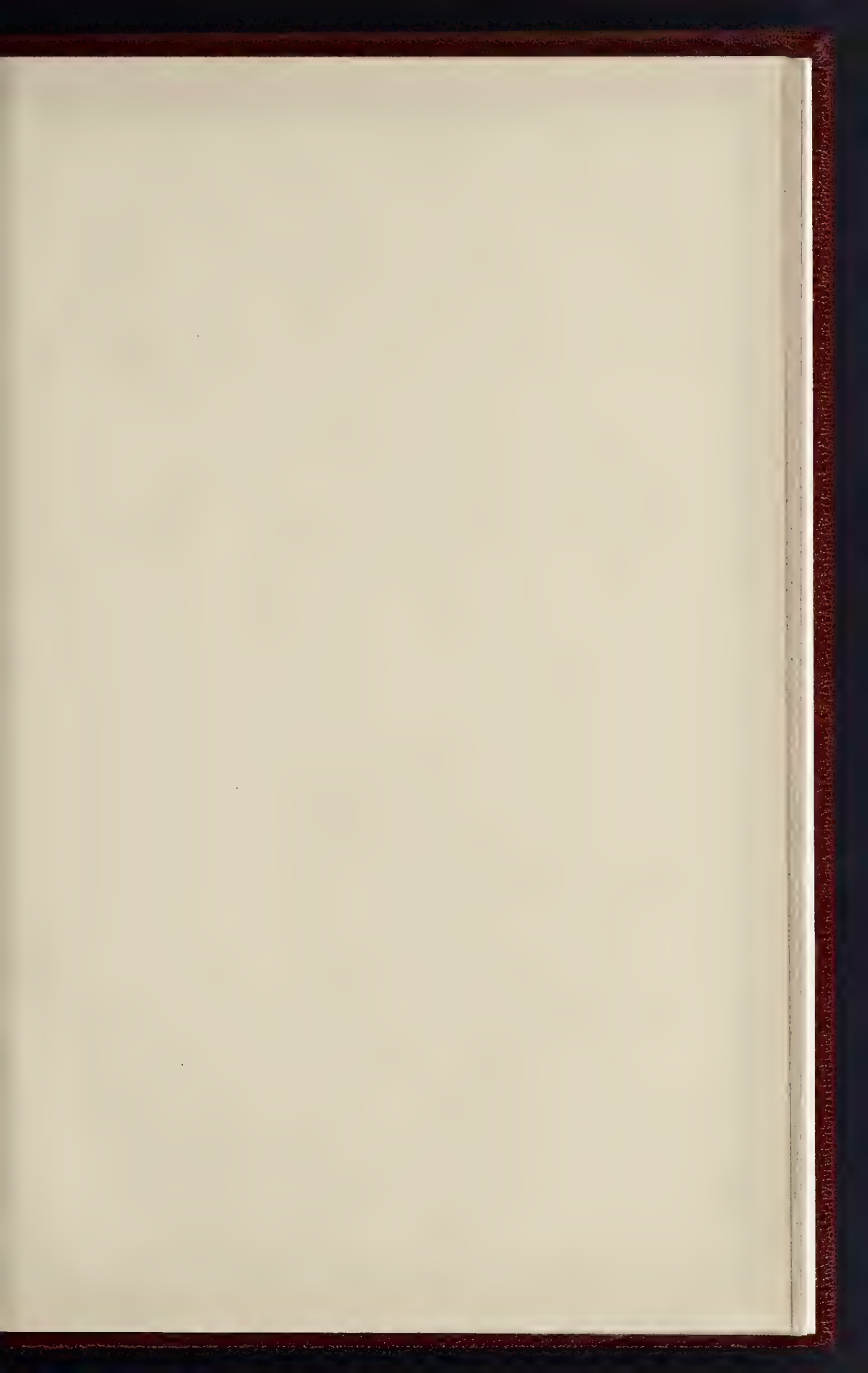
THE BUILDER DECEMBER 22 1906





INTERIOR CHURCH OF ST REMY, DIEPPE

FROM A PHOTOGRAPH BY MR A C COLEMAN



A TOWN CHVRCH
AT THE CORNER OF TWO ST
TO HOLD EIGHT HVNDRED PEO
AND TO HAVE A TOWER.

SOUTH ELEVATION:

HOUSES IN
STREET BY
WEST FRONT



TS



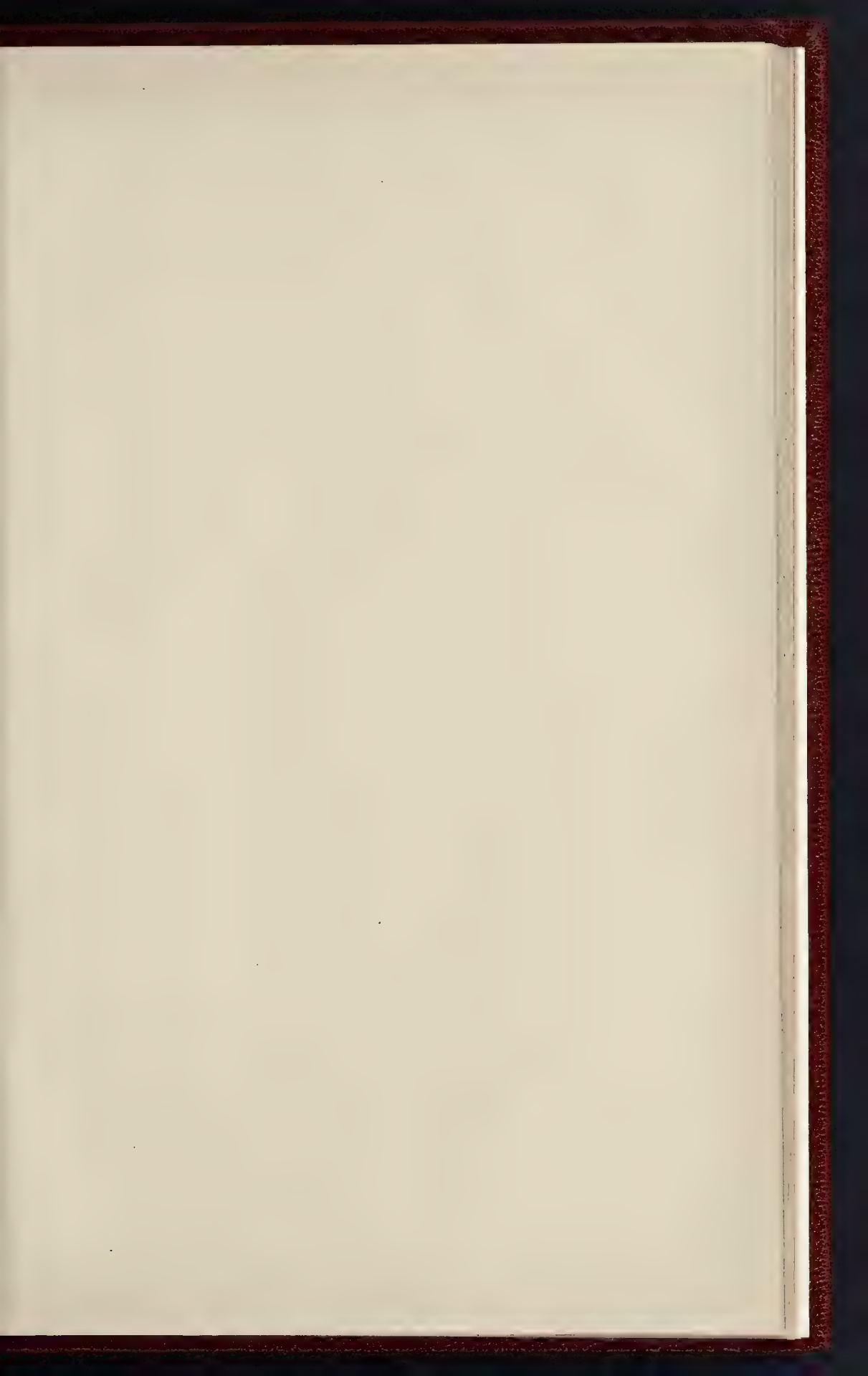
THE TOWER STANDS
CLEAR OF THE UPPER
WINDOW AND GABLE
AND HAS 16 FEET
SQUARE TO THE STREET.

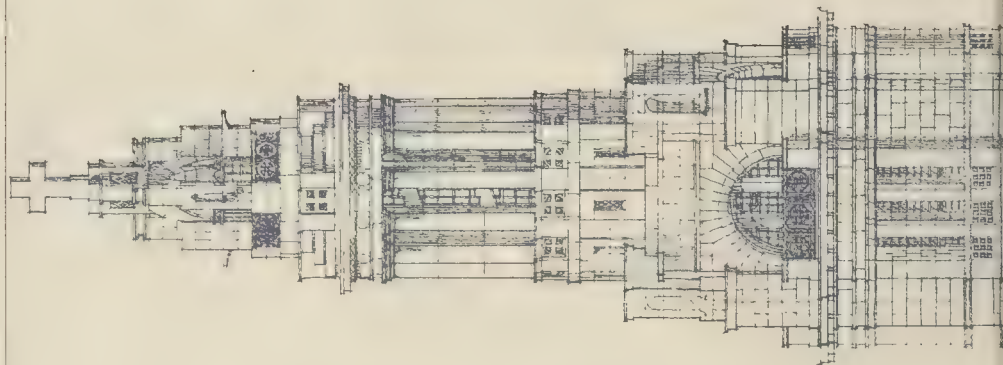
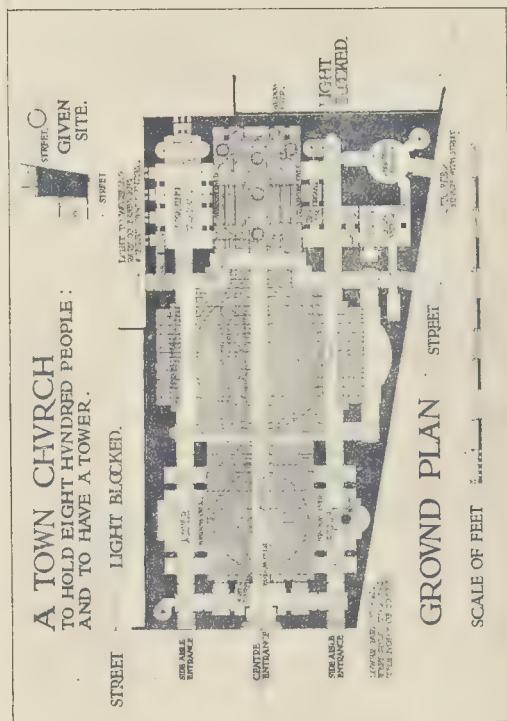
HOUSES IN
STREET ABOUT
HERE UPON
THE TOWER.

FOOT LEVEL
IN CHAIR

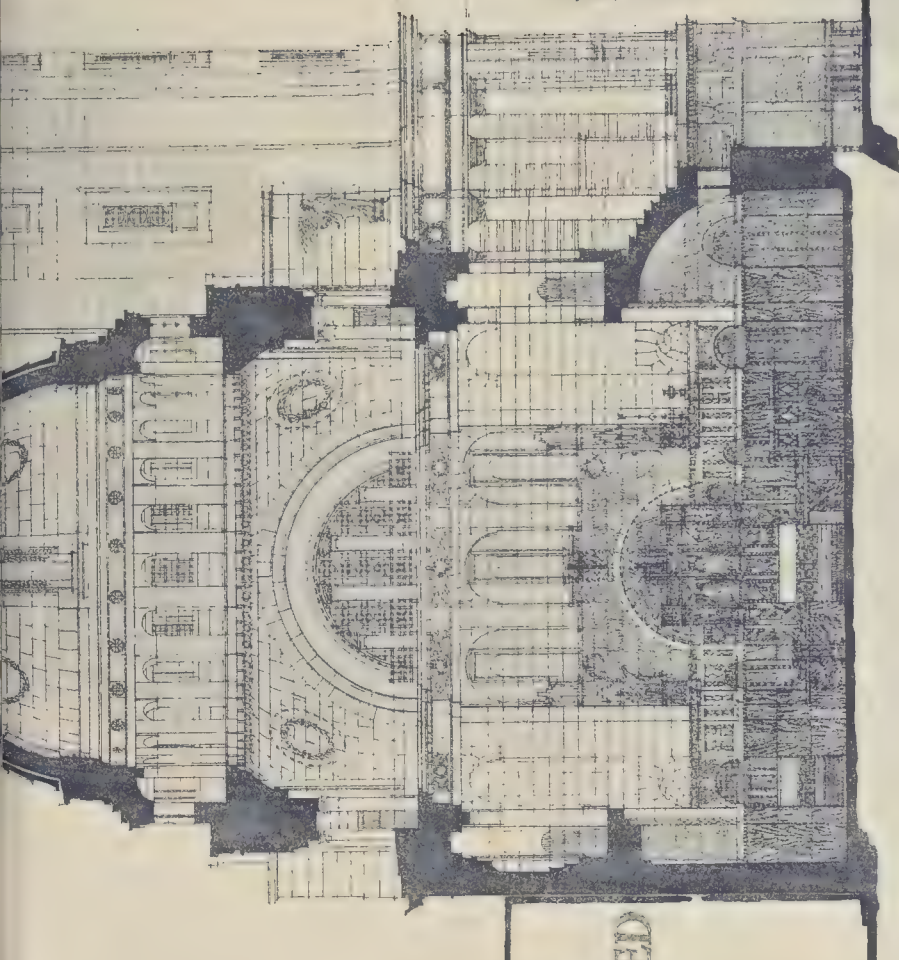
SCALE OF FEET.

IN PHOTO IMAGE C. L. 4 & 5 EAST HURON STREET FETTER LANE E.C.





CROSS SECTION SHEWING EAST END.



HOUSES ABVT
ON TOWER
WHICH FACES
SQUARE TO THE
STREET.

LIGHT
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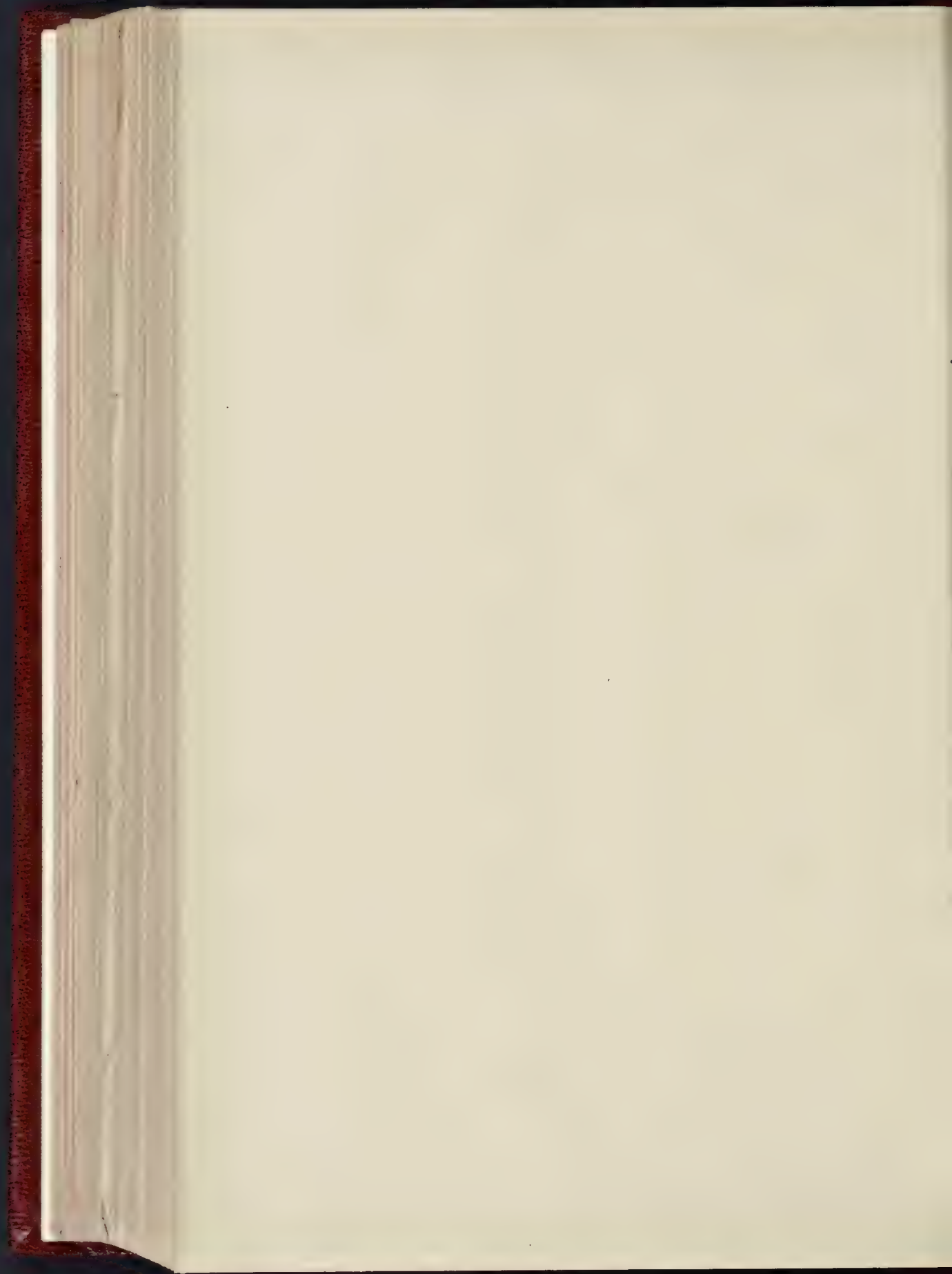
SCALE OF FEET

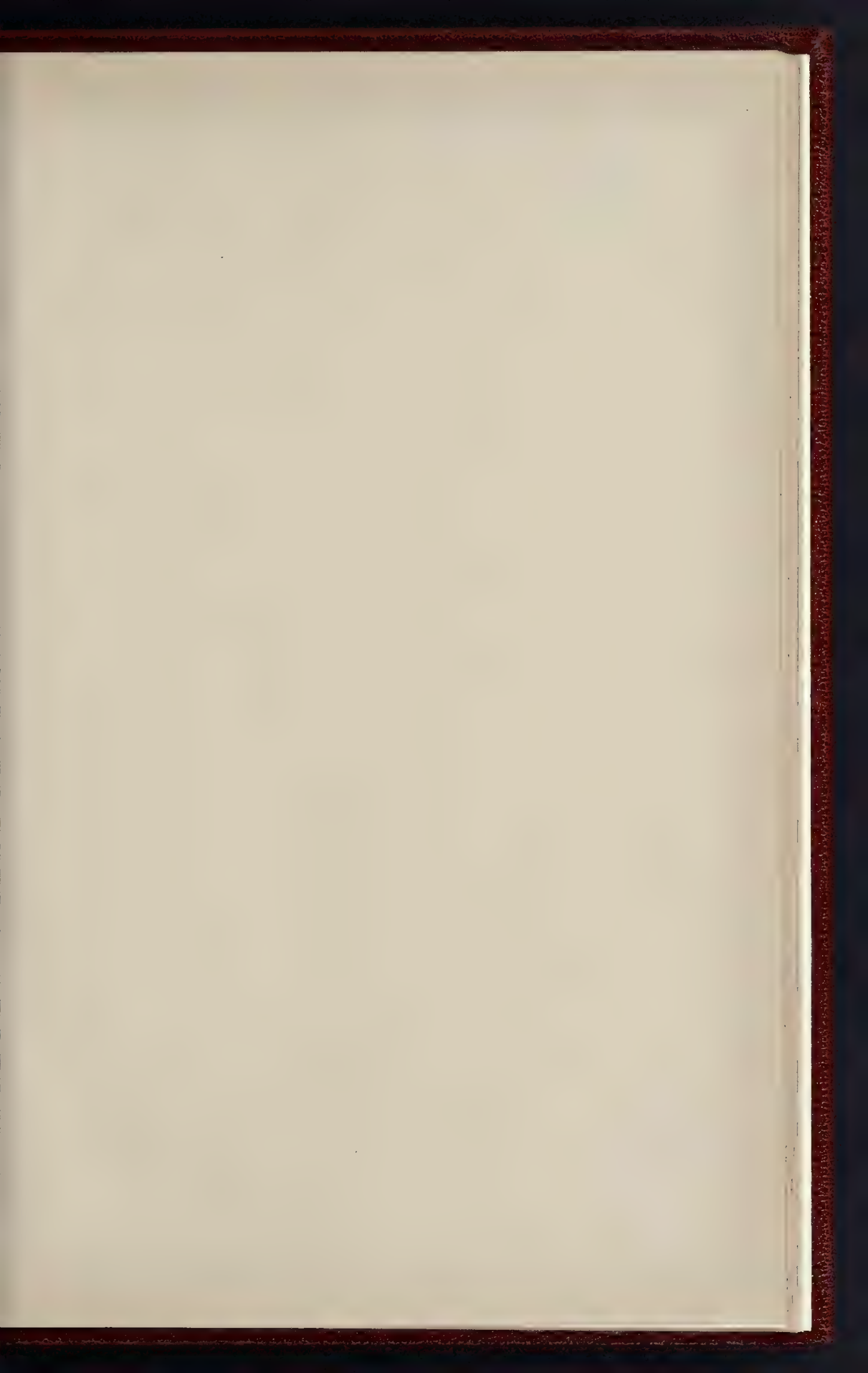
THE PHOTO PLATE C. 1. 4. 3. 1/251 HAWKING STREET LITTLE LANE E.C.

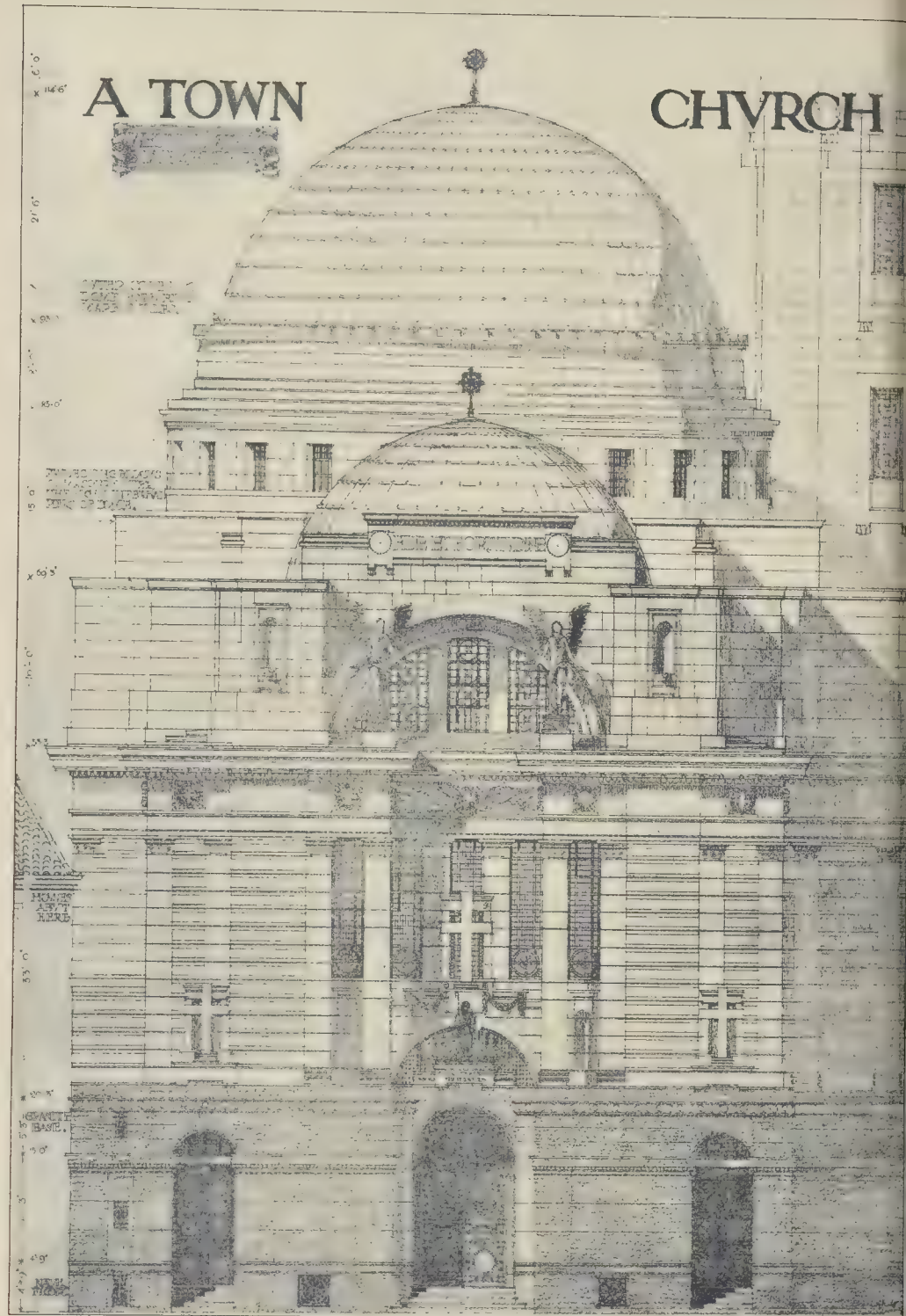
DESIGN FOR A TOWN CHURCH.—By MR. WILLIAM HARVEY

SECTION AND PLAN.

Royal Academy Travelling Studentship, 1906.







WEST ELEVATION.

Royal Academy Travelling Studentship, 1906.

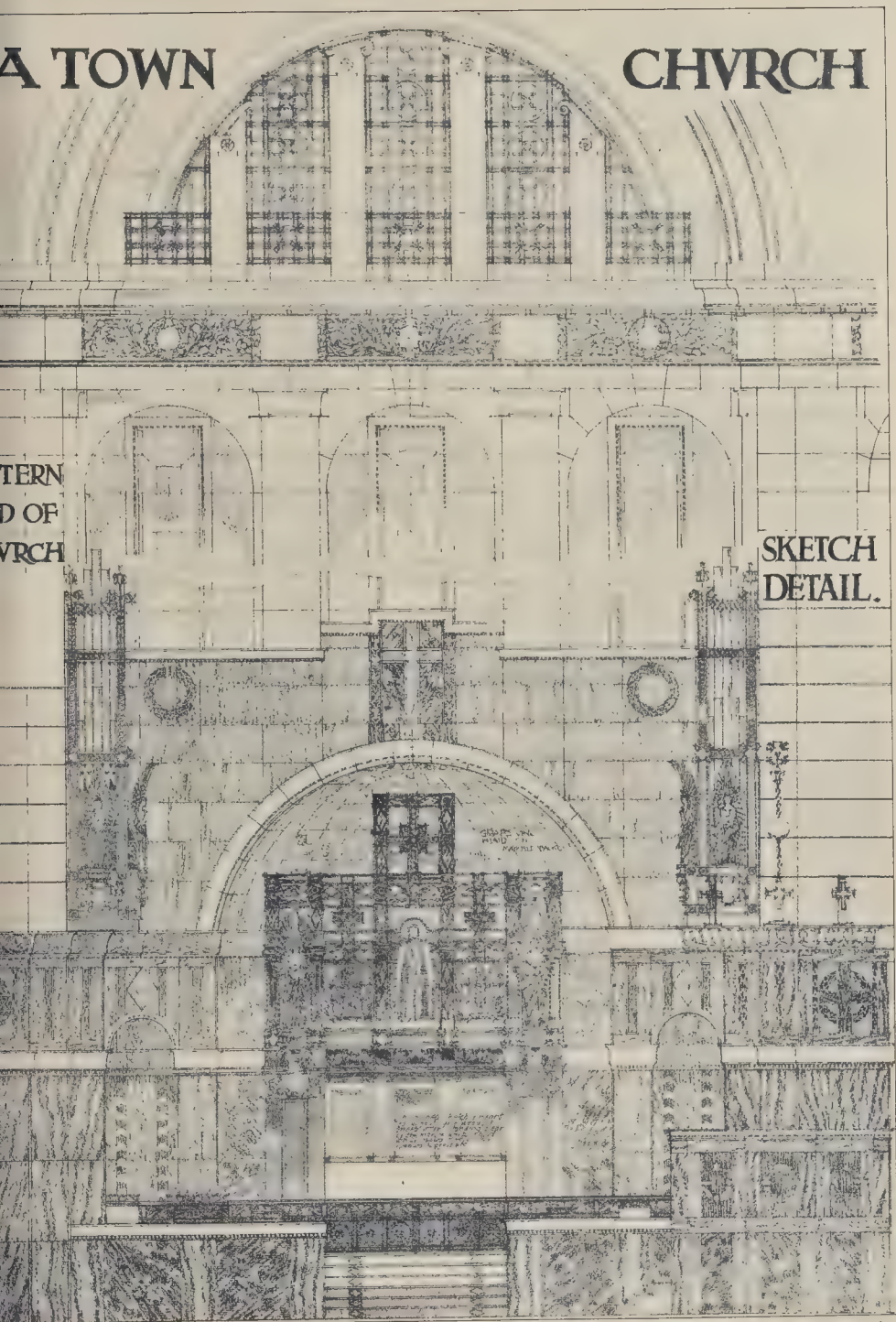
DESIGN FOR A TOWN CH

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DETAIL.



INTERIOR ELEVATION OF EAST END.

—By Mr. WILLIAM HARVEY

THE LONDON COUNTY COUNCIL.

The last meeting of this Council before the Christmas recess was held on Tuesday in the County Hall, Spring-gardens, S.W., Alderman Spicer, Chairman, presiding.

Loans.—On the recommendation of the Finance Committee, it was agreed to lend Battersea Borough Council £7,375*l.* for contributions to street improvements; Hammersmith Borough Council £18,985*l.* for electric lighting; Lewisham Borough Council £74*l.* for paving works. Sanction was also given to borrowing the following—£1,637*l.* for paving works by Hampstead Borough Council; £4,394*l.* for electric lighting by St. Marylebone Borough Council; and £7,109*l.* for contribution to street improvement and £9,831*l.* for electric lighting by St. Pancras Borough Council.

Lack of Employment.—The General Purposes Committee recommended, and it was agreed:—

"That it be an instruction to the Committees of the Council, who have furnished particulars of work done by the Central Board (Unemployed) Body for London as suitable for the classes of the unemployed qualified for assistance under the Unemployed Workmen Act, 1905 (i) that the Central Board shall be employed as responsible for the conditions of the employment as between themselves and the persons employed; (ii) that the works executed by the Central Board shall be subject to supervision by the proper officers of the Council; and (iii) that the amount of co-operation in cost on the part of the Council shall be such as is certified by the Council's officers to be the fair value of such work."

Position of Voluntary Schools.—The Education Committee recommended that peremptory notice should be served on the managers of thirty-two voluntary schools in London that the Council would cease to maintain them as from a fixed date, by reason of the unsuitability of the premises.

Mr. Graham Wallas stated that since the last meeting plans had been sent in by the managers in most cases, showing that these gentlemen desired to put their houses in order. On behalf of the Education Committee he was, therefore, willing to make a concession, by which they would be willing to extend the time by one month, and also to give a month's notice of intention to withdraw maintenance.

In that amended form the recommendations were adopted.

Disposal of the Council's Surplus Property.

The Improvements Committee reported as follows, the recommendation being carried after discussion, during which it was contended by some speakers that the Council would not be able to dispose of its land unless better conditions were offered:—

"We have carefully considered for some time past whether any means can be adopted to expedite the letting of the Council's property, and, in connexion with this question, the suggestion has been made that lettings might be facilitated if persons who approached the Council with regard to taking leases of its property were given information as to the value of the land, and the Council recommended to accept. It has also been suggested that the prices per foot which the Council would be recommended to accept for the various sites should be fixed at once that the Council would be able to let the land which had been so fixed should be accepted."

The Council will remember that our proceedings with regard to the letting of land are governed by paragraph 8 of our order of reference which empowers us, subject to the Council's sanction, to enter into contracts for the sale or lease of land "provided that, unless the Council otherwise direct, all property to be sold or let shall in the first instance be submitted to public auction." In the case of property submitted to auction it is necessary for a reserve to be fixed for each lot. This reserve is fixed by us after consideration of a report by the valuer as to his valuation of each lot. These reserves are in sealed envelopes, which are not opened unless substantial offers are received during the auction. In the case of lettings by private treaty it is our practice to consider such offers as are received, and to make estimates of the value of the sites to which the offers relate. Unless it is clear that the offers are bona fide, no information is given as to the prices which the Council would be recommended to accept. Inquiries are often received from persons who are seeking information only to enable them to hawk the property and thus earn commission or to make a profit, and the Council would probably accept. It is clearly not to the interest of a public authority like the Council that such proceedings should be encouraged, and we therefore see no reason to depart from the present practice.

With regard to the suggestion that prices should be fixed once for all for the various sites belonging to the Council we desire to point out that the more valuable portions of the Council's surplus property are such a description that it is impossible to fix the true value of the sites until the market has been tested and the extent of the competition ascertained. Even in the case of ordinary property there have been several instances where the rent eventually received has been greatly in excess of that which, having regard to the previous transactions in property in the locality, we should have

advised the Council to accept. The only object of fixing the rents would be to fix the minimum with a view to inviting offers. This might have the result of disposing of some of the lands more readily, but the difference between the minimum and the proper rent would accrue as profit to the lessee. We consider that such a course might lead to a state of affairs similar to that revealed at the inquiry into the work of the late Metropolitan Board of Works. It will be sufficient, perhaps, if we quote three instances of the abuses which are likely to occur. In one case a site, leased by the Board for 550*l.* a year, was let very soon afterwards at a rent of 1,050*l.* In another case property was sold for 1,500*l.*, which was resold within a year for 3,000*l.*; in a third case a site was resold at a profit of nearly 2,000*l.* before the original purchaser had even obtained the land from the Board. Although there were other reasons, we think that these results may be chiefly attributed to the anxiety of the Board to dispose, as soon as possible, of its surplus land. We conceive it to be the wish of the Council that, instead of a large profit being secured by private speculators out of dealings in its surplus land, every effort shall be made to obtain for the public adequate rents for the land belonging to the Council. We recommend that no departure be made from the present practice with regard to the disposal of the Council's surplus land."

Houses Let in Lodgings.—The Report of the Public Health Committee on this subject, printed in our issue for December 8, was carried after a brief discussion.

Tramways.—The Highways Committee recommended:—

"That the estimates of expenditure on capital account, amounting in all to 91,870*l.*, submitted by the Finance Committee, be approved, in respect of the reconstruction, or construction, and equipment for the underground conduit system of electric traction, of the undermentioned tramways, namely:—

Tramways.	Fatimate Number.	Details of Estimate.		Total.
		Trackwork, etc. (excluding rails).	Cables and Cable Ducts.	
(1) From Vauxhall via South Lambeth-road and Stockwell-road to Brixton-road	5595	£ 59,100	£ 3,050	£ 62,150
(2) From Vauxhall via Tooting High-street to a point opposite Longley-road authorised by the London County Council (Tramways and Improvements) Act, 1901.	5596	8,200	1,958	10,158
(3) From Tooting High-street via Mitcham-road to the county boundary near Tooting-junction railway-station, authorised by the London County Council (Tramways and Improvements) Act, 1906	5597	16,300	3,262	19,562

"That the estimates of expenditure on capital account, amounting in all to 37,350*l.*, submitted by the Finance Committee, be approved in respect of the provision of machinery, plant, etc., at the proposed Loughborough Junction and Tooting sub-stations, namely:

Sub-station.	Estimated No.	Details of Estimate.		Total.
		Machinery, Plant, etc.	Cable, Cable Ducts, etc.	
Loughborough Junction	5598	£ 8,850	£ 9,250	£ 18,100
Tooting	5599	8,850	10,440	19,290

"That the estimate of expenditure on capital account of 6,200*l.*, submitted by the Finance Committee, on account of the provision and laying of cables, cable ducts, etc., required for the reconstruction, for the underground conduit system of electric traction, of the tramways from Vauxhall, via South Lambeth-road and Stockwell-road to Brixton-road, be approved."

That the contract entered into with Messrs. Reid Brothers, as reported on October 10, 1905, for the laying of cable ducts in canways in connexion with the Council's tramways, be extended so as to include the laying, at a cost not exceeding 6,200*l.*, of the cable ducts.

Erection of Holloway Car-shed.—The Highways Committee brought up the following report:—

"We have had under consideration the question of the erection of a car-shed to be built at Pemberton-gardens, Holloway. The Council, on December 12, 1905, decided to acquire the interest of the Tufnell and Caledonian Park Syndicate in the property known as the Caledonian Football Ground, for a sum of 20,000*l.*, for the purpose of the erection thereon of this car-shed. The building will be required in connexion with the electric working of the tramways in Holloway-road and City-road, for which estimates were approved on December 4, 1905, and for other portions of the Council's tramways to be reconstructed in the near future. The Council on the same date approved an estimate of 255,000*l.* for the provision of 350 additional electric cars for the working of new tramways to be laid during the year 1907-8, and a large number of these cars will be accommodated in the proposed new car-shed, which, when completed, will house 328 cars. We reported on December 19, 1905, that it was proposed to invite tenders for the erection of the car-shed from certain selected firms upon the basis of a schedule of prices, and the Council decided that quantity surveys should be employed to measure up the

completed work in order to ascertain the precise cost. In order that the building may be ready by the time required, it is desirable that the work should be commenced without delay. With this object, the Council will have before it on December 11, 1906, a report in which we suggest that we should be authorised during the Christmas vacation to open any tenders which may be received. The total cost of the work is estimated at 100,000*l.*, which includes the cost of erection of a foreman's house, the provision of traversers, the rails and trackwork in the car-shed, and certain incidental expenses. We recommend that the estimate of expenditure on capital account of 100,000*l.*, submitted by the Finance Committee, in respect of the erection of the Holloway (Pemberton-gardens) tramways car-shed, including incidental expenses, be approved."

Norbury Estate—Brickmaking.—The Housing of the Working Classes Committee reported that burnt ballast will still be required in the making up of roads and footways and in connexion with building operations on the estate, and it is proposed to manufacture concrete blocks and slabs from burnt ballast and the broken materials left from the brick burning. The concrete blocks will be required for use in the construction of retaining walls, etc., and the concrete slabs will be used for the internal walls of the cottages. The supply of red bricks made or in course of manufacture will only be sufficient for about one-half of the cottages shortly to be erected on section B, and the Committee propose to continue the manufacture of red bricks in small quantities in accordance with the demands of the estate. About 2,942,000 stock bricks and 180,000 red

bricks have been made during the season, and an offer has now been received for the purchase of two clamps, together containing about 900,000 bricks, which for present purposes may be regarded as surplus stock. The Committee recommended:—

"That the estimate of expenditure on capital account of 1,200*l.*, submitted by the Finance Committee in respect of the employment of labour and the purchase of materials required in connexion with the burning of ballast, the manufacture of red bricks, and concrete slabs and blocks, and the care of the brick-making machinery and plant on the Norbury estate during the season 1906-7, be approved."

Vauxhall Temporary Bridge.—The Improvements Committee recommended, and it was agreed:—

"(a) That the estimate of expenditure on capital account of 5,000*l.*, submitted by the Finance Committee in respect of the demolition of Vauxhall temporary bridge, and of the works incidental thereto, be approved."

"(b) That expenditure not exceeding 5,000*l.* be sanctioned in respect of the demolition of Vauxhall temporary bridge, and of the works incidental thereto; that the tender of C. Wall, Ltd., to undertake the removal of the bridge, and the execution of certain other works to the satisfaction of the Council and of the Thames Conservancy, and to pay the Council 50*l.*, be accepted."

Land at Shooter's Hill.—The Parks and Open Spaces Committee recommended that the estimate of expenditure on capital account of 4,620*l.*, submitted by the Finance Committee in respect of the acquisition of 9 acres of land at Shooter's Hill for the purpose of a public open space, including legal and other expenses, be approved. The recommendation was carried.

Paving of Roadways Outside Schools.—The Education Committee recommended, and it was agreed:—

"That, to meet the educational requirements, it is essential that the tracks of the tramway lines of the Council opposite to London County Council schools should be laid with wood or other silent paving, and that the Highways Committee be instructed to consider and report upon the whole question."

District Surveyors.—The Building Act Committee reported as follows:—

"We regret to have to report the death, on October 19, 1906, of Mr. Henry William

Stock, District Surveyor for the district of Limehouse, Wapping, St. Katherine, and Ratcliff. Mr. Stock was fifty-five years of age, and was appointed as a district surveyor in 1888.—Mr. William Hewson Lees, District Surveyor for the district of Holborn, East Strand, and part of St. Pancras, and Mr. Daniel Robert Dale, District Surveyor for the district of West Streattham, have resigned their appointments as from December 31, 1906, and March 31, 1907, respectively.

New County Hall—Fees of Assessors in the Competition for Designs.—The Establishments Committee reported as follows:—

We have considered the question of the remuneration to be made to the assessors appointed to adjudicate on the designs submitted in the competition for designs for the new county hall. It will be remembered that Mr. Norman Shaw, R.A., and Mr. W. E. Riley, F.R.I.B.A., the Council's Architect, will act in both stages of the competition, and that these two gentlemen will be assisted in the final stage by a third assessor, who will only act at that stage. The duties of the assessors will, of course, be heavy, onerous, and very responsible, and, having conferred with Mr. Shaw, we suggest that Mr. Shaw and the assessor to be nominated by the architects competing in the final fixed stage of the competition should receive 1,000 guineas each, but we do not suggest that Mr. Riley should be specially remunerated for his duties as assessor. We recommend:—(a) That the estimate of expenditure on capital account of 2,100*l.*, submitted by the Finance Committee in respect of the fees of Mr. Norman Shaw as an assessor, and of the assessor, to be nominated by the competitors in the final stage of the competition, for obtaining designs for the new county hall, be approved; (b) That expenditure on capital account not exceeding 2,100*l.* be sanctioned for the payment of a fee of 1,000 guineas each to Mr. Norman Shaw as an assessor on the designs submitted in the competition for designs for the new county hall, and to the assessor, who will be nominated by the competitors in the final stage of such competition.

New County Hall—Conditions of Competition for Designs.—They also reported that:—

"The Council, on July 31, 1906, and December 4, 1906, agreed to the outlines of a competition for securing designs for the new county hall, to be erected on the Westminster Bridge site, and authorised us to take all necessary steps for obtaining the preliminary plans and arranging for the competition on the lines indicated in the report we submitted. The scheme approved for the competition was as follows:—That the competition be divided into two stages: (a) the preliminary; (b) the final. The preliminary stage to be open to architects of any nationality, and that not less than ten and not more than fifteen of the best designs shall be selected in private by the assessors; the final stage to be open to (1) the authors of the designs selected by the assessors in the preliminary stage, and (2) not exceeding eight leading architects to be invited by the Council, who shall not be required to lodge their designs with the Council until the date fixed for the delivery of the designs in the final stage of the competition.

There will be two assessors for the preliminary stage of the competition, and three for the final, and the question of their fees is dealt with in the preceding paragraph. The Council has already decided that each of the competitors in the final competition shall receive a fee of 200 guineas.

We have had under very careful consideration the question of drawing up the conditions by which the competition will be governed, and in this important matter we have had the advantage of the advice and assistance of Mr. Norman Shaw, R.A., and we have also been in frequent consultation with Mr. W. E. Riley, the Council's Architect. Detailed particulars of the accommodation required by the Council, having regard to the functions of the Council itself, the work of its Committees and of the several Departments, and the intricacies of their detailed workings both in their relations to each other and to the public, have been prepared on the lines indicated in our report of April 18, 1906.

There are several points in the conditions to which we attach considerable importance, and to which we wish to direct the special attention of the Council:—(i.) The instructions to competitors indicate that the particulars show the minimum accommodation required by the Council, and that the competitors will have licence to depart therefrom in any details which may be considered necessary for the development of the elevations. (ii.) Following the principle adopted by government departments in the buildings for the War Office, Admiralty, etc., we propose that the successful competitor in the final stage of the competition shall be assigned the work of carrying out his design. The Council's official Architect will be given discretionary powers in matters relating to internal economy, building, construction, and stability of the building, subject to the Council's approval in all matters which, in the opinion of the Council's Architect, should be brought to it for decision. It is intended that the successful architect shall exercise, in conjunction with the Council's Architect, general and usual superintendence of the works during progress, and examine and certify the accounts for the works and payments under the contract. (iii.) We propose that for their services the successful architect and the Council's Architect shall be remunerated on the usual basis of 5 per cent. on the total cost of the completed building, other than for work in connexion therewith which will not devolve on the successful architect, and that this commission shall be paid in the usual manner and allocated in the proportion of nine-tenths to the successful architect, and one-tenth to the Council's Architect. (iv.) It is proposed that the sum of

850,000*l.* shall be considered sufficient to provide a substantial structure suitable for the Council's purposes, exclusive of furniture and embankment superstructure, also of any special foundation which may be necessary. (v.) The attention of competitors is drawn to the fact that, in considering the design, the greatest importance will be attached to simple and convenient planning.

On the Council approving the conditions, steps will be taken so that they may be issued as early as practicable in the new year to the architects desiring to compete, and we may mention that a large number of inquiries have already been received in the matter.

We have already reported that suitable dates for receiving the preliminary and final designs will be May 7 and October 3, 1907, respectively, but the latter date will be largely dependent on the number of designs to be assessed. We recommend that the conditions, as submitted with this report governing the competition for designs for the new county hall, be approved, and that the Establishment Committee be authorised to take the necessary steps in the matter, and to deal with all questions of detail arising in connexion with the competition.

New County Hall—Selection of Eight Architects for the Final Stage of the Competition.—The same Committee also reported:—

We have had under consideration the question of the selection of the eight architects who are to be invited by the Council to submit designs in the final stage of the competition for designs for the new county hall. After the most careful consideration, we recommend that the Council do invite the undermentioned eight architects to submit designs in the final stage of the competition for designs for the new county hall:—Mr. J. Belcher, A.R.A., F.R.I.B.A.; Mr. W. Flockhart, F.R.I.B.A.; Mr. Ernest George, F.R.I.B.A.; Mr. H. T. Hare, F.R.I.B.A.; Mr. T. G. Jackson, R.A.; Mr. E. L. Lutyens, F.R.I.B.A.; Mr. L. M. Moulden, F.R.I.B.A.; and Messrs. Nicholson & Carleton.

The consideration of the three preceding paragraphs was deferred.

Motor Omnibuses.—The Highways Committee recommended:—

"That the Secretary of State for the Home Department be urged to give effect to the recommendation of the Select Committee on Cabs and Omnibuses in the Metropolitan as to the desirability of public control over the routes of motor omnibuses, and that, having regard to the heavy wear caused to the public streets by motor and other omnibuses plying for hire, it be also suggested to the Secretary of State that he should consider whether legislation should not be introduced requiring a proper contribution to be made by the owners of these vehicles towards the cost of maintaining the streets."

Heating, etc., Tramway Offices at Paul-street, Finsbury.—It was agreed that the offer of Messrs. Rosser & Russell to arrange for the ventilation of and the provision of heating apparatus at No. 59, Paul-street, Finsbury, for a sum of 194*l.* be accepted.

Provision of Sand drying Apparatus.—It was also agreed that the offer of Mr. E. Robinson to supply, for a sum of 250*l.*, a rotary and sand drier and motor be accepted.

Webber-row Estate, Southwark.—Completion of Algar and Dauncey-buildings.—The Housing of the Working Classes Committee reported as follows:—

"The third block of dwellings on the Webber-row estate named Algar-buildings is almost finished, and it is anticipated that the fourth block, named Dauncey-buildings, will be completed by the end of December, 1906. These two blocks of dwellings contains accommodation for 230 persons in twenty tenements of two rooms, and twenty-five tenements of three rooms, and upon their completion accommodation for 220 persons will have been provided on the estate. The remaining block has been designed to accommodate 210 persons."

Theatres, etc.—The following works have been sanctioned by the Theatres and Music Halls Committee:—

Means of escape from the ballet rooms and other works, Alhambra Palace of Varieties (Mr. W. M. Bruton).

Structural improvements of the Battersea Empire York-road, Battersea.

Dressing-room accommodation at the Hackney Empire, Mare-street, Hackney.

Arrangements in connexion with (1) the Furniture Trade Exhibition, to be held at the London Exhibition, Earl's Court; (2) the "Japanese Village" (Mr. A. O. Collard).

Permanent iron barrier at the London Music Hall, Shoreditch High-street (Messrs. F. J. Eed & Meyers).

Cue-table apparatus and stage lighting in the roof of the London Pavilion Music Hall, Piccadilly Circus (Messrs. Wyllson and Long).

Fire curtains at the new theatres in course of erection in Shaftesbury-avenue and Wardour-street and Shaftesbury-avenue and Wardour-street (Mr. W. G. R. Sprague).

Rendering floors, fire-resisting, old Swan Hotel Battersea (Mr. T. J. Jones).

Helter Skelter Lighthouse, Olympia (Mr. A. O. Collard).

Arrangements in connexion with the exhibition of the Society of Motor Manufacturers, Olympia: model cottage to be erected at the forthcoming Building Trades Exhibition, Olympia; and arrangements in connexion with "Hale's Tours of the World" (Mr. F. J. Payne).

Bottle lift, Oxford Music Hall, Oxford-street (Messrs. Wyllson and Long).

Lavatory accommodation at the Pavilion Theatre, Mile End, (Messrs. E. Runtz & Ford).

Arrangements in connexion with the King's room in the basement at the Playhouse, Northumberland-avenue (Blow & Billery).

Lighting arrangements at the Plumstead Baths (Borough Engineer of Woolwich).

Mission Hall, Acuba-street, Southfields (Mr. J. K. Bateman).

Alterations in the position of certain electric light points and radiators at the Savoy Theatre, Strand (Mr. A. Blomfield Jackson).

List of Rates of Wages and Hours of Labour. The Works Committee reported as follows:—

"An agreement has been arrived at between the London and District Association of Engineering Employers and the Amalgamated Society of Engineers, whereby employees in the engineering trade are to receive, as from October 27, 1906, an increase in wages at the rate of 1*s.* a week, or 4*d.* an hour. The Council's list of rates of wages and hours of labour requires amendment to give effect to this agreement, and we recommend that the Council's list of wages and hours of labour be amended in accordance with the above, and including October 27, 1906, in order to provide that the rate of wages payable to the undermentioned trades shall be as follows:—

Rate of pay.
Brass finishers, turners, fitters and
erectors, millwrights, smiths,
boilers, slotters, and planers per
hour 9*d.* to 9*½d.*
Pattern makers per hour 9*½d.*

Having transacted other business, the Council adjourned.

APPLICATIONS UNDER THE 1894 BUILDING ACT.

The London County Council at their meeting on Tuesday dealt with the following applications under the London Building Act, 1894. The names of applicants are given between parentheses:—

Lines of Frontage and Projections.

Battersea.—A one-story addition to the Battersea Polytechnic, on the southern side of Lurline-gardens, Battersea (Mr. J. Harwood for the Governing Body of the Battersea Polytechnic).—Consent.

Bermundsey.—A vestry addition in front of the church of St. Augustine, on the south side of Lynton-road, Bermundsey (Messrs. Hesket & Stokes for the Rev. A. E. Lait).—Consent.

Deptford.—A one-story addition at the flank of No. 296, Queen's-road, Deptford, to abut upon Erlanger-road (Mr. A. D. Johnson for Mr. M. H. Glover).—Consent.

Deptford.—A public convenience on the eastern side of Amersham-road, New Cross, southward of the "Amersham Arms" public-house (Mr. T. Corfield for Deptford Metropolitan Borough Council).—Consent.

Deptford.—Retention of a one-story addition at the rear of "The Rosemary Branch" public-house, Lewisham High-road, Deptford, abutting upon St. James's-road (Messrs. F. J. Eed & Meyers for Mr. D. J. Jones).—Consent.

Fulham.—An addition to an office building on the eastern side of Seagrave-road, Fulham, opposite the entrance to Merrington-road (Mr. A. Whiteley for the London and North Western Railway Company).—Consent.

Hackney, Central.—Retention of a conservatory at the rear of No. 16, Stannard-road, Hackney, abutting upon Ritson-road (Mr. G. Withey).—Consent.

Kensington, South.—Erection of a projecting shelter, in front of the Earl's-court station of the Metropolitan District Railway Company, Earl's-court road, Kensington (Mr. C. H. King for the Metropolitan District Railway Company).—Consent.

Lewisham.—A one-story addition to No. 107, Ringstead-road, Catford, to abut also upon Laleham-road (Messrs. H. H. Castle & Co.).—Consent.

Lewisham.—An extension of the periods within which the erection of one-story shops on part of the forecourts of Nos. 29 and 31, Beacon-road, Lewisham, was required to be commenced and completed, and permission to use the bay-window of No. 29, Beacon-road, for trade purposes (Mr. H. Kent).—Consent.

Lewisham.—A house on the northern side and two houses on the southern side of Bargery-road and two houses on the northern side of Inchmery-road, Catford, with the flanks of three of such houses abutting on the western side of Penderley-road (Messrs. Norfolk & Prior for Mr. J. Watt).—Consent.

Marylebone, East.—That the application of Messrs. V. Buckland & Garrard, for the Right Hon. the Earl Temple, for an extension of the periods within which the erection of a building on a site between Nos. 11 and 13, Portland-place, St. Marylebone, was required to be commenced and completed, be granted.—Consent.

St. George, Hanover-square.—An oriel window in front of No. 24, Upper Brook-street, St. George, Hanover-square (Mr. R. S. Wornum for Mr. S. E. Kennedy).—Consent.

Strand.—Retention of four electric arc lamps

and a projecting sign in front of the London Pavilion Music Hall, Piccadilly-circus (Messrs. Wyllson & Long for the directors of the London Pavilion, Ltd.).—Consent.

Strand.—The retention of a projecting fascia in front of a shop on the northern side of Shaftesbury-avenue, Strand, between Rupert-street and Wardour-street (Mr. W. G. R. Sprague for Mr. J. Jacobus).—Consent.

Strand.—Erection of two illuminated signs over the public way of Cutting-lane, Strand (Messrs. Colclough & Hamp).—Consent.

Wandsworth.—Porches to seventeen houses on the south-eastern side of Deerhurst-road, Streatham-common north, Wandsworth, southward of Hill House-road (Messrs. Cole & Wooding).—Consent.

Westminster.—The retention of a projecting clock in front of Ruskin-house, Rochester-row, Westminster (Mr. A. Keen for Messrs. W. Morris & Co.).—Consent.

Hammersmith.—Buildings on the site of Nos. 308 and 310, Uxbridge-road, Hammersmith, to abut also upon Armingher-road (Mr. W. F. Hurrell).—Refused.

Paddington.—A conservatory addition over the projected porch in front of No. 13, Hyde-park-gardens, Paddington (Mr. J. Gray for Mr. J. K. Greig).—Refused.

Width of Way.

Kensington, South.—Three houses on the southern side of Kensington-place, Kensington, with a forecourt boundary wall in front of such houses at less than the prescribed distance from the centre of the roadway of the street (Mr. H. F. Butler for the Metropolitan Water Board).—Consent.

Width of Way and Height of Buildings.

St. Pancras, South.—A building on the south-eastern side of a proposed street to lead from Burton-street to Mabledon-place, St. Pancras, with a portion of the building and forecourt fence at less than the prescribed distance from the centre of the roadway of the said street and with a portion of the building exceeding in height the width of such street (Messrs. Joseph & Smith for the St. Pancras Metropolitan Borough Council).—Consent.

Lines of Frontage and Height of Building.

Clapham.—The Devas Institute on the north-western side of Thessaly-square, Battersea, to a greater height than the width of Thessaly-square (Mr. H. Howard Batten for the trustees of the London Parochial Charities).—Consent.

Lines of Frontage and Construction.

Hackney, North.—The retention of a wood and iron structure upon part of the forecourt of No. 19, Filley-avenue, Upper Clapton (Mr. G. Kemp).—Consent.

St. Marybone, East.—Three "cathead" cranes at the premises of Messrs. Waring & Gillow, Ltd., Castle-street, East Marylebone (Mr. R. F. Atkinson for Messrs. Waring & Gillow, Ltd.).—Consent.

Width of Way and Construction.

Hammersmith.—The construction and retention of an iron shed on the southern side of Down-place, Hammersmith (Mr. A. Dawkins for the London and Westminster Motor Omnibus Company).—Consent.

Space at Rear.

Chelsea.—A modification of the provisions of sect. 41 with regard to open spaces about buildings, so far as relates to the proposed erection of a building on the south-western side of Draycott-avenue, Chelsea, with a one-story portion on the space at the rear exceeding 16 ft. in height (Messrs. Bouchier, Burnmaster, & Galsworthy for Miss Cowper Coles).—Consent.

Holborn.—A modification of the provisions of sect. 41 with regard to open spaces about buildings, so far as relates to the retention of an addition upon a portion of the space at the rear of No. 18, Handel-street, Bloomsbury (Messrs. Johnson & Co.).—Consent.

Chelsea.—Three dwelling-houses upon a site on the western side of Basil-street, Chelsea, southward of Washington-mansions, with irregular open spaces at the rear (Mr. A. Mitchell for Messrs. Holland & Hannen).—Refused.

Height of Building.

Whitechapel.—A building on the eastern side of Middlesex-street, Whitechapel, to abut also upon the southern side of Strype-street, and to exceed in height the width of Strype-street (Mr. C. B. Holish for Messrs. C. & H. Finesgold).—Consent.

Space at Rear and Height of Building.

St. George, Hanover-square.—The re-erection of No. 3A, Hamilton-mews, St. George, Hanover-square, to a height exceeding the width of Hamilton-mews, and with an irregular open space at the rear (Messrs. W. H. Romaine-Walker & Besant for Mr. B. Lewis).—Consent.

Cubical Extent.

Strand.—A building on the site of Nos. 132 to 135, Long Acre, to exceed 25,000 cubic feet, and to be used for the purposes of a motor carriage works, repair shops, and showrooms

(Mr. W. Woodward for Messrs. Slatter & Son and Mr. W. H. Eastgate).—Refused.

Paddington, South.—That an order be issued to Mr. B. Grewe sanctioning the formation or laying out of a new street for foot traffic only, to lead from Woodfield-road to Harrow-road, Paddington, and the erection of a proposed theatre building abutting upon the southern side of Harrow-road and the western side of the said proposed street (for the Paddington Empire, Ltd.).—Consent.

Formation of Streets.

St. Pancras, South.—Extension of the time within which the formation of a new street for carriage traffic to lead from Burton-street to Mabledon-place, Euston-road, St. Pancras, was to have been clearly defined throughout by posts and rails, and a deviation from the plans approved for the formation of the said street, so far as relates to an alteration in the width of the northern portion of the street (Messrs. Joseph & Smith for the St. Pancras Borough Council).—Consent.

The recommendations marked † are contrary to the views of the local authorities.

Architectural Societies.

NORTHERN ARCHITECTURAL ASSOCIATION.

A meeting of this Association was held at 6, Higham-place, Newcastle, on the 12th inst., when Mr. G. A. T. Middleton delivered a lecture on "Continental Romanesque, and Gothic Detail." Mr. Middleton, in the course of his lecture, said the development of architectural detail from the period of the Norman Conquest until the time of the Reformation, as it occurred in England, was well known to every English architect, forming part of his necessary education. That there was a similar development upon the Continent was equally well recognised, but, as the Continental forms do not so greatly influence modern English practice, they had not, as a rule, been so closely studied, particularly as to do so required personal contact with the buildings of other countries, such as was only to be properly obtained at considerable expenditure of time and extensive travel, while even then so little had been written upon the subject that it was only slowly that the various phases of change fell into their right places. The English forms were distinct to themselves in many respects, due to an entirely different inspiration from that which influenced Continental work; and properly to consider the latter it was necessary temporarily to wipe out of one's consciousness all preconceived ideas and to start, as it were, afresh, as if their insular work were non-existent. Like the English, however, the early Romanesque of the Continent had a Roman origin, but it was much more closely allied to its original. There seemed to have been two streams of influence which followed the two main trade routes into North-Western Europe; one along the Rhine, passing northwards as far as Cologne, and then spreading out like a fan across North France and Germany, and the other traversing the South of France and gradually spreading northwards through Poitou and Berri to the Ile de France. The former stream was much more nearly allied to the Roman than was the latter. In the doorways they found the Corinthian capital examples in an exceedingly pure form, though it was often used to carry an archway arranged in orders or stages, either unmoulded or enriched with mere rolls at the angles and shallow hollows on the main faces, such as were employed in the early Norman period in England. Arches of the same character were found in the South of France, but the detail of the carving was more Byzantine in type than Roman—i.e., cut down by incision below the general surface of the stone rather than with projecting leaves and volutes, and showing a less appreciation of the use of the chisel and more of the drill. In the north-west of France those two types coalesced, forming what was known as Norman, there being superadded another influence, namely, that of the Scandinavian pirates, who ravaged the whole coastline. The result was the production of an architecture whose details were of a mixed character, the classic origin being often difficult to discover beneath the Scandinavian overlap of billet or chevron, representing embroidery stitches, or of grotesque animal sculpture, or of forms suggestive of twisted wire work. Towards the

end of the XIIth century, when the whole spirit of architecture changed and Gothic replaced the Norman of England and the Romanesque abroad, they were accustomed to recognise a similar change in the detail, particularly in the matter of mouldings. This was, however, essentially English, and it was at first a surprise to the English student to find that the mouldings of France and of Germany scarcely altered from their Romanesque character until the end of the XIVth century. The deep undercutting of our beautiful Early English period was unknown in France, save in a few instances where the English influence was paramount. It was much the same, too, with the foliage carving, though in a different degree. It was never so profuse either in France or Germany in the earlier periods as with us, nor of so light and delicate a nature, yet in the XIIIth century it was there representative of the foliage of spring, just as it was with us in England. Our fine rising stem, however, was unknown, but was replaced in the capitals by a broad leaf, like that of the hart's tongue fern, not yet completely open, and consequently ending with a cluster instead of a point, while in continuous enrichments a large flowing scroll was commonly employed, evidently based in general scheme upon the Roman model, an entire moulding being often thus enriched in place of the foliage lying in a hollow and having an almost invariable vertical tendency, as with us. In course of time the spirit changed, and the leaves of summer superseded those of spring. This is representative of the XIVth century, but the undercutting is not often carried to excess, for one might almost say is at present non-existent, the work, whether it be in panels or on capitals, being in low relief, though wonderfully true to nature. The gradual change from spring to summer and again from summer to autumn, which occurred equally in England, could scarcely have been premeditated, though it was exceedingly interesting to trace, until in the later work of France they find an extreme elaboration and delicacy of treatment, as if the masons had at last acquired the full living Gothic spirit, and reveling in the beauty of natural forms and in delicacy of execution. Undercutting was often carried to excess, and the bare garbled bough of winter would sometimes appear amidst the decaying leaves and fully-ripened fruit. Further eastwards, in German territory, two types of work were found in this period, one exceedingly powerful and even heavy, while the other was thin and wiry to excess. Contemporaneously with this development of a new spirit came the evolution of true Gothic mouldings, the work of the French Flamboyant period in particular being original, and as richly cut as English work of the XIIIth century, but entirely different from the flat and lifeless "perpendicular" mouldings to which ours had degenerated by this time.—In the course of the evening Mr. A. B. Plummer (Honorary Secretary) read out the assessors' award in connexion with the Measured Drawings and Sketches Competitions. Premier honours in the two competitions respectively were secured by Mr. H. M. Spence (Shields) and Mr. William Riddle (Newcastle), Mr. H. L. Hicks (Gosforth) and Mr. T. W. Milburn (Sunderland) occupying the second places.

SHEFFIELD SOCIETY OF ARCHITECTS.—At the monthly meeting of the Sheffield Society of Architects and Surveyors, held on the 13th inst. in the Society's room, Leopold-street, Mr. J. E. Mitchell Withers lectured upon the architectural treatment of brickwork. Mr. W. J. Hale occupied the chair. Mr. Mitchell Withers commenced his lecture by a brief reference to the ancient use of plastic materials and sun-dried bricks, leading up to the introduction of Roman bricks or tiles, which were of a large size, but only about 1 in. thick. Good mortar and the careful bonding of the brickwork was very important. After referring to some of the early brickwork in England, illustrated by slides from Hurstmonceux Castle, Tattershall Castle, Hampton Court, and various other buildings, he proceeded to illustrate the use of brickwork by the Dutch, and how they introduced stone into their work at points where strength was required. The characteristics of these buildings were such as became a northern type, high-pitched roofs and ornamental gables with bold chimneys being seen

both in the domestic buildings and in the towers and public buildings. To show the use of brickwork under entirely different conditions, illustrations were given of many buildings in Italy where brickwork formed the main structure, and terra-cotta, stone, or more frequently marble was used in conjunction with it. Where marble was used as a facing the lecturer pointed out that the idea was to use it in just the opposite way to that in which the stonework was used in Holland, namely, for filling in spaces on which there was no special weight or strain, though in some cases the brickwork had been entirely cased in it. After referring to the types of tower used in Italy, a few slides of modern buildings in which brickwork was employed were shown. A vote of thanks was accorded on the proposition of Mr. H. L. Paterson, seconded by Mr. T. Winder, and supported by Mr. J. R. Wigfull and the Chairman.

EDINBURGH ARCHITECTURAL ASSOCIATION.—A meeting of the Edinburgh Architectural Association was held in the Association's rooms, George-street, on the 12th inst., Mr. Hippolyte J. Blanc, R.S.A., the President, in the chair, when Mr. James L. Lawrence (Edinburgh) read a paper on "The Sanitary Considerations of Buildings," in which he called attention to the importance of sanitary science. Alluding to the purely public health side of architecture, he said that one most insanitary piece of construction brought about by the huge blocks of buildings was the inner court or smaller well. The only good point about it, and even this was doubtful, was that they could open their window at any time in the year without fear of a draught. But instead of pure air they might get a smell of their neighbour's dinner or a concentrated knowledge of the ash bucket in the court below. This, with practically no sunlight and too often the need of artificial light from about November till March, should make them hope that planning of this nature would not be long perpetuated. He noticed some time ago that a reason put forth for the cause of the domestic servant problem in London and elsewhere was the bad quarters to which servants were relegated, often with an outlook into these wells. Nor did he think that they were much better off elsewhere north of London, when an odd, badly-lit room without a fireplace was found to appear on a plan, and which it was found convenient to designate "box-room." How often was such a room later on made to serve the purpose of housing the unlucky servant. He did not think people nowadays were blessed with quite so many boxes as the architect would sometimes make out from the space he allotted to them. Of course, if a fire could not be arranged for, it might also be difficult to put in what the law demanded, a ventilation flue or one that would really do its work; but, if possible, this should be provided, because, after all, how many people did have fires in their bedrooms except in cases of illness? The kitchen was to a great extent a dwelling-room, and special provision in ventilation should be introduced for the comfort of its inmates.—Mr. Thomas Fairbairn, in moving a vote of thanks to Mr. Lawrence, said the boxroom business was a thing that should not be sanctioned.—The Chairman intimated that the Association had been fortunate in securing three rooms in the Royal Scottish Academy for the exhibition which is to be held by the architectural profession in the summer. He expressed a hope that the members would do all they could to make the exhibition a success. Meantime they were negotiating for the organisation of the exhibition, and a few committees would be appointed.

MANCHESTER SOCIETY OF ARCHITECTS.—The fourth meeting of the students of the Society was held at the Society's Rooms, on Tuesday, the 11th, when Mr. R. W. Orme read a paper on "Gothic Vaulting." He gave a concise historical sketch of the evolution of Gothic architecture, showing how the desire of the old builders to obtain a fireproof roof first led them to use a stone vault, the use of which led to the great Gothic Minsters of mediæval times. The lecturer then dealt with various forms of vaults, commencing with the groined vault of the XIIth century, and illustrating each form by diagrams, noting the difficulties of vaulting oblong compartments and also of web construction. The

introduction of the pointed arch obviated at once the difficulty of vaulting oblong compartments, having horizontal ridges. The multiplication of the tierceron ribs lead to the "rib and panel" vault, and later to the "Conoid" form of XVIIth century vaults. In conclusion the lecturer showed how the rib, which was such an important factor in early vault construction, in later vaults lost all its constructional value, and the vault became either all rib, as in Gloucester Cloister, or all panel, as in Henry VII. chapel at Westminster, which, although a marvellous piece of stone cutting, yet, unfortunately, loses the true essence of Gothic vaulting.—In the discussion that followed, some interesting suggestions were put forward; one being the advisability and possibility of treating ferro-concrete ceilings in a somewhat similar manner to Gothic rib construction. The rather illogical method of covering a stone vault with a wooden roof was also noted, and it was considered advisable to let the vault tell its own tale both internally and externally. A vote of thanks was passed to Mr. Orme for his interesting paper, and emphasis was laid on the excellent manner in which he had illustrated his remarks by a series of interesting diagrams.

Archæological Societies.

THE BRITISH ARCHÆOLOGICAL ASSOCIATION.—At the evening meeting held on December 12. Mr. C. H. Compton in the chair, a paper was read by Mr. E. G. Tooker on "Waltham Abbey, its Architecture and History." The paper was illustrated by a series of lime light views embracing the chief points of the work at Waltham, and also slides of Durham, Lindisfarne, etc. The precise age of the remains of the church of the Holy Cross at Waltham has long been a source of controversy amongst archæologists, for, although mentioned by Lawrence, of Durham, who was born at Waltham, the earliest manuscript which exists is a tract called "De Inventione Sancte Crucis nostre in Monte Acute, et de ductione ejusdem apud Waltham." This tract may be dated during the latter part of the XIIIth century, subsequent, at any rate, to the death of Lawrence in 1176. This unknown writer entered the college as a boy, and in 1144 was a canon; in 1177 he was expelled, together with the other canons. We gather also that the foundation to which he belonged was one of a college of secular clergy established by Harold, and that the estate in the days of Canute belonged to one Tovi, who held the office of Staller under that King. It was on the estate of Tovi, in Somerset, that the cross was found, as a shrine for which Waltham was built originally. An interesting early XIIth century mould of stone for casting religious badges or pilgrim signs is figured in the *Journal of the Association*, Vol. XXIX., page 421; it bears presumably a representation of the holy cross discovered by Tovi, with the legend "SIGNVM. SANCTE CRVCIS. DE WALTHAM." surrounding it. After the death of Tovi the estate of Waltham was in possession of his son, Athelstan; but, for whatever cause, during the reign of Edward the Confessor the Crown was in possession, and Waltham was conferred on Harold at some date subsequent to the year 1053. The original establishment of Tovi consisted of two priests, and Harold founded a college of secular canons of the order of St. Benedict, consisting of eleven canons and a dean, and the later foundation of Henry II. was Augustinian. Now, the date of the consecration of Harold's building can be fixed with fair certainty, for, according to "De Inventione," the church was consecrated by Kinsige, or Kinsi, Archbishop of York, who died in December, 1060, and amongst those present was Gisa of Wells, who was only nominated to his bishopric in 1060. Again, the feast of the Inventions of the Holy Cross was May 3, and it seems probable that this feast would be selected for the consecration. The Waltham writer also states that the King, who was present at the ceremony, stayed until after the Octave, and then proceeded to Winchester to keep Pentecost, and, assuming the Octave at May 10, the only year about this period at which the first Sunday after that date was Whit-Sunday was the year 1060. The remains at

Waltham consist of the nave, and this is of early Norman work, though it seems impossible that it is as early as Mr. Freeman maintains. Exclusive of the western bay on each side, the nave has three double compartments on each side, the face of the stonework exhibiting the characteristic of fairly fine jointed masonry throughout, and having the arches ornamented with the chevron, and the hood mold with the billet. Four of the large pillars are enriched with sunk spiral and chevrons. The author of the paper then instituted comparisons with Durham, St. John's Chapel in the Tower, St. Albans Abbey, Winchester, Jumièges, Repton, etc., and deduced the approximate date of the building from the jointing of the masonry and the use of the billet moulding. A careful comparison was made between Waltham and Durham, and also Lindisfarne, laying stress on the chevron and spiral incised lines on the columns. The connexion of Waltham with Durham was established by the fact that Walcher, Bishop of Durham, had been granted the estate of Waltham, and it was assumed by the author that the existing work at Waltham was founded upon Cariliph's work at Durham.—The Chairman, in proposing a vote of thanks to Mr. Tooker, said he had taken a great interest in the question of Waltham Abbey, more particularly from the historical point of view.—Mr. J. G. N. Clift, in seconding the vote of thanks, congratulated Mr. Tooker on his paper, and, while not in entire accord with all that had been said by Mr. Tooker, he fully agreed that the work shown in the slides could not be assigned to an earlier date than the first part of the XIIIth century. Mr. Clift also pointed out that the question of wide-jointed and fine-jointed masonry upon which Mr. Tooker relied so strongly was open to exceptions, and also pointed out that Mr. Tooker's arbitrary division between the use of the axe and chisel could not be maintained, for it must be a matter of gradual evolution, and no exact date could be assigned to the change which must have spread gradually through the country.—Mr. R. H. Forster remarked upon the number of times the legendary supernatural movement of relics in a given direction had taken place, and also congratulated the author upon a very interesting paper.—Mr. Kershaw made a few remarks, and after a brief reply by Mr. Tooker the meeting terminated.

SOCIETY OF ANTIQUARIES OF SCOTLAND.—The first monthly meeting of this Society for the present session was held on the 12th inst., Dr. D. Christison, Vice-President, in the chair. A preliminary report on the excavation of the Roman military station at Newstead, Melrose, was given by Mr. James Curle, F.S.A.Scot., illustrated by a plan of the buildings made by Mr. Thomas Ross, architect, F.S.A.Scot., and by many lantern views of the objects found. In the second paper Mr. John Bruce, F.S.A.Scot., of Sumburgh, Shetland, described the results of the excavation of a broch there which had extended over five years. Amongst the objects found were a large stone bowl, two stone chisels, 14 in. and 18 in. in length; a stone saw, 12 in. long; a number of stone whorls, several stone discs, on one of which is cut a design of interconnected spirals; bone implements, pottery, and a crooked-shaped pin of bronze. The third paper was on terra-cotta lamps, by R. Colman Clephan, F.S.A.Scot., illustrated by the exhibition of his collection of lamps—Greek, Etruscan, Roman, and Early Christian.

DISCOVERY AT WINCHESTER CATHEDRAL.—During the excavations at Winchester Cathedral in removing some woodwork inside the north wall of Langton's chantry, Mr. Ferrar, supervising the staff of Messrs. Thompson, of Peterborough, the contractors for the work of restoration, observed a point of wood amongst the grouting and flints, and, carefully removing it to see what it was, he found a yard measure made of boxwood in perfect preservation, with the inches, half-inches, and quarter-inches marked, and at the end the figure 36. Tested by the existing yard this old one is slightly shorter—perhaps the wood has shrunk during the long interment in the wall. It is difficult to give the age of the yard. Bishop Langton's chantry was finished before his death (1500), and most presumably the craftsman forgot his rule, which became buried by the workmen accidentally.—*Southern Daily Echo.*

Competition.

BANGOR UNIVERSITY COLLEGE.—The award in the Bangor University College competition was made known on the 19th inst. The competition was a limited one, and the plans and designs submitted by Mr. H. T. Hare, of London, have been selected.

BOOKS RECEIVED

INTERNATIONAL PRICING TABLES AND PERCENTAGE REGISTER. B. Gordon Sims and J. Gall Inglis (Gall & Inglis).
MEMORIALS OF OLD STROPSHIRE. Edited by Thomas Anden, F.S.A. (Bemrose & Sons, 15s.)

THE LAW OF BUILDING, ENGINEERING, AND SHIPBUILDING CONTRACTS. By Alfred A. Hudson, Barrister-at-Law. Third Edition. Vol. II. (Sweet & Maxwell, 2l. 12s. 6d. the entire work.)

CONSERVANCY OR DRY SANITATION *versus* WATER CARRIAGE. By J. Donkin, F.R.I.B.A. (E. & F. N. Spon, 1s.)

Correspondence.

ZODIACS IN GERMAN CHURCHES.

SIR.—The zodiacs in German churches are, of course, Gothic in design and execution, in contrast to the classical zodiacs of Italy, and even or surpass in interest those of France, though the following are all I know of:—

Outside.—1. *Doorway*.—Strasbourg Cathedral, right-hand porch of the grand façade, with the month occupations, on twelve stone cubes, supporting statues of the Ten Wise and Foolish Virgins and two other figures (? Christ and Matthew). By S. Bina. XIVth century. Large photograph of it by "G. B., 1-5-92," Strasbourg.

Inside.—2. *Pavements*.—S. Gereon, Cologne, three signs on each side and six in front of the altar of the crypt (*Archæologia*, xlv.). "Ann. Arch.", xvii.). By Avenarius. XIII century.—Old Gothic church in Severinskloster, Cologne, a fine mosaic in the vestibule in chocolate and white with the signs in circles.—Cologne Cathedral, in front of the Sanctuary rails is a very large and fine circular mosaic, having Sol, four large phases, and the elements personified in the centre, around which are the signs in circles, cirester 1848.

3. *Walls*.—Cologne Cathedral, in the arcades near the high altar, age of Lincoln Cathedral.—Cologne Cathedral, in fresco, near the high altar, after old examples, by Steiner. XIXth century.

4. *Windows*.—Cologne Cathedral, the first window in the left aisle in stained glass, with Sol, Luna, Iris, Neptune, Ceres, and four elements.

5. *Clocks*.—Strasbourg Cathedral Museum, in the Cathedral architect's house, opposite the cathedral, on twelve round iron plaques, formerly coloured; part of the old cathedral clock; 33 met. diameter. By Habrecht, 1574. Photographs of these are in a work on the Strasbourg Exposition, 1895, by Schrieker, 1896. Painted on a large square board, with the planetary movements, etc.; from the same clock, 1574. Painted on a circular board, with the astronomical calendar, etc., cir. 10 ft. diameter; part of the same clock. Cut out in plate-iron, and painted in old German costume, each about 12 in. high, fastened on a large iron circle about 8 ft. in diameter, inside a larger one; part of the same clock. Painted on an astronomical globe; from the old clock. Painted on the equator of the globe. All in the Cathedral Museum.—Strasbourg Cathedral, south transept, painted brown, with the emblems and month names on a large board, gilt circle on the large clock.—Strasbourg Cathedral, south transept, on a celestial globe in front of the clock. The clock is engraved in Euting: "Guide to Strassburg." Also on a photographic postcard, Munsteruhr, No. 3502. Also on a coloured postcard, No. 1336.

6. *Roofs*.—S. Martin, Cologne, painted, of a large size, white on a red ground, in the last bay of the nave, with sun, moon, and stars. XIXth century.—Romanesque church in the Quatemarkt, Cologne, at the intersection of four equal aisles, amidst stars in floral circles in a large circle, gold on blue ground. XIXth century.—Frankfurt Cathedral, right-hand transept, painted white on a blue ground round an opening, with sun, stars, and a circle of writing. XIXth century. D. J.

THE ARCHITECTURE OF SICILY.

SIR.—The following extract from Freeman's small history of "Sicily" (the Story of the Nations) bears at the account I gave in the discussion of Mr. Seth Smith's paper last Friday, of the manner in which the Segestans deceived the Athenian envoys:—

"The story went that these envoys and the other Athenians who went with them were taken in at Segesta in a strange way. The Segestans took them to see the

temple on Eryx and its wealth, where the envoys were deceived by taking silver-gilt vessels for solid gold. Then they got together all the gold and silver plate in their city, and all that they could borrow anywhere else, and asked the Athenians to a series of banquets, at which each man passed off all the plate as his own. So the envoys went back, thinking that Segesta was a very rich city, and taking with them sixty talents as an earnest. This was early in 415 B.C."

I made a slip, which was afterwards corrected, in saying that the envoys were taken to see the vessels in "the very temple" at Segesta, to which a previous speaker had pointed as justifying the theory that the Greeks built the peristyle of their temples before they built the naos. The point I was endeavouring to make was that these men of Segesta, who could bring themselves to give showy banquets with fraudulent intent, might also, in their solicitude to impress the foreigners, have built their temple on the same principle, viz., outside first and inside when convenient, which, in this instance, happened to be, never.

A. MARVON WATSON.

The Student's Column.

ROOFS: STRUCTURALLY CONSIDERED.—XXII.

21. The Complete Design of a Timber Truss (continued).

IN this article we take up the detail design of the joints between the principal rafters, the diagonal braces, the vertical ties, and the tie-beam. The positions of these connexions are indicated in Fig. 154, p. 513, and the stresses in the various members will be found in Table XXXVIII, p. 514.

(m) *Rafter and Bracing Joints*.—Commencing with the joint P, next to the junction of the principal rafter with the tie-beam, we find by reference to Table XXXVIII, that the compressive stress in the inclined brace is 9,100 lb. The dimensions of the same member have already been calculated at 4 in. by 6 in. on p. 515.

Fig. 166 illustrated the usual method of notching the strut into the rafter, and it will be found by resolving the thrust of 9,100 lb. into two components normal to the two surfaces at the end of the strut that a $\frac{1}{2}$ -in. notch will be ample to provide for the component in the direction of the rafter. Similarly calculated the other component will be found to be well within the resistance of the timber, the bearing surface required being considerably less than that provided by the joint.

Although by Fig. 154 and Table XXXVIII, there is no stress in the tie P₁ L₁, it is desirable

that the rod should be of such diameter as to afford a reasonable amount of support for the tie-beam at the point L₁. By using a $\frac{3}{4}$ -in. diameter rod the resistance to tension, as calculated on p. 605, will be 4,860 lb.

If this stress were a regular part of the duty to be performed by the tie, we should have to consider the advisability of applying a bearing-plate beneath the nut or bolt-head. In the present case, however, it is sufficient to let the nut or bolt-head into the rafter as shown, but a preferable course is to apply an angle washer, as shown in Fig. 167.

One point to which special attention should be directed is that the centre lines of the brace and the tie ought to intersect at the centre line of the rafter.

A neater and in every way a preferable form of connexion is that illustrated in Fig. 167, where a cast-iron saddle is fitted to the under side of the rafter, being so shaped as to provide a square end bearing for the strut, and to furnish means of securing the strut in position.

Joint P₂ is not quite the same as P₁, for the axis of the inclined brace is almost normal to the axis of the rafter.

By Table XXXVIII, the compression stress in the strut P₂ L₂ is 12,700 lb., and, as the dimensions of the member were determined on p. 575 at 4 in. by 8 in., the bearing surface is 32 sq. in.

Taking the permissible compression against the grain of the rafter at 350 lb. (table in *par* (a), p. 513), we have for the requisite area:

$$12,700 \div 350 = 36.3 \text{ sq. in.}$$

This is not provided by the dimensions settled, and the strut should be made either 5 in. by 8 in., or 6 in. by 7 in.

An alternative method would be to notch into the rafter a bearing-plate with the dimensions of 6 in. by 7 in. But a plain bearing-plate does not afford convenient facility for fixing the end of the strut to the rafter, and for this reason a preferable arrangement is a cast-iron saddle, similar to that in Fig. 167, comprising a bearing-plate and two side-plates through which a pin can be inserted.

Referring to Table XXXVIII, we find the tension in the vertical tie is 5,000 lb., which, as calculated on p. 606, requires a rod of $\frac{3}{4}$ in. diameter.

The strain of 5,000 lb. involves a component normal to the fibres of the rafter equal to $5,000 \cos \theta = 4,160$ lb., and to keep the stresses on the timber within the permissible limit of 350 lb. per square inch we

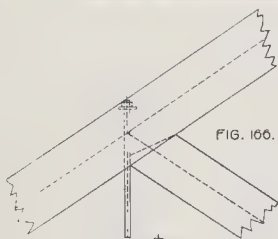


FIG. 166.

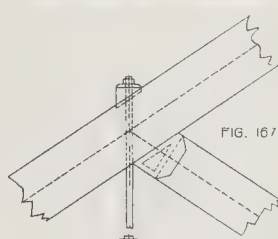


FIG. 167.

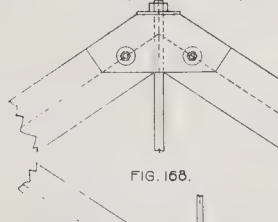


FIG. 168.

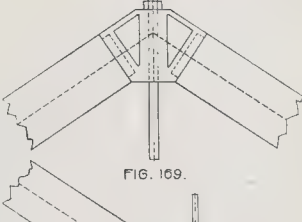


FIG. 169.



FIG. 170.

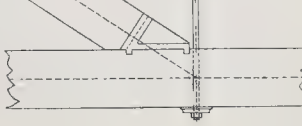


FIG. 171.

ought to fit a washer or bearing-plate with the dimensions of at least

$$4,160 \div 350 = 11.9, \text{ say, } 12 \text{ sq. in.}$$

If an ordinary-sized bevelled washer were fitted, having the area of about 10 sq. in., the compression would be $4,160 \div 10 = 416 \text{ lb.}$ per square inch. The use of a larger washer costs so little that the prudent designer will prefer to use it, and so save any risk of crushing the wood.

Joint P_1 is the connexion between the two principal rafters and the king tie P_3 . As shown in Table XXXVIII. the compressive stress in the portion P_2 of the rafter is 20,700 lb., and the dimensions of the member being 6 in. by 8 in., the cross sectional area is 48 sq. in. By *par.* (a), p. 513, the permissible end bearing stress is 1,600 lb. per square inch, and, so far as resistance to crushing is concerned, the area of the rafter end need not be greater than

$$20,700 \div 1,600 = 13 \text{ sq. in.}$$

Consequently, the actual area of the rafter is so great compared with the area necessary for the end bearing that it is not necessary to calculate the effect of the slight reduction involved by ordinary methods of jointing.

In the present roof, with a steel tie in place of a timber king-post, the joint now under consideration must be somewhat different from the joint illustrated in Fig. 132, p. 402, and, as we shall see later, the method of fixing the ridge-plate has also to be modified.

Fig. 168 shows a simple form of mitre joint for the right-hand and left-hand rafters of the truss, the members being held in position by two steel plates secured by two $\frac{3}{4}$ -in. bolts. To afford bearing for the king-tie a steel plate extends above the side plates along the surface provided by trimming off the angle formed by the upper sides of the two rafters.

On p. 606 we found that the vertical tie P_1 might be formed of a $\frac{1}{2}$ -in. diameter rod upset at the ends, so as to give the requisite area of metal at the bottom of the screw threads, or of a $\frac{1}{2}$ -in. diameter rod, the latter being there indicated as the more desirable for adoption.

To protect the timber against excessive compression beneath the nut at the top of the bolt it will be sufficient to provide a bearing-plate $\frac{1}{2}$ in. thick extending from side to side of the rafters, and having the width of 6 in. corresponding with the width of the flat surface left by trimming off the top corners of the rafters.

Another method of completing joint P_1 would be to fix a cover-plate, 6 in. wide by about 18 in. long, bent so as to fit above the rafters, the king-bolt passing through the centre, and the two ends being secured by bolts through the rafters passing from the outer to the inner surface in a direction perpendicular to the axis of each member.

A third alternative is to fit the end of each rafter into a cast-iron socket similar to that illustrated in Fig. 169, and calculated in accordance with the method described in connexion with the detail design of the cast-iron shoes for the rafter and tie-beam joint (see Articles XX. and XXI., pp. 665 and 697).

A socket of this kind makes a very neat joint, and has the advantage of obviating all bolt-holes through the rafters, the ends of which are joggled into the casting, as indicated in Fig. 169.

(n) *Tie-beam and Bracing Joints.*—Joint L_1 requires little comment, for the vertical tie has theoretically no stress to carry, although it will be in tension in case the tie-beam tends to sag. The total force so developed is not at all likely to be such as to necessitate special means of protecting the lower fibres of the tie-beam against compression, and it will be quite sufficient to place a washer of the usual diameter for a $\frac{3}{4}$ -in. bolt beneath the nut at the end of the tie.

In joint L_2 the compression in the strut P_{1L} is 9,100 lb. This represents the horizontal force of

$$9,100 \cos 35^\circ 40' = 7,670 \text{ lb.}$$

If the end of the brace is notched into the tie-beam, as in Fig. 170, the latter will be more than amply able to resist the shearing force of 7,670 lb. along the plane situated at the level governed by the depth of the notch. The vertical component of 9,100 lb. is also far less than the safe resistance of the timber.

Consequently, we have only to inquire into

the crushing resistance of the toe of the strut.

Taking the depth of the notch perpendicular to the axis of the strut at $\frac{1}{4}$ in., and the width of the strut at 4 in., the effective bearing surface is $4 \times 1.5 = 6 \text{ sq. in.}$, capable of withstanding the force of

$$1,600 \times 6 = 9,600 \text{ lb.}$$

or otherwise expressed, the compressive stress on the toe of the strut is

$$9,100 \div 6 = 1,516 \text{ lb.}$$

or nearly 100 lb. less than the permissible stress assumed in *par.* (a), p. 513.

If the strut were made 6 in. by 7 in. the stress would be reduced to about two-thirds the permissible intensity.

To hold the foot of the strut in place, a coach screw, about 8 in. long by $\frac{3}{8}$ in. diameter, should be inserted, as shown in the drawing.

One thing to be noticed in connexion with the joint described above is that the strut has to carry a non-axial load, and that its capacity is thereby considerably less than would be the case if the joint were designed in such a way as to insure the coincidence of the centre of pressure with the axis of the member.

The neatest way of fixing the brace so as to permit its maximum resistance to be developed in case of need is to apply a cast-iron shoe, as represented in Fig. 171. By providing an opening of suitable size the end of the strut can be reduced just enough to make its outer surfaces flush with those of the shoe, which must be designed so that the centre line of the member shall pass through the centre of the thrust block.

The thickness of metal necessary in the latter, and the dimensions of the ribs projecting downward into the tie beam can be calculated as in Articles XX. and XXI.

The vertical tie of $\frac{1}{2}$ in. diameter has to carry the stress of 5,000 lb., and as the compression across the grain of the tie-beam should be limited to 350 lb. per square inch, the washer above the nut of the bolt ought to be $5,000 \div 350 = 14.35 \text{ sq. in.}$, or about $\frac{1}{2}$ in. diameter.

JOINT COMMITTEE ON WATER REGULATIONS.

THE Joint Committee on Water Regulations met at the Guildhall on Monday, December 10, at eleven in forenoon. Among the authorities and companies represented were:—Birkenhead, Bradford, Birmingham, Bury, Hull, Preston, Newcastle, Weardale, South Staffordshire, Stockport, South Hants, and the Metropolitan Water Board.

In the absence of Mr. Robert Crawford, of Glasgow, Chairman of the Committee, Mr. W. D. Caröe, Master of the Worshipful Company of Plumbers, was voted to the chair.

In opening the proceedings he said that if the chairman had been present he would, no doubt, have remarked on the work of the Committee from the point of view of the Public Health administrator and water authority. He himself regarded the matter rather from the point of view of the architect and consumer. From his own experience he found the greatest difficulty in dealing with the large number of varying regulations, and the Council of the Royal Institute of British Architects would warmly welcome the codifying of water regulations and the setting up of such standards for fittings as would represent, at any rate, an irreducible minimum of efficiency.

Mr. E. Antony Lees (Birmingham) presented the report of the General Purposes Committee, together with a draft annotated model code of regulations with schedules attached setting out the specifications of water fittings, etc., compiled from reports of the various sub-committees, and prepared in form for publication.

On the motion of Mr. J. Watson (Bradford), seconded by Mr. Bancroft (Hull), the General Purposes Committee were empowered to conduct the necessary negotiations with the Local Government Board with a view to the inclusion of the draft code framed by the Committee in the model series of regulations issued by the Board for the purpose of Local Acts and Provisional Orders, enabling regulations to be made on the subject of the prevention of waste or contamination.

It was pointed out that, in view of the authoritative character of the conclusions embodied in the code, representing the majority of the larger water undertakings and three-fourths of the consumers of water in the United Kingdom, and also the practical opinion of architects, plumbers, manufacturers of fittings, and others specially conversant with the subject, the Local Government Board might confidently give a wider and more definite interpretation of their

present powers, and thus secure greater uniformity of practice in regard to water regulations to the great advantage of all concerned.

Mr. Fitzroy Doll and Mr. W. D. Caröe were added as members of the General Purposes Committee. It was reported that the Admiralty had adopted, for use in H.M. Naval establishments, the standard specifications for water fittings framed by the Joint Committee.

The report of the Standardisation Committee was adopted, fixing the meetings of that Committee for the last Saturday in January, April, July, and October, to deal with new fittings and apparatus offered for standardisation, and tested in London or at Belfast, Birmingham, Bradford, Glasgow, Newcastle, and Plymouth.

Communications were reported from a number of water authorities and others pressing for copies of the model code.

The Committee decided that the publication of the code should be deferred for a short time pending the negotiations now in progress with the Local Government Board.

COURT OF COMMON COUNCIL.

A MEETING of the Corporation was held at the Guildhall on Thursday last week, the Lord Mayor presiding.

Paul's Cathedral.—The Lord Mayor read a letter from the Clerk of the Cathedral, stating that there had recently been no serious subsidence of the wall on the south side of the cathedral, and that consent had been given for the construction of a sewer under St. Paul's-churchyard under certain specified conditions.

Lavatory Improvements.—The Streets Committee submitted for the consideration of Messrs. Patman & Fotheringham, Ltd., for providing additional lavatory basins, etc., and accommodation for women at the underground conveniences in Aldgate High-street for the sum of £731., and for similar work at the underground convenience in Bishopsgate-street. Without for the sum of £928. The Court approved.

Paving Works.—The following recommendations of the same committee were agreed to: That the carriageways of the undermentioned streets be taken up and relaid with the existing granite cubes in cement upon a concrete foundation, the deficiency to be made good with new granite, at an estimated cost of 1,938l.—Bread-street-hill (part), Lower Thames-street (eastern portion), Monument-street (south side), from the Monument to Fish Market, Fish-street-hill (Monument to Lower Thames-street), Idol-lane, Laurence Pountney-lane, Cock-lane, Pemberton-row; that the carriageways of the following be laid with asphalt, at an estimated cost of 925l.—Tenter-street, Roman Bath-street, West Herding-street, Cloth Fair (portion); that the footways of the following be relaid with asphalt at an estimated cost of 1,296l.—Barbican (north side), Milk-street, Old Change, Fetter-lane; that the footways of the following be relaid partly with new and partly with existing York stone, at an estimated cost of 110l.—West Herding-street, Pemberton-row; that the carriageway of Cripplegate-buildings be relaid with asphalt, at an estimated cost of 280l.; that the further portion of the carriageways and footways of West Smithfield (in continuation of Long-lane), between the Avenue West of Central-avenue and Herding-street, be repaved, and that Charter-house-street, from the end of the footway to the estimated cost of 700l.; A tender of the Val de Travers Asphalt Paving Company, Ltd., for maintaining the carriageway of Mansell-street for another year from January, 1907, at 2s. 6d. per yard super., was also submitted by the committee and approved by the Court.

Street Improvements.—The Improvements and Finance Committee reporting on a reference relative to the improvement of Cloth Fair, submitted for adoption (1) an arrangement for acquiring the ground needed for widening the public way in front of the premises No. 4, Cloth Fair, for the sum of 776l., to include all interests; (2) an arrangement for acquiring the ground needed to widen the public way in front of Nos. 58 and 59, West Smithfield, and No. 3, Cloth Fair, for the sum of 4,769l. 7s. 3d., to include all interests. Reporting on another reference relative to the improvement of Little Britain, the committee submitted an arrangement for acquiring the freehold interest in the ground required to widen the public way in front of the premises No. 34, Little Britain, for the sum of 1,220l.—The Court approved.

Dwellings for Married Constables.—The Court adopted a report of the Police Committee on the reference as to the erection of dwellings for married constables, recommending the acceptance of the tender of Messrs. Kilby & Geyford, amounting to 16,723l., for the execution of the work; that the surveyor be authorised to employ a clerk of the works at a cost not exceeding 175l.

Drainage Works.—The Billingsgate and Leadenhall Markets Committee recommended that a tender of Messrs. Sheffield Brothers, of Dalston, at 4,895l., be accepted to execute the drainage and sanitary works at the Leadenhall Market.—The Court agreed.

General Building News.

NEW CHURCH, OXFORD.—The foundation-stone of the new church of St. Andrew, which is to be built at the junction of Linton-road with Northmoor-road, north Oxford, was laid a short time ago. The plans for the building were prepared by Mr. A. R. G. Penning, architect. It is proposed now to proceed with the erection of the first section of the church, comprising the nave, chancel, south aisle, west gallery (for organ and choir), south and west porches, vestry, and heating-chamber. This will provide accommodation for about 500 sittings, and will cost about 7,600*l.* The entire scheme will, it is estimated, cost 10,294*l.*

CHURCH RENOVATION, CLARE.—After being closed for over three months for renovation, the Clare Congregational Church has been re-opened. The renovation has been carried out under the direction of Messrs. Bado & Johns, architects, of Ipswich; the contractors having been Messrs. E. Cowle & H. Mitson.

CHURCH RESTORATION, NORTON, WORCESTERSHIRE.—The restoration of Norton Church has now been completed. The work has been carried out under the direction and from the plans of Mr. C. Ford Whitcombe. The nave has been taken down to its original level (a depth of about 10 in.); the whole of the floor has been laid with concrete 5 in. deep, the passages laid with the old stone tiles, and the floor beneath the seats with kiln-dried oak blocks. The font has been removed westward about 6 ft., to its proper position near the tower-arch, and new oak seats are provided throughout. The walls have been treated with mediæval plaster, after the removal of a thick plaster, varying from 2 in. to 4 in., which hid many fine features of the church. A vestry has been built over a new heating-chamber, in keeping with the work of the old building. Mr. G. Huxley was the builder.

SUNDAY SCHOOL, WALKER.—The Primitive Methodist at Walker have opened a new Sunday-school, the first portion of a scheme which also includes the erection of a chapel. The cost of the work just carried out will amount to about 1,850*l.* The buildings stand on a site in Welbeck-road, and comprise a large hall and kitchen. The builder is Mr. Thomas Hutchinson, and the architects are Messrs. Davidson & Phillips, Newcastle-on-Tyne.

SCHOOL, DONCASTER.—Alderman H. H. Birkenshaw, Chairman of the Doncaster Borough Education Committee, opened, on the 18th inst., the new elementary boys' school in Chequers-road, Doncaster, which has been erected by the Council at a cost of 7,000*l.* The whole scheme includes schools for 1,450 scholars—540 boys, 540 girls, and 380 infants, and the estimated cost is 20,000*l.*, with which is included land for street improvement, the cost of the site being 4,237*l.* The whole range of the buildings will have a frontage of 394 ft. in Chequers-road, the frontage of the site itself being 410 ft. The site of the boys' department embraces 2,900 square yds., and is at the extreme south-easterly end of the site required for the scheme. The building contract was carried out by Messrs. Mullins & Richardson, the heating contract by Mr. C. Longbottom, and the furnishing by Messrs. Longbottom, Ingham, & Co., of Leeds. The work was carried out from designs by the late Mr. Crabtree, and under the direction of the Borough Surveyor, Mr. F. O. Kirby.

THE KING'S THEATRE, EDINBURGH.—The new King's Theatre, Edinburgh, has just been opened. The new theatre is built on the cantilever principle, and in all the three tiers there is not a single pillar. The building has a frontage of 84 ft. towards Leven-street. The chief feature is the principal entrance, which is flanked by shafts having enriched Ionic capitals, surmounted by a balcony supporting an oriel window, two floors in height, and capped with an ornamental stone roof. The windows on the second floor are supported by carved corbels, representing tragedy and comedy. The Tavistock elevation is finished in a plainer manner. Ornamental verandas are erected at all the entrances and exits. The main part of the building is entered from Leven-street, and after passing through the veranda two pairs of carved teakwood doors give admittance to the vestibule. The floor is laid with terrazo, and the walls are covered with polished alabaster, while the friezes and ceiling are made of decorated fibrous plaster work. The staircases and balustrades are of white polished marble. Access to the ladies' tea-room and cloakroom, and also to the refreshment bar and smoking-rooms is got from the lounge. The foyer is reached by three separate flights of marble steps, from which entrance to the dress circle is got by three carved mahogany doors, placed in a glass screen. At each end of the foyer is an ornamental kiosks for the sale of fruits, flowers, etc. The width between the side walls of the building is a clear span of 72 ft. On the ground floor are placed the orchestra stalls and pit stalls. At both sides of the stage there are three tiers of boxes—eighteen

in all. At each side of the proscenium are figures representing music and art, and the divisions between the boxes are supported by caryatides. The whole of this decorative plaster work is in the French Renaissance style. The roofs are all constructed of steel and concrete, and covered on the top with vulcanite sheeting, while over the top gallery there is placed a large sliding glass cupola. The stage is 65 ft. wide and 55 ft. deep, cut off from the auditorium by a fireproof curtain. The stage flies and roofing are also of steel and concrete. There is a fireproof scene dock. The dressing-rooms are reached from the stage, and they are also fireproof. The building is heated on the hot water, low-pressure system. Messrs. James Davidson, Coatbridge, and J. D. Swanson, Kirkcaldy, were joint architects of the theatre, and Mr. Thomas I. S. Watson, Edinburgh, was surveyor for the contractors. Messrs. W. S. Cruickshanks & Son were the contractors for the whole structure. The cost of the building, exclusive of the site, has been about 50,000*l.*

HOUSING SCHEME, HULME, MANCHESTER.—On the 4th inst., at the Manchester Town Hall, Mr. K. M. North, Local Government Board Inspector, held an inquiry into the application of the Corporation for sanction to borrow 7,500*l.* for the erection of a block of tenement dwellings for the working classes on land in Barrack-street, Hulme. Mr. Hudson, Deputy Town Clerk, explained that the application was supplementary to an inquiry which was held by Mr. Tulloch on October 27, when the inquiry was as to the expediency of enabling the Corporation to acquire the land on which it was now proposed to erect buildings. The result was that the Corporation were authorised to borrow 6,867*l.* for the purchase of the land to be held by the Corporation for purposes of Part 3 of the Housing of the Working Classes Act, 1890. He submitted that after the result of the inquiry the principle was settled, and it was deemed by the Local Government Board as well as by the Council expedient that this land should be acquired, vested in the Corporation, and appropriated for the purpose of the Housing Acts. Mr. Henry Price, the City Architect, produced plans of the tenement dwellings proposed, and explained them. In answer to questions he agreed that sixty-five to seventy cottages could be put on the land. If they were four-roomed and properly built such cottages would cost nearly 2,000*l.* apiece. On the tenement dwellings, no doubt, the Corporation would make a loss for the future. It would seem that each year there would be a loss of 667*l.* on the proposed buildings. He put the cost at 64*l.* a cubic foot.

NEW THEATRE, CARDIFF.—Messrs. Archibald Dwayne & Co. ask us to mention that they carried out the whole of the constructional steel-work in this building, the completion of which was referred to in our last issue (page 699).

PUBLIC HALL, GLEN URQUHART, N.B.—Mr. Bradley has presented a new public hall to the inhabitants of Glen Urquhart. Mr. Mackintosh, architect, of Inverness, prepared the plans for the work.

PARISH ROOM, COWLEY.—A parish room was recently opened at Cowley by the Countess of Essex. It is a brick-built structure, of Cowley stocks and reds, flanked with buttresses on each side, and a cloakroom and kitchen on the left, adjoining the side-entrance. The main hall is 48 ft. by 28 ft., and is capable of seating over 200 people. Mr. W. S. Try was the builder; Mr. F. J. Brewer being the architect.

THEATRE IMPROVEMENTS, BURY ST. EDMUNDS.—Improvements have recently been carried out at the Theatre Royal, Bury St. Edmunds. The work was executed by Messrs. Dean & Co., of Birmingham, the architect being Mr. Bertie Crewe, of London.

MUNICIPAL BUILDING, SOUTHWICK.—A new public hall has been erected at Southwick. The building is of red Southwater brick, and was designed by the surveyor, Mr. George W. Warr. The building contract amounted to 1,490*l.*

FORESTERS' HALL, SURREY.—Members of Court Windsor Castle, of the Ancient Order of Foresters, have built a hall in which to hold meetings. The new building consists of a hall about 61 ft. long by 35 ft. wide, at one end of which is a raised stage 10 ft. wide, with two dressing-rooms attached. The hall is approached by a corridor at the sides of which are situated the cloakroom and lavatory accommodation. At the back of the hall is a buffet. On the ground floor is also a committee-room, whilst the first floor is retained for ladies' retiring-room, etc. The elevation to Park-street is carried out in red brick, with stone dressings and terra-cotta pediment. The hall is heated by gas radiators, while the illuminant is on the inverted gas mantle system. The new hall was erected by Mr. John Nichol, of Bitterne Park, to plans prepared by Councillor H. J. Weston, of Southampton.

PROPOSED ISOLATION HOSPITAL, HAMPTON.—At the Public Offices, on the 5th inst., Dr. W. W. E. Fletcher, an inspector of the Local Government Board, held an inquiry into the application of the District Council for sanction to a loan of 498*l.* for the erection of a porter's lodge, and a

discharging ward at the Isolation Hospital. Mr. S. H. Chambers, Surveyor to the Council, described the plans to the inspector. The lodge would contain on the ground floor a living-room and kitchen combined, with sanitary and the usual offices, and on the first floor two bedrooms and a bathroom. The discharge ward would consist of a bathroom, dressing-room, and clothes store, with lavatory accommodation, and the bathroom would be supplied with hot water from the lodge kitchen. The buildings would be constructed with red bricks, with stone dressings. A tender had been accepted for executing the works for 497*l.* 10*s.* from Mr. C. H. Keen, of Cranford, subject to the sanction of the Local Government Board.

PROPOSED BUSINESS EXCHANGE, LEEDS.—It is proposed to establish a new business exchange at Leeds. The proposal is to convert the premises until lately occupied by Messrs. Broadbent, in Briggate, into an Exchange providing postal, telegraphic, telephonic, and messenger services, the first floor being used as a reading-room and room for meetings. The ground floor space is 6,000 sq. ft. The plans have been prepared by Mr. Percy Robinson. A committee has been appointed, and a meeting will be called on January 15 for their report to be considered.

Appointments.

BRADFORD.—The Electricity Committee of the Bradford Corporation have decided to appoint Mr. Thomas Roles to the post of City Electrical Engineer, made vacant by the resignation of Mr. A. S. Blackman, who has secured an appointment at Sunderland.

APPOINTMENT OF SANITARY OFFICERS.—The Local Government Board have sanctioned the appointment of Mrs. A. C. Young and Miss M. Fitzgerald as additional sanitary inspectors of the Metropolitan Boroughs of Islington and Woolwich respectively.

LADY APPOINTED COUNTY SURVEYOR.—Miss Alice Berry, B.E., has been appointed Lady Mayo County Surveyor for Galway, in room of her father, who died recently. The total salary is 500*l.*, and formerly the appointment was worth about 1,000*l.*—*Elgin Courier and Courier.*

Sanitary and Engineering News.

THE NEW HARBOUR AT CRASTER.—For many months operations have been in progress in the formation of a harbour at the north Northumbrian fishing village, Craster. The rock-bound coast has always presented difficulties to the fishermen in the way of landing in certain winds; and the harbour in question, which is a memorial, will do away with these serious drawbacks. The additional use of the little seaport as a means of sending southwards the stone from local quarries will require further accommodation for workmen and their families. To meet this want Messrs. McLaren, Christenbank, have acquired sufficient land for the erection of sixteen houses upon it. They will be semi-detached, or built in couples. The plans will be arranged by Mr. M. Temple Wilson, architect, Alnwick. Craster Tower, near the village, has one of the fine piles that were the strongholds of the local gentry in times past.

Foreign.

FRANCE.—The Académie des Beaux-Arts have elected M. Edmond de Rothschild an Honorary Member, in place of the late M. Henri Bouchot.

—M. Dernaz, architect to the Post Office and Telegraph Department, has been appointed architect to the Senate, in place of the late M. Scellier de Gisors.

—M. Pelletier, architect, of Louis-le-Sauvage, has been elected President of the District Architectural Society of l'Ain, Jura, and Saône-et-Loire.—Work is to be commenced shortly for the enlargement of the railway station at Gaunat (Allier), at a cost of 3,700,000 francs.—The third International Art Exhibition at Cannes will be held from December 26 to February 1. An International Art Exhibition is to be held at Bordeaux from May to September of next year. The forty-third Exhibition of the Société des Amis des Arts of Pau will be held from January 15 to March 15.—At the ancient castle of the Popes at Avignon some fine fresco paintings have been discovered on the walls of the principal rooms, which had been plastered over at the time that this remarkable building was adapted for a barracks.—The General Council of the Seine has commissioned four painters—M. J. Sappé, Menn, André Humbert, and Crebassa, to decorate the Salle des Fêtes and the main staircase of the Hôtel-de-Ville of Noisy-le-Sec.—M. Béringuier has been commissioned to decorate with paintings the council-room of the Mairie of Cliehy.—A Departmental Almshouse is to be

installed in the Château de Mirabeau (Puy de Dôme), at an estimated expense of 270,000 francs.—A vote of 90,000 francs has been passed towards the erection of a higher-grade school for young girls at Prades (Pyrenées Orientales).—The death is announced, at the age of 70, of M. Louis Danaila, sculptor, pupil of Emile Leconte and of the Ecole des Beaux-Arts. His first exhibit at the Salon, in 1863, was a group of "Hercules strangling the serpents." He obtained a medal in 1866 and "second medal" in 1885, as well as an Honourable Mention at the 1900 Exhibition. His last work, which is not fully completed, was a decorative figure in stone for the facade of the Mairie of the Xth arrondissement.

GERMANY.—The German Society of Architects and Engineers has revised the curriculum for instruction in the Building Section in technical schools. The result of many years of consideration has led them to decide that these schools shall not propose to train architects, but only to give thorough tuition in construction and practical matters; that more of the training shall be carried out in the workshop and on an actual building; that less time be devoted to developing the artistic side of the student; and that complete education cannot be obtained in a school, but must be acquired by actual practice.

—There is great excitement regarding the fate of the ruins of the Roman aqueduct dating from Domitian, just without the town. These ruins consist of sixty piers, some 7 metres high. In the majority of them the concrete core alone remains, though some of them retain their stone facing. The only other similar ruins in Germany are to be found near Metz, so their rarity should be their safeguard. In the project for extending the town these piers would be surrounded by tall blocks of flats which would destroy their effect. The next step would be to destroy the piers themselves, in order to increase facilities for traffic.—The Emperor has subscribed 10,000 marks to the restoration of the church of St. Lawrence, Nuremberg, which, after Regensburg Cathedral, is the most important Gothic monument in Bavaria. The restorations necessitated by the bad weathering quality of the stone were begun in 1904. Professor J. Schmitz is directing the work, which will extend over a period of six to eight years, if the funds are forthcoming to carry out even the most urgent repairs.—In the competition for Municipal Buildings, Neustadt, West Prussia, the first prize of 1,000 marks was awarded to Messrs. Herffarth & Wilde, of Charlottenburg.—Professor Adolf Brütt, of Berlin, has won the limited competition for designs for a monument to be erected in Berlin University to Mommsen. Each of the seven artists invited to compete was given an indemnity of 2,000 marks. In the prize design the seated figure of the historian is of white marble.

BULGARIA.—The Bulgarian Government announces an international competition for designs for a university in Sofia. Designs to be sent in from April 1 to 14, 1907. Three prizes are offered—10,000, 7,000, and 5,000 francs.

Miscellaneous.

PROFESSIONAL AND BUSINESS ANNOUNCEMENTS.

—Mr. Henry B. Downs, architect, has removed his offices from 10 and 11, Lime-street, London, to South-street, Braintree, North Devon.—The Indestructible Paint Company have removed their offices from 31, Cannon-street to King's House, King-street, Cheapside, E.C.—Owing to the building of the Liverpool Offices of Messrs. G. A. Watson & Co., Ltd., coming down, they have removed their head offices to "Shamrock House," 10, Little College-street, Westminster Abbey, S.W. The late London offices at 32, Gt. George-street, have also been transferred to "Shamrock House." The new Liverpool branch office is now 3, Cross Hall-street, Liverpool.

MEMORIAL TABLET, LYNDBURST.—A brass tablet has been placed in St. Michael's Church, Lyndhurst, to the memory of the late Mr. James Edward Bateman Dashwood, of the Foreign Office. The tablet is erected in the north transept of the church, and is engraved on "latten" brass. It was executed by Mr. Gawthorpe, of London, and fixed by Mr. Ellery, stonemason, of Lyndhurst.

WEST WALTON CHURCH, NORFOLK.—A fund is open for the repARATION, at an estimated cost of 1,500l., of the parish church of West Walton, near Wisbech. The church, dedicated to St. Mary, presents many interesting features of the early and Decorated English styles. The tower stands upon four arches, detached; it rises in three stages, with parapet and pinnacles, forming a gateway into the churchyard. The nave and aisle roofs are greatly in need of repair. The tower has been injured by lightning, its pinnacles are broken, and the bell-frames are insecure. The old North door was preferred when the aisles were widened; a beautiful early English window is on the South side.

THE BUILDING-LINE OF PENTONVILLE-ROAD.—In the printed Parliamentary Papers Mr. Horniman asks the President of the Board of Trade whether his attention has been drawn to the decision of the Tribunal of Appeal in the case of an appeal by the owners of the premises Nos. 190-208, Pentonville-road, against the certificate of the Superintending Architect of Metropolitan Buildings defining the general line of buildings on the north side of Pentonville-road between Southampton-street and North-street; whether he is aware that the effect of the decision will be to make it lawful to erect buildings 80 ft. in height in place of the existing one-story shops; and whether, in view of the desirability of wide thoroughfares and of the fact that the advisory board of engineers, in their Report to the Royal Commission on London Traffic, pointed out that an Act of Parliament of 1756 enacted that no buildings should be erected within 50 ft. of the sides of the Pentonville, Euston, and Marylebone roads, and urged that the principle on which the Act was based should now be acted on, he can see his way to take immediate action to prevent the air space and width of thoroughfares like the Pentonville-road being seriously diminished.—Mr. John Burns, who replies to the question, states that the facts are substantially correct. The Tribunal of Appeal had, however, expressed their willingness to take care for the advisory board of the High Court, and the London County Council are taking steps to get a case stated.

ROYAL COMMISSION ON DRAINAGE.—Replying to a question raised by Mr. J. P. Farrell, in the Parliamentary Papers, Mr. Bryce states that the Royal Commission on Drainage hope to present their Report on Arterial Drainage in Ireland early next month.

MODEL HOUSING EXHIBITION, WOLVERHAMPTON. We hear that there is a scheme for establishing a model village for the Midlands on the outskirts of Wolverhampton. It is proposed to carry out the scheme on an estate of about 400 acres two miles from the centre of the town, and at from 450 ft. to 500 ft. above sea-level. Sir Richard Paget, the owner of the estate, recognises the necessity of preventing the continued erection of crowded rows of dwellings, and desires to develop the estate on lines which will secure healthy and adequate housing accommodation for the inhabitants. The design of the whole area is being prepared in advance. Provision will be made for wide roads, and open spaces for gardening and recreation. The plan of development is being prepared by Mr. Detmar Blow and Mr. Fernand Billery, architects, of London; and Mr. Thomas Adams, late Secretary and Manager of the First Garden City, Ltd., is acting as agent for the owner in carrying out the scheme. It is proposed to hold a model housing exhibition on the estate in the late summer and autumn of 1907, when prices amounting to at least 250l. will be awarded for the best houses containing four and five rooms, and erected at a cost not exceeding 250l. Architects and builders in the Midlands who are likely to be interested in the exhibition, can obtain full particulars from the Secretary, Grosvenor Chambers, Lichfield-street, Wolverhampton.

SEWER VENTILATION, MANCHESTER.—The Manchester Corporation Special Committee on Ventilation of Sewers, presided over by Councillor James Johnston, received a report, on the 13th inst., of examinations of eleven tramway poles fixed in Wilmslow-road, specially constructed with a view to the assumption of the function of sewers. The poles, it was stated, appeared to have done their work in a fairly effective manner, drawing the gas from the sewers and discharging it at a height of twenty-five feet above the street level. The Withington Special Committee had ordered a further number of these poles to be fixed in its own district. It was decided by the Sewers Ventilation Committee that the City Surveyor should select a suitable area on which to carry out a fairly extensive series of experiments by means of poles of the kind referred to or by pipes fixed to the gables of houses, and arrangements should be made with Professor Sheridan Delepine to begin an investigation as to the effect of sewers on the health of the community in such quantities as it may escape from the traps and grids, whether in fact these appliances lead to any ill-effects beyond offensive smells. These experiments will probably extend over a couple of years. The City Surveyor was instructed to ascertain what would be the probable cost. An exhaustive report of the committee, which will probably be presented to the Council at its next meeting, has been prepared by the Chairman and the City Surveyor, covering the whole of the work of the committee since its formation six years ago. In April, 1901, it was suggested by Mr. De Courcy Meehan that sewers should be systematically ventilated by sufficient upright shafts placed in suitable positions, that the surface ventilators should be utilised as inlets for fresh air, and that manufacturers' refuse containing chemicals liable to generate explosive or other dangerous gases in the sewers should be rigidly excluded. Since that period many proprietary methods of ventilation of sewers have

been tested, Dr. Delepine has undertaken bacteriological work, and Dr. Gilbert Fowler has carried out chemical labours in connexion with the committee's proceedings. None of these proprietary systems, says the report, can be recommended for use in the Manchester sewers. It is, however, recommended that a station be provided where bacteriological and chemical observations of a serial and continuous character can be carried out with the precautions necessary to secure accuracy. Professor Delepine considers that the Public Health Laboratory Grounds, which run along High-street and York-place, might at small cost be made a point of observation. Dr. Delepine put together a fair amount of apparatus in 1903 with the object of clearing up the question of the influence of sewer air on health, but owing to the removal of his laboratory it had been found impracticable to fix a station for its complete study.—*Manchester Courier.*

THE FIRE IN DORSET-ROAD.—Messrs. L. Whitehead & Co. wish to state that the serious fire at their storey, in Dorset-road, which was prominently noticed in the daily Press of the 13th inst., has not in any way affected their workshops, stables, and main yard in Portland-place North, and in no way inconveniences them except as regards the loss of business. The business is, therefore, being carried on as usual.

SCOTTISH BUILDERS AND SCAFFOLDING.—The Scottish Building Trades Federation, of which the headquarters are in Edinburgh, have sent a petition to the Home Secretary with reference to the proposed regulations as to the erection of scaffolding and measures for the safeguarding of the lives of workmen while employed in the erection or repair of buildings. The Federation urge that if the regulations are to apply to Scotland the Scottish Building Trades should be directly represented on the Department Committee appointed by Mr. Gladstone to inquire into the subject. The different centres of the Federation throughout Scotland have been communicated with, in order that witnesses may be sent from Aberdeen, Dundee, Inverness, Glasgow, and Edinburgh to give evidence before the committee. Mr. W. Graham Yool, president of the Building Trades' Exchange, of the City and District of Edinburgh, made reference to the proposed regulations at the dinner of the building trades in Edinburgh, on the 13th inst., and said that the framers of the regulations knew absolutely nothing about the conditions which obtained as to the erection of scaffolding and the way building operations were carried out in Scotland. The regulations required to be seriously considered by all interested in the building trade.

EDINBURGH, LEITH, AND DISTRICT BUILDING TRADES' ASSOCIATION.—The annual dinner of the Edinburgh, Leith, and District Building Trades' Association and the Building Trades' Exchange of the city and district of Edinburgh was held in the Royal British Hotel, Edinburgh, on the 13th inst. Mr. Patrick Knox, President, and the Councillors were present. Mr. W. H. Baxter, Councillor Wilson, and Mr. James Millar. Several representatives were present from Glasgow and other kindred associations. The toast of "the Corporations of Edinburgh and Leith" was proposed by Mr. David McKie, Councillor Forrest, replying for Edinburgh, and Councillor Cochrane for Leith. The toast of the two associations was proposed by Mr. W. H. Baxter, Glasgow. Councillor M'Leod replied for the Building Trades' Association, and Mr. W. Graham Yool, Leith, for the Building Trades' Exchange. The latter said if the country succeeded, as it ought to succeed, in retaining its cavalry, there would be new barracks to build in Scotland. "Kindred Associations" was proposed by Mr. W. Patterson; and Mr. James Somerville (Vice-President of the Glasgow Plumbers' Association) and Mr. W. Brims (Edinburgh and Leith House Factors' Association) replied. Mr. Hippolyte J. Blanc, R.S.A., and Mr. J. C. Hamilton (Edinburgh Ordnance Surveyors' Society) responded to the toast of "The Architects and Surveyors," proposed by Mr. James Millar.

A NOVEL ADVERTISEMENT.—The Linolite Company have started a delivery van with notices lighted by lengths of linolite affixed to the van, and run on a 110 volt circuit by means of a small petrol motor direct coupled to a 3-h.p. dynamo.

Capital and Labour.

STATE OF THE BUILDING TRADES.—Employment continued dull on the whole. It showed little general change compared with a month ago, but was better than a year ago. Returns received from firms employing 60,671 work-people at the end of November show a decline in the numbers employed of 2,298, or 3.6 per cent., compared with a month ago. Returns from trade unions of carpenters and joiners and of plumbers show that an improvement took place in these trades during the month. The percentage unemployed of trade union carpenters and joiners in the United Kingdom was 6.9, as

compared with 7-6 a month ago, and 8-3 a year ago; and of plumbers 6-9 per cent. were unemployed at the end of November, as compared with 8-0 a month ago, and 11-1 in November, 1905. In London, 8-2 per cent. of carpenters and joiners were unemployed at the end of November, as compared with 9-0 a month ago, and 10-2 a year ago. With plumbers the percentage unemployed was 11-9, as compared with 12-2 a month ago and 14-6 a year ago. Employment was dull generally except with slaters, and with plasterers in Scotland, who were fairly well employed. Compared with a month ago some improvement was reported by slaters, and also by stonemasons in England, and plasterers and painters in Scotland; some decline was reported by painters in England, and stonemasons in Scotland. Compared with a year ago there was an improvement with slaters, and also with stonemasons in England, and plasterers in Scotland; a decline was reported by stonemasons and painters in Scotland. Bricklayers reported little change in employment compared with a month ago and a year ago.—*Labour Gazette.*

Legal.

APPEAL BY A STONEMASON.

THE case of W. Thornton & Sons v. James McArthur came before the Court of Appeal, composed of the Master of the Rolls and Lords Justices Cozens-Hardy last week, on the defendant's appeal against an order of the Liverpool County Court judge on an application by the plaintiffs to review an award under the Workmen's Compensation Act, 1897.

It appeared that James McArthur, a stonemason, while in the employment of Messrs. Thornton & Sons, of Liverpool, in January, 1906, was engaged in removing scaffolding on the new tramway offices in Hatton-gardens, Liverpool, and whilst so engaged met with an accident, the effect of which was to incapacitate him from work. It was admitted that the workman was entitled to receive compensation under the Act, and by an agreement dated February 7, 1906, the employers agreed to pay him a weekly sum of 17s. 10d. This agreement was in the usual form, and was filed with the Registrar. Shortly afterwards the man was sentenced by the stipendiary to six weeks' imprisonment for some small misdemeanour. During his incarceration the employer's doctor called several times at the workman's house for the purpose of medically examining him, but of course failed to find him. The employers then applied to the County Court judge to suspend the payments on the ground that the man had refused to undergo a medical examination. They then for the first time heard that the man was in prison, and the application was adjourned to enable the man to be examined by a doctor. The judge then dismissed the application, and the employers resumed their application, asking that the weekly payments should be determined on the ground that the man was no longer incapacitated from work. The County Court judge reduced the weekly payments from 17s. 10d. to 10s. a week. Hence the present appeal of the workman.

On behalf of the appellant it was contended that the learned County Court judge was wrong in diminishing the payments when the only application before him was to determine the payments; and secondly, that there was no evidence of improvement in the man's working capacity.

In the result their lordships affirmed the decision of the learned County Court judge, and dismissed the appeal with costs.

PONTYPRIDD BUILDING DISPUTE.

THE case of Jones v. Lewis came before a Divisional Court of King's Bench, consisting of Justices Darling and Bray, on the 16th inst., on the plaintiff's appeal from a judgment of the official referee.

The plaintiff was Mr. Charles Benjamin Smith Jones, carrying on business as a builder under the style of Smith, Jones, & Co., and the defendant was a Mrs. Emma L. Lewis. The plaintiff entered into an arrangement to build a house for the defendant on the Park Estate, Treforest. The defendant had already obtained plans and specifications from a Mr. A. O. Evans, an architect, and she wanted tenders, and the question in the case was whether the specifications formed part of the contract. The Official Referee found that it was a term of the contract made between the plaintiff and the defendant that the house should be erected for 550l., in accordance with the plans and specifications referred to; that the plaintiff was entitled to recover 100l. balance of the contract sum, also 51l. 12s. 6d., and 26l. 7s. 4d. part of 70l. 3s. 6d. extra work, making 178l. 19s. 10d. He further held that the defendant was entitled to recover in respect of her counterclaim 220l. 0s., leaving after allowing for the 178l. 19s. 10d., a balance due to the defendant of 41l. odd.

Plaintiff now appealed against this award and sought to set it aside.

Mr. Abel Thomas, K.C., on behalf of the appellant, said the tenders the defendant had received ranged from 820l. to 995l. Under the award the defendant was to get the house for 550l., and was to get 220l. back. She was thus getting the house for 330l.—a magnificent bargain.

Mr. Justice Bray: I don't know that I should call it a magnificent house.

Their lordships in the result affirmed the decision of the learned Official Referee, and dismissed the appeal with costs.

PROPERTY DAMAGED BY PUMPING.

THE hearing of the case of Fletcher's Executor v. the Corporation of Birkenhead concluded in the Court of Appeal, before the Master of the Rolls and Lords Justices Cozens-Hardy and Farwell, on the 18th inst., on the defendants' appeal from a judgment of Mr. Justice Bray at the Liverpool Assizes. His lordship gave judgment in favour of the plaintiff, who had since died, and his executor now presented the present appeal.

It appeared that the late Mr. Isaac Fletcher, of Seaton Lodge, Upton, on November 18, 1904, received notice from the Birkenhead Corporation, claiming compensation in that they by the exercise of the Birkenhead Corporation (Gas and Water) Act, 1881, and other Acts incorporated therewith, had injuriously affected premises known as Brookside, Upton, belonging to the plaintiff. It seemed that the property in question had long been acquired by the Corporation in pursuance of the powers conferred upon them. On this land they sank a well and erected a pumping station, and the plaintiff alleged that the effect of the pumping was to draw silt from underneath his house so that the building was let down. The matter went to arbitration, and the umpire found that the Corporation had, by the authorised working after the completion of the authorised works, occasioned damage to the property of the claimant by from time to time taking such water as was found in and under the lands taken by the Corporation for constructing their works. Such damage, however, was not occasioned by the abstraction of water only, but by the abstraction of water which carried with it silt from under the premises of the claimant. The umpire fixed the compensation at 1,200l. The matter then came before Mr. Justice Bray on questions of law. In a case under the Railway Clauses Act the House of Lords had decided that no compensation was recoverable in respect of authorised workings, and it was contended in the present case that inasmuch as the umpire had found that the damage arose from the authorised working after the completion of the works the same principles applied, and no compensation was recoverable. Mr. Justice Bray, in finding for the plaintiff, based his decision on his view of the sections of the Waterworks Clauses Act, and said it was extremely unsatisfactory to one Act of Parliament to another Act of Parliament. Hence the present appeal, in support of which it was contended that the considerations applied by the House of Lords to the case under the Railway Clauses Act applied to the present case under the Waterworks Clauses Act.

At the conclusion of the arguments of counsel, their lordships affirmed the decision of Mr. Justice Bray, and dismissed the appeal with costs.

A stay of execution was granted pending an appeal to the House of Lords, the Corporation agreeing to pay 4 per cent. on the sum involved in the event of the appeal proving unsuccessful.

Mr. Horridge, K.C., and Mr. F. E. Smith, M.P., appeared for the appellants; and Mr. Pickford, K.C., and Mr. Leslie Scott for the respondent on the appeal.

Patents of the Week.

APPLICATIONS PUBLISHED.*

16,681 of 1905.—J. R. CRAIG: Apparatus for the Production of Ozone from Oxygen or Atmospheric Air, and its Application for Ventilation and other Purposes.

Tars relates to an apparatus for the production of ozone from oxygen or atmospheric air, and consists in the arrangement upon a metallic frame, capable of removal from the outer casing of the ozonising apparatus, of electrodes insulated from said frame, and alternating with baffle plates or rings.

23,394 of 1905.—J. D. MCCABE: Knives of Clay-mixing Machines.

This relates to a knife of a clay-mixing machine cast in two parts. The parts can be joined together in three different ways—namely, clutched and fastened with a split pin, clutched and bolted through the centre, and screwed clutched and nut.

* All these applications are in the stage in which opposition to the grant of Patents upon them can be made.

23,768 of 1905.—E. TAYLOR: Draught Improvers for Consuming Smoke in Steam Boiler Furnaces, Domestic Fireplaces, and the like.

This relates to a draught improver and smoke consumer, and consists in the use of a number of metal plates placed one above the other and held in such a manner as to form a number of air spaces between the said plates.

28,816 of 1905.—H. PETERS: Manufacture of Portland Cement and Apparatus for Use therewith.

This relates to an apparatus for the removal of dried mixtures of slurry and fuel from the floors of rectangular drying chambers in connexion with ordinary vertical cement-burning kilns, and consists essentially of rakes mounted in the said chambers and an arrangement for causing to-and-fro motion of the said rakes in the said chambers.

23,870 of 1905.—G. T. FOLEY: Smoke and Down-draught Pressing Device for Chimneys.

This relates to a self-contained down-draught preventing device and extracting device for smoke, foul air, dust, or the like, for chimneys, ventilating and other conduits, and consists of a casing built in the chimney or conduit wall provided with fixed or removable inclined louvre plates, sides permanently fixed to the casing, and extending into the chimney, and a plate carried by the casing pivoted to its lower end and adapted to be adjustable.

24,397 of 1905.—J. LEEMING and A. GREEN-RALPH: Hydraulic Presses.

This consists in a combination with a hydraulic press or presses, and an intensifier of a series of hydraulic cylinders and controlling valves in addition to the necessary back pressure valves placed in the pipe connections between the water main or source of supply and the press and operating automatically to reduce the initial pressure from the source of supply on the press ran to the maximum pressure required.

25,162 of 1905.—M. G. WOOD: Locks and Latches.

This relates to a lock or latch, and consists in the arrangement wherein the bolt and latch proper is made of a stirrup-like shape so as to embrace the other part of the bolt to which the levers or tumblers are pivoted.

450 of 1905.—T. HARRIS: Drainage Ventilating Shafts or Air Inlets.

This relates to drainage ventilating shafts, and consists of a gully of such size and shape as shall admit of being placed wholly inside a vertical drain or sewer pipe, except the socket wherewith it is hung in position on such pipe, and shall leave an annular space between the outside of the gully and the inside of the drain or sewer pipe. It provides, through openings formed in the side, for the admission of fresh air and water into the drain wherein it is fixed; any detritus entering said gully drops into the well, which is formed below the side openings or water line, and which prevents any substance entering such drain or sewer that may cause obstruction.

2,565 of 1906.—A. F. MORRISON and M. INGRAM: Baths, Lavatories, Sinks, and the like.

This relates to baths, lavatories, and the like, and consists in making the bath, landing sink, or the like, with a lip or edge around the receptacle to prevent or minimise the chances of splashing over when a fluid is agitated therein. To secure this the upper edge of the said receptacle is made curved inwards and finished in a form known as "bird's head and beak," which tends to turn back a fluid agitated within the receptacles instead of it washing over, as frequently happens with receptacles of the ordinary kind.

3,196 of 1906.—G. and W. G. GUMMER, LTD., and G. GUMMER: Bath Valves and the like Water Fittings.

This relates to bath valves and the like water fittings, and consists in the arrangement and combination of parts and appliances comprising a screw-down valve for both hot and cold water, and arranged and constructed so that the discharge of either cold, tepid, or hot water can be caused to flow, and to be regulated by two ports in the said valve, and so that hot water cannot possibly be turned on first.

3,782 of 1906.—L. OGGET: Portable Buildings.

This relates to a portable building composed of wooden panels assembled edgewise one with the other, and is characterised by the fact that there are fixed to the four sides or edges of the panels, shaped metal bands fitting each other, each of said panels being provided with hooks, and those opposite to and engaging them being provided with mortises for the reception of the said hooks in such a manner that the employment of bolts or nails for the assemblage is avoided.

6,700 of 1906.—W. MUESER: Bars for Concrete Steel.

This relates to a bar adapted to be used as a core to be embedded in a concrete envelope,

PATENTS.—Continued on page 739.

List of Competitions, Contracts, etc.

For some Contracts still open, but not included in this List, see previous issues. Those with an asterisk (*) are advertised in this Number: Competitions, —; Contracts, iv. vi. viii. x. Public Appointments, xvi.; Auction Sales, xxvi. Certain conditions, beyond those given in the following information, are imposed in some cases, such as: the advertisers do not bind themselves to accept the lowest or any tender; that a fair wages clause shall be observed; that no allowance will be made for tenders; and that deposits are returned on receipt of a bona-fide tender unless stated to the contrary.

Competitions.

FEBRUARY 6.—Galway.—HOSPITAL. Galway Board of Guardians invite plans and estimates on a fever hospital proposed to be erected at Galway. A premium of 25% will be given; but in the event of the Guardians deciding to give the supervision of the building to the architect or engineer, whose plan has been accepted, this premium will be merged in his fees. The selection will be made by an architect or engineer having no interest in the business. Particulars as to hospital accommodation, etc., required, will be furnished by Mr. Robt. P. Mulvey, Clerk of Union, Galway. The plans will be received up to 11 o'clock a.m. on February 6.

Contracts.

BUILDING.

* **DECEMBER 23.—Worcester.**—WAREHOUSE AND OFFICES.—Builders desirous of tendering for new warehouse and offices at Worcester, for Messrs. Ray's, Ltd., should apply to Messrs. Simpson, J. Ayton, architects, 3, Victoria-buildings, Crick Lane, W.C., on or before December 23. Plans may be seen, and bills of quantities obtained, for which a deposit of 25% will be charged.

DECEMBER 25.—East Preston.—COVERED WAY, ETC. East Preston Guardians invite tenders for the following works at the Workhouse:—(1) The construction of a screening-chamber on the Workhouse main drain; (2) the erection of a covered way; (3) the erection of boundary walls and fences, and making-up grounds. Plans and specifications may be seen at the office of the architect, Mr. Harold M. Potter, 41a, Warwick-street, Worthing. Tenders, endorsed "Tender for Covered Way, etc.," must reach Mr. Arthur Shelley, Clerk, Town Offices, Littlehampton, not later than December 26.

DECEMBER 26.—Oldham.—ALTERATIONS TO BATHS.—Oldham Markets and Baths Committee invite tenders for proposed alterations and additions to the boys' swimming baths at the Central Baths, Oldham. Plans can be seen, and bills of quantities and form of tender obtained, at the office of the Borough Surveyor. Sealed tenders, endorsed "Tender for Alterations at Boys' Swimming Bath," and addressed to the Chairman of the Markets and Baths Committee, to be returned not later than December 26.

DECEMBER 27.—Bridlington.—ADDITIONS TO CHURCH. For additions to St. John's, Wesleyan Chapel, drawings, etc., may be inspected at the office of Mr. J. Earnshaw, architect, Carlton House, Bridlington, and sealed and endorsed tenders are to be delivered by 5 p.m. on December 27.

DECEMBER 28.—Golcar.—HOUSE. The erection of a dwelling-house in Carr Top-lane, Golcar. Plans may be seen, and quantities obtained, at office of Messrs. P. Taylor & Co., architects, Central-buildings, Middlesbrough, from December 21 to 28, on which latter day tenders must be delivered not later than 12 o'clock noon.

DECEMBER 28.—Paddock.—HOUSES.—The erection of eight dwelling-houses in Branch-street, Paddock. Plans may be seen, and quantities obtained, at Minsbridge office of Messrs. Lunn & Co., architects and surveyors, Minsbridge and Huddersfield, from December 18 to 28, on which latter date sealed and endorsed tenders must be delivered not later than 5.30 p.m., free of charge.

DECEMBER 28.—Ripley.—TOWN HALL ALTERATIONS.—The Ripley U.D.C. invite tenders for new offices and public urinal, and also an additional staircase, at the Town Hall, Ripley, Derby. The drawings can be seen, and specification, bill of quantities, and form of tender obtained, from Mr. G. W. Bird, C.E., Surveyor, Town Hall, Ripley, Derby, upon payment of 25% sealed tenders, endorsed "Town Hall Alterations," must be delivered at the office of Mr. Geo. M. Capon, Clerk of the U.D.C., Public Offices, Ripley, Derby, on or before December 28.

DECEMBER 28.—Warwick.—WORKSHED.—For erection of a work-shed at the Workhouse, Warwick, for the Guardians. Plan and specification may be seen at the office of Mr. F. P. Trevis, F.I.A.S., 1, Church-street, Warwick, any day (except Sunday) between 10 a.m. and 4 p.m. Tenders, sealed, and endorsed "Tender for Work-shed," addressed to Mr. C. H. Passman, Clerk to the Guardians, 48, Bedford-street, Leamington Spa, must be delivered by 9 a.m. on December 28.

DECEMBER 28.—Widnes.—ENGINE-ROOM, ETC.—Widnes Corporation invite tenders for the erection of an engine and boiler house at their Stockport pumping station. Copies of specification, conditions of contract, and bill of quantities may be obtained, and the plans inspected, on application to the Water Engineer, Widnes, and on payment of 25%. Tenders, endorsed "Engine and Boiler House," must be addressed to the Chairman of the Gas and Water Committee, and delivered at the Town Hall, Widnes, on or before noon on December 28.

DECEMBER 29.—Portunna.—COTTAGES.—Portunna R.D.C. will on December 29, receive tenders for the building of twenty-seven labourers' cottages, singly, in accordance with plan and specification, to be seen with Mr. M. Lavan, Clerk to the Council, Office, Union Workhouse, Portunna. The Council

will also receive tenders for the fencing of the plots upon which the cottages are to be erected. Tenders must be on official forms, to be had of the Clerk.

DECEMBER 31.—Porthcawl.—HOUSE. For erection of a dwelling-house at Porthcawl, for Mr. William Jenkins. Particulars at the offices of Messrs. Geo. F. Lambert & Son, Bridgend, or at Gaddy's, South-road, Porthcawl. Tenders to be sent in by December 31.

DECEMBER 31.—Portobello.—EDINBURGH. Works.—Edinburgh School Board invite estimates for executing the following works in connexion with the extension of Tower Bank School, Portobello:—(1) Mason and brick work; (2) carpenter and joiner work; (3) smith work; (4) slater work; (5) plaster and cement work; (6) plumber work; (7) painter work. Plans and specifications may be seen, and schedules and measurements may be obtained, at the office of Mr. Carline, surveyor-general. Estimates, marked outside "Estimates for Work for Tower Bank School," to be sent to Mr. Geo. W. Alexander, Clerk to the Board, School Board Offices, Castle-terrace, Edinburgh, not later than December 31.

JANUARY 1.—Nottingham.—SCHOOL.—Nottingham Education Committee invite tenders for the erection of a mixed school, and addition to the infants' school, Nucleon-boulevard. Plans may be seen at, and copies of the specification, bill of quantities, and form of tender obtained, from the office of the City Architect, Mr. Frank B. Lewis, Guildhall, Nottingham, a deposit of 25% sealed tenders, addressed to Mr. W. J. Abel, Clerk, Education Offices, Victoria-street, to be delivered not later than 10 a.m. on January 1.

JANUARY 1.—Ruthin.—COUNTY OFFICES.—Denbighshire C.C. invite tenders, based on bills of quantities to be supplied, for the erection of new county offices, Ruthin. Plans, together with a deposit of 15% to the County Architect and Surveyor, Mr. Walter D. Wiles, 42, High-street, Wrexham, on or before January 1.

JANUARY 2.—Hambleton.—ADDITIONS TO DORMITORY, ETC.—Hambleton Guardians invite tenders for (a) carrying out certain small additions to the young women's dormitory; and (b) the erection of a range of one-chambered and the extension of the lavatory accommodation in the men's quarters, at the Union Workhouse, Hambleton. A plan and specification of the proposed work can be seen on application to the Board's Architect, Mr. Edward L. Lunn, 36, High-street, Guildford. Sealed and endorsed tenders are to be delivered to Mr. Ferdinand Smallpiece, Clerk to the Guardians, 1, High-street, Guildford, not later than 1 o'clock on January 2.

* **JANUARY 4.—Catford.**—SORTING OFFICE.—The Commissioners of H.M. Office of Works, etc., invite tenders for enlargement of the sorting office at Catford. For particulars and bills of quantities, send an application to Mr. J. Wayer, H.M. Office of Works, S.W. Bills of quantities and forms of tender may be obtained from the Secretary, H.M. Office of Works, Catford, Kent, on or before January 4. Tenders, endorsed "Tender for Catford Sorting Office Enlargement," must be delivered not later than 12 noon, January 4.

JANUARY 5.—Warwicksland.—WALL, ETC. The erection of a wall and iron railing at Warwicksland School. Plans and Specifications will be shown by Mr. Roden, School House, Penton. Tenders, sent in on or before January 5, addressed to School Managers, and endorsed "Tender for Wall."

* **JANUARY 7.—Leek.**—ENGINE-HOUSE, ETC.—Leek U.D.C. invite tenders for building coal-breaker, wagon-tipper, and neighborhood pits, gas-engine house, tunnel under Newcastle-road, and other works at the Gasworks, near Leek Station. Plans, specifications, and stipulations may be seen, and copies of specifications, bills of quantities, and form of tender obtained, from the Council's Surveyor, Town Hall, Leek. Sealed tenders, on form supplied, and priced quantities (under separate cover), endorsed "Building for Coal-handling Plant," and addressed to the Chairman of the Gas Committee, to be delivered to the Surveyor, as above, before noon, January 7.

JANUARY 7.—Milford.—MANSE.—For erection of a manse in Milford Co. Donegal. Plans, etc., can be seen with Mr. John M. Robinson, architect, 7, East-wall, Londonderry, or with Mr. R. McCausland, Milford, Ireland, and endorsed tenders to be delivered to Mr. R. McCausland, Milford, by January 7.

JANUARY 8.—Greenland.—SCHOOL.—Durham County Education Authority invite tenders for new County school at South Moor, Greenland, for about 550 scholars. Plans, etc., can be seen at the office of the architects, Messrs. Clark & Moscrop, Feethams, Darlington. Sealed tenders, endorsed "South Moor, Greenland, Council School," to be sent in on or before January 8, addressed to the Secretary, Elementary Education Department, Shire Hall, Durham.

* **JANUARY 9.—Margate.**—LAUNDRY MANS' QUARTERS.—The Metropolitan Asylums Board invite tenders for the erection of laundry mans' quarters at East Cliff House, Cliftonville Margate, in accordance with drawings and specifications by the Engineer-in-Chief. Drawings, specifications, conditions of contract, and form of tender can be inspected at the Board's Office, Embankment, E.C., on and after December 27. Tenders, addressed as

noted on form, to be delivered at the Board's Office not later than 10 a.m., January 9.

JANUARY 10.—Dunning.—POLICE-STATION.—For the building works required in the erection of a police-station at Dunning, Scotland. Plans, etc., may be seen at the office of Mr. David Smart, architect, Perth, from whom schedules of measurement and further particulars can be obtained, and endorsed, sealed tenders must be lodged with Mr. David Smart, County Clerk, County Buildings, Perth, by January 10.

* **JANUARY 11.—Berks.**—NEW SCHOOL. The Berkshire Education Committee invite tenders for a new school for 250 scholars, at Southwick, Berks. Names to the Secretary of the Education Committee, The Forbury, Reading, on or before January 2, together with deposit of 25% for bills of quantities. Plans, specification, and form of contract may be seen at the Education Secretary's Office on and after January 2. Tenders to Education Secretary, on the form and in the envelope provided, not later than first post, January 11.

JANUARY 12.—Loughrea.—ADDITIONS, ETC., TO CHURCHES. For additions and improvements to the churches of Abbey and Duniry, Loughrea, Co. Gal. Plans, etc., can be seen at Duniry, and office of Mr. W. A. Scott, A.R.I.B.A., 45, Mountjoy-square, Dublin, architect. Sealed tenders, marked "Abbey and Duniry Churches," to be sent to Mr. W. A. Scott, P.O. Duniry, to arrive on or before January 12.

* **JANUARY 14.—Totton.**—NEW SCHOOL, ETC.—The C.C. of Southampton invite tenders:—(1) the erection of a new school at Totton; (2) the installation of low-pressure hot-water apparatus therein. Plans, specification, and conditions of contract may be seen, and bills of quantities obtained, at the office of Mr. W. J. Taylor, County Surveyor, The Castle, Winchester, on and after December 31. A deposit of 25% will be required for a copy of the bills of quantities for Estimate I., and similar deposit for Estimate II. Tenders, endorsed "County School, Totton," to be delivered to Mr. H. Barber, Clerk to the C.C., The Castle, Winchester, by 10 a.m., January 14.

JANUARY 18.—Walsend.—POLICE BUILDINGS.—Northumberland Standing Joint Committee invite tenders for the whole of the works required in the erection of police buildings, Walsend. Names to Mr. J. A. Bean, County Architect, The Moor Hall, Newcastle-on-Tyne. Bills of quantities will be forwarded on payment of a deposit of 25%. Sealed tenders, sent in the envelope provided, to be delivered not later than 4 p.m. on January 18.

No DATE.—Bagillt.—CHURCH.—For the building of an English Calvinistic Methodist church at Bagillt. Plans and specifications to be had from Mr. Richard Jones, jun., architect, Holywell. Tenders to be sent to Rey. R. G. Jones, Rosscave, Egre-mont, Cheshire.

No DATE.—Reading.—ADDITIONS, ETC., TO WORKHOUSE.—Reading Guardians invite tenders for additions and alterations at the Workhouse, Oxford-road, Reading. Application in writing to Mr. E. J. W. Hughes, Clerk to the Guardians, 32, Thorn-street, Reading. Plans and specification may then be seen, and forms of tender obtained, between the hours of 10 a.m. and 5 p.m., on applying to the architect, Mr. W. G. A. Hargrave, Forces House, Queen's Road, on depositing with him the sum of 10s. Tenders must be signed, sealed, and endorsed "Tenders for New Workhouse Buildings, etc.," and delivered to Clerk at the Boardroom, Thorn-street, Reading, at such a date as will be hereafter arranged.

No DATE.—Sherburn.—COTTAGES.—For erection of cottages near Sherburn. Send address to A 154, The Yorkshire Post, Leeds.

No DATE.—Winterton.—ALMSHOUSES.—The erection of three almshouses at Winterton, Lincolnshire, for the trustees of the late Mrs. Mary Clarke. Plans may be seen at the Vicarage, Winterton, and bills of quantities obtained from Messrs. Joy, Cross, & Son, solicitors, Barton-on-Humber.

ENGINEERING, IRON, AND STEEL.

DECEMBER 22.—South Shields.—ELECTRIC LIGHT.—South Shields T.C. invite tenders for the carrying out of the installation of electric light in all departments of the Dean Road School. The drawings may be inspected at the office of Mr. J. H. Cawthra, M.I.E.E., Borough Electrical Engineer, South Shields, from whom form of tender, etc., may be obtained. Tenders, on the form supplied, must be delivered to the Secretary to the Education Committee at his office, Gosport-road, South Shields, on or before noon on December 22, endorsed "Tender for Wiring Dean-road School."

DECEMBER 24.—Greenock.—PUMPS, ETC.—Greenock and District Combination Hospital Board invite tenders for (1) fire pump and accessories; (2) fire general service pump and accessories; (3) cast-iron tank in water tower; (4) cooking apparatus for new Combined Hospital, in course of erection at Greenock. Gateside, Inverkip-road. Greenock, according to plans and specification by Mr. John Dixon, A.M.I.M.E., consulting engineer, 219, St. Vincent-street, Glasgow. Schedule of quantities and prices of material can be obtained on application to Mr. Colin MacCallloch, Clerk to the Board, Municipal Buildings, Greenock, on payment of a deposit

DECEMBER 26.—**Oldham.**—STREET WORKS. (Oldham Corporation Committee) invite tenders for the sewerage

paving, flagging, and completing of Limeside-road (parts of), Frederick-street (part of), Martha-street, Norman-street, and Davies-street. Plans and specifications can be seen, and quantities and forms of tender obtained, at the office of the Borough Surveyor. Sealed tenders endorsed "Tenders for Street Works," and addressed to the Chairman of the Surveyors Committee, to be returned not later than December 26.

DECEMBER 27. **Burslem, STREET WORKS.**—Burslem Corporation invite tenders for the laying up back Telwright-street. Plan and specification can be seen, and quantities obtained, at the Borough Surveyor's Office, Queen-street, on payment of 2s. 2s. sealed tenders, endorsed "Private Streets," to be sent to Mr. A. Ellis, Town Clerk, Town Hall, Burslem, not later than 10 a.m. on December 27.

DECEMBER 27. **Gunthorpe, SEWER.**—The Southwell R.D.C. invite tenders for 333 yds. of 6-in. sewer in the Parish of Gunthorpe. Specifications and particulars may be obtained from Mr. Walter Cotton, surveyor, Southwell. Tenders to be sent to Mr. G. E. Kirkland, Clerk to the Council, Southwell, on or before December 27.

DECEMBER 27. **Leeds, PRIVATE STREET WORKS.**—Leeds Highways Committee invite tenders for the paving and flagging of the following streets:—Lucas-place, back Lucas-street, back Hartley-grove. Drawings may be seen at the City Engineer's office, Municipal Buildings. Forms of tender and bills of quantities may be obtained, and copies of the documents forming the contract inspected, on application at the Highways Office, 155, Kingsall-road. Sealed tenders, endorsed "Tender for Private Street Works," and addressed to the Highways Committee must be delivered at the Town Clerk's Office, Town Hall, Leeds, not later than 10 a.m. on December 27.

DECEMBER 27. **Winchester, SEWERS.**—The Corporation invite tenders for the purpose of laying four lengths of sewers. Drawings, specifications, and form of agreement can be seen on application to, and bills of quantities and form of tender obtained from, the City Surveyor, at the Guildhall, on payment of 2s. 2s. Tenders, enclosed in sealed envelopes, endorsed "Tender for Sewers," to be delivered to Mr. Thomas Hedd, Town Clerk, Guildhall, Winchester, at or before 9 a.m. on December 27.

DECEMBER 29 JANUARY 3. **Banchory, ROAD WORKS.**—Banchory T.C. invite tenders for the macadamising, etc., of 557 lin. yds. or thereby of streets within the Burgh, including channels, kerbing, gullies, footways, and crossings thereon. The Burgh Road Surveyor will meet intending offerers at View-mountain-road (west end), on December 29, at 1.30 p.m. to point out the works. Specifications may be seen at the office of Mr. J. Merson, Town Clerk, High-street, Banchory, where tenders should be lodged not later than January 3.

DECEMBER 29. **Brentwood, ROAD WORKS.**—Brentwood U.D.C. invite tenders for the making-up of North-road-avenue, Brentwood, according to the plans and specification to be seen upon appointment with Mr. A. J. Meehan, Surveyor, Town Hall, Brentwood. Tenders to be sent to Mr. C. Edgar Lewis, Clerk, Brentwood, securely sealed, marked "Tender North Road-avenue," by December 29.

DECEMBER 31. **St. Albans, ROAD WORKS.** For the draining, levelling, paving, metalling, kerbing, channelling, and making good Sandford-road, St. Peter Rural Herts. for St. Albans R.D.C. Plans, etc., may be inspected, and the bills of quantities, with forms of tender, obtained from Mr. Henry F. Mence, Town Hall-chambers, St. Albans, on payment of 2s. 2s. Sealed tenders to be delivered at the offices of the Council, 8, St. Peter's-street, St. Albans before 12 noon on December 31.

DECEMBER 31. **Surbiton, DRAINAGE.**—The U.D.C. of Surbiton invite tenders for drainage works under 251 in. value. Names to Mr. James Bell, Clerk to the Council, on or before December 31.

JANUARY 3. **Luton, PAVING.**—Luton Town Council invite tenders for paving and doing other works of private improvement in Clarendon-road and Rutledge-way, in accordance with the plans and specifications prepared by the Borough Surveyor, and to be seen at his office at the Town Hall, Luton. Separate tenders for each street to be received by Mr. Geo. Sell, Town Clerk, Town Hall, Luton, by 4 o'clock p.m. on January 3.

JANUARY 3. **Mountain Ash, SEWER WORKS.**—Aberdare U.D.C. invite tenders for the laying of about 600 lin. yards of 27-in. cast iron sewer, and the lifting and relaying of about 470 lin. yds. of 27-in. cast-iron sewer, and the lifting and relaying of about 230 timber tubing, with all necessary manholes, sluices, etc., at Cwm Cynon, Mountain Ash. Plans, sections, and specification may be inspected at the Surveyor's Office, Town Hall, between the hours of 10 a.m. and 5 p.m. Sealed tenders, endorsed "Outfall Sewer," must be delivered to Mr.

Thos. Phillips, Town Hall, Aberdare, on or before January 3.

JANUARY 5. **Horwich, SEWERS.**—Horwich U.D.C. invite tenders for the construction of about 5,000 yds. of stoneware and iron pipe sewers, 12 in. and 9 in. in diameter respectively, together with the necessary manholes, etc. Plans, sections, and specification may be seen on application to the Surveyor at the Council Offices, Horwich, who will furnish bill of quantities and form of tender, on payment of a deposit of 2s. Sealed tenders, endorsed "Main Sewers," to be delivered to Mr. Peter Tetherthorpe, Clerk to the Council, Council Offices, Horwich, not later than January 5.

JANUARY 7. **Erith, PRIVATE STREET WORKS.**—The U.D.C. of Erith invite tenders for private street works in Alexander-road, Erith. Plans and specification may be seen and form of tender, estimate of quantities, and further particulars obtained, at the office of the Surveyor of the Council, Bexley-road, Erith. Upon payment of 1s. Tenders, endorsed "Private Street Works Tender," must be received by Mr. Charles H. Fry, Clerk of the Council, District Council Offices, Erith, Kent, not later than 4 p.m. on January 7.

JANUARY 7. **Newtown, Mountain Ash, SEWER.**—Mountain Ash U.D.C. invite tenders for the laying, laying, and jointing of about 225 yds. of 15-in. cast-iron or pipes near Newtown, Mountain Ash. Plans, sections, and specification may be seen, and form of tender and bill of quantities obtained, on application to Mr. W. G. Thomas, Surveyor, Town Hall, Mountain Ash. Sealed tenders, prepaid and endorsed "Newtown Sewer," to be sent to Mr. M. P. Linton, Clerk to the Council, Town Hall, Mountain Ash, so that they be received not later than 9 a.m. on January 7.

JANUARY 14. **Romford, SANITARY AXES.**—The Romford Guardians invite tenders for erection of four sanitary annexes at the Workhouse, in accordance with plans and specifications by the architect, Mr. James Keeneland, 25, Bedford-row, W.C., from whom bills of quantities and forms of tender may be obtained before December 29. Sealed tenders, endorsed "Tender for Sanitary Annexes," to be sent to the Clerk, 15, North-street, Romford, on or before 4 p.m., January 14.

JANUARY 17. **Burnley, ROAD WORKS.**—For kerbing, flagging, paving, and making-up of a number of streets in the village of Hasleton, for the Burnley R.D.C. Drawings and specifications may be seen, and form of tender, etc., obtained, from Mr. S. Edmondson, surveyor, 18, Nicholas-street, Burnley. Sealed tenders, endorsed "Private Street Works, Hinton," to be delivered at the office of Mr. J. S. Horn, Clerk, 18, Nicholas-street, Burnley, by January 17.

JANUARY 19. **Bexley, SEWER.**—Bexley U.D.C. invite tenders for providing and laying about 2,079 lin. yds. of 9-in. and 309 lin. yds. of 6-in. best glazed stoneware pipe sewers, with manholes complete, in the Oaklands and Broadway Estates, near Christchurch part. Plans and specification may be seen, and bills of quantities and form of tender, obtained, on application to Mr. W. T. Howse, Surveyor to the Council, at the Council Offices, Bexley Heath, on payment or deposit of a cheque for 2s. 2s. Sealed tenders, endorsed "Christchurch Part Sewers, Oaklands and Broadway Estates," to be delivered to Mr. Thos. G. Baynes, Clerk to the Council, Council Offices, Bexley Heath, Kent, not later than January 19.

JANUARY 22. **Sowerby Bridge, BACTERIA BEDS.**—The Sowerby Bridge U.D.C. invite tenders for the undermentioned works at the Sewage Works, Milner Road, Sowerby Bridge, viz.: The supply, delivery, and filling the remaining twelve bacteria beds with filtering medium, quantity, about 9,000 cubic yds. Conditions and samples of filtering medium, etc., may be seen at the engineer's office, Hallings Mill-lane, Sowerby Bridge. Specification and quantities may be obtained on application to the engineer, Mr. C. L. Whitehead, C.E., M.E., Sowerby Bridge, on payment of a 5s. Bank of England note only. Tenders, endorsed "Bacteria Beds," and addressed and delivered to Mr. E. W. Evans, Clerk and Solicitor to the Council, Commercial Bank-chambers, Halifax, in sealed envelopes, not later than January 22.

No Date. **Caldy, ROAD.**—For the construction of a road at Cald, near West Kirby, Cheshire. For particulars apply to Mr. D. B. Rappart, Merebank-promenade, Liscard, Cheshire.

No Date. **Coolridge, DRAINAGE.** For draining 3 ft. deep a six-acre field (work only) at Lane End Farm, Coolridge. Apply Mr. Wm. Murgatroyd, Teydon.

No Date. **Shepley, BOWLING GREEN.**—The excavators and drainers' work required in laying a

bowling green (turf excepted) at Shepley. Plans and particulars to be seen at Holly Park, Shepley. Mr. J. T. Chambers, surveyor.

STONE, MATERIALS, AND STORES.

DECEMBER 28. **Rochdale, STORES.**—Rochdale Canal Company invite tenders for the supply of stores for the year 1907, as follows:—Boats and nails (various); brushes (various); canvas; engine packing; ironmongery; oils and paints; ropes (various). Samples can be seen, and approximate quantities ascertained, on application at the Company's Stores, 80, Dale-street, Manchester, on December 18 and 19, and tenders (endorsed) must be forwarded so as to reach Mr. C. R. Dykes, Secretary, Manchester, not later than 10 a.m. on December 23.

DECEMBER 29. **Barry, MATERIALS.**—Barry U.D.C. invite tenders for the supply and delivery of the following goods, up to May 31, 1907:—Lead and compo pipe, pig and sheet lead, block tin, etc. Further particulars and forms of tender may be obtained from the Gas and Water Engineers, Gasworks, Barry. Sealed tenders, endorsed "Lead and Compo Pipe," "Pig and Sheet Lead," or "Block Tin," as the case may be, to be sent to Mr. T. B. Tordoff, Clerk, Council Offices, Barry, not later than 12 noon on December 29.

DECEMBER 29. **Bury, MATERIALS.**—Bury Tramways Committee invite tenders for the supply and delivery of the following materials:—Tramway rails and fishplates; tie bars, fish bolts, and nuts; points and crossings; sole or anchor plates; copper rail bonds; granite setts; cement. Specifications and bills of quantities, with forms of tender, can be obtained on application at the office of Mr. Arthur W. Bradley, A.M.Inst.C.E., Borough Engineer and Surveyor, on payment of 2s. for each specification. Sealed tenders, endorsed "Tramway Rails, etc.," or as the case may be, are to be forwarded to Mr. John Huggins, Town Clerk, Municipal Office, 10, Market-street, Bury, and addressed to the Chairman of the Tramways Committee, so as to be received not later than December 29.

JANUARY 1. **London, STORES.**—Bombay, Baroda, and Central India Railway Directors invite, up to noon on January 1, tenders for the supply of the following stores, viz.: (1) Accumulator cells, etc.; (2) building canvas, etc.; (3) eye bolts and strand wire, for fencing. Tenders must be made on forms, copies of which, with specifications, can be obtained at offices of Mr. W. V. Constable, Secretary, Gloucester House, 2, 3, and 4, Bishopsgate-street Without, London, E.C., on payment of 21s. each (which will not be returned).

JANUARY 1. **Norwich, BRICKS.**—160,000 red bricks, equal in all respects to the sample which may be seen at office of Mr. Arthur E. Collins, M.Inst.C.E., City Engineer, Guildhall, Norwich, delivered as, when, and in such quantities as are required, alongside the sewage works in progress between Old Lakenham and Hall-road, Norwich. Tenders, on the forms supplied, enclosed in envelopes sealed with sealing-wax, endorsed "Bricks," and addressed to the Chairman of the Sewerage Committee, must be delivered at office of Engineer not later than 10 a.m. on January 1.

JANUARY 21. **Camberwell, ANNUAL CONTRACTS.**—Camberwell B.C. invite tenders for the undermentioned stores, materials, etc., the contracts to commence April 1, 1907, and terminate March 31, 1908:—(a) Timber for carts, vans, etc.; (c) wheel lead, painters' and oilman's sundries, glass, carat grease, oils, soaps, candles, etc., tar, pitch, creosote, Intense, leather belting, various packings, and sundries; (d) brooms, brushes, and combs; (e) shovels, pickaxes, files, nails, screws, nuts, bolts, shoeing, hoop, bar, and round iron and steel, coach and builders' general ironmongery, wrought-iron tubes, cast-iron pipes, lead sheet, and pipe, etc.; (f) maintenance of private telephones and electric bells; (g) flints, ragstone, hoggin, granite, Thames and crushed talass, broken granite, granite kerb, channel and pitching, York stone, ear paving materials, lime and cement, bricks, slates, and miscellaneous building materials; (h) asphalt and tar paving works; (i) stoneware drain pipes, etc.; and sewer ironwork; (j) disinfectants, etc.; (k) incandescent electric lamps, incandescent and other gas fittings. Forms of tender may be obtained from Mr. William Oxtoby, Borough Engineer, Town Hall, Camberwell, S.E., specifying sections desired. Samples may be inspected at Grove Vale Depot, opposite East Dulwich Station. No tender will be considered except on the authorised form of tender, which must be delivered at the Town Hall not later than 5.30 p.m. on January 21.

Public Appointments.

Nature of Appointment.	By whom Advertised.	Salary.	Applications to be in
*CLERK OF WORKS.	Romford Guardians	31. 3s. per week	Dec. 31
ASSISTANT MASTERSHIP (EVENING SCHOOL)	Architectural Association	31. 3s. per week	Jan. 3

Auction Sales.

Nature and Place of Sale.	By whom Offered.	Date of Sale.
*TIMBER, 103, LAVENDER-HILL, BATTERSEA—On the Premises	Joseph Hibbard & Sons	Jan. 7, 8, & 9
*BUILDING SITE, MILE END, E.—At the Mart	Daniel Watney & Sons	Jan. 10

PATENTS.—Continued from page 735.

comprising a regularly-formed central body provided with external projecting ribs of uniform cross-section symmetrically and regularly disposed about the central body at an angle to its longitudinal axis, so that the whole bar has a constant cross-section throughout its length, and under conditions of stress as a substantially uniform elongation.

11,518 of 1906.—J. DAVEY: Means for Holding Windows Open for Ventilation and to Prevent Rattling of the same.

This relates to a sash-fastener, and consists of a metal plate fixed to the styles of the upper sash, and a screw or bolt applied to a nut or barrel on the lower sash in such a manner that the said screw or bolt can, on being brought level with the threaded holes in the metal plate, be rotated until the sashes are drawn against the parting head, thus preventing the rattling of the sashes whether close or open for ventilation.

19,127 of 1906.—G. E. HUMPHRIES: Scaffolding Brackets.

This relates to a scaffolding bracket comprising horizontal vertical and diagonal members, the horizontal member having an integrally-formed hook of rectangular section at its inner end adapted to fit a similarly shaped slot in the fastening contrivance.

25,301 of 1905.—G. H. GASCOIGNE: Wireproof Flooring.

This relates to a fireproof flooring, and consists in the combination with ferro-concrete joists or beams provided at intervals in the member or compression part with transverse openings of grooves, or the like, of concrete arched-shaped centring adapted to be placed on the joists or beams when in position, and a concrete floor filling laid over the joists and centring and firmly binding the whole together.

4,971 of 1906.—A. A. R. LANG: Erection of Building and the Construction of Building Blocks therefor.

This relates to concrete building blocks formed in two or more parts connected by tie-rods and having spaces between the parts; the blocks are also formed by moulding in a mould box.

5,918 of 1906.—T. WINSTANLEY: Concrete-mixing Machinery.

This relates to a concrete-mixing machine, and consists in the combination of a cylindrical rotating barrel, with a rack on one end, and inwardly coned ends mounted and revolving upon a fixed hollow shaft supported and fixed at its ends in fixed clamp-bearings on the upper ends of frame, one end of said hollow shaft having connected with it the detachable water-measuring tank.

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SOME RECENT SALES OF PROPERTY.

ESTATE EXCHANGE REPORT.

December 10.—By MORGAN, DAVIES & CLARK, Carshalton, Surrey.—Park-la, The Carshalton-pk. Gates, also the building land on which the gates stand, 11 p. 200
December 11.—By ARTHUR BARKON, Walworth.—10, 20, and 21, Sedan-st., u.t. 43½ yrs., g.r. 12½, w.r. 105½, 8s. 820
Welling, Kent.—10 to 23 (odd), Bethel-st., u.t. 95 yrs., g.r. 25½, 12s., w.r. 156½, (including mortgages), 1,232
December 12.—By C. W. DAVIES & SON, City Road.—50, City Garden Row, u.t. 22 yrs., g.r. 6½, g.r. 36½, 1,156
December 13.—By MORGAN, DAVIES & CLARK, Carshalton, Surrey.—Park-la, The Carshalton-pk. Gates, also the building land on which the gates stand, 11 p. 200
December 14.—By ARTHUR BARKON, Walworth.—10, 20, and 21, Sedan-st., u.t. 43½ yrs., g.r. 12½, w.r. 105½, 8s. 820
Welling, Kent.—10 to 23 (odd), Bethel-st., u.t. 95 yrs., g.r. 25½, 12s., w.r. 156½, (including mortgages), 1,232
December 15.—By C. W. DAVIES & SON, City Road.—50, City Garden Row, u.t. 22 yrs., g.r. 6½, g.r. 36½, 1,156
December 16.—By MORGAN, DAVIES & CLARK, Carshalton, Surrey.—Park-la, The Carshalton-pk. Gates, also the building land on which the gates stand, 11 p. 200
December 17.—By ARTHUR BARKON, Walworth.—10, 20, and 21, Sedan-st., u.t. 43½ yrs., g.r. 12½, w.r. 105½, 8s. 820
Welling, Kent.—10 to 23 (odd), Bethel-st., u.t. 95 yrs., g.r. 25½, 12s., w.r. 156½, (including mortgages), 1,232
December 18.—By C. W. DAVIES & SON, City Road.—50, City Garden Row, u.t. 22 yrs., g.r. 6½, g.r. 36½, 1,156
December 19.—By MORGAN, DAVIES & CLARK, Carshalton, Surrey.—Park-la, The Carshalton-pk. Gates, also the building land on which the gates stand, 11 p. 200
December 20.—By ARTHUR BARKON, Walworth.—10, 20, and 21, Sedan-st., u.t. 43½ yrs., g.r. 12½, w.r. 105½, 8s. 820
Welling, Kent.—10 to 23 (odd), Bethel-st., u.t. 95 yrs., g.r. 25½, 12s., w.r. 156½, (including mortgages), 1,232
December 21.—By C. W. DAVIES & SON, City Road.—50, City Garden Row, u.t. 22 yrs., g.r. 6½, g.r. 36½, 1,156
December 22.—By MORGAN, DAVIES & CLARK, Carshalton, Surrey.—Park-la, The Carshalton-pk. Gates, also the building land on which the gates stand, 11 p. 200

By MADDISON, MILLS, & MADDISON (at Yar-
mouth, Suffolk.—108, Beccles-rd., f., y.r. 5115
108, Beccles-rd., f., y.r. 5115
Yarmouth, Norfolk.—36, Victoria-rd., f., y.r. 510
27½, Victoria-rd., f., y.r. 510
By M. DE ROME & SON (at Kendal),
Whinflet, Westmorland.—"Ashstead Farm,"
551a, 2r. 18p., u.t. 37 (odd), West Ham-la, f.,
December 12.—By D. BURNETT & CO.,
Tottenham.—High-rd., f.g. rents 24s., reversion
in 72 yrs., f.g. rents 42s., reversion in 90 and
92 yrs., f.g. rents 30s., reversion in
92 yrs., f.g. rents 14s., reversion in
92 yrs., f.g. rents 14s., reversion in
Stratford.—31 to 37 (odd), West Ham-la, f.,
w.r. 94½, 18s. 980
By JAMES & CO.,
Kensal Rise.—117, Chamberlayne Wood-rd. (s.),
u.t. 95½ yrs., g.r. 12½, s.r. 100½, 1,600
Southall, Middx.—54 to 64 (even), West Eud-
rd., f., w.r. 140½, 8s. 1,620
By ROGERS, CHAPMAN, & THOMAS,
South Kensington.—4 and 6, Cedar-mews
(stabling), u.t. 64½ yrs., g.r. 12½, y.r. 100½, 300
By R. TIDY & SON,
De Beauvoir Town.—83 and 105, Downham-rd.,
u.t. 12½ yrs., g.r. 12½, s.r. 100½, 345
By G. TROLOPE & SONS,
Pleasance.—10, Stratton-st., f., p.; also 13 and
15, Market-mews (stabling), u.t. 4½ yrs.,
y.r. 130½, 16,000
By DONALD YOUNG & CO.,
Camberwell.—99, 101, and 103, Denmark Hill,
u.t. 26 yrs., g.r. 13½, 9s., y.r. 410½, 1,000
Plaistow.—Denmark-st. (g. rents 11½, 15s., u.t.
77½ yrs., g.r. nil, with rev. 100½, 200
By TOMKINS, TAYLOR, & OLIVER (at Charlwood),
Charlwood, Surrey.—Rectory La., "Lynn's
Cottage" and building land adjoining, f.,
y.r. 12½, 453
Rectory La., frehold cottage and garden,
y.r. 9½, 150
By C. E. MORRIS, SONS, & PEARD (at Win-
cantow),
Maperton, Somerset.—"Capula Farm," 53a,
1 r. 0 p., 2,005
"Titwell" and "Wheat" Closes, 11 a. 0 r.
38 p. f., 385
Holkon, Somerset.—Frehold enclosure, 10 a.
1 r. 12 p., 321
Charlton Musgrove, Somerset.—"Hook Farm,"
220 a. 1 r. 23 p., 6,010
December 13.—By GLASIER & SONS,
Strand.—Wellington-st., the Lycium There, also
83, 84, 35, 36, and 37, Exeter-st. (s.),
area 23,600 ft., 119,500
By BISLEY & SONS,
Bermoadsey.—10 to 18, Eldridge-rd., u.t. 29½
yrs., g.r. 30½, 12s., y.r. 245½, 1,200
Lewisham.—78, Marsala-rd., u.t. 76 yrs., g.r. 4½,
g.r. 42½, 335
Rotherhithe.—90, Lower-rd., u.t. 40½ yrs., g.r.
15½, 320
Kennington.—26, Kempsford-rd., u.t. 20½ yrs.,
g.r. 4½, increasing to 6½, y.r. 39½, 225
By HAYDON & SONS,
Notting Hill.—1a, Holland-rd., area over 1 of
an acre, f., p., 5,700
By MAY & ROWDEN,
Shatesbury Avenue.—40, Great Windmill-st.,
8½, f., y.r. 66½, 1,950
By C. C. CLARKE & SONS,
Clapton.—Nightingale-rd., f.g.r. 22½, reversion
in 64 yrs., 300
Canning Town.—37, Victoria Dock-rd., f., y.r. 300
Hackney.—204, Ambers-rd., u.t. 41 yrs., g.r.
6½, 8d., p., 345
Walthamstow, Chelmsford-rd., f.g.r. 33½,
reversion in 93 yrs., 726
Boston-rd., f.g.r. 10½, reversion in 78 yrs., 225
By NEWBORN, SREPHARD, & EDWARDS,
Islington.—54 to 64 (even), Windeat-st., c., w.r.
187½, 4s. 1,350
43, and 47, Gibson-st., f.g.r. 105½, 1,320
25, Gibson-st., u.t. 20½ yrs., g.r. 9½, y.r. 50½,
Canbury.—21, 23, and 25, Spencer-st., u.t.
12 yrs., g.r. 18½, y.r. 134½, 16s. 230
40 and 66, Halton-rd., u.t. 11½ yrs., g.r.
14½, 10s., y.r. 90½, 175
Holloway.—35, Holloway-rd., u.t. 60½ yrs., g.r.
11½, s.r. 65½, 530
By STIMSON & SONS,
Battersea.—16 and 17, Rowena-cres., u.t. 70½
yrs., g.r. 10½, y.r. 67½, 12s. 510
Caledonian-rd.—65, Plymouth-st., u.t. 43 yrs.,
g.r. 4½, 4s., y.r. 25½, 245
Islington.—62 and 64, Shepperton-rd., u.t. 2½
yrs., g.r. 11½, y.r. 66½, 250
Forest Hill.—12½, 12s., and 12s., Devonshire-rd.,
("Belle Vue Mansions"), u.t. 97 yrs., g.r.
110½, s.r. 85½, 18s. 1,400
Kingsland.—92 to 102, 4s., Hagston-rd.,
u.t. 35 yrs., g.r. 8½, s.r. 208½, 710
42 and 44, Middleton-rd., u.t. 32½ yrs., g.r.
10½, y.r. 68½, 470
Wandsworth.—14 and 46, Birdhurst-rd., u.t. 76
yrs., g.r. 10½, w.r. 62½, 8s. 500
Walworth.—37a to 37d, Aylesbury-st., u.t. 41½
yrs., g.r. 21½, 12s., 770
33 and 35, Runham-st., u.t. 62½ yrs., g.r. 10½,
w.r. 72½, 16s. 400
Bermoadsey.—39 to 41, Kiroos-st., u.t. 8½ yrs.,
g.r. 12½, w.r. 100½, 170
13, 14, and 15, Weston-pl., u.t. 7½ yrs., g.r. 3½,
y.r. 84½, 14s. 140
Southwark.—13, 14, and 15, South-st., u.t. 38½
yrs., g.r. 13½, w.r. 101½, 8s. 410
Streamham.—33, Glenage-rd., u.t. 75 yrs., g.r.
14½, s.r. 60½, 410
Acreley.—22½, Acreley-rd., area 2 of an acre,
u.t. 41½ yrs., g.r. 21½, 11s., s.r. 80½, 450

By WORSFOLD & HAYWARD (at Dover),
Dover, Kent.—Blucher-row, frehold house and
stable, p., 2185
36 and 36a, Stargate-st. (s.), u.t. 63½ yrs., g.r.
Norr., y.r. 80½, 640
Northampton.—the Harbour Dining Rooms,
u.t. 63½ yrs., g.r. 2½, 10s., y.r. 25½, 260
34 and 36, Tower Hamlets-st., f., 240
37, Tower Hamlets-st., with stable and sundry
(including engine and machinery), f., p., 315

Contractions used in these lists.—F.g.r. for frehold
ground-rent; l.g.r. for leasehold ground-rent; l.g.r. for
improved ground-rent; g.r. for ground-rent; r. for rent;
f. for frehold; c. for copyhold; l. for leasehold; p. for
possession; e.r. for estimated rental; w.r. for weekly
rental; q.r. for quarterly rental; y.r. for yearly rental;
u.t. for unexpired term; p.a. for per annum; yrs. for
years; la. for lace; st. for street; rd. for road; sq. for
square; pl. for place; ter. for terrace; cres. for crescent;
av. for avenue; gds. for gardens; yd. for yard; gr. for
grove; b.h. for berthouse; p.h. for public-house; o. for
office; s. for shops; ct. for court.

MEETINGS.

THURSDAY, DECEMBER 27.
Royal Institution (Christmas Lectures).—Mr. W.
Dudell, M.I.E.E., on "Signalling to a Distance, from
Primitive Man to Radiotelegraphy," I. 3 p.m.
SATURDAY, DECEMBER 29.
Royal Institution (Christmas Lectures).—Mr. W.
Dudell on "Signalling to a Distance, from Primitive
Man to Radiotelegraphy," II. 3 p.m.

TO CORRESPONDENTS.

NOTE.—The responsibility of signed articles, letters,
and papers read at meetings rests, of course, with the
author.

We cannot undertake to return rejected communica-
tions; and the Editor cannot be responsible for
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We are compelled to decline pointing out books and
giving addresses.

Any commission to a contributor to write an article,
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All communications regarding literary and artistic
matters should be addressed to THE EDITOR; those
relating to advertisements and other exclusively busi-
ness matters should be addressed to THE PUBLISHER
and not to the Editor.

PRICES CURRENT OF MATERIALS.

* Our aim in this list is to give, as far as possible, the
average prices of materials, not necessarily the lowest.
Quality and quantity obviously affect prices, and
which should be remembered by those who make use of
this information.

	BRICKS, &c.
	£ s. d.
Hard Stocks.....	1 10 0 per 1000 alongside, in river.
Bough Stocks and Grizles.....	1 7 0 " " "
Picked Stocks for Facades.....	2 17 6 " " delivered.
Facades.....	1 9 0 " " at railway depot.
Bed Wire Cuts.....	1 14 0 " " "
Best Fareham Bed.....	3 12 0 " " "
Best Bed Pressed Borough Facing.....	5 0 0 " " "
Best Blue Pressed Staffordshire.....	3 15 0 " " "
Do. Bulstone.....	4 0 0 " " "
Best Bourbridge Fire Bricks.....	3 14 0 " " "
GLAZED BRICKS.	
Best White and Ivory Glazed Stretchers.....	12 0 0 " " "
Headers.....	11 0 0 " " "
Quoins, Bulstone, and Flats.....	16 0 0 " " "
Double Stretchers.....	19 0 0 " " "
Double Headers.....	16 0 0 " " "
One Side and two Ends.....	19 0 0 " " "
Two Sides and one End.....	20 0 0 " " "
Slays Cham- fered, Squints.....	30 0 0 " " "
Best Dipped Salt Glazed Stretch- ers and Headers.....	13 0 0 " " "
Quoins, Bulstone, and Flats.....	14 0 0 " " "
Double Stretchers.....	15 0 0 " " "
Double Headers.....	14 0 0 " " "
One Side and two Ends.....	15 0 0 " " "
Two Sides and one End.....	15 0 0 " " "
Slays Cham- fered, Squints.....	14 0 0 " " "
Second Quality White and Dipped Salt Glazed.....	2 0 0 " less than best.

BRICKS, &c. (continued).

GLAZED BRICKS (continued)—

	s. d.	
Thames and Pit Sand	7 0	per yard, delivered.
Thames Ballast	5 0	per ton, ..
Best Portland Cement	27 0	per ton, ..
Best Ground Blue Lias Lime	19 0	per ton, ..

NOTE.—The cement or lime is exclusive of the ordinary charge for sacks.

Grey Stone Lime	11s. 6d.	per yard, delivered.
Stourbridge Fireclay in sacks 27s. 6d.		per ton at rly. dpt.

STONE.

BATH STONE—delivered on road wag- s. d.		
gons, Paddington Depot	1 6	per ft. cube.
Do. do. delivered on road wagons, ..		
Nine Elms Depot	1 8	per ft. cube.
Portland Stone (20 ft. average)—		
Brown Whitbed, delivered on road ..		
wagons, Paddington Depot, Nine ..		
Elms Depot, or Pimlico Wharf, ..	2 1	per ft. cube.
White Haselbed, delivered on road ..		
wagons, Paddington Depot, Nine ..		
Elms Depot, or Pimlico Wharf, ..	2 2	per ft. cube.

Ancaster in blocks	s. d.	
10 per ft. cube, deld. rly. dpt.		
Bea	1 6	per ft. cube.
Greenshill	1 10	per ft. cube.
Darley Dale in blocks	2 4	per ft. cube.
Red Cornhill	2 4	per ft. cube.
Croftburn Bed Freestone	2 0	per ft. cube.
Red Mansfield	2 4	per ft. cube.

YORK STONE—Robin Hood Quality, ..		
scattered random blocks, 2 10 ..		
6 in. sawn two sides land- ..		
ings to sizes (under ..		
40 ft. super.)	2 3	per ft. super.
4 in. rubbed two sides ..		
ditto, ditto	2 6	per ft. super.
3 in. sawn two sides slabs ..		
(random sizes)	0 11	per ft. super.
2 in. to 2 1/2 in. sawn one ..		
side slabs (random ..		
sizes)	0 7	per ft. super.
1 1/2 in. to 2 in. ditto, ditto ..		
0 6		

HARD YORK—		
Scattered random blocks, 3 0 ..		
per ft. cube, ..		
6 in. sawn two sides land- ..		
ings to sizes (under ..		
40 ft. super.)	2 8	per ft. super.
4 in. rubbed two sides ..		
ditto	3 0	per ft. super.
3 in. sawn two sides slabs ..		
(random sizes)	1 2	per ft. super.
2 in. self-faced random ..		
slabs	0 5	per ft. super.

Hopton Wood (Hard Bed) in blocks 2 0 ..		
per ft. cube, deld. ..		
rly. dpt., ..		
6 in. sawn both ..		
sides landings 2 7 ..		
per ft. super. deld. ..		
rly. dpt., ..		
3 in. sawn both ..		
sides random ..		
slabs 1 0 ..		
2 in. do. 0 8 1/2 ..		

	s. d.	
In. in.		
20x10 best blue Bangor 13 2 6 ..		per 1000 of 1200 at r. d.
20x12	13 17 6	per 1000 of 1200 at r. d.
20x12 first quality	13 0 0	per 1000 of 1200 at r. d.
20x12	13 15 0	per 1000 of 1200 at r. d.
18x8	7 5 0	per 1000 of 1200 at r. d.
20x10 best blue Port. ..		
madoc	12 12 6	per 1000 of 1200 at r. d.
18x8	6 12 6	per 1000 of 1200 at r. d.
20x10 best Eureka un- ..		
fading green	15 17 6	per 1000 of 1200 at r. d.
20x12	13 7 6	per 1000 of 1200 at r. d.
18x10	13 5 0	per 1000 of 1200 at r. d.
18x8	10 5 0	per 1000 of 1200 at r. d.
20x10 permanent green 11 12 6 ..		
18x10	9 12 6	per 1000 of 1200 at r. d.
18x8	6 12 6	per 1000 of 1200 at r. d.

	s. d.	
TILES.		
Best plain red roofing tiles ..	42 0	per 1000 at rly. dpt.
Hip and Valley tiles ..	3 7	per doz.
Best Broseley tiles	50 0	per 1000
Do. Ornamental tiles	52 6	per 1000
Hip and Valley tiles ..	4 0	per doz.
Best Ruabon red, brown, or ..		
brindled do. (Edwards) ..	57 6	per 1000
Do. Ornamental do. ..	60 0	per 1000
Hip tiles	4 0	per doz.
Valley tiles	3 0	per doz.
Best Red or Mottled Stafford- ..		
shire do. (Peaked)	51 9	per 1000
Do. Ornamental do. ..	54 6	per 1000
Hip tiles	4 1	per doz.
Valley tiles	3 8	per doz.
Best "Rosemary" brand ..		
plain tiles	48 0	per 1000
Best Ornamental tiles ..	50 0	per 1000
Hip tiles	4 0	per doz.
Valley tiles	3 8	per doz.
Best "Hartshill" brand ..		
plain tiles, sand-faced ..	50 0	per 1000
Do. pressed	47 6	per 1000
Do. Ornamental do. ..	50 0	per 1000
Hip tiles	4 0	per doz.
Valley tiles	3 6	per doz.

	s. d.	
WOOD.		
BUILDING WOOD.		
Deals: best 3 in. by 11 in. and 4 in. ..	13 10 0	per 1000 of 1200 at r. d.
Deals: best 3 in. by 9 in. and 4 in. ..	13 0 0	per 1000 of 1200 at r. d.
Battens: best 2 1/2 in. by 7 in. and ..		
8 in., and 3 in. by 7 in. and 8 in. ..	11 0 0	per 1000 of 1200 at r. d.
Battens: best 2 1/2 in. by 6 in. and 3 in. ..	0 10 0	per 1000 of 1200 at r. d.
Deals: seconds	1 0	per 1000 of 1200 at r. d.
Battens: seconds	0 10 0	per 1000 of 1200 at r. d.
2 in. by 4 in. and 2 in. by 5 in. ..	8 10 0	per 1000 of 1200 at r. d.
Foreign Saw Boards—		
1 in. and 1 1/2 in. by 7 in. ..	0 10 0	more than battens.
3 in.	1 0 0	per 1000 of 1200 at r. d.

WOOD (continued).

	At per load of 50 ft.	s. d.
Building Wood (continued)—		
Fir timber: best middling Danzig ..	4 10 0	per 1000 of 1200 at r. d.
or Memel (average specification) ..	4 0 0	per 1000 of 1200 at r. d.
Seconds	4 0 0	per 1000 of 1200 at r. d.
Small timber (8 in. to 10 in.) ..	3 12 6	per 1000 of 1200 at r. d.
Small timber (6 in. to 8 in.) ..	3 0 0	per 1000 of 1200 at r. d.
Swedish balks	2 10 0	per 1000 of 1200 at r. d.
Pitch-pine timber (30 ft. average) ..	4 0 0	per 1000 of 1200 at r. d.

JOISTERS' WOOD.

	At per standard.	s. d.
White Sea: first yellow deals, ..	24 0 0	per 1000 of 1200 at r. d.
3 in. by 11 in.	22 0 0	per 1000 of 1200 at r. d.
3 in. by 9 in.	19 10 0	per 1000 of 1200 at r. d.
Battens, 2 1/2 in. and 3 in. by 7 in. ..	18 10 0	per 1000 of 1200 at r. d.
Second yellow deals, 3 in. by 11 in. ..	18 10 0	per 1000 of 1200 at r. d.
3 in. by 9 in.	17 10 0	per 1000 of 1200 at r. d.
Battens, 2 1/2 in. and 3 in. by 7 in. ..	16 10 0	per 1000 of 1200 at r. d.
Third yellow deals, 3 in. by ..		
11 in. and 9 in.	13 10 0	per 1000 of 1200 at r. d.
Battens, 2 1/2 in. and 3 in. by 7 in. ..	11 0 0	per 1000 of 1200 at r. d.
Petersburg		
3 in. by 11 in.	21 0 0	per 1000 of 1200 at r. d.
Do. 3 in. by 9 in.	18 0 0	per 1000 of 1200 at r. d.
Battens	13 10 0	per 1000 of 1200 at r. d.
Second yellow deals, 3 in. by 11 in. ..	10 0 0	per 1000 of 1200 at r. d.
Do. 3 in. by 9 in.	14 10 0	per 1000 of 1200 at r. d.
Battens	11 0 0	per 1000 of 1200 at r. d.
Third yellow deals, 3 in. by ..		
11 in. and 9 in.	13 0 0	per 1000 of 1200 at r. d.
Do. 3 in. by 9 in.	12 10 0	per 1000 of 1200 at r. d.
Battens	10 0 0	per 1000 of 1200 at r. d.

White Sea and Petersburg—		
First white deals, 3 in. by 11 in. ..	14 10 0	per 1000 of 1200 at r. d.
3 in. by 9 in.	13 10 0	per 1000 of 1200 at r. d.
Battens	11 0 0	per 1000 of 1200 at r. d.
Second white deals, 3 in. by 11 in. ..	13 10 0	per 1000 of 1200 at r. d.
3 in. by 9 in.	12 10 0	per 1000 of 1200 at r. d.
Battens	10 0 0	per 1000 of 1200 at r. d.
Pitch-pine: deals	18 0 0	per 1000 of 1200 at r. d.
Under 2 in. thick extra ..	0 10 0	per 1000 of 1200 at r. d.
Yellow Pine—First, regular sizes ..	44 0 0	per 1000 of 1200 at r. d.
Odments	33 0 0	per 1000 of 1200 at r. d.
Seconds, regular sizes	33 0 0	per 1000 of 1200 at r. d.
Yellow Pine odments	28 0 0	per 1000 of 1200 at r. d.
Kauri Pine—Planks, per ft. cube. ..	3 6	per 1000 of 1200 at r. d.
Danzig and Russian Oak ..	0 3 0	per 1000 of 1200 at r. d.
Large, per ft. cube ..	0 2 6	per 1000 of 1200 at r. d.
Small	0 5 6	per 1000 of 1200 at r. d.
Wainscot Oak Logs, per ft. sup. ..	0 0 8 1/2	per 1000 of 1200 at r. d.
Dry Wainscot Oak, per ft. sup. ..	0 0 7 1/2	per 1000 of 1200 at r. d.
1 in. do. do	0 0 7 1/2	per 1000 of 1200 at r. d.
Dry Mahogany—Honduras ..	0 0 9	per 1000 of 1200 at r. d.
Isapo, per ft. super. as inch ..	0 0 9	per 1000 of 1200 at r. d.
Selected, Figury, per ft. super. ..	0 1 6	per 1000 of 1200 at r. d.
As inch	0 1 6	per 1000 of 1200 at r. d.
Dry Walnut, American, per ..	0 10 0	per 1000 of 1200 at r. d.
super. as inch	17 0 0	per 1000 of 1200 at r. d.
Teak, per load	17 0 0	per 1000 of 1200 at r. d.
American Whitewood Planks, ..	0 4 0	per 1000 of 1200 at r. d.
per ft. cube	0 4 0	per 1000 of 1200 at r. d.

	Per square.	s. d.
Prepared flooring, etc.—		
1 in. by 7 in. yellow, planed and ..	0 13 6	per 1000 of 1200 at r. d.
shot	0 14 0	per 1000 of 1200 at r. d.
1 in. by 7 in. yellow, planed and ..	0 16 0	per 1000 of 1200 at r. d.
matched	0 12 0	per 1000 of 1200 at r. d.
1 in. by 7 in. white, planed and ..	0 12 0	per 1000 of 1200 at r. d.
shot	0 12 6	per 1000 of 1200 at r. d.
1 in. by 7 in. white, planed and ..	0 15 0	per 1000 of 1200 at r. d.
matched	0 15 0	per 1000 of 1200 at r. d.
1 1/2 in. by 7 in. white, planed and ..	0 11 0	per 1000 of 1200 at r. d.
matched and beaded or V-jointed brds. ..	0 11 0	per 1000 of 1200 at r. d.
1 in. by 7 in.	0 14 0	per 1000 of 1200 at r. d.
3 in. by 7 in. white	0 10 0	per 1000 of 1200 at r. d.
1 in. by 7 in.	0 12 9	per 1000 of 1200 at r. d.
6 in. at 6d. to 9d. per square less than 7 in. ..	0 15 0	per 1000 of 1200 at r. d.

JOISTS, GIRDERS, &c.

	In London, or delivered ..	s. d.
Railway Vans, per ton.		
Rolled Steel Joists, ordinary ..	7 5 0	per 1000 of 1200 at r. d.
sections	7 5 0	per 1000 of 1200 at r. d.
Compound Girders, ordinary ..	9 10 0	per 1000 of 1200 at r. d.
sections	12 5 0	per 1000 of 1200 at r. d.
Steel Compound Stanchions ..	10 10 0	per 1000 of 1200 at r. d.
Angles, Tees, and Channels, ordi- ..	9 5 0	per 1000 of 1200 at r. d.
nary sections	9 5 0	per 1000 of 1200 at r. d.
Planch Plates	9 5 0	per 1000 of 1200 at r. d.
Cast Iron Columns and Stanchions ..	8 0 0	per 1000 of 1200 at r. d.
including ordinary patterns ..	8 0 0	per 1000 of 1200 at r. d.

METALS.

	Per ton, in London.	s. d.
IRON—		
Common Bars	8 10 0	per 1000 of 1200 at r. d.
Staffordshire Crown Bars, good ..	9 0 0	per 1000 of 1200 at r. d.
merchant quality	9 0 0	per 1000 of 1200 at r. d.
Staffordshire "Marked Bars" ..	11 0 0	per 1000 of 1200 at r. d.
Mild Steel Bars	9 0 0	per 1000 of 1200 at r. d.
Hoop Iron, best quality	9 10 0	per 1000 of 1200 at r. d.
"Galvanised"	17 0 0	per 1000 of 1200 at r. d.
"(And upwards, according to size and gauge.)"		
Sheet Iron Black—		
Ordinary sizes to 20 g.	10 0 0	per 1000 of 1200 at r. d.
24 g.	11 0 0	per 1000 of 1200 at r. d.
28 g.	12 10 0	per 1000 of 1200 at r. d.
Sheet Iron, Galvanised, flat, best quality—		
Ordinary sizes to 20 g.	14 10 0	per 1000 of 1200 at r. d.
Ordinary sizes to 22 g. and 24 g. ..	15 0 0	per 1000 of 1200 at r. d.
26 g.	15 10 0	per 1000 of 1200 at r. d.
Sheet Iron, Galvanised, flat, best quality—		
Ordinary sizes to 20 g.	17 10 0	per 1000 of 1200 at r. d.
22 g. and 24 g.	18 0 0	per 1000 of 1200 at r. d.
26 g.	19 10 0	per 1000 of 1200 at r. d.
Galvanised Corrugated Sheet—		
Ordinary sizes 6 ft. to 8 ft. 20 g. ..	14 10 0	per 1000 of 1200 at r. d.
22 g. and 24 g.	15 0 0	per 1000 of 1200 at r. d.
26 g.	16 0 0	per 1000 of 1200 at r. d.
Best Soft Steel Sheets, 6 ft. by 2 ft. ..	12 0 0	per 1000 of 1200 at r. d.
to 3 ft. by 20 g. and thicker ..	13 0 0	per 1000 of 1200 at r. d.
Best Soft Steel Sheets, 22 g. & 24 g. ..	13 0 0	per 1000 of 1200 at r. d.
26 g.	14 0 0	per 1000 of 1200 at r. d.
Cut Nails, 3 in. to 6 in.	10 0 0	per 1000 of 1200 at r. d.
(Under 3 in., usual trade extras.)		

LEAD, &c.

	Per ton, in London.	s. d.
LEAD—Sheet, English, 3lb. and up ..	22 10 0	per 1000 of 1200 at r. d.
Pipe in coils	22 10 0	per 1000 of 1200 at r. d.
Soil pipe	25 0 0	per 1000 of 1200 at r. d.
Compo pipe	25 0 0	per 1000 of 1200 at r. d.
Zinc—Sheet	33 15 0	per 1000 of 1200 at r. d.
Vieille Montagne	34 0 0	per 1000 of 1200 at r. d.
Silesian	33 15 0	per 1000 of 1200 at r. d.
COPPER—		
Strong Sheet	0 1 4	per 1000 of 1200 at r. d.
Thin	0 1 5	per 1000 of 1200 at r. d.
Copper nails	0 1 3	per 1000 of 1200 at r. d.
BRASS—		
Strong Sheet	0 1 2	per 1000 of 1200 at r. d.
Thin	0 1 3	per 1000 of 1200 at r. d.
Tin—English Ingots	0 1 1	per 1000 of 1200 at r. d.
Solder—Plumbers'	0 0 9	per 1000 of 1200 at r. d.
Timmen's	0 0 11 1/2	per 1000 of 1200 at r. d.
Blowpipe	0 1 1	per 1000 of 1200 at r. d.

ENGLISH SHEET GLASS IN CRATES OF STOCK SIZES.

	24d. per ft. delivered.	s. d.
15 oz. thirds	24d.	per 1000 of 1200 at r. d.
21 " fourths	24d.	per 1000 of 1200 at r. d.
24 " fourths	24d.	per 1000 of 1200 at r. d.
26 oz. thirds	24d.	per 1000 of 1200 at r. d.
32 oz. fourths	24d.	per 1000 of 1200 at r. d.
32 oz. fourths	24d.	per 1000 of 1200 at r. d.
Fluted Sheet, 15 oz.	24d.	per 1000 of 1200 at r. d.
11 oz.	24d.	per 1000 of 1200 at r. d.

TENDERS.

Communications for insertion under this heading should be addressed to "The Editor," and must reach us not later than 10 a.m. on *Thursday*. (N.B.—We cannot publish Tenders unless authenticated either by the architect or the building-owner; and we cannot publish announcements of Tenders accepted unless the amount of the tender is stated, nor any list in which the lowest Tender is under 100*l.*, unless in some exceptional cases and for special reasons.)

* Denotes accepted. † Denotes provisionally accepted.

ABERDARE.—For heating the higher standard schools, for the Town Council. Mr. W. Dyack, Burgh Surveyor, Town House, Aberdare. Mr. Roderick, architect, Clifton-street, Aberdare.—Hampton & Co., Cardiff*..... £270

ABERDEEN.—For macadamising roads, etc., for the Town Council. Mr. W. Dyack, Burgh Surveyor, Town House, Aberdare. Mr. Roderick, architect, Clifton-street, Aberdare.—Hampton & Co., Cardiff*..... £270

ALDBOROUGH.—For erecting new school for Norfolk Education Committee. Mr. C. J. Brown, architect, Cathedral Close, Aldborough. R. Chapman, £2,500 0 0 Youngs & Son £2,187 0 0 G. A. Lines £2,525 0 0 R. Shanks £2,160 0 0 W. Porter £2,470 0 0 T. H. Blyth £2,130 1 6 C. T. Baker £2,470 0 0 T. H. Vair £2,094 0 0 L. J. 2,300 18 0 R. C. Green £2,076 0 0 W. J. Hannant £2,300 0 0 grass £2,076 0 0 J. K. Kay £2,298 0 0 J. H. Neale £2,070 0 0 J. W. Michie £2,298 0 0 B. C. Watts £2,055 0 0 Blyth & Son £2,282 0 0 Buxton, Nch. £2,035 0 0

DARTFORD.—For road repairs at Gore Farm (convenient for) Hospital for the Metropolitan Asylums Board. Mr. W. Harston, Surveyor, Dartford.—J. C. Trueman Road Maintenance & Stone Supply Co., Ltd. 114 19 F. Miskin, Ltd., Milton Wharf, Gravesend* 100 0

ENFIELD.—For street works, for the Urban District Council. Mr. R. Collins, Surveyor, Public Offices, Enfield.—G. Napier & Sons, Ltd. £2,559 10 8 J. Jackson £2,429 15 7 Imperial Stone Co. £2,409 15 0 G. Bell & Sons, Ltd. £2,387 7 0 W. Griffiths (Alternatives) £2,388 7 10 Grounds & Newton £2,385 8 6 W. B. Mayhew £2,380 10 3 T. Adams £2,288 13 6 Wallace & Lums £2,281 15 6 Fry Bros. £2,270 1 9 W. Griffiths £2,268 3 1 Adams £2,268 3 1 Jennings & Grenfell £2,220 0 0 A. Monk £2,211 15 3 E. Knillton £2,194 7 8 T. Free & Sons £2,189 7 6 Bower Bros. £2,154 15 6 J. Ellis & Sons, Ltd. £2,127 7 11 Empire Stone Co. £2,112 15 10 W. Walker & Son, Ltd. £2,036 0 0 E. J. Betts £1,927 2 0

ENFIELD.—For the erection of an infirmary for fifty beds at the Chase Farm Schools, Enfield, for the Guardians of the Edmonton Union. Mr. Stuart Hill, architect, 106, Cannon-street, E.C. Quantities by Mr. Joseph Peebles, 7, Southampton-street, Bloomsbury, W.C.—S. J. Collins £8,500 0 J. Greenwood & A. Roberts & Co. £7,800 0 Hyde & Co. £7,580 0 R. Jackson & Co. £6,997 0 A. Faulks £6,988 0 Patman & Co. £6,988 0 Ingham £6,965 0 J. Thomas £6,929 0 P. Webster & Son £6,850 0 L. & W. H. F. £6,780 0 H. Knight & Son £6,749 0 Lonsby & Salmon £6,690 17

GERBARD'S CROSS.—For a house and stables at Gerard's Cross, for Mr. W. B. Blakemore, Mr. Hugo R. Bird, architect and surveyor, Brentwood, Essex.—G. Darlington £1,730 H. Brown £1,423 F. W. Burtwell £1,363 E. Dix £1,392 Watkins £1,640 F. Jarvis, Brentwood £1,468 Y. J. Lovell & Co. £1,365

HINGHAM.—For reconstruction of sanitary offices and other improvements at Hingham School, for the Norfolk Education Committee. Messrs. C. Ellis & Barton £363 16 6 J. Youngs & Son £417 0 0 A. J. Harrison £349 0 0 C. Monnment £400 10 0 H. C. Tofts £346 8 7 J. H. Mickleburgh £375 0 0 C. Durant £346 2 0 W. Woodward £370 0 0 Spruall & Son £341 0 0 E. J. Smith £370 0 0 B. Shanks £320 0 0 H. P. Bowden £364 0 0 Hingham* £320 0 0

HUDDESFIELD.—For additions to cleaning works at Seed-hill, for Messrs. J. Holroyd & Co., Ltd. Messrs. Stokes & Stokes, architects, St. Peter's-street, Huddersfield. Quantities by the architects:—Masons: Law Stead & Sons* £577 10 0 Joiner: J. C. Farbutt* 361 10 0 Plumber: J. Marsden* 169 10 0 Ironfounders: H. Brook & Co.* 100 4 0 Slater: W. E. Jowitt* 63 0 0 Painters: Beers & Son* 38 0 0 Plasterer: W. E. Jowitt* 20 0 0 [All of Huddersfield.]

KING'S NORTON.—For sewerage Monyhall Hall Estate, for King's Norton and Northfield Urban District Council. Mr. A. W. Cross, Surveyor, 23 and 25, Valentine-street, King's Heath:—Sutherland & Co. £4,000 0 0 G. Trentham £3,918 13 4 J. Riley £3,918 13 4 W. P. Hobrough £5,293 0 0 T. H. McDonald £3,893 0 0 C. E. Holloway £5,250 0 0 W. Cumliffe £3,890 0 0 Curral, Lewis, F. Osenton £3,408 0 0 & Martin, R. H. B. Neal, Ltd. £4,869 0 0 Ltd., Plymonth £4,408 0 0 Lock & Price £3,317 9 10

LEICESTER.—For reinstating spinning mill after fire, for Messrs. Donthorpe & Co., Ltd. Messrs. Tait & Harcourt, architects, Leicester and Coventry:—J. E. Johnson & Son, Leicester* (lowest). £785

LONDON.—For supply of fittings, etc., for convenience in Lower Richmond-road (Hammersmith to Putney tramways), for the London County Council:—Doulton & Co., Ltd. £493 0 0 B. Finch & Co., Ltd. £37 0 0 G. & D. Musgrave, Ltd. £86 10 6 G. Jennings, Ltd. £82 15 10 Adametz, Ltd., Westminster* £97 19 8

LONDON.—For erecting headquarters, riding school, stables, shops, and club premises for the 2nd County of London (Westminster Dragons) Imperial Yeomanry at the corner of Hornettery-road and Elvinton-street, S.W. Mr. D. B. Heddervick, architect, 38, Great James-street, Bedford-row, W.C. Quantities by Mr. A. B. Henderson, 46a, Pall-mall, S.W.:—Collis & Sons £14,800 0 0 Hibbert Bros., Ltd. £13,657 8 3 W. S. Sheehy & Co. £12,868 0 0 Higgs & Hills, Ltd. £12,838 0 0 W. H. Lorden & Son £12,674 0 0 Baboy & Sons £12,647 0 0 Putnam & Fotheringham £12,633 0 0 W. Wallis £12,436 0 0 Sheffield Bros. £12,288 0 0 F. & B. F. Higgs £12,247 0 0 G. Longdon & Son, Ltd. £12,098 0 0

LONDON.—Improvements, British-street, Poplar, for the London County Council.—[The revised accommodation, on the completion of the improvements, will be for 322 boys, 322 girls, and 356 infants, total, 1,004, being a gain of 4 places in the boys' department, 56 places in the girls' department, and a loss of 43 places in the infants' department. There will, therefore, be a net gain of 16 places in the total accommodation of the school.] J. Appleby & Sons £12,650 0 0 W. Lawrence & Son £12,387 0 0 W. Grear & Son £11,997 0 0 J. & M. Patrick £11,735 0 0 E. Lawrence & Sons £11,697 0 0 Kirk & Randall £11,690 0 0 W. H. Lascelles & Co., Ltd. £11,597 0 0 J. Parsons £11,442 9 5 T. D. Leng £11,419 0 0 G. E. Wallis & Sons, Ltd. £11,393 0 0 Treasure & Son, Tottenham-road, Upper Holloway* £10,559 0 0

[The estimate of the Architect (Education), comparable with the tenders, is £10,620.]

LONDON.—For the construction of underground convenience in Theobald's-road and additions to Shaftesbury-avenue convenience, for Holborn Borough Council. Quantities by Messrs. Gardner & Theobald, 110, Great Russell-street:—Theobald's-road. Shaftesbury-avenue. Total.

	£	s.	d.	£	s.	d.	£	s.	d.
E. J. Clayton	4,380	0	0	897	0	0	5,277	0	0
F. & E. Davey, Ltd.	4,850	0	0	1,187	0	0	6,037	0	0
Davis, Bennett, & Co.	3,849	0	0	849	0	0	4,698	0	0
C. Dearing & Sons	4,050	0	0	914	0	0	4,964	0	0
Doulton & Co., Ltd.	4,340	0	0	1,023	0	0	5,363	0	0
F. & G. Foster	4,398	0	0	914	0	0	5,312	0	0
G. Jennings, Ltd.	4,063	3	4	648	10	0	4,711	13	4
W. Johnson & Co.	8,507	0	0	876	0	0	9,383	0	0
C. W. Killingback & Co.	4,330	0	0	1,070	0	0	5,400	0	0
Martin, Wells, & Co., Ltd.	3,989	0	0	969	0	0	4,958	0	0
Mellows & Co., Ltd.	3,878	0	0	777	0	0	4,655	0	0
B. E. Nightingale	3,590	0	0	796	0	0	4,386	0	0
J. Parsons	3,826	0	0	801	0	0	4,627	0	0
D. B. Paterson	3,847	6	8	787	3	3	4,634	9	11
Putnam & Fotheringham	3,683	0	0	810	0	0	4,493	0	0
C. R. Price	3,950	0	0	900	0	0	4,850	0	0
Spencer, Santo, & Co., Ltd.	3,870	0	0	976	0	0	4,846	0	0

[Borough Surveyor's estimates, Theobald's-road, £3,856. Shaftesbury-avenue, £387.]

LONDON.—For the supply of lime for the treatment of sewage, for the Main Drainage Committee of the County Council:—

Name of Tenderer.	Delivered at Barking (14,800 tons).		Delivered at Crossness (9,000 tons).		Delivered at Barking and Crossness.	
	Alongside Jetty.	Into Store.	Alongside Jetty.	Into Store.	Alongside Jetty.	Into Store.
	Per Ton. s. d.	Per Ton. s. d.	Per Ton. s. d.	Per Ton. s. d.	Per Ton. s. d.	Per Ton. s. d.
Formby's Cement Works Co., Ltd., Grosvenor-road, S.W.*	*11 11	*13 3	12 4	13 9	12 2	13 6
Fletcher & Co., Gravesend, Kent*	—	—	*12 3	*13 8	—	—
Associated Portland Cement Manufacturers (1900), Ltd.	14 1	15 7	13 7	15 1	14 1	15 7
Peters Bros.	14 2	16 6	14 2	15 6	14 2	15 6
L. Sommerfeld	14 9	16 3	15 9	16 3	14 9	16 3
Hall & Co. (Croydon), Ltd.	—	—	—	16 4	—	—
O. Christopherson & Co.	—	—	—	16 9	—	—
Treichmann, Weeks, & Co., Ltd.	16 6	—	—	16 6	—	—
(For 5,000 tons only).						
Current contract prices	—	—	—	13 8	—	13 5

LONDON.—For laying-out works, Ruskin-park, for the London County Council:—
 D. Rowell & Co. £359 10 0
 The Hope Foundry Co. 340 15 0
 L. Faulkner & Son. 323 0 0
 Hayles, Jones & Baylis, Ltd., 316 0 0
 W. Gratix & Sons. 296 11 9
 E. J. Raybould & Co., Ltd. 288 1 3
 J. Elwell. 279 0 0
 M. McVey. 275 9 9
 Hill & Smith, Brickley-hill Iron Works Staffordshire. 270 13 7

LOWER WHITWOOD.—For erecting two dwelling-houses and shop and stables, Castleford-road, Mr. A. Hartley, architect and surveyor, County-chambers, Castleford:—
 T. G. Wright & Sons, Oxford-street, Castleford*, £660

MARDY.—For erecting new buildings at Mardy, Glamorganshire, for the Ferndale Industrial Co-operative Society, Ltd. Messrs. Lewis & Morgan, architects, Pontypridd:—
 D. Richards. £2,971 9 8
 G. Harries. 2,855 0 0
 J. Jenkins. 2,101 0 0
 W. Williams. 2,099 0 0
 Smith, Jones, & Son. 2,039 15 7
 Williams Bros. £2,001 7 7
 D. Davies & Co. 1,960 0 0
 J. B. Mundy. 1,600 0 0
 I. J. A. D. A. F. 1,870 14 0

MATLOCK.—For taking down existing buildings and walls and the rebuilding of walls in Bakewell-road, for the Urban District Council Mr. J. Diggle, Engineer and Surveyor, Town Hall, Matlock:—
 Antill Bros., Matlock. £222

MILL HILL.—For new sorting office for H.M. Commissioners of Works:—
 E. Lawrence & Galbraith Bros. £1,735 0
 Sons. £2,009 0
 R. Lister. 1,918 0
 W. Tait. 1,815 0
 Martin, Wells, & Co., Ltd. 1,799 0
 Patman & Fotheringham, Ltd. 1,793 0
 Speechley & Smith. 1,775 0
 F. & A. Willmott. 1,761 0
 E. Wallis. 1,756 0
 Banyard & Son. 1,750 0
 E. Brown & Son. 1,732 5
 C. Ansell. 1,717 0
 J. Barker & Co. 1,693 0
 A. Fairhead & Son. 1,687 0
 F. Gough & Co. 1,684 0
 Perry Bros. 1,667 0
 F. E. Nightingale. 1,594 0
 F. & G. Foster. 1,590 0
 G. Wiggs. 1,588 0
 Hyde & Co. 1,567 0

MONMOUTH.—Accepted for the erection of house and stables on the Red House Estate, for Capt. H. Pedersen, Mr. E. G. Davies, architect, Hereford and Monmouth:—
 J. Hall, Monmouth. £695

NORWICH.—For steam mules and fittings at the Workhouse, for the Guardians. Messrs. Morgan & Buckingham, architects and surveyors, 3, Redwell-street, Norwich:—
 Brightside Foundry and Engineering Co., Ltd., Sheffield. £565

PENGAM.—For erecting a chapel schoolroom, for the Calvinistic Methodists, Rhymney District. Mr. Wm. Harris, architect and surveyor, Giffard, Bargoed:—
 Morgan & Watkins £680 2 1
 P. Jones. 537 0
 D. Williams. 529 0
 H. Y. Davis. 528 0
 Y. P. Williams. £521 10
 Aber* 498 10

PONTRHYTHALLT.—For erecting a new chapel adjoining Pontrhythallt Station, for the Llanrug C.M. Chapel Committee, Mr. E. F. White, architect and surveyor, 27, Bangor-street, Carnarvon:—
 E. Jones & Son, Plasdolwyd, Llanwnda, nr. Carnarvon. £1,440

PONTYPRIDD.—For private street works in Madoc-street, for the Urban District Council, Mr. P. R. A. Willoughby, Engineer and Surveyor, Pontypridd:—
 G. L. Morgan, Pontypridd* £225 3

PONTYPRIDD.—For private street works in Factory-lane, for the Urban District Council, Mr. P. R. A. Willoughby, Engineer and Surveyor, Pontypridd:—
 J. E. Evans, Pontypridd* £61 2 1

PONTYPRIDD.—For private street works in Graig-terrace, for the Urban District Council, Mr. P. R. A. Willoughby, Engineer and Surveyor, Pontypridd:—
 G. L. Morgan, Pontypridd* £648 12 3 1/2

PONTYPRIDD.—For 376 yds. of stoneware pipe sewers and contingent works, for the Urban District Council, Mr. P. R. A. Willoughby, Engineer and Surveyor, Pontypridd:—
 J. E. Evans, Pontypridd* £124 7 9

PONTYPRIDD.—For private street works in Wood-street, Cliffryd, for the Urban District Council, Mr. P. R. A. Willoughby, Engineer and Surveyor, Pontypridd:—
 G. L. Morgan, Pontypridd* £310 17 2

SWANAGE.—For making-up roads on the Court Park Estate for the Urban District Council, Mr. L. Sidney, senior, Town Hall, Swanage:—
 G. T. Budden. £677 6 9
 G. T. Budden & G. Pond, Swanage* 684 0 0
 Burt & Rurt. £621 0 0
 G. Pond, Swanage* 688 2 1

TAUNTON.—For the construction and making up of Giffard-street and Stephen-street, for the Town Council, Mr. D. Edwards, A.M.Inst.C.E., Borough Engineer and Surveyor, Municipal-buildings, Taunton:—
 Giffard-street.
 W. C. Shaddock £199 4 0
 Surveyor's & Co., £176 2 10
 Estimate. 193 17 2
 F. Small. 197 15 1
 Stephen-street.
 W. C. Shaddock £287 14 0
 Surveyor's & Co., £249 12 9
 Estimate. 267 15 5
 F. Small. 261 14 7
 J. Y. Coles, Taunton* 236 0 9

TWICKENHAM.—For private street improvement works (Bridge-road, Broadway-avenue, Carnac-road, etc.), for the Urban District Council, Mr. F. W. Pearce, Surveyor, Town Hall, Twickenham:—
 £290 14 7 Bridge-road
 493 9 4 Carnac-road
 246 4 6 Radnor-road
 1,134 7 11 Lebanon Park
 719 6 3 Laurel-avenue
 F. Hoffman, Egham* £479 15 0
 Broadway-avenue
 Shepherd & Sons, Teddington* 479 15 0

UTTOXETER.—For sewerage extension (Contract No. 2), for the Urban District Council, Messrs. Wilcox & Raikes, Engineers, 63, Temple-row, Birmingham:—
 W. H. Reading, Fawcett-street, Wolverhampton* £1,200

WENDING.—For enlargement and improvement of Wending school, for the Norfolk Education Committee:—
 W. Lerner £523 0 0
 W. Crane. 602 6 8
 J. Youngs & Son. 577 0 0
 I. W. Fisher. 571 4 5
 Cobbit & Gorko. 570 5 8
 J. Mickleburgh. 563 0 0
 E. J. Smith. 525 0 0
 Springall & Son. 512 0 0
 Ebbs & Barton. 510 15 10
 H. C. Tofts. £505 1 11
 Tash & Langley. 497 13 10
 E. Mack. 495 4 2
 S. Shanks. 495 0 0
 Burton & Sons. 458 11 6
 J. Needs, Fakenham* 474 0 0
 Brummitt & Co. 472 14 0
 C. Durrant. 455 4 8

WENDLING.—For enlargement and improvement of Wending school, for the Norfolk Education Committee:—
 W. Lerner £523 0 0
 W. Crane. 602 6 8
 J. Youngs & Son. 577 0 0
 I. W. Fisher. 571 4 5
 Cobbit & Gorko. 570 5 8
 J. Mickleburgh. 563 0 0
 E. J. Smith. 525 0 0
 Springall & Son. 512 0 0
 Ebbs & Barton. 510 15 10
 H. C. Tofts. £505 1 11
 Tash & Langley. 497 13 10
 E. Mack. 495 4 2
 S. Shanks. 495 0 0
 Burton & Sons. 458 11 6
 J. Needs, Fakenham* 474 0 0
 Brummitt & Co. 472 14 0
 C. Durrant. 455 4 8

WENDING.—For enlargement and improvement of Wending school, for the Norfolk Education Committee:—
 W. Lerner £523 0 0
 W. Crane. 602 6 8
 J. Youngs & Son. 577 0 0
 I. W. Fisher. 571 4 5
 Cobbit & Gorko. 570 5 8
 J. Mickleburgh. 563 0 0
 E. J. Smith. 525 0 0
 Springall & Son. 512 0 0
 Ebbs & Barton. 510 15 10
 H. C. Tofts. £505 1 11
 Tash & Langley. 497 13 10
 E. Mack. 495 4 2
 S. Shanks. 495 0 0
 Burton & Sons. 458 11 6
 J. Needs, Fakenham* 474 0 0
 Brummitt & Co. 472 14 0
 C. Durrant. 455 4 8

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The Builder.

VOL. XCI.—No. 3334.

DECEMBER 29, 1906.

ILLUSTRATIONS.

The Waldorf Hotel, Aldwych.....	Messrs. A. Marshall Mackenzie, A.R.S.A., & Son, Architects.
The Hall of the Brewers' Company.....	Measured and Drawn by Mr. Sidney W. Davis.
1. Details of Order.	
2. Section Looking South.	
3. Elevation and Section Looking East.	

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The London County Council Hall Competition.



FROM the agenda papers of the London County Council we learn the particulars, as proposed by the Establishment Committee, which are to form the

basis of the instructions to architects who may take part in the competition. These proposals have not been yet formally considered and passed by the Council; and before they are we hope that two points in the proposals, at all events, will be reconsidered and altered.

The first of these is the totally unnecessary, and to our thinking preposterous proposal, to throw the first competition open to all architects without distinction of nationality; in other words to invite the whole world to compete. We doubt there is another municipal council of a capital city in the world which would think it necessary thus to slight the architects of its own country by implying that they cannot be trusted to produce competent* to adequately carry out such a building, and to add to their difficulties a competition by inviting architects from other countries to compete with them. There might be more reason in putting up a national building of the first importance, such as a House of Parliament, to international competition (though we doubt if either the French or the Germans would do so); but for a

municipal building, even of the first order, it is really absurd. It would have been quite reasonable and quite suitable if the competition had been confined to London architects, especially as it is almost certain that a London architect will in the end be the selected competitor, and the same object would thus be attained without tempting a number of persons all over the world to waste their time and energies in a work which, even on the small scale of the first competition, will involve a great deal of thought and trouble with hardly a chance of reward. And what do the Council expect to get by thus appealing to foreign architects? Do they think it in the least degree probable that any French, German, or Italian architect will understand the requirements for an English municipal building as an English architect would? And if not, what is the purpose of this international invitation? Does it arise simply from the ineradicable desire in the minds of English public bodies to see architects throwing away their time and energy and irritating their spirits by useless competition? What will they get from this invitation to foreigners? Probably some fine sketch ideas for buildings, which in plan will prove hopelessly unsuitable, accompanied by a number of impossible or eccentric designs. A waste of work, a waste of trouble to the assessors, all to no useful purpose, unless it be to amuse the County Councillors by a private exhibition; for we cannot find that even the slight reward of public exhibition, and whatever reputation that may bring

them, is held out to the victims of the first competition. It is a foolish scheme, and directly at variance with the progressive opinion on this head, which tends more and more towards the conclusion that competitions, if the system is continued, should be limited in their effects as far as possible, so as to minimise to competitors the loss of time and the illusory nature of the chances held out to them.

The other objectionable feature of the competition is the selection of eight favoured architects who are to be invited by name, who are to be spared all the labour of the first competition, and are then to walk into the lists for the second competition, having had all this time to consider the problem quietly in advance. That is not playing the game. It is creating a favoured class in the competition, with whom the others are not competing on equal terms. Apparently this special list has been provided for fear some of the most eminent London architects should refuse to join in an open competition. In that case, why not make it a limited competition among the favoured eight? It is not in the least likely that the Council will get anything better out of their international competition than one or other of these eight would furnish them with. Let them do one thing or another; have an open competition limited to English architects, or a limited competition for eight (or twelve) selected architects. But to mix the two principles, open and limited competition, in this way, is utterly bad business.

RECENT ARCHITECTURAL DEVELOPMENTS IN JERUSALEM.—II.

WITHIN Jerusalem several important architectural developments have taken place within the past two or three years. One pleasing architectural monument has been added to the city in the shape of a little square church surmounted by five domes built on the outlines of an ancient mediæval church in the Via Dolorosa. The stone courses of the foundation seem to have been left *in situ* and the new church has been built upon them. This little building (Fig. 5) has a remarkable interest, not merely from an architectural but also a geological point of view. The central cupola is supported on four monoliths of red Bethlehem stone polished to the surface of ordinary marble. These monoliths are of a remarkable size—about 20 ft.

high and 3 ft. diameter. The means of handling such stones are still primitive in Bethlehem, and one would think inadequate for such dimensions, but the work seems to have been accomplished without any great difficulty. The interior of the building presents in addition to these enormous blocks of marble-like stone a remarkable collection of polished lime-stones and alabasters, etc., from the quarries to the east of Bethlehem. The altars, floor, and other parts of the interior are decorated in a very tasteful and satisfactory manner with inlays of brilliantly-coloured stones—bright green, brown, red, and purple. The carved stonework is of a correct Byzantine style, and the proportions of the building, and its moulded details, etc., are most elegant and pleasing. Altogether this little building, which also looks as if it had cost a great deal of money and is worth it, is perhaps the most satisfactory monument of the Latin Church of modern days in

Jerusalem. Herr Wenderlin, the author of this interesting monument, is a German architect now resident in the Holy Land.

In singular contrast with the little church just described, is another new building, also in the Via Dolorosa. This is a church built by the Armenian Catholics, and evidently an example of a large building carried out by the local masons without the intervention of an educated architect. As a consequence it displays the flimsy construction, and want of any natural taste in the selection of ornamental details, always observable in such cases. Years ago an argument was carried on as to the *raison d'être* of an architect. It was maintained that true art could only be expected in the modern buildings if we returned to a (perhaps imaginary) condition of the Middle Ages, when the designing of detail is supposed to have been generally left to the individual caprice of the working mason. Advocates of such a theory should inspect the Armenian Catholic church or many other such buildings in Jerusalem—they will find plenty of examples of an original treatment of detail, but hardly a single pleasing or appropriate feature.

If the efforts of the native masons and builders are deplorable when exhibited on the new churches of the Latins or Protestants—that is to say, on buildings which may be supposed to have been erected with a certain European oversight—the attempts at “architecture” under the auspices of the Orthodox Greek church (Christians of the Ottoman Empire) are almost indescribable. At the present moment the ancient centre of Jerusalem is passing through that process rendered familiar to Europeans by the transformation of French and Italian towns, known as “Haussmannising,” or by the expressive Italian term, “sventramento,” or disembowelling. The “sventramento” of Jerusalem has commenced at the very door of the Holy Sepulchre church—that central object of interest and associations as wide and vast as the Christianity of the past 1900 years.

Whether the “sventramento” will penetrate within the venerable walls of the great monument of Christianity remains to be seen. At present the whole of the south side (with the exception of the little Mosque of Omar) of the ancient Rue des Palmiers, has been given over to a most extraordinary and ugly speculative building enterprise.*

The greater part of the area bounded on the north by the Rue des Palmiers and on the west by the old Rue du Patriarche, or “Christian-street,” now belongs to the Greek Church Community of the Holy Sepulchre—said to be one of the richest ecclesiastical institutions in the Levant. With a very natural desire to



* Some years ago the eastern end of this site (covered by the ruins of S. Mary Major church, a building of the XIIIth century), was presented to the German Protestants and a new church was erected on the site, with a tower and spire of about 100 ft. high. The church has little claim to be criticised as architecture—it looks like a modern German Lutheran church transplanted from some bath-resort on the Rhine—although it is credited by the general public with being a reproduction of the old Crusading church. It was opened by the present German Emperor during his tour in the Holy Land in 1898.

The German Protestant church is built on the N.E. corner of a large quadrangular area in the centre of the ancient city, known, in Modern times, as the “Muristan.”

make the best of a good opportunity, the Greek clergy have set about converting this eligible site into a network of bazaars to compete with, if not eventually take the place of, the dirty old covered market, which for so many centuries has been one of the features of Jerusalem.

But the modern Greek clergy have tastes in architecture which hardly appeal to the average European. The result produced in the middle of Jerusalem is a sort of nightmare phantasmagoria, which must be seen to be credited. The modern shops and arcades, entrance archways, etc., covered with a profusion of architectural details of various styles, misunderstood in their application, and meaningless under the circumstances, represent the bathos of Levantine want of taste and sentiment in things monumental. For monumental such work unfortunately is—it is executed in the hardest limestone, and will probably endure for many centuries to come. As a centre for this astounding piece of speculative building stands a curious fountain (needless to say, waterless) composed of pedestals, vases, masks, etc., probably quite unique of its kind. (See sketch, Fig. 7.)

One very interesting fragment of antiquity (hitherto only known to students) has been laid bare by the recent "sven-tramento." It seems to be the sole remaining souvenir of the great "Hospital" of S. John, which occupied the greater part of the area now appropriated for the new Greek Bazaars. This interesting relic is the substructure of the modern Greek church of the "Prodomos." It may always have been the sort of crypt which it now constitutes; in any case the massive masonry below ground and the few courses which are built up into the modern church are evidently of the Crusading Kingdom epoch. (Fig. 6.) With the exception of this fragment nothing now appears to survive above ground of the famous "hospices" of the Order of S. John. Some traces of ruined arches may still be discovered on the same side of Christian-street—traces which will ere long be swept away, as all the rest has been, when the rebuilding mania has reached that part of the town.

Adjoining the German Protestant church of the Redeemer, which occupies the site of S. Mary Major, are the remains of an ancient convent surrounding a square cloister to some extent preserved. This was the Benedictine convent attached to the original church, and has no connexion with the site of the "Hospital" (or Hospice, as it would now be called) of S. John, notwithstanding a current error on the subject at the present day.

Of the Mohammedans and the Jews, those two great sections of the Jerusalem community, there is little to record of a recent date. Since the visit of the German Emperor in 1898, when the great mosque of the Haram (site of the ancient temple) was cleaned up for his inspection, and rendered beautiful according to Moslem taste with a great deal of brown and white paint, nothing has been done to that wonderful monument of so many bygone associations. Persistent rumours are, however, afloat that within the near future some startling "restorations" are to take place in this important shrine

of the Moslem world. Such proceedings may, however, be viewed with considerable anxiety outside the Moslem faith, and both Christians and Jews will be interested in any alterations to this most venerated of all sites in the world. Before any radical changes can be accomplished in the conditions of the sacred enclosure the archaeologists, both Biblical and profane, will doubtless have an opportunity of discussing the matter.

At the present time a vast amount of energy seems developing in the Turkish Empire—of which these rumours of "restorations" in the "Mosque of Omar" are evidences. Jerusalem will before long be united by a railway with Mecca. French engineers are planning the new connecting link between Haifa and Ramleh on the Jerusalem-Jaffa line, and when this is completed the two greatest "Holy Cities" of the Mohammedan world will be united. The port for both these centres of pilgrimage seems to be indicated at Haifa. Here there are the perfect conditions for such an undertaking—the sea is not too deep for the construction of a breakwater enclosing a vast area, and the site is naturally protected by Mount Carmel from the dangerous south wind of the coast. From Haifa a railway in any direction passes through the most fertile of regions, and there is no question about its paying. There is also no question about the new "Haj" or pilgrim railway to Mecca paying—it is being constructed on pietistic principles, not as an investment of capital on the part of the public. It is perhaps the only railway in the world built out of the voluntary offerings and collections due to a purely religious motive. When once constructed it is supposed the current expenses of up-keep will be met by the traffic returns. At present this railway is in use to some extent as far as Kerak, a little to the south of Jerusalem on the other side of the Dead Sea.

No line of direct communication between Jerusalem and the new "Haj" railway can ever be made, on account of the engineering difficulties in crossing the immense depression of the Jordan Valley, and also on account of the uninhabited condition of the country. At some future time a line may perhaps be carried up the western side of the Jordan Valley, touching a few agricultural centres and joining on to the Damascus-Haifa railway near Tiberias.

WIDENING OF BLACKFRIARS BRIDGE.—The Bridge House Estates Committee of the Corporation have accepted Sir William Arrol & Co.'s tender of 203,000*l.* Eight firms of contractors submitted tenders in response to the twelve invitations issued by the Committee.

METROPOLITAN CATTLE AND MEAT MARKETS.—On December 19 Mr. A. L. Bower, Chairman of the Cattle Markets Committee of the Corporation of London, laid the foundation-stone of the public abattoirs, which will be erected by Messrs. Charles Dearing & Son, of Islington, from the plans and designs of Mr. Sydney Perks, Surveyor to the Corporation. An area of two acres in the market at Islington has been apportioned for the new buildings, which will supplant the existing slaughterhouses, and will embody all the most recent hygienic arrangements and improvements as adopted by the Committee after their visits of inspection to Manchester and Liverpool, and to Germany and France. The cost, 40,000*l.*, has been raised upon the private property of the Corporation and a draft upon the City purse. On the following day Mr. F. B. Harper, Chairman of the Central Markets Committee, laid the first stone of a new building at West Smithfield which will cost about 20,000*l.* and will be assigned to the live-poultry traffic.

NOTES.

In a letter to the *Times*, Mr. Caröe cites Canterbury Cathedral as an instance of the irreparable injury that is being caused to historic buildings by the action of coal smoke. Although a small city with no large manufacturing establishments, Canterbury is, nevertheless, capable of producing smoke in sufficient volume to cause the most serious results. Following the expenditure of 9,000*l.* upon three faces of the Angel Tower, the scaffolding has been arranged so as to permit examination of the fourth face, with the result that Mr. Caröe finds it to be in a deplorable condition. The stone is rotten behind the crust of smoke, and the work of the ancient craftsman is gone for ever. Analysis proves that this condition is due entirely to coal smoke, an agent whose destructive qualities cannot be realised by those who produce it so freely, or by those who ought to prevent its production. We are quite in sympathy with Mr. Caröe in his appeal to the manufacturers and local authorities of Canterbury, but fear that even if the discharge from factory chimneys were rendered smokeless, there would still be something to fear from the invisible products of combustion as well as from the smoke emitted by domestic chimneys-pots, which, taken collectively, are not less harmful than isolated flues of more monumental proportions.

THE case of Fletcher v. Mayor, etc., of Birkenhead, commented upon by us December 30, 1905, has been carried to the Court of Appeal, where the decision of the Court below was affirmed on all points. The case is a very important one. The defendants under an Act of Parliament had acquired certain land and had erected certain works in connexion with their waterworks undertaking upon it. The plaintiff owned a dwelling-house and land adjoining, and the subsoil under this land was partially wet running silt, so that the pumping operations carried on by the defendants withdrew this silt and caused the land to subside. The defendants argued that this damage being incidental to the working of the undertaking as distinguished from its construction gave the plaintiff no right to compensation, contending that the case was similar to railway companies under the Railway Clauses Act, in the case of those undertakings it having been decided by the House of Lords that compensation was not recoverable for vibration caused in the working of the railway. The Court of Appeal analysed the various Statutes, and came to the conclusion—(1) That under the defendants' private Act the pumping which caused the damage was part of the construction of the works contemplated by the Statute; (2) even if this were not so the Waterworks Clauses Act, 1847, differed from the Railway Clauses Act, 1845, in that the former Act in sect. 6 gave compensation for damage caused by the maintenance and user of the works, as well as by their construction; and (3) that sect. 12 of the Waterworks Clauses Act, 1847, also applied to water taken by pumping to maintain supply. The plaintiff, therefore

succeeded, but the question is one of such importance that it seems likely that the case will be carried further to the House of Lords.

Sanitary State of Non-Provided Schools. In 1905, after a careful inspection, the London County Council condemned 267 non-provided school buildings as unfit for use. This was a striking comment on the manner in which the managers of the so-called voluntary schools had attended to the structural condition of the buildings under their charge. It was even more a condemnation of the inefficient system of Government inspection. Since this Report was made to the Council 58 schools have been put into a proper structural state by the managers, but the 209 remaining schools are still untouched. The Bishops of London and Southwark now appeal for 50,000*l.* for the purpose of bringing the buildings up to the required structural and sanitary standard. We are much inclined to think that from an educational and hygienic point of view it would be preferable for the scholars in these schools to be absorbed in provided schools, and for such new schools as may be necessary to be built. In the large towns it is essential that the bodies of the scholars as well as their minds should be considered, and we doubt if this tinkering with old buildings can make them really satisfactory or whether those who study in them do so under the best conditions. From an educational point of view we should like to see every school in London a non-provided school—in other words, one uniform educational system which would put an end to these begging letters from the Bishops in respect of what is really a national matter.

Temporary Wooden Stands. A CASE was heard last week at the Guildhall in which the question was raised whether a District Surveyor of the County Council was entitled to inspect, and charge a fee for inspecting, a temporary structure, a stand, erected in the offices of the London and India Dock Company in Leadenhall-street, to enable a small party of spectators to view the Lord Mayor's Show. The Alderman dismissed the summons, but consented to state a case. This question came before the Courts at the time of the funeral of Queen Victoria, and in Westminster Corporation v. London County Council it was decided that the powers of licensing wooden structures conferred by sect. 84 of the London Building Act, 1894, on the London County Council, were transferred by the London Government Act, 1899, to the various Borough Councils. Sect. 84 has, however, no application in the City. In the case of Mayor of Westminster v. Watson it was held that these stands were structures or works under sect. 145 of the London Building Act, 1894, of which the District Surveyors were entitled to have notice, and that where there was a *bona fide* duty on the District Surveyors to inspect the structure they were entitled to fees, but that the London County Council should fix a lower scale of fees when the duties were thus divided. The point would, therefore, seem to be—Was there a necessity

for inspection? From the short report of the case it is not clear whether these cases were brought to the notice of the Alderman, or whether he decided the case on that ground.

Further Subsidence of Buildings in Tunis. In our "Note" of October 20 on "The Importance of Good Foundations" we mentioned the remarkable subsidence of a concrete-steel granary in Tunis. This building is one of three erected on the same site, and we now learn that after the first had been safely restored to a vertical position, the middle block began to settle at one side until the cornice overhung the base by about 20 in., a fault that was remedied without much trouble. The building in question being square in plan, and situated between the adjoining structures, was naturally less liable to disturbance than the other two, partly because of its shape and partly owing to compression of the ground on two sides. A few weeks later, however, block No. 3 began to develop a double inclination, which continued until the cornice of the outer side overhung the base by 18 ft., and one corner had settled to a depth of nearly 5 ft. lower than the other. Notwithstanding the onerous nature of the task, this building was restored to the perpendicular within twenty days. We do not know the exact height of the buildings, but some idea of the measurement can be gathered from the statement that all of them have six floors in all, commencing at ground level. No injury of any kind appears to have been done to the concrete-steel construction by the subsidence and restoration of the buildings, a point that is made clear in some measure by the fact that the window-glass was not broken. Levelling operations were effected by loading the upheaved side of each building, and assisted by trenches dug along the foundations, permitting the soft subsoil to flow upward under the pressure. The fact that these huge buildings were displaced and restored *en masse* without injury is a wonderful testimony to the strength and rigidity of properly-designed concrete-steel structures, although showing that the designer had not adequately considered the question of foundations.

Substitutes for Copper. THE continued rise in the price of copper during the last few years has had the effect of hindering the expansion of the electrical industry in various directions. The cost of manufacturing cables and fittings has been considerably reduced; but the rise in the cost of materials more than counterbalances this saving, and many manufacturers have recently issued notices stating that the prices of certain articles in their catalogues have been advanced 20 or 30 per cent. It is not surprising, therefore, that the merits of all the possible substitutes for copper are being carefully considered by electricians. The difficulties in suitably soldering aluminium wire have not yet been completely overcome, although it is extensively used for transmitting electric power at high pressures by overhead wires. Extensive practical experiments have recently been carried out by Mr. Betts in America on the use of sodium as a conductor. The results show that in

some cases it is much more economical than copper. As sodium reacts violently with water it is protected by an iron tube. The tube is closed at one end by a cast-iron cap and heated. Molten sodium is then poured into it from an iron kettle. Contact is made between adjacent conductors by graphite ends with short copper junction pieces. Of all the common metals sodium is the best electrical conductor, and it is manufactured in large quantities at electro-chemical factories near Niagara Falls by the Castner process. The cost of manufacture is about 6d. per lb., while the cost of salt is slight and chlorine is a by-product. As more economical processes of making sodium have recently been invented Mr. Betts anticipates that the price will soon be 4d. or 5d. per lb., and hence it would be very much cheaper than copper. It has, however, several limitations; for instance, it can only be used for overhead transmission, and it must not be brought near a building. If one of the iron pipes burst the sodium would probably burn quietly, but any attempt made to put the fire out by water would be most dangerous.

Producing Oxygen. It has long been known that oxygen in the gaseous form can be obtained by allowing water to come in contact with sodium peroxide or potassium peroxide, but it is only in recent years that this simple method of generating oxygen has become extensively used. The high cost of these peroxides has prohibited their use on a large scale. The value of oxygen for inhalation is well known, and in those places where oxygen may be suddenly required, and where compressed oxygen cannot be obtained, sodium peroxide may be found very useful. Under the name "oxylithe" alkali peroxides are sold in the form of cakes in suitable boxes. When oxygen is required, a pin-hole is made in the box, and the box is immersed in water. The gas then comes off rapidly, and may be collected in a rubber bag or other suitable receiver. But the price of a box of oxylithe is half-a-crown, and only one cubic foot of oxygen is obtained from each box. The gas prepared in this way is, therefore, too expensive for use on a large scale. In saving life the cost would hardly be considered. For industrial purposes, such as welding by means of the oxy-acetylene blowpipe, large quantities of oxygen are required, and a cheaper material for producing oxygen has to be used. A compound called "epurite," which costs only twopence per pound, is sometimes used, and it is stated that one pound of this material will yield about 1½ cubic feet of oxygen. We do not know of what "epurite" is composed. All we are told is that it is a deliquescent powder "containing oxygen in a latent state in a form susceptible of easy liberation on contact with water," but apparently oxygen obtained from "epurite" is as cheap as compressed oxygen.

Electric Signalling on Railways. THE paper read last week by Mr. H. G. Brown to the Institution of Electrical Engineers, on "The Track Circuit as Installed on Steam Railways," gives a clear account of a practical application

of electricity which is little known even to electrical engineers. In electric traction, electrical methods can readily be employed for signalling when a train is on a section of the track, but it is not obvious that similar methods can be economically employed on steam railways. The principle of the method described by Mr. Brown depends on the fact that the electrical resistance of the ballast and sleepers between two lines of rails is appreciable. Consecutive rails are connected by copper bonds, as in electric traction. The length of the "track circuit" is usually 1,000 ft. When there is no vehicle on this section, a constant difference of electrical pressure is maintained between the two rails by means of accumulators having resistance in series with them. When a train or a wagon is on the section the two rails are practically short-circuited by the wheels and axles, and so the electrical pressure between them becomes negligibly small. In this case the windings of a magnetic relay which are connected between the rails cease to be excited, the effect being that the signal is brought to danger. Any failure on the part of the batteries or in the insulation between the rails will also bring the signal to danger, the method, therefore, fulfils this first essential condition of any system of signalling. The Daniell cells formerly employed were found untrustworthy, as their internal resistance was too variable. The first cost of accumulators is greater than primary batteries, but they are cheaper to maintain. The electrolyte also has a much lower freezing point than the zinc and copper sulphate solutions used in the cells, and hence there is no necessity for a deep battery well to protect them from the cold. Although it is difficult to see how this system can fail with heavy trains, yet it is possible to imagine that if the rails were in a bad condition a light wagon would not have a sufficiently low resistance to short-circuit them effectively. As such a wagon might possibly be left on the track during shunting operations, a fuller discussion of this case seems necessary.

Technical Education.

ON Friday last week the distribution of certificates, prizes, and medals took place at two institutions where special importance is attached to the practical side of technical education. The first of these is the Crystal Palace School of Practical Engineering, devoted to the training of civil, mechanical, and electrical engineers in such a way that at the end of his two years' course the student has acquired a fair knowledge of the three great branches of his future profession, and is ready to enter upon that extended course of study which should continue throughout his subsequent career. In addressing the students upon the occasion to which we refer, Lord Brassey alluded to the long list of ex-students who had taken prominent positions as a testimony to the value of the school—a tribute we are able to corroborate from personal knowledge of the thoroughly practical character of the training there imparted. The second institution is the Trades Training Schools, founded by the Carpenters' Company and other City Guilds—an establishment

where, as Sir William White remarked, the students are engaged in attempting to perfect themselves in those trades and crafts in which they are daily occupied. While mere book learning invariably tends to vanish if not applicable to the daily life of its possessor, the assimilation of theory and practice, which is the great object of the two training schools here mentioned, is distinctly calculated to create a lasting impression on the minds of students, and to encourage in them the habit of looking for the confirmation of theoretical knowledge in the course of practical work.

War Office Buildings, Pall Mall.

ON December 18-19 the executive staff vacated the offices on the south side of Pall Mall, and the statue of Lord Herbert of Lea has been removed to within the court-yard of the War Office in Whitehall, where it faces the middle arch of the gateway in Horse Guards-avenue. Some of the chimney-pieces and other fittings have been taken to the new building in Whitehall. The central portion of the offices in Pall Mall was either a rebuilding or an extensive alteration by William Atkinson, before 1839, for the Ordnance and Transport Departments, of the Albion Hotel, a "subscription house," the successor apparently of the Union Club established in 1801. The Union Club premises were formerly known as Cumberland House, erected after designs attributed to Matthew Brettingham for Edward, Duke of York, and afterwards occupied by Henry, Duke of Cumberland, brothers of King George III. The finishing and fitting up of the house cost the Duke of Cumberland nearly 70,000*l.*; the house was converted (in December, 1801) after his death for purposes of the Union Club. Of the adjoining official buildings the house known as Buckingham House, on the east side, was built in 1794 by Sir John Soane for the Marquis of Buckingham; on the west side of the fore-court is the block erected by Sir James Pennethorne, and illustrated in the *Builder* of August 16, 1851; next west to that are the middle portion and the west wing of (old) Schomberg House built for the third and last Duke of Schomberg in the later years of the XVIIth century; Peter Berchett painted the principal staircase. (Old) Schomberg House was the home of Gainsborough, who occupied the west wing during the last eleven years of his life; his contemporary, John Astley, artist, occupying the middle portion, over the portico of which he set up a bas-relief of "Painting." To Astley succeeded Cosway, R.A., and after Cosway's death the Polygraphic Club.

Blackfriars Bridge.

It is amusing in one aspect, though saddening in another, to see the daily newspapers speaking with solemn interest of the careful manner in which the widening of Blackfriars Bridge is to be carried out without spoiling the "design." The *Daily Telegraph* of the 19th, for instance, tells us how "the handsome outer steel girders and parapets, and the fine red granite decorative pillars on the supporting piers, will be used unaltered to form the new west side," so that the Londoner will notice "no alteration in

this fine structure" beyond the widening of the roadway. The bridge has been condemned by every artist since it was built, as one of the most vulgar and tawdry things in London; but no such criticism ever reaches the deaf ears of the typical "daily" journalist; for him it is still a "fine structure," and he would probably be utterly bewildered to know why anyone could object to it. Architects and art-critics may preach for half a century on absurdities of design like this bridge, but such structures never reach the ear of the daily paper and its public. The remark as to the "decorative pillars" is too delightful. It must be admitted that they are of no use; but we fear that does not make them decorative. One would have hoped that the necessity for widening the bridge might have been made the occasion for building a new and less objectionable structure; but there are many people who would have thought this a destruction of one of the architectural adornments of London!

THE STRUCTURAL DESIGN OF ENGINEERING FACTORIES.*

THE system of construction of engineering workshops has changed considerably during recent years in consequence of the rapid developments of engineering practice and the necessity for more rapid and economical production demanding improvement in plant and operations. The erection of new buildings and the reconstruction of existing ones has been necessary to meet these altered conditions.

Formerly, engineering factories were constructed of heavy masonry or brick walls of great thickness suitable to carry steam travelling cranes, and bound together with heavy timber roof trusses. The lighting was usually provided by windows in the side and end walls, and sometimes from narrow roof lights. Little attention was given to ventilation and heating. The shops were dull and gloomy; artificial light, usually gas or oil, was often required to enable the workmen to attend to their duties. Considerations with regard to the expensive and substantial character of the buildings were not favourable to economical reconstruction or modification to suit any proposed re-arrangement of machinery and plant.

Modern workshops consist of wider buildings of greater height, with plenty of roof light, efficient ventilation and artificial heating. Jib cranes, mono cranes, and high-speed electric travelling cranes are adopted to enable the work in progress to be expeditiously handled.

As the weights and speeds of travelling cranes increased, it became necessary to construct the walls with heavy piers or buttresses (as shown on the right side of the transverse section of the building in Plate I) to carry the longitudinal gantry girders, which were usually made of trussed timbers. These piers enabled the heavy local loads from the cranes and roof to be provided for on suitable foundations at definite fixed points, but they occupied valuable floor space. Cast iron columns of H section were then introduced in place of masonry piers to carry the crane and roof loads and to strengthen the walls. Later on, the columns and gantry girders were constructed of wrought iron or steel. The adoption of wrought iron enabled a wider spacing of columns and a more economical use of the floor space, as well as a less costly construction. As the heavy local loads could be carried by the reinforcing material, the heavy walls became unnecessary, and gradually the modern steel framed building was evolved, capable of supporting all the loads, the outer walls being required only for protection against the weather. The brick or masonry walls of the full height were dispensed with. The outer side covering was formed of corrugated iron or weather boarding, and the roof covering consisted of tiles,

* A paper read before a joint meeting of the Junior Institution of Engineers and the Architectural Association Discussion Section December 3, by Mr. Adam Hunter, A.M Inst C.E.

slates, corrugated iron, or glass. Light steel roof trusses replaced the timber trusses, and with the columns formed a rigid framework to resist the structural and wind loads as well as those from the cranes and shafting.

A later development is the substitution of 9 in. brick filling in steel framework for the outer walls. Reinforced concrete is also finding a legitimate use for filling in the structural steel framework.

The structural design alone of engineering factories will be dealt with in this paper. The planning and disposition of machinery and the necessary crane equipment is outside its scope. These are matters for experts who have a thorough knowledge of the particular trades and of their requirements in the processes of manufacture. These requirements differ in the same trades according to the volume of work to be carried on and possible developments. Great assistance in the consideration of the plans can, however, be given by the structural engineer to the manufacturer when he is able to formulate his requirements. The use to which the buildings are to be put, the position of the machinery, the possible extension and growth of the business, and the size and shape of the site will, generally, determine the dimensions. As a general rule, the buildings are of one storey, but where the ground is expensive or limited in area it may be necessary to build them in two or more storeys.

Material.—The principal material used in the framework is mild steel made by the open hearth acid process, and having an ultimate tensile strength of 28 to 32 tons per square inch of section, and an elongation of at least 20 per cent. in a length of 8 in. Basic steel of a lower tensile strength should not be used unless a substantial increase is made in the sectional areas of the different members. Cast iron, although apparently an excellent material for compressive stresses, is entirely discarded, except for unimportant details. Owing to the low price of steel, it is possible to make a steel column of equivalent strength cheaper than one in cast iron. The impossibility of obtaining long columns without joints, the hidden flaws and imperfections, the liability of breakage in transit with its consequent loss of valuable time in replacing the castings, rule cast iron out of account as a reliable structural material. It must not be forgotten also that columns used in workshop buildings are subjected to severe bending stresses due to temperature, and from the racking forces and shocks from jib and travelling cranes. Cast iron is unsuitable for stresses of this character.

As an example of the stresses due to temperature to which the columns are subjected, a building will be considered having the moderate, but quite common, length of 300 feet. No provision is made in a workshop building for contraction or expansion either longitudinally or transversely. All movements due to changes of temperature are allowed to bend the columns, and as they are secured to massive foundations they will deflect as cantilevers from their bases. The range of temperature in this country will cause a difference in length of about $\frac{1}{4}$ in. in a building 300 ft. long, deflecting the extreme end columns $\frac{1}{4}$ in. If the length of the column is taken at 30 ft. and the columns are assumed to be securely bolted to the gantry girders and to the foundations, the tensile stresses in the columns due to temperature may be as high as $\frac{3}{4}$ tons per square inch, or about the elastic limit of the cast iron. If the columns were set and fixed at a mean temperature the maximum tensile stresses would be half this amount. With shorter columns the stresses would be proportionately greater, as they vary inversely as the square of the length.

Many difficult problems arise in the design of workshop buildings, requiring not only scientific but practical knowledge of the manufacture and erection of structural work. Special study and experience is essential to enable a satisfactory and economical design to be prepared. Special rolled sections should be avoided, for although they may be listed by manufacturers they are not readily obtained. As few different sections should be used as possible so as to obtain quick delivery of material from the rolling mills. It is better to vary the thickness of a section to obtain increased area than to use one of different scantlings. Although standard sections may be used, it does not follow that

they can be obtained quickly or even obtained at all. There are certain sections in common use and continually being rolled. These should be used, as the mills are able to supply them without delay.

Forces due to Cranes.—On account of the adoption of high-speed electric travelling cranes fitted with magnetic brakes, it is important to provide for the horizontal forces produced by the sudden application of the brakes to the rapidly moving crane, and for the forces due to acceleration and retardation of the speeds. The horizontal braking force cannot be greater than the sliding friction between the wheels and the rail, assuming the crane to be suddenly stopped when travelling at its greatest speed, and the wheels to skid on the rails. It attains its maximum value at or near the point of rest. The maximum value of this force may be assumed to be one-eighth of the load on the wheels and to be divided between the two lines of rails in proportion to the load carried by each. The following table gives the coefficients for sliding friction between steel tyres on steel rails, and is compiled from experiments by Westinghouse and Galton with railway trains:—

TABLE I.*

Speed in miles per hour	10	15	25	35	45	50
Speed in feet per minute	880	1730	2200	3340	3960	1400
Coefficient of friction	0.110	0.087	0.080	0.051	0.047	0.040

* Goodman's Mechanics Applied to Engineering.

In designing railway bridges it is usual to assume that the maximum horizontal force due to the sudden application of continuous brakes to the train is about 400 lb. per ton of weight of the rails, or a coefficient of 0.18. It is certain that the track on a gantry girder in a workshop is in a much better condition through the method of supporting it than an ordinary railway track, and would consequently have a lower coefficient of friction. The horizontal forces from the cross travel of the crab may be taken as one-half of the preceding, on account of the lower speed at which it works and slower acting brakes. It is not unusual to drag weights along and across the floor of the workshop by means of the travelling cranes. Provision should be made in the design to resist these forces. As sliding surfaces or rollers are usually provided under the pieces being moved, the horizontal component of the dragging force may be taken at one-tenth of the lifting capacity of the crane.

Jib cranes and mono cranes are frequently fixed to the main columns. Adequate provision must be made both in increased scantlings and design of the details of the framework to resist the forces due to them. No weights can be given for these cranes, as the working loads and radii vary so much.

Main line shafting may be secured to the roof trusses where there are no travelling cranes. Where there are travelling cranes the shafting may be supported from the longitudinal gantry girders and main columns. The additional load in hundred-weights per lineal foot from the weight of the shafting, pulleys, and pull of belting may be taken at from one-eighth to one-tenth D^2 where D is the diameter of the shaft in inches.

Wind Pressure. The external loads to which a building is subjected are principally those due to snow and wind. In this country it is seldom that a greater fall of snow at one time than 12 in. occurs, and even this is rare. Twelve inches of newly-fallen snow will weigh about 5 lb. per square foot. This is an ample provision, as it is usually taken in conjunction with a high wind pressure, although it is doubtful if 12 in. of frozen snow would lie long undiminished, even under a moderate wind.

A great variety of ill-informed opinions exist with regard to the maximum wind pressure, against which it is necessary to provide. The Board of Trade specifies a wind pressure of 56 lb. per square foot for loaded railway bridges, but in the case of road bridges and buildings no regulations exist other than local building laws or requirements, and these are often based on an imperfect knowledge of this subject. The pressure of 56 lb. per square foot was fixed by the Royal Commission appointed to investigate the cause of the failure of the Tay Bridge in 1879. Previous to this date the effect of wind pressures was seldom

considered in designing a structure, and when considered the amount varied considerably, depending much upon the timidity or tenacity of the engineer. Since the fall of the Tay Bridge more knowledge has been gained with regard to wind pressures. During the construction of the Forth Bridge careful records of wind pressures were kept.

The highest pressure of wind recorded at Greenwich between the years 1849 and 1869 was 41 lb. per square foot, and many instances occur in the Greenwich records of pressures of 30 lb. and 40 lb. These wind pressures were probably from velocity records on the rotary cup anemometer, and reduced to pressures by the formula, $p = 0.005 V^2$, published by Smeaton in 1759, and regarded as an authority until recent years. Later investigations have shown that the results given by this formula are too high. Various experimenters have assigned different values to the constant. From careful experiments made at the National Physical Laboratory, this constant has been given as 0.0027 (*Proceedings of the Institute of Civil Engineers*, Vol. CLVI.). From these same experiments it was shown that the negative pressure on

the leeward side of a triangular roof may be greater than the positive pressure on the windward side of the roof slope, and the negative pressure on the leeward side of the building may be as great as one-third of the positive pressure on the windward side.

The greatest wind pressure to which a building is subjected is that from a horizontal wind. The uplifting force of the wind need not be considered except for open sheds. The maximum pressure is not uniform from the ground level to the roof, but is greatest at the centre. It is diminished near the ground level by the frictional resistances of the ground, and at the eaves from the eddies formed by the air escaping over the roof. The change in direction of the air when striking a flat surface such as the side of a building will form a cushion to diminish the effects of impulse and shocks from local gusts. The impulse of gusts must also be diminished by the time taken to overcome the inertia of the building.

The following table from experiments by Stevenson shows the varying velocities of wind at different levels above the ground in an open space, and forms a guide to the varying pressures at these levels:—

TABLE III.

Feet above ground,	5	9	15	25	52
Velocities in miles per hour,	4	6	6	6.5	7.5
	7	17	18	21	23
	13	23	25	30	32
	19	24	31	35	40
	26	32	34	37	43
Average.....	13.8	21.2	22.8	25.9	29.1

In the experiments on roof models at the National Physical Laboratory the varying pressure on the vertical windward side was shown to vary in the following relative ratios for a building with a roof slope of 30 deg. and an air velocity of ten miles per hour:—

At ground level	179
At centre of height	182
At eaves level	168

In American practice the wind pressure on factory buildings is usually taken at from 20 lb. to 30 lb. per square foot for buildings over 25 ft. in height.

With regard to wind pressure in factory design, it will be found sufficient if the buildings are designed to resist an average steady wind pressure of 30 lb. per square foot, this pressure being taken in estimating the wind load on any member of the frame.

† The table of these records was given with a very short résumé of the paper in our issue of December 15 (page 692).

work supporting an area of 300 sq. ft. and under, and would be diminished by 1 lb. per square foot for every 100 sq. ft. in excess of this amount to a minimum of 20 lb. per square foot, and that the building should resist overturning with a steady pressure of 50 lb. per square foot. Higher pressures than these will only occur at rare intervals, and under such pressures the stress may safely be permitted to approach the elastic limit of the steel.

The subject of wind pressure has been treated at some length. It is a question constantly arising as to what pressure should be allowed in designing a structure, and it is hoped that sufficient information has been given to enable satisfactory decisions to be made that will not involve an extravagant use of material.

General Principles of Design.—In general, the design of a workshop building must be such as to fit resist without appreciable distortion the whole of the external and internal forces to which it may be subjected. Unless this is so, the travelling cranes will bind; and if shuffling is used, it will get out of line and run with the consequent frictional losses. An important matter to bear in mind is that rigidity and stiffness are of as great importance as strength, and that the design as a whole should contribute to these factors in the simplest and most economical manner. In the design of details attention should be given to the large secondary stresses from the unavoidable eccentricity of connexions and from unequal loading. In buildings of a permanent character the possible developments of the business should be given full consideration, as a small increase of section will yield an increase of strength out of proportion to the extra cost. Recently two buildings which were designed for 10-ton travellers were strengthened to carry a 50-ton traveller in the one case and a 40-ton in the other. The extra cost of providing for these loads when the buildings were designed about six years ago would have been small compared to the cost of strengthening them afterwards.

A workshop building consists of main columns of suitable section to support the loads from the longitudinal gantry girders and roof trusses, and to form, together with the roof trusses, a frame to carry the structural and crane loads and to resist the external forces. Diagonal bracing is placed in a vertical plane between the main columns to resist the horizontal forces due to the braking of the travelling cranes and from the action of jib cranes and end wind pressure. Diagonal bracing in a horizontal plane is fixed between the tops of the columns at roof level in order to assist in distributing local forces from cranes and side wind, and to line up and square the building. To prevent the roof trusses being overturned by end wind on the gables the pair of roof trusses at each end is braced between the rafters, and also in a vertical plane on the centre line. The main columns should always be carried up to the underside of the roof trusses, and the roof girders fixed between the columns, and not on top of them. The roof trusses are further secured to the top of the columns with triangular brackets or rakers at the junction. This construction is simple to manufacture, easy in erection, and rigid in construction.

The actual working conditions should be considered in fixing the likely combinations of loads. Often there are two or more travelling cranes in one bay, and two may be brought together to lift a single load by means of a lifting beam, or a sling may be passed round the load and attached to the lifting hook of each crane. It is possible that two cranes travelling in the same direction may be braked about the same time. Ample provision will be made for the braking loads if they are assumed at 50 per cent. of the total possible effort of all the cranes. The same proportion will be sufficient for the jib cranes. The maximum side wind pressure need not be taken with the full crane loads. Such a combination rarely occurs, and when it does there should be an ample margin of safety in the structure to provide for it.

Having outlined the general principles of the design, attention will now be given to some of the constructional details.

Foundations.—No definite rules can be laid down as to the class of foundation to adopt,

as the conditions of each case vary more or less from that of any other, and depend to some extent on the mechanical appliances and materials at hand. The importance of a good foundation cannot be overestimated, for upon the efficiency of the foundation depends to a large extent the stability of the structure.

It must be remembered that it is that part which, when once completed, is covered up and cannot be attended to afterwards without great risk and expense.

The bottom of the foundation should be laid in all cases deep enough to be beyond the influence of frost or drought. In this country a depth of 3 ft. will be sufficient for soils of a porous nature, and about 4 ft. in clayey soils. In countries where there are greater extremes of temperature it is necessary to go deeper. These depths are necessarily approximate, as the stratification of the ground and the loads to be carried will determine the depth to which it is necessary to go. A foundation cannot be over-ly and economically proportioned without a correct knowledge of the soil and underlying strata. If existing structures, such as wells or railway cuttings, do not afford this information, it will be necessary to sink trial pits or borings on or near the site. The bearing capacity of the soil may be ascertained by loading trial cylinders. A sufficient precaution in ordinary cases is to try the bottom of the excavation with iron rods, or to bore holes for a few feet below the proposed bottom to find if the soil remains firm to a sufficient depth.

The simplest and cheapest form of foundation is a rectangular block of concrete of suitable dimensions to distribute the load. The columns are fixed to the concrete by long bolts having a large washer at the bottom. The bolts should have sufficient play in the concrete to allow of some adjustment in fixing the columns. Square-tapered holes, formed by wooden boxes, are left in the concrete. The size of the hole at the top should be sufficient to allow the washer to pass through, and should be tapered about 1 in 24. After the concrete is set the boxes are removed and the bolts are inserted. The holes are grouted up with cement when the columns are plumbed and fixed in position. . . . Where heavy loads are to be carried, a grillage may be used instead of a bedstone. The depth of the excavations and quantity of concrete is reduced by this means. A piled foundation may be used in conjunction with the grillages.

Main Columns.—A single rolled beam may be used, or a web-plate with four angles, and these may be strengthened by the addition of flange plates. Two or more joists may be used with flange plates, or connected by lattice bars or batten plates. Light gantry girders may be supported on brackets riveted to the columns. Where heavy travelling cranes are carried by the gantry girders, the loads are transmitted to the ground in a more efficient and economical manner by designing the columns so that the section is brought directly under the girders.

Gantry Girders.—The gantry girders must be designed to resist not only the vertical loads imposed on them by the travelling cranes, but also the horizontal bending stresses due to the braking of the cranes in cross travel, and from dragging weights across the floor. A top flange of greater width and stiffness is required than for an ordinary girder of the same span. The rolled beam is a cheap and economical girder for light loads. Where great rigidity and stiffness are required the box girder is suitable. This section is designed so as to be accessible for machine riveting. The top flange is formed with inner as well as outer angles, to stiffen the flange plate against dishing under the rail, due to the heavy concentrated wheel loads. Box girders are open to the objection which applies to all closed sections, that the interior is not accessible for inspection and painting after completion, but as the interior is practically sealed it is unlikely that any serious corrosion will take place. In any old box girders which the author has seen opened up there was far less corrosion on the interior than on the exterior surfaces. Lattice gantry girders are in use, and compare favourably with plate girders in economy of material and stiffness. The rails in general use are bridge rails riveted to the top flange

of the girders. Flat bars are sometimes used for the rails for heavy cranes.

Roof Girders.—The cross sections suitable for roof girders depend somewhat on the span and loads to be carried. Rolled beams, plate, and lattice girders are used. Plate and lattice girders are, of course, suitable for all spans and conditions of loading. The lattice girders are light in appearance, and economical for spans over 30 ft. They can be made deeper than plate girders without waste of material, and act to some extent as longitudinal bracing. Rakers are sometimes added, and the vertical diagonal bracing between the main columns dispensed with.

The trusses should be designed with all purlins resting directly over an apex, so that the vertical intersecting line of the load comes through the intersection of the gravity lines of the truss. If this cannot conveniently be done the rafters should be designed to resist the consequent bending as well as the direct stresses. The main ties are usually horizontal, to obtain a more economical and rigid construction. There is generally no satisfactory reason in buildings of this class for giving the roof tie a large camber, as is often done. Through the various racking stresses to which a roof truss in these buildings is subjected, the horizontal member is often in compression, and the section should be such as will resist this stress in the most direct and suitable manner. The horizontal bracing under the roof trusses is bolted to the tie where they cross, and this connexion is simplified by using a horizontal lower member for the roof trusses.

Where shafting or runways for cranes are supported from the trusses, the lower member is made of channel bars, so that the shafting or runways may be fixed at any convenient point, and also to better withstand the shocks from the starting and stopping of machines. Provision is sometimes made so that tackle may be attached to the trusses for lifting weights, such as the crabs of the travelling cranes and other loads.

In rolling mill roofs it is sometimes desirable that the rolls, weighing as much as 8 to 10 tons each, may be lifted from them. Light travelling cranes may be carried from the roof trusses.

The connexion of the roof trusses to the columns is often a weak point in the construction, and every precaution should be taken to make it as stiff and rigid as possible.

In foundries and smithies where there are corrosive gases, sufficient allowance should be made for corrosion by increasing the section over that required for strength.

The sections of material adopted in roof trusses or girders are generally angle bars, whether the member is in tension or compression, and that all joints and connexions are riveted. In the best practice it is considered desirable that flat bars and rods and adjustable members should be avoided. An angle bar makes a good tie as a flat bar or rod. It permits of simple riveted connexions, and forms a stiff and rigid member. It is the cheapest section rolled in steel. Where an angle bar is used as a tie and connected by one leg, allowance is made for the eccentricity of the connexion. A simple rule is to take the effective area as that of the riveted leg added to one-half of the free leg. Where the angles are connected by cleats so as to be riveted in both legs, the full sectional area may be taken.

It is quite the usual practice for the whole of the roof covering to be of glass. Putty glazing is extensively used and gives entire satisfaction. It is cheap and, when properly done, has a long life. Plastic putty, made with a proportion of tallow in the whitening, is sometimes employed. Different forms of patent glazing are also used. Those with the lead covered bars, such as Mellows well-known type are the most durable. Patent glazing is more expensive than putty glazing, but the maintenance is practically nil, and the life is unlimited. The glass used is rough cast plate, $\frac{1}{2}$ in. in thickness, in widths of from 18 in. to 24 in., and in lengths of from 70 in. to 80 in.

Very little trouble on account of vibration and temperature movements is experienced with glass roofs.

No inconvenience is found to arise with all-glass roofs due to the workshops getting unduly warm in the summer time or from the

winter cold. With the lofty roofs in use and ample roof ventilation, no complaints are made of undue warmth. The heating system of steam pipes provides against the winter temperature. A precaution usually taken to keep the workshops cool is to whitewash the glass in the early summer. By the end of the autumn the rains have generally cleaned it off, and what little remains is easily removed with a little washing soda and water at the annual inspection and cleansing of the roofs. The benefit of a good roof light is apparent at once to any one who compares it with the old style of narrow roof lights and side windows. The workmen can attend better to the work in hand, and there is increased efficiency and a saving in the cost of artificial lighting.

Sliding gates are usually placed outside the building, and are made of wood or corrugated iron on a steel framework. They should be hung from the top on friction rollers to permit of easy opening.

Ventilators.—Fixed or movable louvres may be used with the sheeted ventilator. In foundries and smithies large open ventilators are required to permit of the escape of smoke and gases. In machine and erecting shops the small ventilators give ample ventilation. A curved baffle plate should always be fixed at the bottom of the ventilator to keep out driving rain and snow.

Floors.—Types of floors suitable for galleries and ground floors are shown in Plate 15. Canadian rock maple is sometimes used for machine shop floors. It is hard and durable. Heavy machine castings may be dragged on it with comparative ease and without splintering the floor. Wood-block flooring, similar to street paving, is in common use for machine and erecting shops. In smithies and boiler shops, furnace ashes, well rolled, is the usual type of floor.

Painting.—The steelwork is painted before leaving the manufacturer's yard, and receives at least one coat of paint after it is erected and the building covered in. Red lead is best for the priming coat and oxide paint for the finishing coat. In German specifications it is required that the steelwork should first receive a coat of boiled linseed oil, in order that the red lead coating should be more coherent with the steel. Steelwork that has to come in contact with brickwork or concrete should not be painted, but should receive a wash of cement as the brickwork or concrete work proceeds. Galvanised corrugated sheeting should not be painted until it has been exposed for some time to the rain and weather. Some traces of pickling acid may have been left on the sheets, and this exposure clears all remains of it. The steelwork which is exposed to the weather should be painted about every three years, and where it is under cover an interval of five years may elapse.

The Control of Design and Construction.—It is quite apparent that the design of works of this class is a matter more for the engineer than for the architect. The problems are almost wholly of an engineering character; those of an architectural nature being entirely subservient to them. Architects could, however, render a great service in making the buildings of a more pleasing appearance, and their aid in this matter would be welcomed by engineers. As buildings, not only of workshops, but all classes are becoming more of engineering structures than formerly, through the adoption of steel frames and mechanical appliances, it would appear that in the future the principal direction of these works should be vested not in the architect but in the engineer.

NEW THEATRE IN SHAFESBURY AVENUE.—A new playhouse, to be known as the Hicks Theatre, has been erected in this thoroughfare. The building has two tiers only. The decorations are of the Louis XVI. period. The auditorium, which is circular in plan, will seat about 1,200 people. It is 50 ft. wide and 70 ft. deep, reckoning from the front of the proscenium to the back wall of the pit. The drapery, carpets, and upholstery are of a deep shade of rose du Barre. The theatre contains two boxes on each side of the proscenium. The pit holds some 500, and the gallery about 300 people, and there are 190 stalls. The stage measures 70 ft. in width and 40 ft. in depth, the height to the gridiron being 63 ft. There are seventeen dressing-rooms, all provided with hot and cold water. The building has been erected by Mr. Walter Walsh, of Balham, from the designs of Mr. W. G. R. Sprague.

INSTANCES OF TWO CHURCHES IN CLOSE PROXIMITY.

We have several instances in various counties in which two churches have been built close together. They are sometimes in the same churchyard, and at others within a stone's throw of each other; some are side by side, and others are almost in a line, the west end of one being close to the east end of the other.

There is a very interesting example of this duality in the county of Essex. The two edifices are known as Willingale Spain and Willingale Doe. They stand side by side, a few paces apart. Antiquaries tell us that Willingale Spain was a gift to the Priory of Blackmore from a Spanish noble, William de Hispania, the owner of neighbouring lands, to the end that his father and mother, as well as his wife and himself, should be held in remembrance by that community; and that Willingale Doe was founded by a French noble of the family of D'Eau, who also owned lands in the district. Both churches consist of a nave and chancel, and have a porch on the south side. A turret with a spirelet has been deemed sufficient arrangement by way of belfry for Willingale Spain, while Willingale Doe has a strong tower. The Spanish founder, who lived in the days of Norman rule, dedicated his building to St. Andrew and All Saints; the French noble, who lived in a later century, chose St. Christopher for the patron saint of his edifice. We may conclude there was a time when both churches were in the hands of the same masons, as both possess details that correspond in style. There are tombs in them telling of old griefs. The brasses on the floor of Willingale Doe are of special interest, as they are considered to be representations of members of the family of Torold, who were descended from the individual figured in the celebrated Bayeux tapestry, and labelled in it "Hic est Torold." The two fabrics stand ripening in the Essex sunshine, full of memories and traditions. One homely legend has found its way into the talk of the country-side to the effect that these churches were built by two sisters. When one had brought the building of the first to a conclusion the other said she would build one, too; and her sister replied, "Willing, girl, do" (hence Willingale Doe).

Passing on northwards we may see two churches at Trimley, in Suffolk, in the same churchyard, facing the wide rural "street," or road with a pleasant radiance of serenity, both looking equally inviting and restful. They tell of the wealth and piety of this fine county. At Bury St. Edmunds the much finer churches of St. Mary and St. James are also close together, with an avenue of trees from the south porch of one to the north porch of the other.

There are more examples in Norfolk. There are two in one churchyard at South Walsham. Each possessed a tall tower, whereof one has been suffered to fall into decay, and now stands in isolated solemnity, open to the winds and split from the summit to the ground. The tracery in the windows of both edifices is exceedingly elaborate, and they have both an air in keeping with the reputation of the county for the richness and number of its fabrics. There are two more in close proximity at Antingham, one of which, however, is in ruins, and there are two more at Hackford and Reepham, near Norwich, that are quite close together. The east end of one of these last, St. Michael's, is but a short distance from the west end of St. Mary's, Reepham. They both have strong towers partially covered with greenery, but only one has been finished off with finials. This is a part of the land where the churches are rich in superb oaken roofs, with carved angels upholding the beams, and grand painted and gilded screens, and, curiously, on the other hand, where we may yet see some that are still simply covered in with thatch.

There are two fine churches in one churchyard near Louth, at Alvingham. One is dedicated to St. Adelwald and the other to St. Mary. They stand about 30 ft. apart in the deep, soft grass among shrubs and tombstones. Both have western towers, and, with the exception of a battlemented parapet on St. Mary's, their general outline is alike. Neither possesses the tall, slender spire that is usual in this part of the country.

Going further northwards, in Holy Island,

off the coast of Northumberland, mentioned by the Venerable Bede as a semi island because when the tide is low it is possible to cross on foot the miles of sands that stretch between it and the mainland, there are two more churches in one churchyard. One of them is the great famous Norman priory church, now in picturesque ruin (hanging ruins the remains are called on account of a high transverse rib of the tower left standing out against the sky), and the other, 52 ft. westwards of it, is the parish church, or St. Mary's. There is a village on the island with about 500 inhabitants in winter, increased in summer by visitors, and there is a new hotel, some inns, a castle or fort in which is a small garrison, and a "heugh" on which fishermen keep a constant look-out; but the presiding genius of the place is still St. Cuthbert, the vigorous ascetic who departed to the mercy of God many hundreds of years ago. The shores are strewn with his beads (encrites); traces of a tiny chapel may be made out among the rocks to which he used to retire to pass away days in solitude, meditation, and prayer; and the priory church was the place of his burial before his remains began the long journeys that ultimately ended at Durham. These two churches in their ocean setting, swept by the winds off the great grey North Sea, are like magnets to many minds. The register of St. Mary's, dated 1578, tells of many deaths by drowning in consequence of people being overtaken by the incoming tide or by sinking into quicksands. It has an entry concerning marriages, dated 1660, to the effect that they were prohibited at various seasons that are there set forth. The vessels used here in Holy Communion are the same that the villagers have held in reverence since the days of Queen Elizabeth.

In the same Border country, at Bywell, there are two churches about 150 yds. apart. One is dedicated to St. Andrew the other to St. Peter. They are familiarly distinguished as the black or white churches. A local historian quotes a popular impression that one of them was built in consequence of a quarrel for precedence between two sisters. The evidence of the masonry, however, completely sets aside this tradition, as it assures us of a long interval of time between the dates of the two erections. In the old moss-trooping days Bywell carried on a manufacture of stirrups, bits, curbs, and buckles, so much in request by riders and raiders, and it was usual for the inhabitants to drive their cattle into the long, wide street nightly and take it in turn to watch at both ends of it. In tribulations the churches were used as places of refuge, as when a great rising of the Linc. occurred in 1771. A valuable stud of horses would have been drowned but for the protection of the pews, and one mare, it is recorded, that belonged to the father-in-law of Thomas Bewick, the wood engraver, in its terror saved itself by mounting on to the Communion table.

Turning southwards now Evesham comes to mind. Here in the parochial churchyard in this pleasant district of sunny gardens and orchards are two churches in close companionship, besides a magnificent detached tower 110 ft. high. Both churches are believed to have been founded by the ecclesiastics of the neighbouring Abbey. One is dedicated to St. Lawrence the other to All Saints. They are both regarded with great admiration on account of the richness and beauty of their details, which include fan tracery in the roofs, and both have western towers with spires. Remembering the famous battle fought at Evesham in 1265 between Simon de Montfort, Earl of Leicester (often recognised as the founder of the House of Commons), and Prince Edward, better known to us as King Edward I., this superb group in its lavish expenditure and concentrated idealism seems in some way commensurate with the heroism displayed on that occasion and in keeping with its renown.

A few miles away still in the same centre of fruit growth, at Pershore, there are two more venerable churches only divided by a roadway. They are fine fabrics, full of antique grace, respectively known as St. Andrew's and Holy Cross, the last-mentioned dedication only applying to the nave, the rest having been dedicated to several saints in conjunction. At the Reformation, when the Abbey was suppressed, the

parishioners bought this edifice for 400l. The choir of four bays is full of architectural charm. It is 102 ft. in length and has a vaulted roof of great beauty. The central tower, the very core, as it were, of the old Abbey, looks over the adjacent country benignly as with a benediction.

Still further south, in Wiltshire, there is an instance of two churches near together at Alton Barns and Alton Priors; the former known as St. Mary's, the latter as All Saints'. They are about 300 yds. apart, and set in meadowland, through which run two small streams. Cambridgeshire, too, has an example at Swaffham. This village is spread into three parishes, and has three churches, two of which are in one churchyard on the top of a hill. One is dedicated to St. Mary, and is known as Priors or Little Swaffham, and the other as St. Cyric's; speaking of them both they are sometimes called Swaffham Two Churches. Being on an eminence they may be truly said to lend enchantment to the view. Regular Divine service is now only held in St. Cyric's.

This is but a brief glance across the kingdom. The proximity of St. Margaret's to Westminster Abbey is another instance, and doubtless the readers of these notes will be able to add others to those set down some, perhaps, that have been and are now no more, like St. Faith's below old St. Paul's, and may be glad to be led into reminiscences that are likely to be a source of much pleasure.

S. W.

DIARIES AND ALMANACS.

MESSRS. HUDSON & KEARNS (Stamford-street, S.E.) have issued their very useful blotting-pads for 1907, and we have pleasure in again calling attention to them. These blotting-pads are admirably arranged, neat in appearance, and convenient in form, and they wear so well that if it were not for the calendar and date remembrance portions there would be no need to renew them at the end of the year. Two excellent pads are No. 8a (price 7s.) and the "Bankers" (price 8s.), which show calendar, indexed book-diary, a tear-off space for daily engagements, etc., and a 10-in. rule, while No. 8a, though smaller than the "Bankers" pad, has space for standing memos and a tear-off writing space. These and other pads are very serviceable, and it would be difficult to suggest any improvement upon them.

The "City Diary" for 1907 (W. H. & L. Cullingridge, 148 and 149, Aldersgate-street, E.C.) is the forty-fourth annual issue of a compact and neat little diary, which is a handbook to the City proper as well. The prefatory information includes a list, with addresses, of the members of the Corporation; details of the various other governing authorities of the City; a list of the City churches, with the clergy and vestry clerks; summarised statements, giving the fees charged, concerning the City's schools; and other information. The diary itself has three days on a page, and is interleaved with blotting paper. The price is 1s.

The "Gloucester" Diary and Director's Calendar for 1907 is the twelfth year of issue of a useful little work published for the Gloucester Railway Carriage and Wagon Company, Ltd., by Mr. F. J. Brooke, of Gloucester. The diary includes a list of the stations and junctions attended by the company's wagon repairers.

Mr. W. Monk's "Calendarium Londonense" for 1907 is illustrated by an etching of the Hyde Park Screen as seen from the wide road space at the end of Piccadilly, with the crowded traffic duly represented, a motor carriage in the foreground, as characteristic of the present moment. The writing of the calendar, and the little decorative devices accompanying it, are exceedingly picturesque, and an advance on those of previous years. The calendar is published by Messrs. W. Monk and Elkin Mathews, Vigo-street.

THE FENCE, REGENT'S PARK.—In a "Note" in our issue of October 27, we commented upon the foolish proposal to substitute an iron railing for the appropriate oaken fence around the park. We observe that the ill-advised proceeding is being carried out, and that the new railing has already been erected along the subscribers' enclosure, by the lake, in front of Hanover Square and Clarence terraces, between Hanover

Architectural Societies.

NOTTINGHAM ARCHITECTURAL SOCIETY.—A meeting of the Society was held in their rooms on the evening of the 18th inst., when Mr. P. H. Ellis read a paper on "The History of Architectural Education." At the commencement reference was made to Vitruvius as the first ancient writer upon the subject of architecture, whose works have reached our time, and who is reputed to have been born in the year 80 B.C. The school of architecture founded by Crassus at Rome for the instruction of slaves was quoted as probably the first organised effort in this direction. With the object of providing skilled architects and workmen to meet the demands of his day, Constantine the Great later founded architectural schools in Europe and North West Africa, and is said to have offered premiums to those who would have their sons brought up as architects, and to skilled workmen who would bring up their sons in their own time. The Council is a link between the Roman Collegia and the art and trade guilds of the Middle Ages were next dealt with; "Leader Scott's" extravagant estimate of whose influence was quoted with considerable reserve. The earlier monastic or Cluniac school, whose architecture was destined to produce in the 11th century monuments freed from the last Roman traditions, and the Saracenic schools next received attention, followed by a concise history of the great guild system, which played so important a part during the Middle Ages, and the sphere of whose influence was traced by the author in gradually diminishing degree down even to Wren's day. The revived Classic movement in architectural history was traced from the close of the 14th century, when, after centuries of oblivion, the original Codex of Vitruvius was once more brought to light, the study of which, combined with the measurement and reproduction of the noble remains of Imperial Rome, united in forming the Renaissance school of early days. Elizabethan methods were also touched upon, at which period we get our first introduction to the inclusion of travel as a factor in architectural education. Time did not permit entering in any detail upon the modern aspect of the subject, and the paper concluded with an account of the foundation in the year 1768 of the Royal Academy, when Thomas Sandby, R.A. (a native of Nottingham, by the way), was appointed the first Professor of Architecture there.

GLASGOW INSTITUTE OF ARCHITECTS.—The usual quarterly meeting of the Glasgow Institute of Architects was held on the 19th inst., Mr. Monru, President, in the chair. The meeting approved of a report by the Council regarding a proposal to form a building fund for new premises for the Institute, and also of a letter of protest sent to the Corporation regarding the conditions of the Riddrie estate competition. It was reported that the Council had had under consideration the proposed Corporation by-laws, and also the proposed Bill on similar lines for England and Scotland. The Council saw nothing in the proposed Corporation by-laws to which special objection could be taken, but it was agreed to watch the proposed Bill, and to take steps to have a clause introduced providing that it should not apply to Scotland, as the circumstances in Scotland are different from those in England. The Secretary reported that all the applications for the Fellowship of the Royal Institute of British Architects which had been sent through this Institute had been passed by the Royal Institute, and that the time for similar applications had been extended for another year. It was pointed out that the course of training in the Glasgow School of Architecture covers the whole ground of the Royal Institute of British Architects' examinations, and it was agreed to ask the Royal Institute of British Architects to recognise the work of the school as follows: (1) That the diploma or senior certificate of the Glasgow School of Architecture should exempt the student from the Preliminary and Intermediate Examinations of the Royal Institute of British Architects; and (2) that the corresponding class work done in the Glasgow School of Architecture should be accepted as "testimonies of study" for the Final Examinations of the Royal Institute of British Architects.

METROPOLITAN WATER BOARD.

At the sitting of the Metropolitan Water Board on Thursday last week the Works and Stores Committee reported that on July 20 the Board accepted the tender of Messrs. O. Wright & Co. of 22,666l. 2s. 10d. for the construction of a pipe line between Child's Hill to Cranley Gardens, but the tenderers found they had made an error in their bill of quantities which would have the effect of increasing their tender by 2,000l. Afterwards they found other errors, and were unable to do the work for less than 26,500l. The Committee then approached Messrs. D. Bell & Co., the next lowest tenderers, but on checking the figures certain arithmetical errors were found. After careful consideration the Committee recommended that tenders from twelve selected firms of contractors be invited for the work. This was carried.

Quantity Surveyors.—It was resolved to add the name of Mr. C. W. Brooks to the list of quantity surveyors recommended for employment by the Board.

Gias House Bridge, Hoddeston.—On the advice of the Chief Engineer it was resolved to invite tenders for the reconstruction of this bridge.

WESTMINSTER CITY COUNCIL.

The usual fortnightly meeting of the Westminster City Council was held on Thursday last week.

Exclusion of the Public from Vincent-square.—Reporting on a resolution from the Westminster branch of the National Democratic League asking the Council to search the local records to ascertain by what authority the public were precluded from having access to Vincent-square, the General Purposes Committee recommended that the League be informed that the Public School Act, 1868, enacted that the governing body of Westminster School should keep the square open as an open space for the recreation of the boys belonging to the school. This was agreed to.

Rebuilding of Westminster County Court.—The Committee reported that a further letter had been received from the Office of Works in reference to this matter, stating that they could only repeat that they were satisfied a new building could be erected on the existing site which would be adequate to meet all the requirements of the district. They therefore regretted they could not recommend the Government to enter into the proposal to acquire additional land in order to provide a building in excess of what they considered to be the necessities of the case.

Piccadilly Improvement.—The Improvements Committee presented a report *re* an offer they had made to the London County Council to bear the expense of the paving and other works connected with setting back the railing in Piccadilly at the Geological Museum, provided the necessary arrangements could be made with the Office of Works. They stated they had received a letter from the London County Council in which they said that the First Commissioner of Works had arranged for the setting back of the railing subject to certain conditions.—It was agreed to accept the conditions and to complete the work at the earliest possible date.

Amending the Drainage Law.—The Works Committee reported the receipt of a letter from the London County Council with reference to representations made to them by the Poplar Borough Council and other borough councils, suggesting that a clause should be inserted in the next London County Council General Powers Bill to amend the law relating to combined drainage, so as to throw upon owners of premises the cost of maintaining all combined drainage systems. They had also received a letter from the Fulham Borough Council referring to the Conference of Borough Councils held on the subject, and the joint memorial presented to the Local Government Board urging the necessity of amending legislation being introduced at an early date to deal with the question. They also sent copy of a letter from the Local Government Board stating that they were not at present in a position to promise to introduce legislation.—In view of the attitude taken up by the Local Government Board the Committee thought that no good purpose would be served by adopting the suggestion of the Fulham Council, and therefore they made no recommendation on the subject.

INTERNATIONAL SOCIETY OF SCULPTORS, PAINTERS AND GRAVERS.—At the Council Meeting of the International Society of Sculptors, Painters and Gravers, held on December 18 Mr. Francis Howard was elected honorary secretary, in succession to Mr. T. Stirling Lee.

DECORATIVE TRADES' EXHIBITION, GLASGOW.—An exhibition, organised by the Glasgow Master Painters' Association, under the auspices of the National Association of Master Painters, in connexion with the annual conference of the trade, which takes place in the city early in January, will be opened shortly in the Fine Art Institute, Glasgow.

Fifty Years Ago.

FROM THE *Builder* OF DECEMBER 27, 1856.

"FROZEN OUT"—A SANITARY HINT.

The writer of this has taken an opportunity of lately visiting some localities where the houses, new and smart outside, show condition internally to cause alarm. In some instances working men occupied three rooms, probably a couple of kitchens and place above. In summer-time the numerous little children are separated and spread about; when cold weather comes the mother fears that they will catch cold, and the beds of the whole are huddled into one room, the door of which, and also the window, is bound with leather or list, and in some instances the chimney is probably stopped up, and no means are allowed for the admission of the necessary element of health, life, and strength. There are generally other families in the same house, who adopt similar precautions against "Jack Frost" and the north-east winds, and then think cosily "that their doors are all closed and their windows all barred," and that the pinching enemy has been set at defiance, forgetting or not thinking that they are raising in the garrison a more dangerous enemy than without the walls, which might readily and would be, in some cases, certain to strike down old and young. We mention this feeling from personal observation that great necessity exists for doing so, and earnestly urge on our readers the necessity of cautious and common sense arrangements, and to impress upon landlords the need there is for having all staircases, and as far as practicable the rooms of such houses as above referred to,

vigorously ventilated. To return, however, after this long digression to the "freezing out," no one will for a moment doubt that in addition to the shutting out of the air and overcrowding, that the stopping of the water supply cannot fail to add to the evil: the washing-day is put off, and linen, etc., stored dirty in close closets, etc., and it becomes a matter of difficulty to get the children, floors, etc., attended to as usual. In ordinary health this is bad, but when sickness and death are in a house the need of these remarks is more evident, and their truth will be recognised by many a district surveyor and London missionary.

***We fear that the hygienic warning given in our columns fifty years ago is as much needed now. Even among the better educated classes in this country the aversion to opening windows more than can be helped is very noticeable, and we have heard it remarked on by visitors from Australia, where people seem not to be so afraid of open air. Among the lower classes one often finds evidence that windows are never opened at all, from one year's end to another.

Illustrations.

THE WALDORF HOTEL, ALDWYCH.



THE Waldorf Hotel and Restaurant forms part of the London County Council improvement scheme, and is situated in a prominent site in Aldwych between the two new theatres, Waldorf and Aldwych.

It is designed in a bold manner to be in keeping with the strong lines of the Gaiety

Theatre, with which it will often be seen in conjunction. The lower story is of white Aberdeenshire granite, and otherwise the building is of Portland stone, with Westmoreland slates and copper on the roof.

The Louis XVI. style has been adopted both externally and internally. The building is of fireproof construction. The floors are of reinforced concrete, and steel is largely used. The plan of the bedroom floors has been modelled on the latest American hotels, having numerous bathrooms *en suite* with bedrooms, so that visitors may, if they desire it, have the convenience of a private bathroom. The work is being rapidly pushed on with a view of opening next autumn.

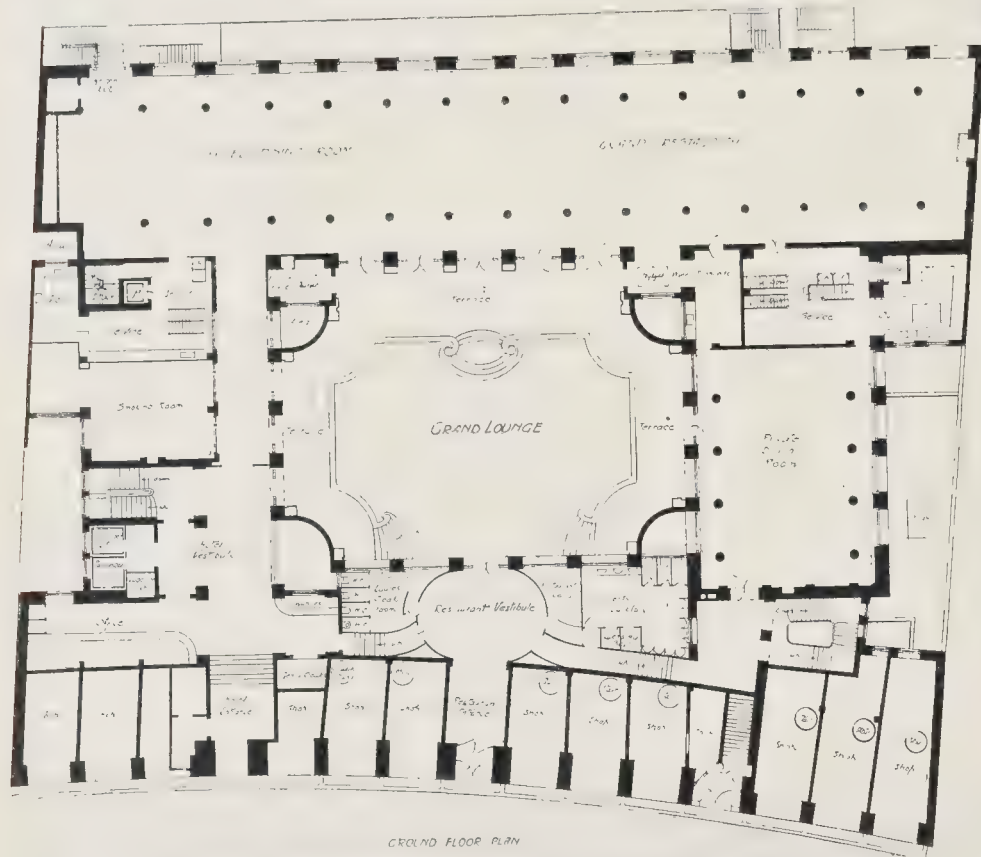
Messrs. the Waring White Building Company are the builders, Messrs. Waring & Gillow the decorators. Mr. Emil Fuchs is responsible for the sculptured frieze.

Messrs. A. Marshall Mackenzie & Son are the architects.

THE BREWERS' HALL: MEASURED DRAWINGS.

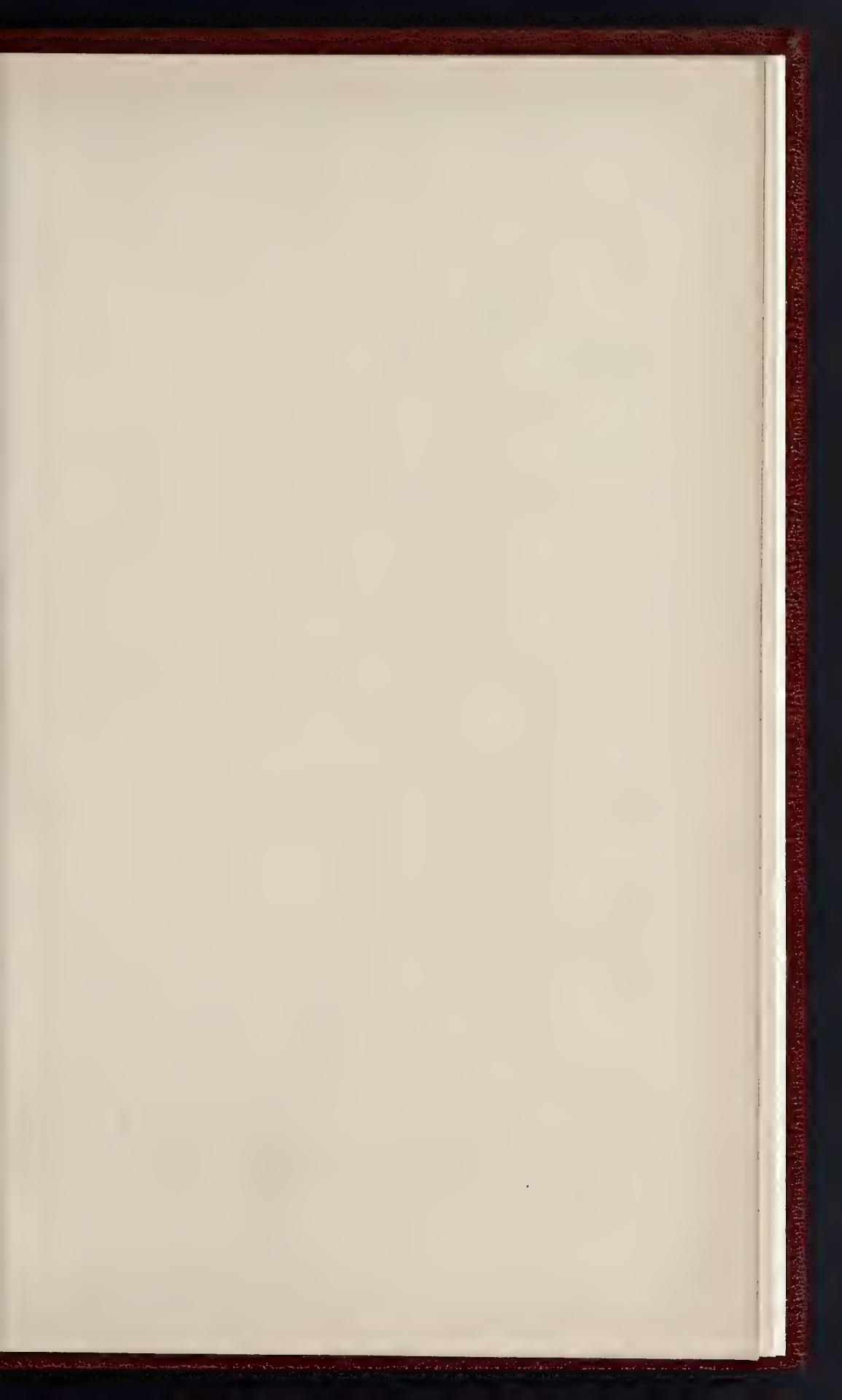
THE drawings here reproduced gained for their author, Mr. Sidney W. Davis, the Royal Academy silver medal for a set of architectural drawings. The original drawings, finished in pencil, are a particularly good set, combining effect, care and accuracy.

The decorative details are not of a very pure type, but the design of the side of the room illustrated in "Section looking South," shows a very well-proportioned arrangement of mullioned windows and panels, and the carver has known how to give the wreaths above each window a graceful line and fall.



GROUND FLOOR PLAN

Waldorf Hotel. Plan.

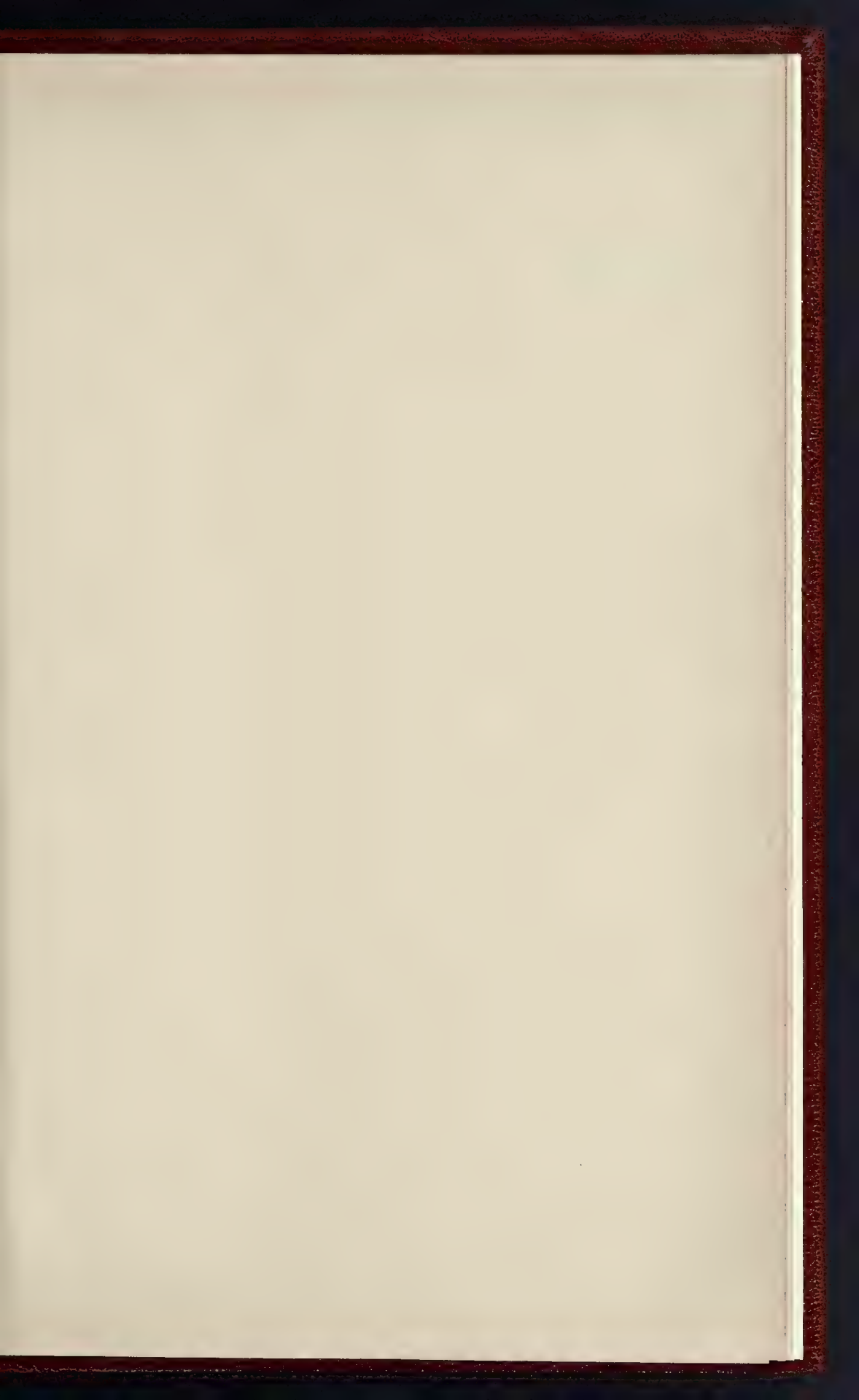


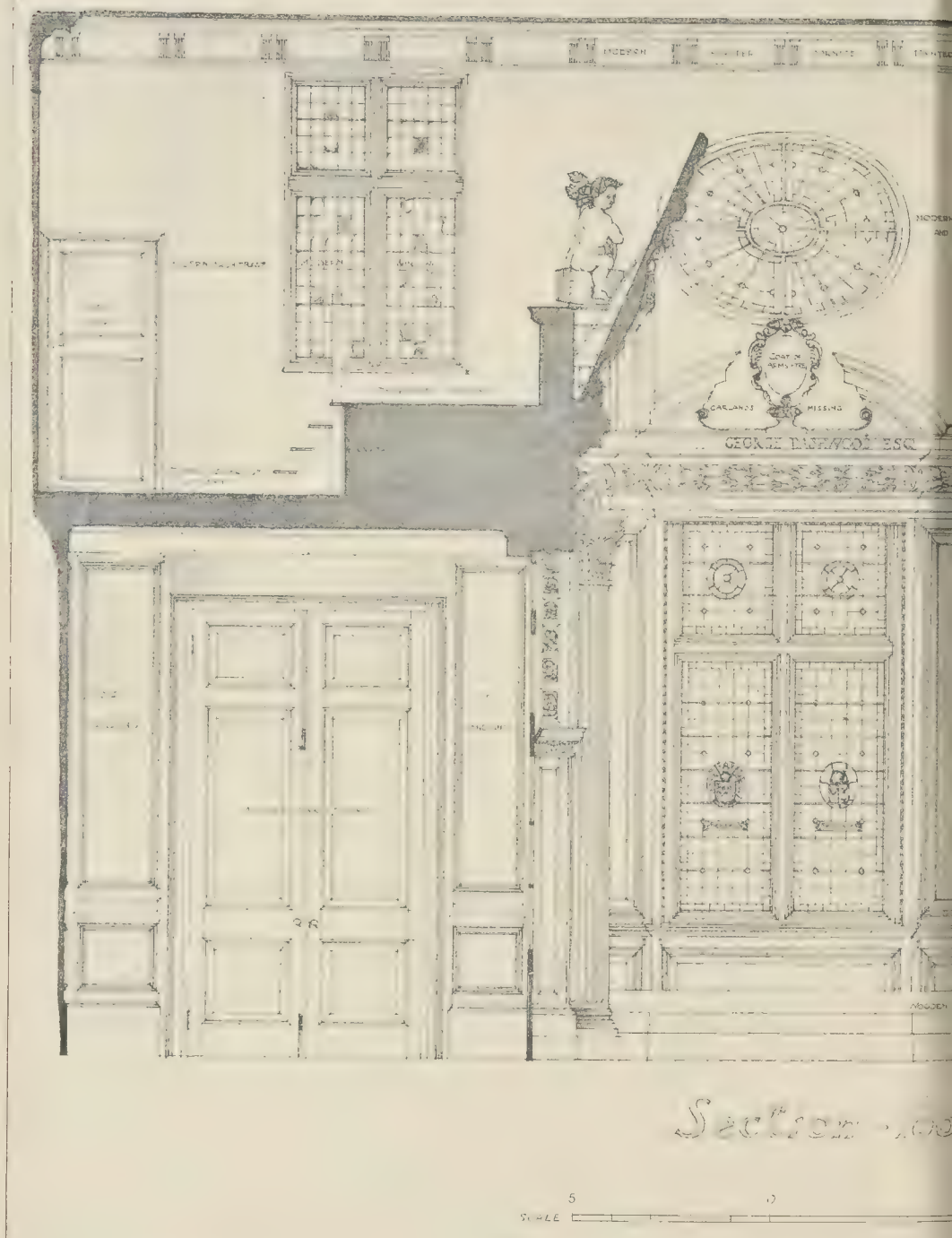


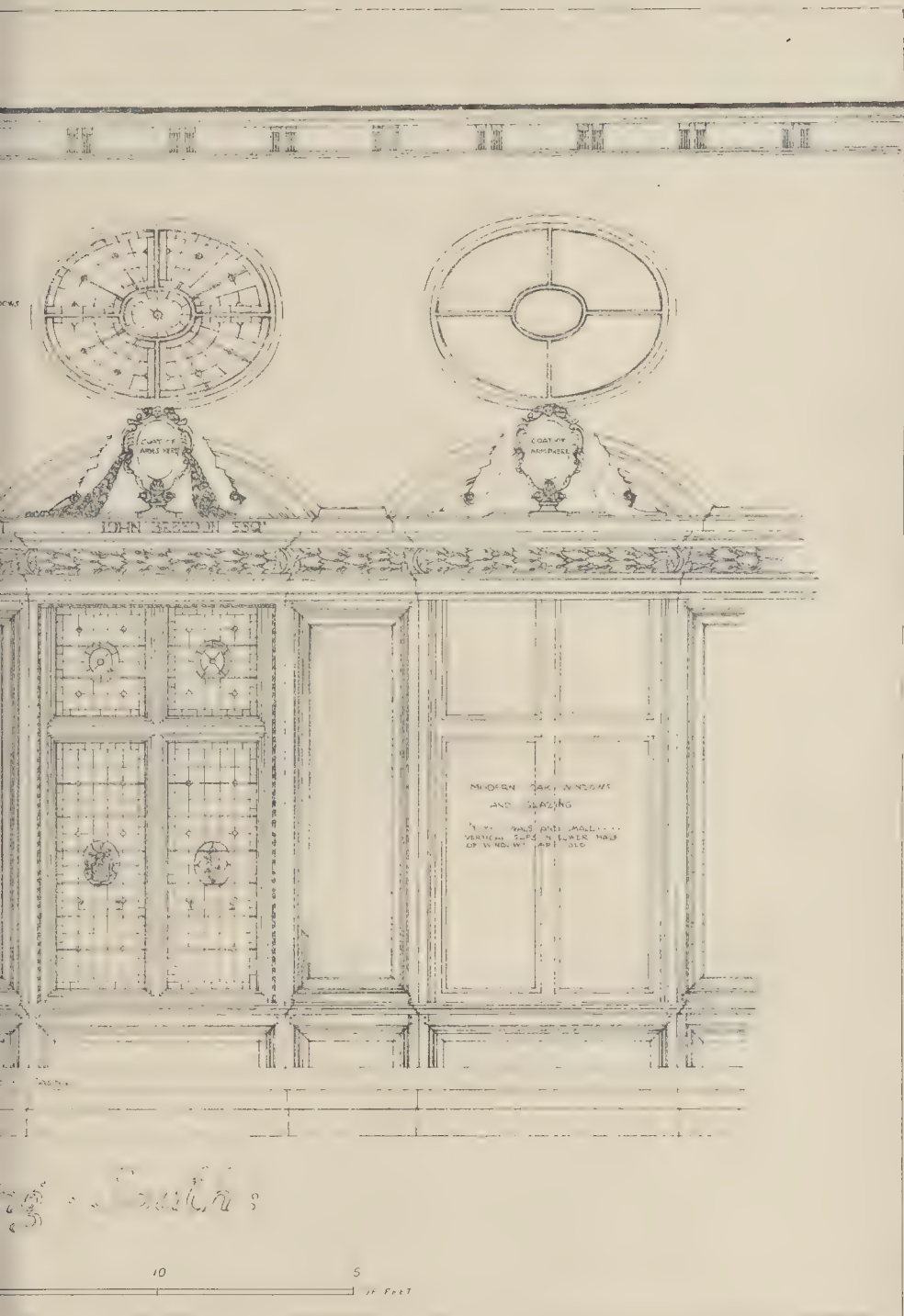
THE WALDORF HOTEL, ALDWYCH.—MESSRS. A

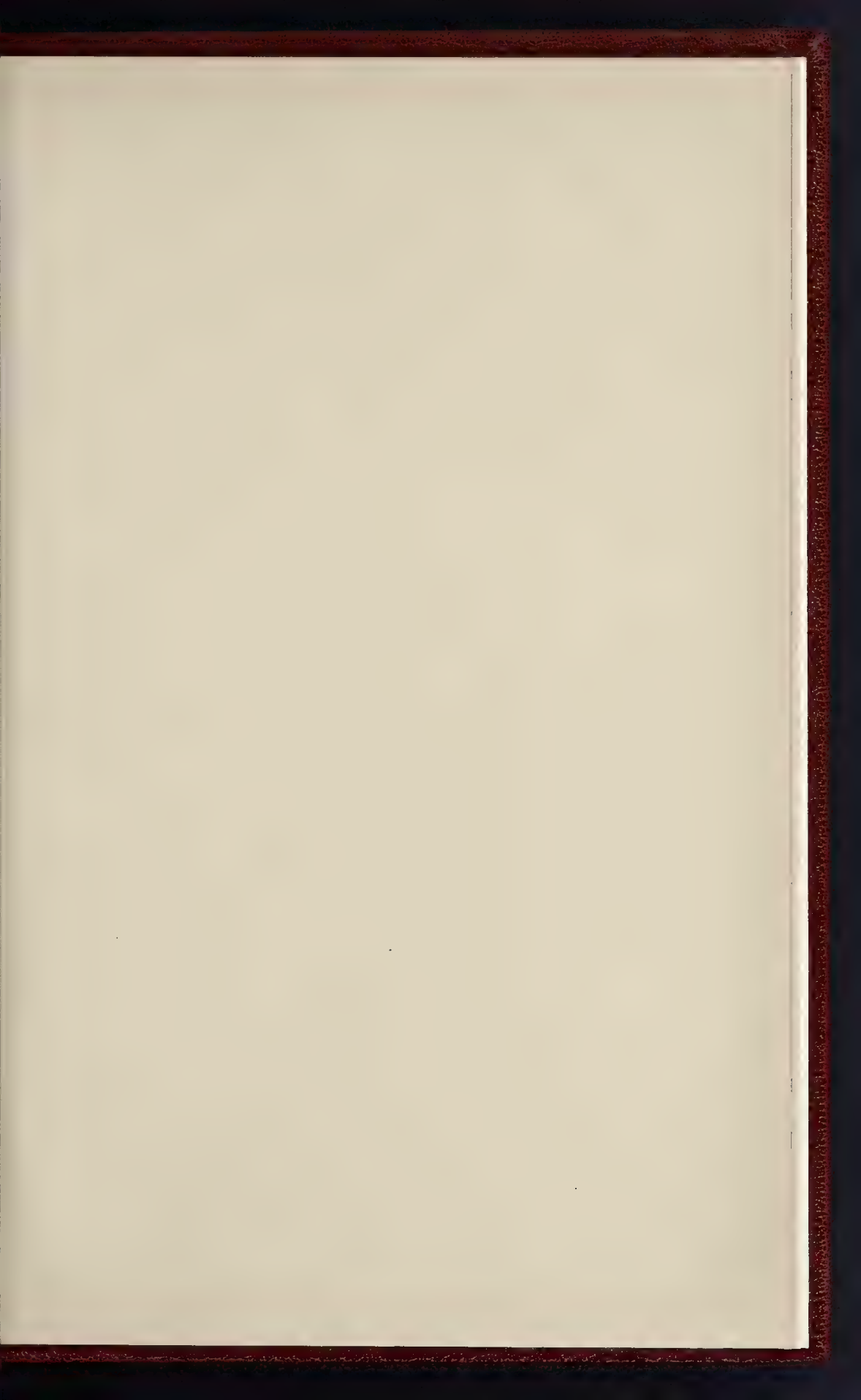


INK PHOTO 31/10/10 F.C. L. 1 4 A.D. EAST HATHIC STREET FIFTH LANE E.C.

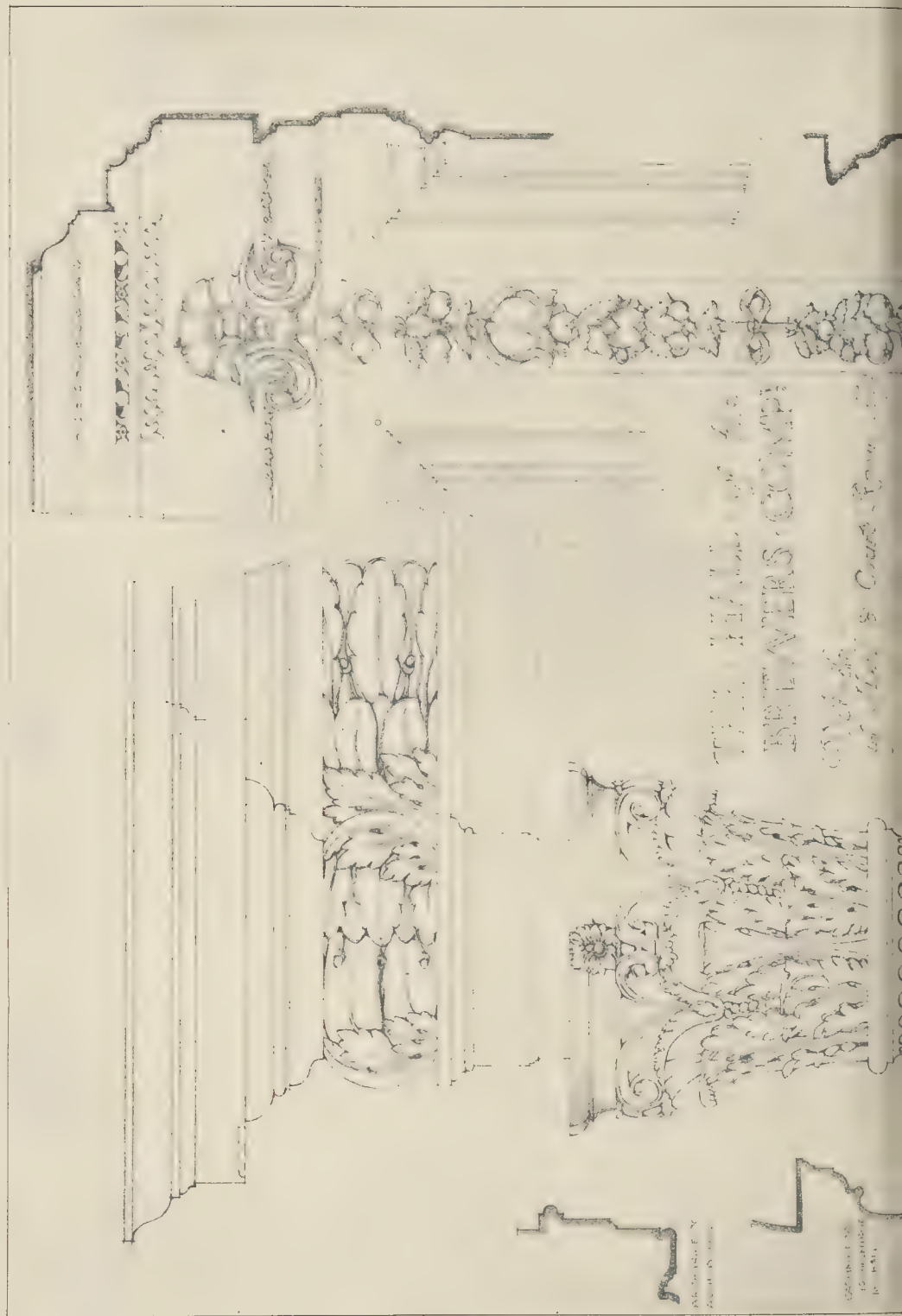








THE BUILDER, DECEMBER 29, 1906



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$\frac{d}{dt} \left(\frac{\partial L}{\partial \dot{x}} \right) = \frac{\partial L}{\partial x}$

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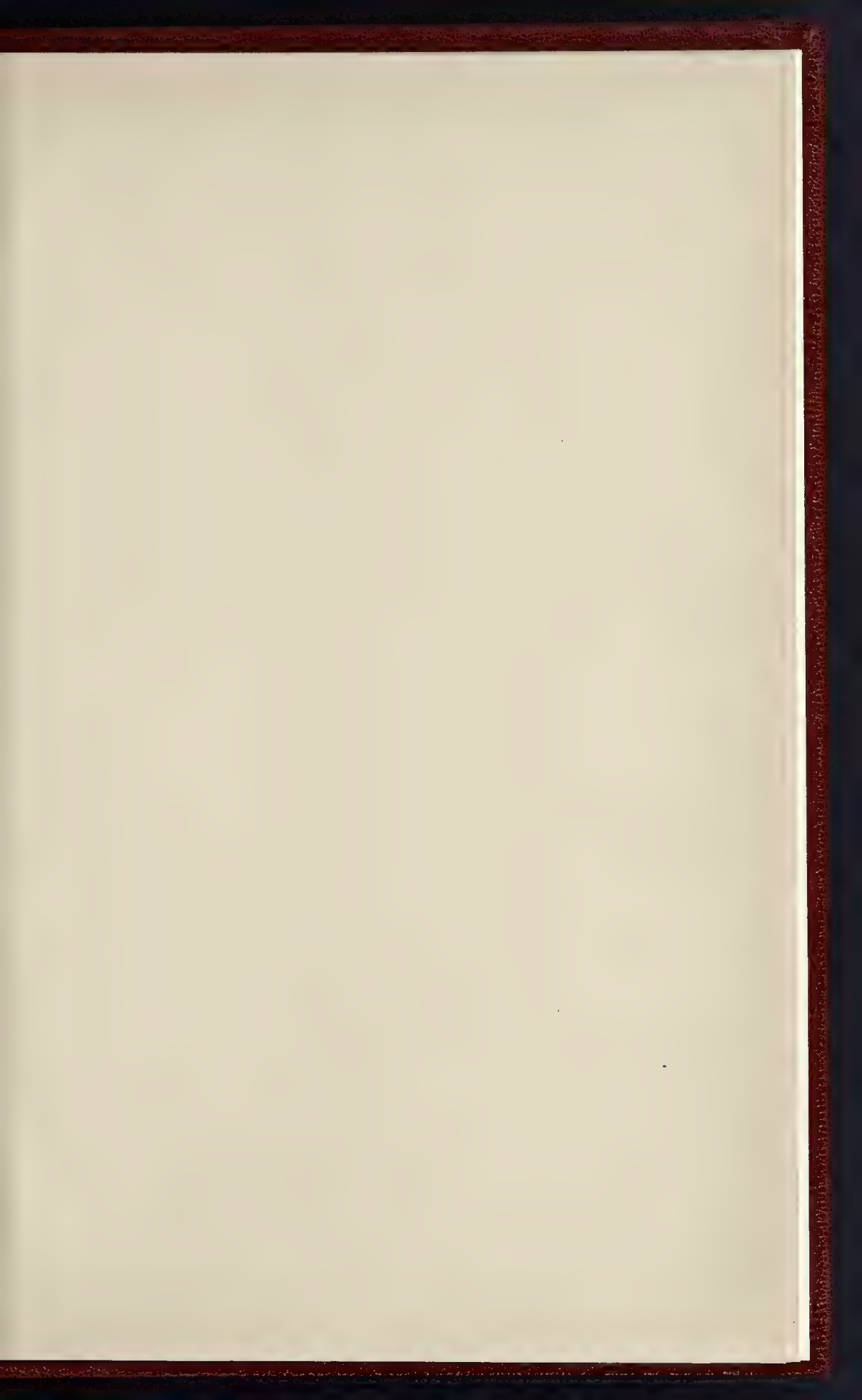
1871/1872

THE UNIVERSITY OF CHICAGO

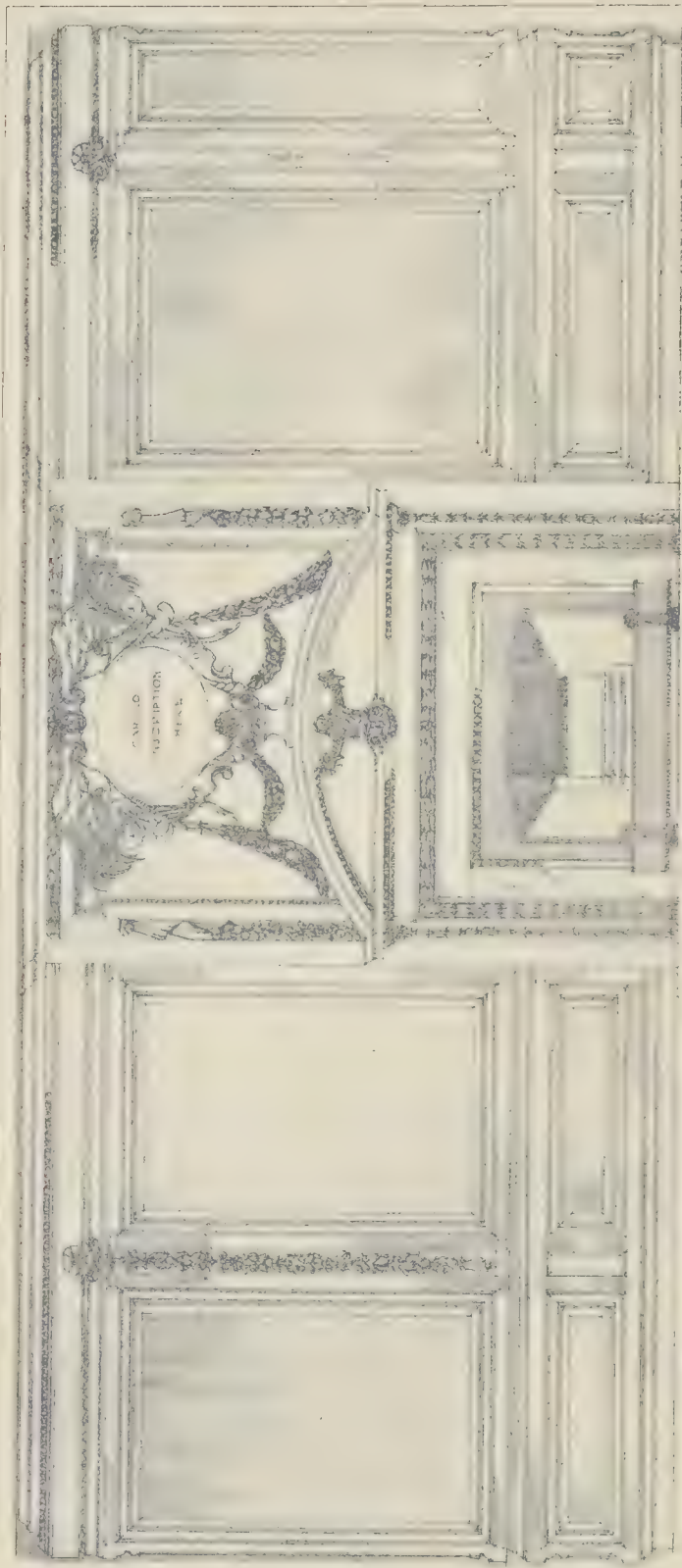
Cincinnati, Ohio
 20. January. 1882. Friend.

THE HALL OF THE BREWERS' COMPANY—MEASURED AND DRAWN BY MR. SIDNEY W. DAVIS

Royal Academy Silver Medal, 1906

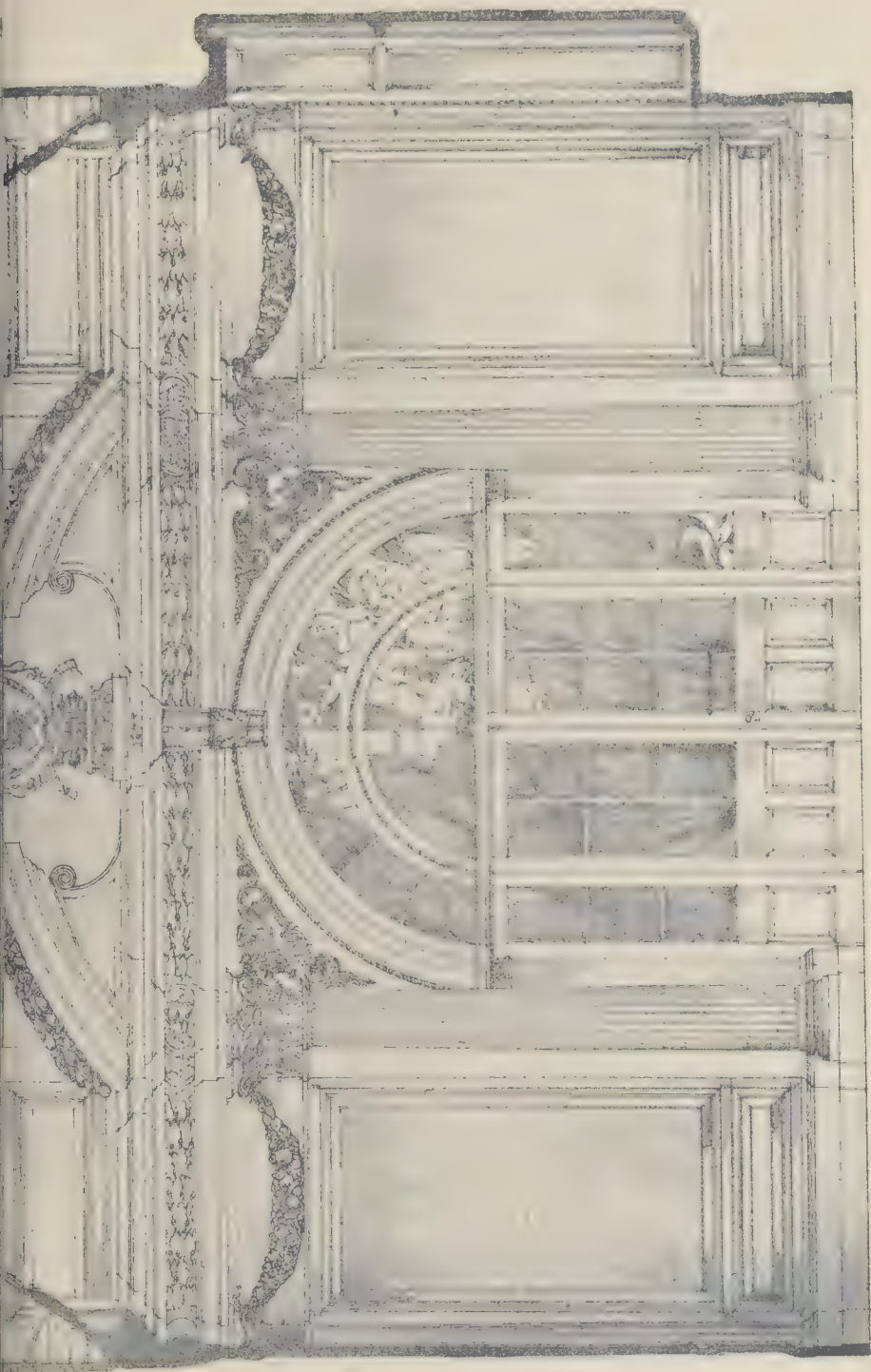


THE BUILDER, DECEMBER 29, 1906.



ELEVATION LOOKING SOUTH.





SECTION LOOKING EAST.

0 10 FEET

Architectural Drawing of the Hall of the Brewers' Company, showing a section looking east.

THE HALL OF THE BREWERS' COMPANY—MEASURED AND DRAWN BY MR. SIDNEY W. DAVIS.

Royal Academy Silver Medal, 1906.

Competitions.

BANGOR COLLEGE BUILDINGS.—In our last issue we briefly mentioned the result of this competition. The following is the award of Mr. Aston Webb, R.A., in respect of the designs sent in for the new College buildings at the University College of North Wales, Bangor:—"I have now carefully examined four sets of designs, with the reports of our authors, that have been sent in for the proposed new buildings, and I am of opinion that all of them have sufficiently complied with the conditions of competition to entitle them to the premiums offered. I have also made a careful examination of the site and its surroundings, and I am of opinion that the design that best meets the requirements and the conditions laid down for the competition is that marked No. 2, and I therefore place it as design first, and consider that the author entitled to the premium of 250*l*. Judging on this design, I feel confident the author could provide a satisfactory building, and, in respect to his being prepared to meet the conditions in making any variations in the plan and arrangements that they may think desirable after consultation with him, and to his being able to justify his estimate, I should strongly recommend the Council to appoint the author of the design marked No. 2 as the architect for the new buildings." The Council met and appointed as their architect the author of the successful design. This proved to be Mr. Henry T. Hare, London.

BIRMINGHAM COUNCIL HOUSE EXTENSION.—The design of Messrs. Ashley & Ewan has been accepted for the extension of the Council House. The plans will be on view at the Council House until January 10.

Books.

Building Cases, being a Digest of Reported Decisions Affecting Architects, Surveyors, Builders, and Building Owners. By F. ST. JOHN MORROW, LL.D. (Dub.), Barrister-at-Law. (London: Butterworth & Co. 1906.)

THE developments of modern life, the extension of municipal management, and, we fear, must add, the complexity of modern legislation have much increased the difficulties experienced by architects, surveyors, and builders in the practice of their professions and occupations, and a knowledge of any branches of the law has now to be added to their other qualifications. Text-books dealing with the legal aspect of building questions have become a necessity, and reports are no longer only to be found in the library of the lawyer. One of the latest additions to the legal literature for the builder is a digest of building cases by Mr. St. John Morrow, which the author hopes may also be of service to those engaged in civil government and to lawyers. In this work the author has set himself the difficult task of collecting the cases affecting architects, surveyors, builders, and building owners and arranging them under alphabetical headings in the form of a digest. One of the drawbacks to a digest has been overcome by the addition of a very comprehensive index, which enables the reader to obtain a connected view of the subjects dealt with in the decided cases, and in the appendix to the work will be found a form of agreement and schedule of conditions for building contracts printed by permission of the Royal Institute of British Architects; a professional practice as to the charges of architects, approved by the above Society; and Rydes' scales of surveyors' fees.

The cases collected in this digest the author has derived from all sources, not confining himself to the law reports, and they are printed in good type, and are easy reference. In an alphabetical arrangement few people would agree exactly to other in adopting a system, and some persons abhor cross-references; therefore it may be a hypercriticism to point out that these are headings, "Air," "Ancient, and Her Lights," and "Light and Air," an arrangement that might lead a person consulting the work to overlook some of the cases in the absence of a cross reference. It must, of course, be borne in mind that the cases have been collected with a special reference to building matters, and not with

the view of supplying the leading case on points of law generally. As an example of this the heading "Negligence" may be referred to; under "*Volenti non fit injuria*" will be found a case decided in 1885 by a judge of first instance, but the leading case on this maxim is now *Smith v. Baker*, decided by the House of Lords in 1891.

The author states that he has included in the cases which he has collected in this volume some decisions which have been overruled by subsequent judgments in the High Court, "because, although they can no longer be relied upon in courts of justice, they frequently furnish valuable assistance to those whose duty it is to advise parties as to their legal position." We confess we cannot follow the author in the above reasoning, and in our opinion it is a matter of regret that he has included any cases no longer law in this digest, especially as, so far as we can see, an indication has not in every instance been given as to which are the cases to be received with caution, and therefore the reader is left in some uncertainty as to whether he can rely on a case or not, and the value of the work is thereby lessened.

Laymen who consult a book in the form of a digest must bear in mind the distinction which exists between a digest and a text-book. In the former the "headnote" is the only form that can be adopted, and the statement of law contained in the headnote must be read strictly in connexion with the facts there set out. Text-book writers generalise the law as laid down in the decided cases, and endeavour to deduce general principles so as to enable the reader to determine which principle will apply to the facts of his case. A digest of cases is often useful as an accessory to the text-books, especially to those who have not any series of reports in their library, and the present volume has no doubt been published to meet this requirement.

Emden's Building Contracts, Building Leases, and Building Statutes. Fourth edition. By JOSEPH BRIDGES MATTHEWS and W. VALENTINE BALL, Barristers-at-Law. With a Glossary of Architectural and Building Terms, Revised and Extended by MAURICE B. ADAMS, F.R.I.B.A. (London: Butterworth & Co. 1907.)

RATHER more than ten years have elapsed since the appearance of the third edition of this volume, that edition being the work of His Honour Judge Emden and Mr. Henry Johnston. The present volume consists of over 700 pages, exclusive of an extensive index of nearly 100 pages, which greatly adds to the usefulness of the work, and tables of cases and statutes. The table of cases has been rearranged on an excellent model, with references to all the recognised law reports, and where the cases are reported in more than one report all the references are given, which is a system we should wish to see generally adopted, as practitioners have often only one set of reports, and a reference to one particular series much limits the usefulness of a text-book. Besides cases reported in the legal reports some others are referred to which are only to be found in the *Times* and the *Builder* and other journals. New forms have been added, some of these being obtained from the new work "The Encyclopedia of Forms" by permission of the publishers. We have given prominence in the first instance to the above features because in a book of this size and character the ease of reference is of the first importance. The work appears to have been brought well up to date; we find the very recent cases cited. The text is clear, and the various propositions are laid down concisely, references being given to the cases which are set out at the foot of each page. The glossary of architectural and building terms, which was omitted from the last edition, reappears, having been enlarged and revised. Certain matters incidental to the main subject, such as the liabilities involved in certain covenants in leases by landlords and tenants in regard to rates, taxes, and statutory impositions, and the liabilities imposed by certain sections of the Public Health Acts and by by-laws made under those Acts, have received special attention. The work may almost be described as an encyclopædia of the law relating to building, and should be valuable to both lawyers and laymen.

The Temple of Deir el Bahari. By EDUCARD NAVILLE. Part V. (London: Offices of the Egypt Exploration Fund.)

THE fifth part of Mr. Naville's series of publications on the temple of Deir el Bahari is almost entirely occupied with illustrations and comments on the wall-paintings, which belong more to Egyptian history generally than to architecture. One plate is devoted to plans and sections of the Upper Court and Sanctuary, the portion of the Temple the wall paintings of which are illustrated in the remaining plates. A short description of this plate is furnished by Mr. C. R. Feers.

The large court had originally a double colonnade round it, of which only the bases of some of the columns remain. On the west side of the court is an entrance giving access to three narrow rock-cut chambers opening one out of another. Before this door-way is a porch projecting rather oddly into the middle of the courtyard; it is the same width as the intercolumniations of the colonnade, two of the columns of which have been more or less preserved by being encased between the walls of the porch, which are not as high as the columns, but have kept them standing, so that the general character of the colonnade can be inferred from these two examples. The colonnade and the surrounding walls of the court are of the XVIIIth dynasty; the porch is a Ptolemaic addition, rather awkwardly built in, apparently to give greater importance to the entrance to the three apartments beyond, the first and largest of which is of the same width as the porch and the intercolumniation. In the west wall, arranged symmetrically on each side of this porch, are nine niches, eighteen in all, of which four are deeper than the others, the deep and shallow ones alternating.

The first chamber has a barrel vault in horizontal courses, protected from stones falling from the cliff above by a pointed roof of flat stones inclined against each other at an angle of about 45 deg., the whole having a rough resemblance to the section of a vaulted cathedral with its sloping timber roof above. The second chamber has a flat ceiling and two little transept rooms north and south. The third chamber is a Ptolemaic addition, so that there was evidently an intention in the Ptolemaic period to emphasise the importance of this portion of the temple.

To the south of the main court, and entered from a small court preceding it, is a long narrow hall running east and west, which retains at the west end a portion of its original barrel vault, of the same construction as that of the first chamber in the centre.

It seems odd that, with all these data to go upon, no attempt should have been made at an architectural restoration of this portion of the temple; an attempt, which would certainly not have been omitted in any French publication of the same kind.

BOOKS RECEIVED.

LONDON BUILDING ACTS (AMENDMENT) ACT, 1905. By Bernard C. Molloy, Barrister-at-Law. (The *Estates Gazette* Office. 5s.)

MODERN BUILDINGS: THEIR PLANNING AND CONSTRUCTION. Edited by G. A. T. Middleton, A.R.I.B.A. Vol. V. (The Caxton Publishing Company.)

Correspondence.

BOROUGH COUNCILS AND BY-LAWS.

SIR,—Can any of your readers inform me (1) whether there are any small borough councils or urban district councils in England which have not adopted building by-laws; (2) if any council or councils which formerly had building by-laws have rescinded them entirely with the sanction of the Local Government Board, or having rescinded them, been allowed to adopt less stringent and more applicable by-laws? Will any of your readers give the names of any councils to which the above queries refer?

I am seeking this information for a small borough town with a population of 3,000 which has adopted the Model By-laws of the Local Government Board applicable to urban districts, and the council of which are now anxious to alter, amend, or repeal them, because the present by-laws tend to stultify all building operations since adopted some ten years ago.

SURVEYOR.

ZODIACS IN VARIOUS CHURCHES.

SIR.—The following instances of zodiacs in churches are all that I know of besides those already mentioned—

1. Painted in the Santa Catalina Sanctuary, or Pantheon, opening out of the Colegiata of San Isidore in Leon; about XIIIth century. (Lomax: "Sketches in Spain," 1888, p. 400.)

2. It has been said that there is a zodiac, sculptured in stone, outside S. Stephen's Cathedral, Vienna.

3. In a stained glass window, with the occupations of each month, in Mons Cathedral. (*Archæologia Cantiana*, iv.)

4. Worked in colours, in circles, along the centre of a long carpet, covering the middle of the sacristy, leading to the high altar, in the new church in Catherinje-street, Utrecht.

5. In another church in Catherinje-street, Utrecht, on a square carpet, are Aquarius, Leo, etc.

6. Carved in two rows of circles, on the front of an ancient Icelandic armchair, of cornel wood, from Holm Cathedral (probably the episcopal throne). The signs names are in Runes and also in Latin. Now in Kongelige Museum, Copenhagen. (Stephens: "Runic Hall," Engraved in Worsae: "Abbildunger fra det Kongelige Museum.")

7. On the head of a tau-shaped episcopal staff of walrus ivory: XIIIth century. In V. A. M., No. 218. A coat of it, in ivorie ivory, 1865, is in the V. A. M., No. 112. It is engraved in Du Chailly: "The Viking Age," 1889, II., 254. A photograph of it is in the V. A. M. collection, No. 3790.

8. It is stated that there is a zodiac in Kilpeck Church, on a doorway arch, Herefordshire. Engraved in *Country Life*, 1906. Ante 1124.

9. Dean Stanley seems to say there are signs on stones, in the pavement, outside Edward the Confessor's tomb, Westminster Abbey.

10. Also round the tomb of Henry III. ("Memorials of Westminster Abbey," 1904, p. 222.) D. J.

The Student's Column.

ROOFS: STRUCTURALLY CONSIDERED.—XXIII.

21. The Complete Design of a Timber Truss (concluded).

THE last tie-beam and bracing joint is L_3 where either of the braces $P_2 L_2$ may have to carry the stress of 12,700, while the other is entirely free from stress according as the wind blows from the right hand or the left hand.

This joint can be made in several ways, some of which are described below.

Fig. 172 illustrates a simple method of connexion where the two braces are let into the tie-beam and held in place laterally by timber fish-plates secured by bolts and nuts.

A simple calculation shows that sufficient bearing surface can be secured to guard the toe of either brace and the fibres of the tie-beam against undue compression. The fish-plates may be of wood or steel as preferred, and having nothing to do beyond preventing accidental displacement of the braces need not be more than, say 1½ in. thick for timber or ½ in. thick for steel, and can be held in place by ¾ in. bolts and nuts with washers of the customary diameter.

As by Table XXXVIII., the stress in the 1½ in. king-tie is 16,100 lb., the bearing plate beneath the tie-beam must have sufficient area to limit compression against the grain to 350 lb. per square inch.

Hence we require $16,100 \div 350 = 46$ sq. in. The width of the tie-beam being 6 in., the length of the plate must be $46 \div 6 = 7.6$, say 8 in. By calculation as in Articles XVIII. and XIX. it will be found that the plate should be ¾ in. thick.

Fig. 173 represents a better form of joint where a timber block is let into the tie-beam to the depth of 1 in. and held in place laterally by steel plates and ½ in. diameter bolts and nuts, while the braces are kept in place by dowels. The braces here get a square bearing against the angle block, and another advantage is that the tie-bolt passes clear of them through the central block. As before, the king-tie requires a 6 in. by 8 in. bearing plate below the tie-beam.

Fig. 174 illustrates a cast-iron angle block let into the tie-beam, and providing a bearing surface perpendicular to the axis of each brace. The block can be kept in position laterally by the king-tie, or by outside ribs, or by a central block let into the tie-beam. As before, the king-tie requires a 6 in. by 8 in. plate below the tie-beam.

(o.) Connexion of Purlins.—No special

treatment is necessary for attachment of the purlins except that in cases where the principal rafters are jointed as illustrated in Figs. 168 and 169, the ridge-plate must be replaced by two purlins, one at each side of the vertical centre line of the truss, and as two members are so employed they may be made thinner than those over joints P_1 and P_2 .

(p.) Wall Plate.—The only detail remaining for consideration is the wall plate or bearing beneath the joint L_3 .

As shown in Fig. 154, the vertical load is 25,500 lb., and to provide adequate resistance to compression against the grain of the timber the wall bearing or that portion of the wall plate beneath the tie-beam should have the area of $25,500 \div 350 = 67$ square inches.

The tie-beam being 6 in. wide, the width of the wall bearing ought to be

$$67 \div 6 = 11.16 \text{ in.}$$

By Fig. 154 the horizontal component of the vertical load is 5,700 lb., and we must see that the wall plate or bearing will be capable of resisting the tendency to lateral displacement due to this force.

Assuming the wall to be of brick, the bearing will probably be secure without any special provision for preventing horizontal movement, because friction between the timber and the brickwork is very considerable.

Referring to Table XLVI., we find the coefficient of friction for timber on stone to be $f = 0.40$.

Then by rule (32) the total friction between the two materials will be

$$F = Pf.$$

In the present case we have $P = 23,500$ lb. Whence

$$F = 23,500 \times 0.4 = 9,400 \text{ lb.}$$

which is about two and a half times the force to be withstood.

For a similar reason it is not absolutely necessary to notch or cog the tie-beam upon the wall plate as represented in Figs. 150 and 151, p. 402, but for additional security it is better that this should be done.

(q.) Quantities for the Complete Truss.—Having now settled all details of the truss, we can next compute the exact weight, which in Article XVI., p. 514, was provisionally estimated at 3,240 lb.

Commencing with the timber members of the truss and taking them in the order adopted in preceding articles, we find the dimensions of the principal rafters were settled in par. (e), p. 574, at 6 in. by 8 in.

As indicated by Figs. 145 to 149, p. 435, the actual length of the principal rafters is not governed entirely by the span of the roof. In the present case, however, we will base the length on the span and pitch of the roof.

Then the length of each principal rafter is

$$\frac{1}{2} (90 \div \cos. 33^\circ 40') = 36 \text{ ft.}$$

Adopting the cubic foot as the unit of measurement, we have

$$2 (6 \times 8) \times 36 = 24 \text{ cu. ft.}$$

For the purpose of this and the following calculations, the weight of the timber will be taken at 47 lb. per cubic foot, giving for the weight of the two principal rafters

$$24 \times 47 = 1,128 \text{ lb.}$$

By par. (j), p. 575, we have two struts $P_1 L_3$ measuring 4 in. by 6 in., the approximate length being 12 ft.

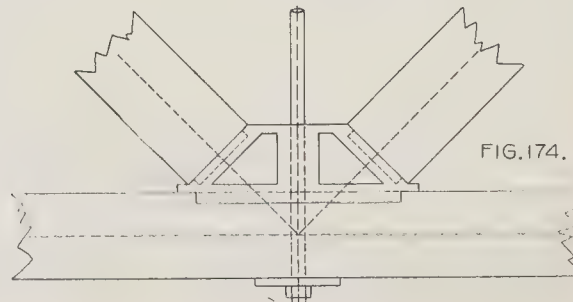
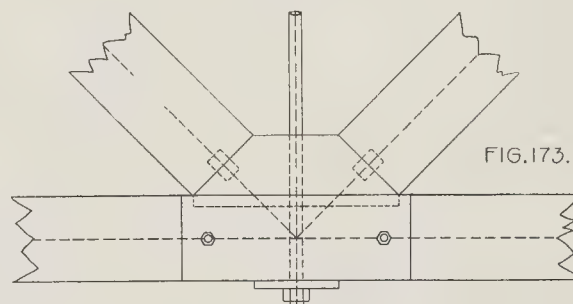
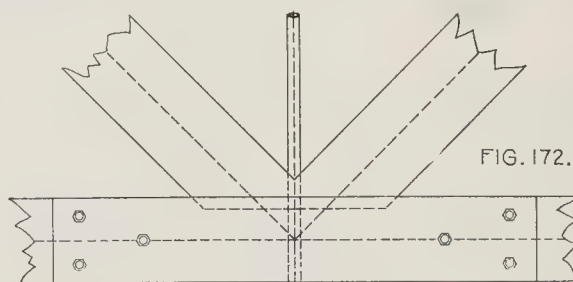
These dimensions give

$$2 (4 \times 6) \times 12 = 4 \text{ cu. ft.}$$

and

$$4 \times 47 = 188 \text{ lb.}$$

By the same paragraph the dimension of



the two struts, $P_2 L_3$ were settled at 4 in. by 8 in., but in *par. (m)*, p. 751, we found that to provide adequately for joint P_2 it would be necessary to increase the dimensions to 5 in. by 8 in., or 6 in. by 7 in., unless a bearing-plate or a cast-iron saddle were applied to the principal rafter.

In the present calculations we retain the original dimensions of 4 in. by 8 in., and adopt the cast-iron saddle for joint P_2 .

Then the volume of the two struts, with the approximate length of 14 ft. each, will be $\frac{2(4 \times 8)}{144} \times 14 = 6.22$, say 6.25 cub. ft.

and the weight will be $0.25 \times 47 = 293.75$, say 294 lb.

By *par. (g)*, p. 575, the dimensions of the tie-beam are 6 in. by 8 in., and allowing for a projection of 13½ in. at each end beyond the intersection of the centre lines of the principal rafters and the tie beam, the total length will be 32.25 ft.

This gives $\frac{(6 \times 8)}{144} \times 32 = 10.75$, say 11 cub. ft.

and $11 \times 47 = 517$ lb.

Turning to the steel vertical ties, we have two members $P_1 L_1$, with the diameter of ½ in., and the approximate length of 8 ft. The sectional area of each bar is $0.75^2 \frac{\pi}{4} = 0.4418$ sq. in., and the volume of the two bars is $2 \times 0.4418 \times 8 = 84.75$, say 85 cub. in.

The mean weight of steel being about 490 lb. p. cubic foot, or $490 \div 1728 = 0.2835$ lb., the weight of the two ties is $85 \times 0.2835 = 24.1$, say 24.25 lb.

The two members $P_2 L_2$ with the diameter of ½ in. are approximately 14 ft. 6 in. long.

The sectional area is $0.875^2 \frac{\pi}{4} = 0.601$ sq. in., and the volume is $2 \times 0.6 \times 14.5 \times 12 = 209$, say 210 cub. in. and the weight is $210 \times 0.2835 = 59.5$ lb.

The king-tie of 1½ in. diameter, with the corresponding area of 1.485 sq. in., is about 21 ft. long, and its volume is $1.485 \times 21 \times 12 = 374$, say 375 cubic in.

and the weight is $375 \times 0.2835 = 106.3$, say 106.25 lb.

The nuts required for the three sets of vertical ties are as follows:—

4 ½ in. nuts for ties $P_1 L_1$ at 0.25 = 1.00 lb.
4 ½ in. " " $P_2 L_2$ " 0.37 = 1.48 lb.
2 1½ in. " " $P_3 L_3$ " 1.26 = 2.52 lb.

Total 5.00 lb.

For each cast-iron shoe at joints L_0 (see Fig. 163, p. 665), two ½ in. bolts 10 in. long are necessary, the weight of which with square heads is 183 lb. each, or 732, say, 75 lb. for the two sets.

Each saddle at joints P_1 , generally repre sented in Fig. 167, p. 731, should be made with a projection let into the lower surface

of the principal rafter, and the inclined brace should fit into a recessed part to keep it from slipping in a downward direction. One lag screw, say, ½ in. diameter by 6 in. long, will serve to hold the saddle in place, and the brace can be secured by a ½ in. diameter bolt and nut about 6 in. long passing through the sides of the saddle. Then for two such saddles we require two lag screws, weighing, say, 1.25 lb., and two bolts and nuts, weighing 1.75 lb.

For the similar saddles at joints P_2 we also require two lag screws and two bolts, weighing 1.25 lb. and 1.75 lb. respectively.

Each cast-iron shoe at joints L_3 (see Fig. 171) should be held in place by two ½ in. lag screws 6 in. long, and weighing, say, 2.5 lb. for the four.

The following washers are required for the various joints:

For the two shoes, as at L_0 (Fig. 163), four 3½ in. diameter cast-iron washers, weighing 5 lb.; for two ties, as $P_1 L_1$ (Fig. 171), two 3½ in. diameter cast-iron angle washers, weighing 5 lb., and two 3½ in. diameter cast-iron ordinary washers, weighing 2.5 lb.; for two ties as $P_2 L_2$, two 4½ in. diameter cast-iron angle washers, weighing 12 lb., and two 4½ in. diameter ordinary cast-iron washers, weighing 6 lb.

The tie $P_3 L_3$ requires a 6 in. by 8 in. bearing plate, ½ in. thick, at joint L_3 , the weight of which, neglecting the metal cut out for the bolt hole, will be

$6 \times 8 \times 0.75 \times 0.2835 = 10.2$, say 10 lb.

Finally we have to estimate the weight of two cast-iron shoes for joints L_0 , two saddles for joints P_1 , two similar saddles for joints P_2 , one angle block for joint P_3 , two cast-iron shoes for joints L_3 , and one angle block for joint L_3 .

To avoid tedious calculations we will assume that the weights of the ten castings have been computed as below:

Two shoes L_0 at 56 lb. = 112 lb.

Two saddles P_1 at 14 lb. = 28 lb.

Two saddles P_2 at 14 lb. = 28 lb.

One block P_3 at 42 lb. = 42 lb.

Two shoes L_3 at 14 lb. = 28 lb.

One block L_3 at 42 lb. = 42 lb.

Total 280 lb.

Summarising the various weights determined above, we obtain the total weight of the truss as given in Table XLVIII.

Comparing the weight ascertained with that provisionally assumed for the purposes of calculation, we find that an ample margin is left, which may be regarded as an addition to the general factor of safety.

Obituary.

Mr. Stock.—The late Mr. Henry William Stock, District Surveyor for the Limehouse, Wapping, and St. Katharine district, who was appointed as a district surveyor in 1898, was a son of Mr. Henry Stock, of the firm of Messrs. Stock, Page, & Stock, of Denman-street, London Bridge, S.E., architects and surveyors. In

March, 1906, Mr. Stock succeeded his father as Surveyor to the Halverdeshers' Company, upon the resignation by Mr. Henry Stock of that appointment.

General Building News.

PRIORY CHURCH OF ST. MARY THE VIRGIN.—

The second link in the large work of restoring the ruined Priory Church of St. Mary the Virgin, at Nuneaton, to religious uses was completed on St. Andrew's Day with the consecration of the new presbytery. This priory was founded by Robert, Earl of Leicester, in the reign of Henry II., for nuns of the order of Fontevault, of which there were only two other houses in England. It was a branch of the Benedictines, and the larger houses were double ones containing monks as well as nuns. The church of Nuneaton consisted of a presbytery of two bays, transepts of two bays each, with a chapel to the east of the northern, a central tower, and a long, aisleless nave. The only entrance from without was by a large porch on the west side of the north transept. The presbytery and transepts were rebuilt in the XIIIth century, and covered by low vaulting in wide bays. Of this church the only remains are, besides the crossing piers which stand to their springers, the plinths of part of the north and south sides of the presbytery, the plinths of the east and west walls of the north transept with the lowest courses of the porch, the plinths of the east side of the south transept, with the south wall as high as the springer of the nave vault, and the north and west walls of the nave vault, to varying heights. These ruins were, from the suppression until 1870, in private hands, but in that year Mr. James Tomkinson gave them, with about three acres of land, to the newly-formed parish of St. Mary's, when about 50 ft. of the nave was rebuilt. Since then further church accommodation was required, and at a meeting of the parishioners three years ago it was agreed that another section of the completion of the church be taken in hand. Mr. Harold Brakspear, of Corsham, under whom the repairs at Malmesbury Abbey Church had just been completed, was entrusted with the work. The new presbytery is exactly on the lines of the old, 40 ft. in length by 29 ft. in width, and the remains of the deep-moulded plinth of the side walls are retained in position. The style adopted is a free treatment of the late XIIIth century work. The east end has a large five-light window, and the side walls four two-light windows in each. The altar is kept away from the east wall against a low screen. In the south wall is a piscina and sedilia arranged in continuous wall arcading, which is continued to the north side in the eastern bay. The east arch of the crossing, which was altered in the XIIIth century rebuilding, has been reinstated, and the responds repaired as little as possible consistently with sound work. Under the arch is the frame work of a rood screen, to be finished as a lunette below, surmounted by a great cross with carved canopies at the ends of the arms. The choir seats are at present placed inside the presbytery, but when the rest of the church is finished will occupy their original position under the crossing. The contract was gained in a limited competition by Mr. Henry Wilcock, of Wolverhampton. The heating is an enlargement of a scheme already put into the rebuilt nave by Messrs. Wright Brothers, of Sheffield, and the small amount of carving there is has been executed by Mr. C. H. Palmer, of Bristol.

ROMAN CATHOLIC CHURCH, DORCHESTER.—The foundation-stone was recently laid by the Bishop of Plymouth of a new Roman Catholic church, which is being erected on a site in High West-street. The building will have a frontage to High West-street of 28 ft., and to Alington street of 85 ft. It will accommodate about 260 persons. The exterior walling will have coursed rock-faced stone, with Bath stone dressings to windows and doors. The two fronts will be flanked by buttresses, the set-offs and water-tables being of stone. The High West-street front will be gabled and surmounted with a carved stone cross. A niche will be placed in the apex of the gable. All the windows have moulded labels and the openings glazed with leaded lights. The roofs will be covered with slate, with ornamental crenelling on the ridge. The principal entrance will be approached by two steps, and, with the vestibule, the floors will be laid with Staffordshire tiles. The nave is shown 23 ft. by 57 ft., and the sanctuary 23 ft. by 21 ft. The floors will be laid with pitch-pine blocks on cement concrete, the sanctuary floor being raised one foot above the nave. The height of the nave to the wallplate is 20 ft. 6 in., and to the highest part of ceiling 29 ft. The roof is of steep pitch, and between the semi-circular principal the ceiling is of semi-octagonal form and panelled with boarding the whole length of building. On the east side is the sacristy, 14 ft. 6 in. by 13 ft. 6 in., with outer porch and Lady chapel. The interior walls will be finished with tinted stucco. The exposed timbers of the

TABLE XLVIII.—QUANTITIES FOR COMPLETE TRUSS.

Member.	No.	Dimensions.		Cubic Feet.	Weight lb.
		Transverse.	Longitudinal.		
		<i>Transverse.</i>	<i>Longitudinal.</i>		
		In.	Ft.		
Principal Rafter	2	0 × 8	36	24	1128
Brace $P_1 L_1$	2	4 × 6	12	4	188
Brace $P_2 L_2$	2	4 × 8	14	61	294
Tie-Beam	1	0 × 8	2	11	517
					2127
		<i>Steel.</i>	<i>Cubic in.</i>		
		in. dia.			
Tie $P_1 L_1$	2	½	85	241	
Tie $P_2 L_2$	2	½	219	591	
Tie $P_3 L_3$	1	1½	24	375	108½
Nuts	12	—	—	—	—
	2	11	—	—	—
	2	11	—	—	—
Bolts and Nuts	4	10	—	—	7½
	6	6	—	—	3½
Lag Screws	1	6 × 8	¾ in. thick.	—	14
Bearing Plate Washers for Ties $P_1 L_1$ and for sundry bolts, say	18	—	—	—	11
					22½
		<i>Cast Iron.</i>	<i>Cubic in.</i>		
		¾ in. dia.			
Ordinary Washers	6	—	—	—	7½
"	2	—	—	—	6
Angle	12	—	—	—	5
	12	—	—	—	12
Angle Blocks and Saddles	10	—	—	—	—
					31½
Total Weight					2601

roofs will be stained and varnished. Provision will be made for heating the building, the chamber being placed in the basement. The architects are the Very Rev. Canon Scoles and Mr. G. Raymond, of Baungatoke, and the contractors entrusted with the work are Messrs. J. W. & H. Childs, of the Kingston Works, Yeovil.

CONGREGATIONAL CHURCH, MANCHESTER.—The alterations in the Congregational Church, in Palatine-road have involved the re-arrangement of the entire choir. The high gallery, which contained the old organ and the seats for the choir, has been removed, and also the large wooden pulpit. In the new work the floor of the choir has been raised three steps above the level of the floor of the church. Upon this raised floor positions have been allocated for the choir stalls, the organ, and the proposed stone pulpit. The space for the Communion table has been placed in front of the choir and raised one step above the floor of the church. The organ has been erected against the east wall, in a central position, with a detached console in front. On both sides the stalls for the choir have been placed parallel to the side walls of the church. The pulpit will be erected shortly. It is the gift of Mr. Peter Eadie, jun., and will be a memorial to the late Mrs. Emily Eadie. The organ-case, together with the choir stalls and canopies, has been executed by Messrs. Sequoia. The whole of the work, including the design of the organ, has been carried out in accordance with the designs of Mr. John Swarbrick, architect, and under the direction and supervision of Messrs. J. & J. Swarbrick, architects to the Alterations and Organ Committee. The general contractors for the structural alterations were Messrs. Peace & Norquay, of Manchester; the organ-case has been executed by the builder of the organ, Mr. J. J. Binns, of Leeds; while the traceried stone screen, the Verona red marble tiling of the Communion space, and the pulpit are the work of Messrs. Wm. Hilton & Sons, of Manchester. The wood carving has been executed by Messrs. J. Hallwood & Sons, and Mr. Wm. Cowen, both of Manchester. The latter carver has been engaged exclusively upon the wood carving of the organ-case.

BUCKFAST ABBEY.—One of the Benedictine monks of Buckfast Abbey, Buckfastleigh, is at present at the studios of Mr. Harry Hems, Exeter, where he is being taught the art of dressing stone. The monks have started to build an abbey and church on the old Cistercian foundations, at Buckfast, the probable cost of which amounts to between 30,000l. and 40,000l. The dressing and pointing of the stone will be done by the monks themselves, and the abbey authorities confidently expect that some of the fathers will be proficient enough in stone carving to do the more elaborate parts of the church, such as the altars. The building operations are in the hands of the monks themselves, under the direction of the abbey architect, Mr. F. A. Walters, of Westminster. The late abbot, Dom Boniface Natter, had almost completed the foundations of the new church when he met with such an untimely end in the wreck of the *Sirio*, off the Spanish coast last August. The rebuilding of the abbey church is intended as a memorial to the late abbot. It will be in purest Romanesque, and follow the lines of the building of the celebrated Fountains Abbey. The sanctuary will form more than half the actual church, and this portion is to be completed first. During the excavations of the Cistercian buildings many fragments of masonry, coloured tiles, stained glass, a leaden bulla of John XXII., pieces of carved stone from Early Norman to late Perpendicular, etc., were found. The height of the building will be, on the inside, 60 ft., and, with regard to the abbey, the old staircase, which is a feature in at least four of the old Cistercian abbeys, will be reproduced.—*Western Times*.

SCHOOL, CAERPHILLY.—The first new school erected at Caerphilly by the Glamorgan Education Committee was opened on the 7th inst. The school is designed on the central hall principle, with six classrooms, a cloakroom, and a head-teachers' room. In the basement there are playgrounds and a heating-chamber. The walls are built of local stone with Ruabon brick and box ground Bath stone dressings, the roofs being covered with Welsh slates. The school, which provides accommodation for 330 scholars, was designed and carried out under the supervision of the County Architect, Mr. D. Pugh-Jones, F.S.I., Cardiff, at a cost of 5,000l., the contractor being Mr. T. F. Howells, of Cardiff, and the clerk of the works Mr. Thomas Jones.

MANCHESTER STOCK EXCHANGE.—The new Manchester Stock Exchange, bounded by Norfolk-street, New Brown-street, and Pall Mall, is now complete. The "House" is at the rear of the building with a main entrance on the level in Norfolk-street, and with vestibule and waiting and interview rooms in convenient proximity. The secondary entrance, with clerks' vestibule, is in Pall Mall. The "House" is directly under a dome supported by marble columns, and the walls are lined with marble and arcaded. Forty telephones boxes are arranged in sections, giving communication with all parts

and the telegraph receiving and distributing centres, with pneumatic tube equipments, are close at hand. Special rooms have been so arranged that members may overlook the "House" and always be in call, while provision is made for the clerks in the "House" clearing-room. The secretary and his staff have a suite of rooms near the entrance, readily accessible both to members and public. The building also includes a bank and suites of offices. The design is Renaissance in character. The lower part of the building with the entrances and arched windows is faced with light grey granite, and Portland stone facing has been used all round the upper part. The building is fireproof throughout. It has cost over 35,000l. The marble work has been executed by Messrs. Fenning & Co., Ltd., London; the fibrous plaster work, from the architects' designs, was by Messrs. J. B. Johnson & Co., Liverpool; the plastering, painting, etc., work has been carried out by Mr. C. E. Harwood, Strangeways, Manchester; the electric-passage lift in the centre of the staircase is by Messrs. W. Sprowson & Co., Manchester; the heating and ventilating is the work of Messrs. Saunders & Taylor, Ltd., Manchester; the plumbing contract was carried out by Messrs. R. B. Worth & Co., Manchester; the iron and steel work was supplied by Messrs. E. Wood & Co., Ltd., Manchester; the wrought-iron work, from the architects' designs, was by Mr. T. Powers, Lower Broughton; and the British Luxfer Frisken Syndicate, London and Manchester, supplied the pneumatic dome. The whole of the lower portion of the building has been carried out in "Grey Royal" granite, from the quarries of Messrs. Cooper, Wetters, & Co., Ltd., London. The architects were Messrs. Bradshaw & Gass, of Bolton. Illustrations of the building were given in our issue for July 9, 1904.

THE NEW GALLERIES FOR THE ROYAL SCOTTISH ACADEMY.—The National Galleries Bill has passed through Committee in the House of Commons. One effect of the Bill, says the *Scotsman*, is to set free the large back building at the Mound, at present occupied jointly by the National Gallery and the Royal Scottish Academy, for the purpose of a National Gallery. Internally this building will need a certain amount of reconstruction, especially at the south end, where the administrative offices of the Royal Scottish Academy are situated, but plans for this have not been gone into yet. The front building, known as the Royal Institution will be allocated, in perpetuity, to the Royal Scottish Academy, who will find in it galleries, administrative offices, and a library of a much superior kind to what they have at present. A general sketch plan has been drawn up by Mr. Oldrieve, of the Board of Works, for the reconstruction of the interior of the Royal Institution building to fit it for the uses of the Royal Scottish Academy. Not a stone of the outside of the building will be touched. Internally, the present ground or street floor will be lowered 5 ft., and at this level, which will practically be that of Princes-street, the administrative offices and library of the Academy will be situated. They will form a suite of rooms, well lighted from the present windows, and in all respects admirably adapted for the work of the Academy. Entering from the main doorway at the north end, there will be a grand staircase leading to the picture galleries above. At the Princes-street end, in connexion with this staircase, there will be cloak-rooms and a refreshment department. The present upper floor of the Royal Institution will be lowered 6 ft., so that galleries of a suitable height, well lighted from the top, will be formed. The idea is that from the top of the staircase there will be openings upon two small galleries, each half the width of the building; in turn, these will lead to a grand central gallery, the whole width of the house; and at the south end there will be two more galleries corresponding to those at the entrance. In these smaller galleries would be hung the water-colours, architectural drawings, etc. It is understood that in their new galleries the Royal Scottish Academy will have about twice as much wall space for the hanging of pictures as they possess at present. As to the "fitting" of the different bodies from the Royal Institution, so as to allow the architect to proceed with his alterations, it seems evident that some time must elapse before it can be accomplished.

Sanitary and Engineering News.

THE ROYAL EDWARD DOCK, BRISTOL.—A report has been prepared by Mr. W. W. Squire, the Bristol Docks Engineer, detailing the progress made with the works connected with the Royal Edward Dock during the three months ended November 30. From this it appears that the weather during September was favourable for work, but during October and November it was unfavourable. At the end of November the total amount of excavation from the site of the

lock dock and graving dock amounted to 2,132,366 cubic yds. The dock walls are completed except the west wall, which is in progress. The walls of the entrance lock as far as the middle gates are completed to cope level. From the middle gates to the outer end of the lock they are within 8 ft. of cope level. The invert has been completed up to the middle gates, but the excavation for the remaining portion of the invert is in progress. The whole of the graving dock is completed except for a small portion of the coping at the nose end. The foundations of the engine and boiler house are in progress. The superstructure and filling of the south pier have been completed, and the superstructure of the north pier is completed except for a short length at the outer end. The remaining portion of the junction cut is well in hand. The riveting of the plating of both leaves of the lock gates has been completed, and testing is in progress. All the material for the middle gates, and nearly all the material for the outer gates have been delivered at Avonmouth. The machinery for the southern leaf of the inner lock gates has been partly erected, and all the details for the other machines have been completed in the contractors' yard. The erection of the sluice machinery at the junction cut is completed, and similar work is proceeding on the dock and graving dock. The captains had been delivered, but some have yet been erected. With regard to the pumping machinery at the graving dock, the greater part of the principal castings have been made, and these are in the shops being machined. The suction pipes have been delivered. A large amount of detail work, including crank shafts, connecting rods, valve gearing, is also in the shops being machined. The principal castings for the condensing plant are also being made, and are being completed. The making of ferro-concrete piles for the foundation of the gantry has been finished, and about half the piles had been driven at the end of November. The making of similar piles for No. 1 shed is in progress, and for the foundations of shed No. 2 all the timber piles have been driven, and some of the steel work has been delivered on the ground. The tender of the Motherwell Bridge Company has been accepted for the graving dock caisson, and that of Messrs. G. K. Stothert & Co. for the fairbairns.

NEW WATERWORKS, FRODINGHAM.—On the 20th inst. the scheme which has been carried through at Frodingham to supply the townships of Brunby and Frodingham, forming the Urban District Council area with water, was opened for the public service. The scheme is by Mr. A. Atkinson, C.E., of Brigg, and is one for domestic purposes.

Foreign.

FRANCE.—The General Council of the Lower Seine Department has decided on the establishment of an asylum *dépôt* at Grugny, at a cost of 882,000 francs. A sum of 100,000 francs has been voted by the Municipal Council of Boulogne for works for the enlargement of the Town Museum.—The Department of "Assistance Publique" has opened a competition for a monument to the memory of members of the staff of hospitals and asylums who have fallen victims to their professional duties. The first prize has been awarded to M. Lebrun, architect.—It is proposed to demolish the prison of St. Lazare, at present a house of correction for female prisoners, and to build a new prison in the Javel district (XVth arrondissement).—A group of artists has been commissioned, under the direction of M. Duhieu, the painter, to decorate the Salle des Fêtes of Saint Mandé.—The Duchesse d'Uzès has been elected president, for three years, of the "Union des Femmes Peintres et Sculpteurs."—The death is announced, at the age of 28, of M. Didier Navarre, son of M. Edmond Navarre, member of the Société Centrale des Architectes, a young artist was a pupil of the Ecole des Beaux-Arts and of M. Marcel Lamberet. A brilliant career had been expected for him, as he combined sound knowledge in drawing with imaginative faculty.—The death is also announced, at the age of 84, of the painter, Philippe Chaperon, who was the oldest of the theatrical decorative painters of Paris. He had much talent, and had executed some of the best decorations at the Opera, the Opera Comique, and the Comédie Française.

GERMANY.—Not only Germany but the whole civilised world was painfully astonished when the papers lately announced that Cologne Cathedral was so severely affected by the weather that its safety was feared for. Fortunately the report was exaggerated, but the damage so far as has been ascertained up to the present is of a serious nature when we consider that the cathedral, which took centuries to build, was only completed twenty-five years ago. From 1242, when the foundation-stone was laid, till the XVth century the work was carried on spasmodically, the east end, the towers,

and part of the nave being built. Then, for three centuries the cathedral was not touched, the exposed portions being protected by weatherboarding only. In 1842 vigorous building operations were begun, which were completed in 1880, 26 million marks having been spent in this period on the work. In 1904 the choir was again touched, and in 1905 the large stones began falling from the parapet and buttresses, since which extensive disintegration of stonework has been discovered on the west door, which will cost about 80,000 marks to repair, while the south door, barely forty years old, has begun to crumble. Here the limestone carving of the west door is still untouched, while the sandstone masonry is pitted with holes 10 cm. deep, and scales off in lengths of 2 ft. even where not exposed to rain. The repairs to this door alone will cost from 200,000 to 300,000 marks.—The Blitzbohrer Society, Berlin, has patented a floor polisher which is driven in a circular direction by electricity, and is used in the following manner: necessary to drive the brush, and consequently it can be switched on to any electric light plug, and all the attendant has to do is to guide the brush by its handle over the surface to be polished.—The new Museum, Darmstadt, the work of Herr Alfred Messels, of Berlin, was opened in 1906. The building is of a light-colored sandstone, stands out in fine contrast to the grey-tinted limestone of the main building.

Switzerland. The bridge is 1 and 2 weight tests were applied to the new ferro-concrete bridge, Chippis. This bridge connects the large aluminum factory at Chippis, on the Rhone, with Sierre, and is the largest ferro-concrete bridge in the world. It has 120 concrete arches, 60 metres in the clear, from which the roadway is suspended. It was designed and constructed by Messrs. Froel, Westernmann, & Co., of Zurich. The revised building regulations of Zurich limit private houses to four stories in height. The new building regulations permit the roof space be used as a fifth story, the regulation wall measurements must be increased by 20 cm. in thickness; the staircase must be fire-proof and must have windows on every floor. The roof space behind the stair-compartments must be protected by a fire-resisting construction. The floor above the collar-beam must have plastered walls.

INDIA.—The Madras authorities are discussing whether the new harbour shall be constructed at Vizagapatam or at Bimlipatam. A new branch of railway, fifteen miles, will be built from Vizagapatam at a cost of Rs9,33,000.—The Government have issued a plague order to the effect being extended throughout India. The old style of house being favourable to them, houses will be remodelled on modern principles.
—Practical sanitation is to be taught to Army medical officers at Rawal Pindi, Poona, Lucknow, and Bangalore.—A new dock scheme for Calcutta has been proposed by the Port Commissioners, and new jetties and warehouses are being built. Owing to the great expansion of Calcutta trade, additional accommodation in the near future will be still required.—The Government expenditure over the earthquake in April, 1905, in the Kangra district has been found to amount to Rs6,78,000. Temporary buildings and repairs, restoration, rebuilding, etc. Distribution of timber is not included in this amount.—A Victoria memorial fountain has been unveiled at Poona.—At Coimbatore the Victoria Hospital is being built, to which the Government have granted Rs1,50,000.—A sum of Rs1,00,000 for the Grand Forest Museum has been opened, which is the first of its kind in the country.—A project for the construction of a bridge at Sara is under consideration.—The "Central Province Victoria Technical Institute," has been opened, at a cost of Rs1,50,000.—The consequence of the recent cholera epidemic in Snoken nuisance in Bengal are to be met by the Bengal Snoken Nuisance Act.

Miscellaneous.

PROFESSIONAL AND BUSINESS ANNOUNCEMENTS.

— Mr. Albert E. Bullock, architect, has removed his offices from 5, John-street, Bedford-row, to 43, Chancery-lane, W.C. — Mr. E. Godfrey Page, architect, has removed his offices from 4 and 5, Warwick-court, Gray's-inn, to 2, Old Serjeants'-inn, Chancery-lane, E.C. — Messrs. Spalding & Spalding, architects, have removed their offices from 15, Queen-street, to 37 and 37, King-street, Cheshire, E.C. Their telephone number remains as before—"1167 Central." — Mr. Henry N. Kerr, District Surveyor for St. James's, Westminster, has removed his office from Berwick House, 139, Oxford-street, to 13A, Great Marlborough-street, W.

INCORPORATED CHURCH BUILDING SOCIETY.—The Society held its usual monthly meeting on Thursday, the 20th inst., at 7, Dean's-yard, Westminster, the Rev. Canon C. F. Norman in the chair. Grants of money were made in aid of the following objects, viz.—Building new churches at Plumstead, St. Michael and All

Anglo, Kent, 200*l.* for the first portion, and Russhden, St. Peter, Northants, 130*l.* in lieu of a former grant of 100*l.*; towards rebuilding the Church of St. Mary, Highweek, near Newton Abbot, 130*l.* in lieu of a former grant of 85*l.*; and towards enlarging or otherwise improving the Church of St. Mary, Highweek, near Newton Abbot, St. John-the-Baptist, 50*l.*; Aberystwyth, St. Michael and All Angels, Cardiganshire, 100*l.* in lieu of a former grant of 80*l.*; and Astley, St. Peter, near Stourport, 65*l.* in lieu of a former grant of 40*l.* Grants were also made from the Society to the following churches for building or repairing mission churches at Clerkenwell, St. Paul (Goswell-road), 10*l.*, and Pictou, in the parish of Kierkeleving, Yorks, 20*l.* The following grants were also paid for works completed:—Willessden, St. Matthew, Middlesex, 80*l.*, being balance of a grant of 100*l.* made in 1867; Dulwich, St. George, 5*l.*; Charlisle, St. George, 5*l.*; Slough, St. Paul, 200*l.*; Iford, St. John, Essex, 100*l.*, making in all 250*l.*; Nunanton, the Abbey Church of St. Mary-the-Virgin, 120*l.*; West Acton, St. Martin, Middlesex, 130*l.*; South Tottenham, St. Philip, Middlesex, 100*l.*; Belmont, near Durham, 100*l.*; Felling on-Tyne, St. Oswald, 30*l.*; Swanley, Kent, 30*l.*; and Thornton-le-Clay, near Foston, Yorks, 10*l.* In addition to this the sum of 160*l.* was paid towards the repairs of twelve churches from trust funds held by the Society. The Society likewise accepted the gift of a sum of 100*l.* for the repair fund of the Church of St. Barnabas, Walthamstow. A donation of 200*l.* has been promised by an old friend of the Society on condition that a further sum of 800*l.* is received without delay. The Committee earnestly appeal to all those who are interested in the Society to claim this conditional donation before the close of the present year.

THE BUILDING OF ASYLUMS.—On the 20th inst., the Royal Commission on the Care and Control of the Feeble-minded held its sixteenth sitting at Westminster, London. Mr. Green, M.P., H.M. Prison Commissioner, presided. The four commissioners, Mr. Green, Mr. Lush, Mr. Lunn, and Mr. Lunn, gave evidence with reference to the design and erection of asylums. If local authorities employed competent architects to draw their plans, he said, there would be no need to have a special committee. The staff of the Lunacy Commission, Mr. Country surveyors were not competent to undertake the design and erection of a building costing, say, £50,000. Mr. Green: You cannot expect any one who has not been brought up to it to survey or breathe the true spirit of the Renaissance or reach the higher flights of Gothic fancy. Witness declined to admit that the regulations issued by the Lunacy Commission were the cause of the erection of the most monstrous buildings in some of the Continent and cost far more than those in England. It was not true economy to put up the least expensive building. For harmless imbeciles a great saving could be effected by adopting the cottage home system. As to the further evidence, the Commission adjourned.

The "Wilson Premium" for the best paper read before the Crystal Palace Engineering Society during the present session has been awarded by the Council to Mr. R. R. Yerburgh for his paper on "Timber in the Tropics." The winning paper was presented by Mr. Yerburgh to the President, Mr. L. S. Layman; "Motors for Military Work," by Mr. F. A. Baker; and "Some Types of Rack Railway in Switzerland," by Mr. H. H. M. Spink. The premium was presented to Mr. Yerburgh by Lord Brassey, President of the Institution, and Mr. Yerburgh, in his acceptance of the premium, expressed his appreciation of the occasion of the 102nd distribution of certificates at the above school, on Friday, December 21, at which he presided.

FRANCO-ITALIAN EXHIBITION, 1908. At a meeting held on December 17, of the executive Committee, the Duke of Argyll, honorary president, announced that the following appointments had been made:—Lord Derby, president of the Exhibition; principal architect, M. Tudoire, who designed the architectural court of the Esplanade des Invalides, Paris Exhibition of 1889; honorary treasurer, Sir John Lubbock, Bt., Bart., K.C.B., and Sir John Belcher, Bart., K.C.B.; honorary consulting engineer, Sir Benjamin Baker, Bart., K.C.B.; and chief executive officer, Mr. Lionel Kinalry. The ground, extending over some 1000 acres on the east side of Wood-lane, near Uxbridge-road and Shepherd's - bush railway stations, is being laid out, and a further space of 42 acres has been added for the holding of the Olympic games and the erection of a pavilion and grand stand. The London County Council have approved the plan, and the royal warrant has been issued for the laying-out of the grounds.

SURVEY OF MEMORIALS OF GREATER LONDON.—Under the presidency of Lord Monkswell a general meeting of the committee was held on December 18 at Monkswell House, Chelsea-embankment. In the course of some remarks upon the contents of the report for the last two years, Mr. C. R. Ashbee, honorary chairman of the committee, expressed his belief that the survey of London

would be completed within the next ten years provided that financial aid were forthcoming from some of the learned societies, and that the number of members of the working committee were raised to fifty. The making of the survey is carried out, gratuitously, by that committee, and the results, in the form of reports and publications, are cast upon the subscriptions of the honorary members. Mr. Ashbee's report, which will be considered at a subsequent meeting, contains recommendations and suggestions for establishing the work upon an improved basis and so largely increasing the number of contributors. The general survey of London parishes and the publication of monographs descriptive of the more important buildings, for which the materials are supplied by the voluntary labourers of the Society, are also included in the programme under Mr. Ashbee's general advisory assistance.

The recent sale at Sotheby's of Mr. S. T. Fisher's library included the following works:—Hoare's 'Ancient Wiltshire,' and 'The Modern History,' 1812-44, ten volumes, 34*l.* (J. Bumpus); 'Bretagne,' with supplement, 1734-8, a large copy, 41*l.* (Batford); 'Blomefield's "Norfolk," continued by C. Parkin, 1769-75, 30*l.* (Quaritch); 'Hasted's "Kent," 1778, 17*l.* (Kimell); 'Dallaway's "Western Division of Sussex," comprising the parishes of the County of Sussex, 1830; and Arundel, with Cartwright's additions, 1832, to the last-named section, 1819, whereof nearly all the impressions were destroyed by a fire, 36*l.* (Groves); Fenton's "Pembroke-shire," 1800, paper, 10*l.* 6*s.* (Young); and seven or eight volumes of the *Archæologia*, 1770-1905, 16*l.* (Quaritch).

Legal.

THE STRAND BUILDING DISPUTE.

The case of *Lorden v. Draper* and another came before Mr. Justice Neville, in the Chancery Division, on the 21st inst., on a motion by the plaintiff to restrain the defendants from trespassing on his premises, No. 421, Strand, W.C., and from further proceeding with the erection of a party wall except in accordance with the provisions of the London Building Act.

Mr. Jenks, K.C., said that Mr. Lorden was in possession under a building agreement of the site of No. 421, Strand, which he had cleared and would in due course be erecting buildings on. Mr. Draper was the owner of the adjoining premises, No. 422, Strand, where there was a party wall between the two premises. The wall was dangerous. Mr. Draper said that was due to something the plaintiff had done, and brought an action against him, which was pending. The wall was condemned by a magistrate's order, and had been taken down by Mr. Draper. Since then Mr. Draper had proceeded to make excavations on his own property, and only to do that, but also to put in concrete footings. Mr. Draper now wanted to restrain him from further trespassing. Mr. Draper's solicitor had written offering an undertaking not to commit any further acts (he did not admit the trespass) pending the hearing of Mr. Draper's action: that Mr. Lorden wanted was to restrain him during the pendency of his (Mr. Lorden's) action.

Mr. Maenaghten, K.C., said he could not give that undertaking.

Mr. Jenkins said he must in that case ask for the injunction. The point on the second branch of the case was the rebuilding of the wall. Mr. Draper said he was not rebuilding but merely strengthening. As Mr. Lorden was building a new block of buildings on his site it was essential to him that the party wall should be rebuilt in accordance with his requirements.

Mr. Macnaghten said what was done was a work of necessity to preserve what was left of the wall. He would prefer an injunction rather than give any undertaking as he had the London County Council against him as well as the

His lordship said he thought the injunction ought to be to restrain Mr. Draper from trespassing except for the purpose of maintaining the security of the wall, and he would limit the injunction in that way. The costs would be costs in the action.

EMPLOYER'S SUCCESSFUL PLEA OF WORKMAN'S SERIOUS AND WILFUL MISCONDUCT.

THE case of *Brooker v. Warren* came before the Court of Appeal, consisting of the Master of the Rolls and Lords Justices Cozens-Hardy and Farwell, on the 20th inst., on the appeal of the respondent, a timber merchant, from an award made by the judge of the Cheltenham County Court in favour of the widow of a deceased workman under the provisions of the Workmen's Compensation Act, 1897.

The short facts were these:—On January 10 last the deceased, who was employed by the

appellant, was engaged with a man named Timbrell in sawing up deals at a circular saw which was driven by machinery. The saw was then adequately protected by a guard, and the deceased was told by his employer that he was to be sure and keep the guard on while using the saw. In the afternoon of January 10 the deceased man had occasion to change the saw so as to be able to split larch poles, and he intentionally omitted to replace the guard over the saw. The object of the guard was to prevent timber which had jerked up from being caught by the teeth at the back of the saw and being thrown about the workshop to the common danger. The deceased was in the act of splitting a small piece of larch pole, and his duty was to start the sawing at the thin end of the pole and not to let go his hold until the pole was nearly sawn through, it being Timbrell's duty to receive the split ends of the pole on the other side of the saw, and to draw the pole on against the saw until completely cut through. For some reason the deceased man applied the thick instead of the thin end of the pole, and let it go before Timbrell had a firm hold at the other end. When the pole was nearly split through something caused the pole to jerk up and down, hurling Timbrell's knees against the bench, causing him to let go the pole. The result was that the pole jumped on to the top of the saw and shot backwards, striking the deceased and inflicting the injury from which he died. The only question in the case was whether the injury to the deceased was attributable to his serious and wilful misconduct, within the meaning of sub-section 2, of the Act so as to disentitle his widow to compensation. The learned County Court judge decided that the deceased man's omission to replace the guard on the day of the accident did not, having regard to his findings of fact in the case, amount to serious and wilful misconduct, and he made, as before stated, an award in favour of the appellant.

Mr. Ruegg, K.C., and Mr. Wethered appeared for the appellant, and Mr. Maddocks in support of the award of the learned County judge.

At the conclusion of the arguments of counsel the Master of the Rolls, in giving judgment, said that in his opinion the only and inevitable conclusion from the evidence and the findings of fact was that the injury to the deceased was attributable to his serious and wilful misconduct. The deceased man knew of the orders given to him on many occasions both by the factory inspector and by his employer to use the guard when working the saw, and he deliberately refrained from using the guard. He was guilty of misconduct in deliberately and intentionally refusing to obey the order to use the guard, and the misconduct was wilful, and that misconduct was serious because it produced a condition of danger to himself and others. He was, therefore, guilty of serious and wilful misconduct. The only reason suggested by the County Court judge for arriving at the contrary conclusion was that owing to the state of the deceased man's mind his wilful disobedience did not amount to serious misconduct, though it might be so in the case of other people. In his lordship's opinion the deceased was fully aware of the order and of its importance, and he deliberately refused to obey it. It was his duty to obey it, and it was a very serious matter not to have done so on account of the danger likely to be caused thereby to himself and to others. It seemed to him to be a clear case of serious and wilful misconduct. Indeed he could hardly imagine a case of more serious and wilful misconduct. He thought that judgment ought to be entered for the appellant.

The Lords Justices concurred.

CLAIM UNDER WORKMEN'S COMPENSATION ACT.

THE case of Groom v. The Stanton Iron Works Company came before the Court of Appeal, consisting of the Master of the Rolls and Lords Justices Cozens-Hardy and Farwell, last week, on the appeal of the appellant, the widow of a deceased workman, against the refusal of the Ilkerton County Court judge to award her compensation in respect of the loss of her husband, who met with his death in the course of his employment with the respondents, who have extensive works in Derbyshire. In addition to their works proper the respondents had on their ground workmen's cottages, a church, and a public-house, while parts of the land were given up to garden allotments. The deceased workman was a bricklayer in the respondents' employ, and when he met with his death he was engaged in demolishing an old building which had been used as a workman's cottage. It was situated about 200 yds. from the place where the work of the factory was carried on. In these circumstances the County Court judge held that the claim of the widow did not come within the provisions of the Workmen's Compensation Act, as in his opinion the accident occurred too far away from the factory for him to hold that it took place "in, on or about a factory." Hence the present appeal in support of which it was argued

that the whole of the area occupied by the respondents constituted a factory.

Mr. W. H. Stevenson, for the appellant, contended that the learned County Court judge had not applied the proper test to the question as to whether the accident occurred "in, on or about" a factory within the meaning of the Act. The reason given by the learned judge for holding as he had clearly showed that he did not appreciate what he really had to decide. He had based his finding solely upon the point that the place where the accident happened was much too far distant from the factory. He submitted that distance was clearly not the test, because if it were the legislature would have laid down some guiding principle on the matter. The question the learned County Court judge should have considered was whether the man's employment was not habitually about a factory, and whether his employment at the time of the accident was not really and substantially "in, on or about" a factory. He submitted that under the Factories Act the accident occurred on part of the close or curtilage of the factory within the definition given in that Act.

The Master of the Rolls, in giving judgment, said it was quite clear that the actual work of the factory was not the same as that which brought him within the provisions of the Workmen's Compensation Act, and into the condition of working on a factory. The building he was dealing with did not constitute a factory of itself. It was said that within a short distance of the work he was actually engaged upon there was a factory belonging to the same persons who employed him to demolish this old building. The facts had only to be stated to show that the case did not fall inside but outside the Act. Proceeding, his lordship said he had dealt with the word "about" in the Act several times in the course of the last five or six years; he had been engaged in considering cases under the Act, and he thought it was perfectly clear now that the word "about" did unquestionably contain the notion of physical contiguity, but it also contained a reference to the nature of the work upon which the person was engaged. It must not only be physically contiguous to the factory, but it must have relation to the business of the factory. Those two conditions must be combined if the person was to be held to be employed about a "factory" as defined by the Act. Neither of the conditions involved in the word "about" was fulfilled by the claimant in this case. The work of pulling down the old property had nothing whatever to do with the factory, and the learned County Court judge had held that there was a physical proximity within the meaning of the principle applicable to the Act. So far from seeing the slightest indication of any misapprehension on the part of the learned judge as to the legal standard applicable to the case, his lordship thought it was obvious from the terms of the findings of the learned County Court judge that he had addressed himself to the true point and applied the right standard. For these reasons he thought the appeal should be dismissed with costs.

The Lords Justices concurred.

MARGATE BUILDING DISPUTE.

THE case of Margate v. Beedell and another came before a Divisional Court of King's Bench, consisting of Justices Darling and Bray, last week, on the plaintiff's appeal from a judgment of the judge sitting at the Margate County Court.

In this case the plaintiff sought an injunction to prevent an alleged breach of building covenants regulating the conditions under which certain building plots in the Madeira-road, Margate, should be built upon. It appeared that the plaintiff was the owner of a plot on the Cliftonville Estate, the defendants being the owners of adjoining plots, and the matter complained of was the erection of a building 41 ft. long and 18 ft. high bounding the defendants' plots. Plaintiff complained that this obstructed his light and constituted a breach of the covenants. The County Court judge holding that the erection was not a breach of the covenants, he entered judgment for the defendants. Hence the present appeal of the plaintiff.

Mr. Clavell Salter, K.C., and Mr. Young appeared for the appellant, and Mr. Montague Lush, K.C., Mr. F. Lowe, K.C., and Mr. S. Cooper, for the respondents on the appeal.

At the conclusion of the arguments of counsel on behalf of the appellant, and without calling upon counsel for the respondents, their lordships affirmed the decision of the learned County Court judge, and dismissed the appeal with costs.

A TEMPORARY WOODEN STRUCTURE.

An interesting test case affecting surveyors' fees was heard in the Guildhall Police Court on the 20th inst. Mr. Hills, District Surveyor for the eastern division of the City, claimed 15s. from the London and India Docks Company, for surveying a "structure" in Leadenhall-street.

The "structure" was a temporary wooden staging erected at the company's offices from which a private party of thirty persons viewed the Lord Mayor's Show.

"Supposing," said Mr. A. F. Wootton, defending, "that instead of erecting a stage we had pushed the kitchen-dresser up to the window and used the housemaid's steps as a means of getting on to it—would you have considered yourself entitled to come in and survey?"

"I should not claim that, because I should not consider in that case that you had erected a structure," replied the surveyor. Pressed as to what he considered a structure under the London Building Act, the witness said it was merely a question of fact, of which he was the judge. In the case of a number of desks pushed up to a window and planks bolted on them he should claim a right to survey.

"Supposing," observed the magistrate, Alderman Sir Honore Davies, "I erected a ballroom in my back garden, and invited my friends to come to a dance there, would you suggest that you were entitled to come into my house and examine that?"

"I am afraid I should," admitted the surveyor. He maintained that he had the right to enter premises, "that he had received no notice of any work going on."

"And if you found no work in hand, how would you justify your presence?"

"I couldn't do it then, but I think the powers to enter are very wide."

The summons was dismissed with costs against the defendant, and the magistrate consented to state a case.—*Daily Chronicle*.

Patents of the Week.

APPLICATIONS PUBLISHED.*

27,229 of 1905.—D. BEARDS, F. BEARDS, D. BEARDS, JUNR., A. C. BEARDS, and F. COPE: *Night Latches*.

THIS relates to a night latch in which a bolt is moved back by the key through the medium of a lever which is carried by the bolt, a slotted convex lever being pivoted between the bolt and lever to admit of the bolt being moved back by the knob or handle, and a stop fixed within the case which prevents the lever being moved back by the key until it has been properly raised thereby.

2,948 of 1906.—H. BROOK: *Hangers for Gates and the like*.

THIS relates to hangers for gates and the like, and consists of a pin or stud having an elongated slot therein in which is adapted to register a bolt or the like inserted through openings in the metal strap or yoke to secure the latter to the pin or stud and adjustable in said slot by means of packing inserted therein or between the stud and any equivalent pin to re-instate the gate or door in the correct perpendicular position.

4,805 of 1906.—C. FENN: *Chimney top*.

THIS relates to a chimney top having means for facilitating the up-draught of the flue, and consists in constructing the same similar to an ordinary cylindrical square or other convenient shape top, and then forming around the surface of the same at four or other convenient number of points well up the chimney-top, holes each of which is provided with a cover which gradually widens towards the bottom of the chimney top. These covers are preferably arranged so that at their lower extremities their side edges practically meet around the surface of the chimney top approximately at the bottom of the same. From this point they taper up to the holes. The lower ends of the covers of the holes are left open so that they form funnels to the holes. The covers are each further provided with a slit or opening along their faces, and widen out into the opening at the lower end of the cover. This slit or opening in the face of each cover extends more than half-way up the said cover, leaving the part over the hole still intact, the chimney top or pot is then finished with a member provided with louvres.

6,902 of 1906.—W. H. FISHER: *Molding presses*. THIS relates to a molding press, and consists of a vertically movable platen adapted to receive a wheeled truck carrying the mold box, in combination with crickets projecting through openings in the platen, said crickets normally engaging the wheels of the truck for supporting the body of the steam by the platen, but allowing the wheels to project into the openings, and the body of the truck, thereby raised on the platen when the platen is raised.

10,696 of 1906.—T. J. ROBERTS: *Locks for doors and the like*.

THIS relates to locks for doors and the like, and consists of rods passing up and down from the

* All these applications are in the stage in which opposition to the grant of Patents upon them can be made.

PATENTS.—Continued on page 761.

List of Competitions, Contracts, etc.

For materials still open, but not included in this List, see previous issues. Those with an asterisk (*) are advertised in this Number: Competitions, —; Contracts, iv. vi. viii. x. Public Appointment, xvi.; Auction Sales, xxiv. Certain conditions, beyond those given in the following information, are imposed in some cases, such as: the advertisers do not bind themselves to accept the lowest or any tender; that a fair wages clause shall be observed; that no allowance will be made for tenders; and that deposits are returned on receipt of a boni-fide tender unless stated to the contrary.

Competitions.

JANUARY 31. — Sunderland. — **LIBRARIES.** — Sunderland Corporation invite competitive designs from architects practising in the borough for branch libraries to be erected in Church-street North and Vilette-road. Premiums of 20s. and 10s. are offered for the first and second designs for each of the two libraries. Instructions to competitors and lithographed plans of the sites may be obtained from Mr. John W. Monner, Assoc. M.Inst.C.E., Borough Engineer, Town Hall. Designs are to be delivered, free of cost, at the office of the Borough Engineer Town Hall, before 12 o'clock at noon on January 31.

FEBRUARY 6. — Galway. — **HOSPITAL.** — Board of Guardians invite plans and estimates of a fever hospital proposed to be erected at Galway. A premium of 25s. will be given; but in the event of the Guardians deciding to give the supervision of the building to the architect or engineer whose plan has been accepted, this premium will be merged in his fees. The selection will be made by an architect or engineer having no interest in the business. Particulars as to hospital accommodation, etc., required, will be furnished by Mr. Robt. F. Mulvey, Clerk of the Guardians. The plans will be received up to 11 o'clock a.m. on February 6.

MARCH 2. — Castleford. — **SCHOOL.** — The Governors of Castleford Secondary Schools invite competitive designs from architects practising in the West Riding of Yorkshire for a dual secondary school, etc., for 300 scholars, on a site in Healdfield-road, Castleford, and offer premiums of 250 and 125 respectively for the designs placed first and second by the assessor, Mr. Walter H. Brierley, F.S.A., F.R.I.B.A., architect, York, whose decision is to be final. Printed conditions and instructions (ready about January 1), together with a plan of the site, can be obtained on written application to Mr. Alfred Wilson, Clerk to the Governors, Station-road, Castleford, accompanied by a stamped addressed brief envelope, and a deposit of 10s. 6d. Designs are to be delivered on or before noon on March 5.

Contracts.

BUILDING.

DECEMBER 31. — Ballycastle. — **COTTAGES.** — Ballycastle R.D.C. invite tenders for the erection of cottages in the following townships: Broughshane, Turinagh, Aghrannagh, Breen, Cloughmore, Ballymoy, Whitehall, Townparks, Prusk, Ballycraig, Jones, and Ballycraig. Broughshane, Broughshane, East Tor, Drumnawillin, Cookey, Moyrath 1st. The deposited maps and the plans, specifications, and draft contract may be inspected in the office of the Clerk of the Ballycastle R.D.C., 10, Market-street, Ballycastle, and must be received by Mr. Hugh McMill, Clerk of the Ballycastle R.D.C., Broughshane, Ballycastle, not later than 5 o'clock p.m. on December 31.

DECEMBER 31. — Duloe. — **READING-ROOM.** — For erecting reading-room at Duloe. For specifications apply to Mr. Natchley, Frothingham, Duloe, and tenders to be sent to Mr. Natchley by December 31.

DECEMBER 31. — Friarhall. — **CARPENTERS AND JOINERS' WORK.** — Bradford Corporation invite tenders for carpenters and joiners' work required to be done in repairs and reinstatement after fire at Dumb Mill, Friarhall. Drawings and general conditions of contract may be seen, and full of quantities and form of tender obtained, on application to the City Architect, Whitaker-buildings, Brewery street, Bradford. Sealed and endorsed tenders must be sent to Mr. Frederick Stevens, Town Clerk, Town Hall, Bradford, not later than 12 o'clock noon on December 31.

DECEMBER 31. — Thirk. — **CATTLE MART.** — The erection of new cattle mart, Thirk, for the Thirk Farmers' Auction Mart Company, Ltd. Plans and general conditions and all information at offices of Mr. W. Hargreaves Bourne, A.R.I.B.A., architect, Darlington. Bills of quantities will be supplied to those who apply before December 31.

JANUARY 3. — Lumphanna. — **COTTAGE.** — Estimates wanted for the mason, carpenter, slater, and plaster for the erection of a new cottage at Lumphanna (Mrs. Burnett's cottage). Plans and specifications may be seen with the tenant. Offers will be received by Messrs. Cochran & Macpherson, advocates, 132, Union-street, Aberdeen, up to January 3.

JANUARY 3. — Sale. — **UNDERGROUND CONVENIENCE.** — Sale U.D.C. invite tenders for the erection of an underground convenience, at the junction of School-road and Chapel-road. Plans and general conditions may be seen, and bill of quantities obtained, on application to Mr. W. Holt, Engineer and Surveyor for the Corporation, at the office of St. John's Church, according to plans and specifications

which may be seen at the offices of Messrs. Wood, work & White, 55, Baxtergate, Whithy, where tenders, sealed and endorsed, are to be delivered not later than noon on January 3.

*** JANUARY 4. — Catford.** — **Sorting Office.** — The Commissioners of H.M. Office of Works etc. invite tenders for enlargement of the sorting office at Catford, S.E. Drawings, specifications, may be seen on application to Mr. J. Wayer, H.M. Office of Works, S.W. Bills of quantities and form of tender may be obtained from the Secretary, H.M. Office of Works, Storey's Gate, S.W., to whom tenders, endorsed "Tender for Catford Sorting Office Enlargement," must be delivered not later than 12 noon, January 4.

JANUARY 5. — Dutton. — **Nurses' Home.** — Runcorn Guardians invite tenders for the erection of a nurses' home, at Dutton Workhouse, and the alteration of certain existing buildings. Applications for specification and quantities, accompanied by a deposit of 3s. 3d., to be made at office of Mr. Geo. F. Ashton, Clerk to the Guardians, 71, High-street, Runcorn, before January 5 next. Plans may be inspected at the offices of Messrs. W. & G. Owen, architects, Warrington.

JANUARY 5. — Tempo. — **TOWER AND SPIRE.** — A tower and spire to the Catholic Church, Tempo, Co. Fermanagh, for the Rev. T. S. O'Neill, P.P. Plans and specification may be seen at the Parochial House, Tempo, Enniskillen, or at the offices of the architect, Mr. J. V. Browne, P.E., Belfast. Bank-chambers, Belfast, to whom sealed and endorsed tenders are to be delivered not later than January 5.

JANUARY 5. — Shirley. — **Fire Station.** — Hornchurch Parish Council invite tenders for the erection and completion of a fire station, with works incidental thereto, on Bill-lane, Hornchurch. The plans and specification may be seen, and forms of tender obtained, at the office of the architect, Mr. E. Little, Landfield-gardens, Hornchurch-road, Romford. Sealed tenders, endorsed "Tender for Fire Station," are to be sent to Mr. R. G. Ward, Chairman, Hornchurch Parish Council, Hornchurch, not later than 12 o'clock noon on January 5.

JANUARY 5. — Shirley. — **Horse-Scutlingham Corporation** invite tenders for the erection of stabling accommodation at Clock House, Shirley. Plans, etc., may be seen, and forms of tender obtained, at the Borough Engineer's Office, upon production of the Borough Treasurer's receipt for a deposit of 2s. 3d. Tenders on the printed form, and endorsed "Tender, Clock House Stables," must be left at the Town Clerk's Office before 2 p.m. on January 5.

JANUARY 5. — Landport. — **STORE.** — For building a store at the Factory of Doudney and Co., Ltd., soap manufacturers, Landport. Specification, plans, and quantities may be seen at the office of the architect, Messrs. Jones, Tuttle, 324, Commercial-road. Sealed tenders to be sent by January 9 to 333, Commercial-road, the registered offices of Doudney & Co., Ltd. Mr. J. H. Smith, Secretary.

JANUARY 16. — Stewarton. — **CENTREY.** — Estimates wanted for (1) digger, brick, and mason works for the erection of a new Centrey, at Stewarton, and (2) plaster, cement, and rough cast works, etc.; (3) drainage, levelling, and road making. Plans and specifications may be seen at the Parish Council Office, Stewarton, or at the office of Messrs. J. & J. Amos, architects, Irvine. Schedules of measurement can be obtained from the architect, on the deposit of 1s. sterling. Sealed offers, marked "Offer for Centrey," to be lodged with Mr. James Kerr, F.S.A., Clerk to the Parish Council, Parish Council Office, Stewarton, on or before January 16.

JANUARY 12. — Banbury. — **ALTERATIONS AND REPAIRS.** — The Trustees of the Bridge Estate Charity invite tenders for certain alterations and repairs at Nos. 1 and 4, Cherwell-terrace, Banbury. Specifications and plans can be seen, and information obtained, on application at the office of Messrs. Portledge & Sons, Clerks to the Trustees, 45, High-street, Banbury. Sealed tenders, endorsed "Bridge Estate Charity, Cherwell-terrace," to be delivered at the office not later than 2 o'clock p.m. on January 12.

JANUARY 12. — Templepatrick. — **ALTERATIONS, ETC.** — To Messrs. Alterations and additions to Manse, Lalehill, Templepatrick. Plans and specifications may be seen at the office of Mr. W. D. R. Targart, 2, Wellington-place, Belfast. Tenders to be lodged before 12 o'clock noon on January 12.

*** JANUARY 15. — Tottenham.** — **UNDERGROUND CONVENIENCE.** — The Tottenham U.D.C. invite tenders for the erection of an underground convenience at High Green, Tottenham. Plans can be seen, and conditions, specifications, bills of quantities, schedule of prices, and form of tender can be obtained, from the Engineer to the Council, Council Office, The Green, Tottenham, during office hours. Sealed tenders, on form supplied, endorsed "Tender for Underground Convenience, High Green," to be delivered to the Clerk to the Council by 12 o'clock noon, January 15.

JANUARY 15. — Walsend. — **POLICE BUILDINGS.** — Northumberland Standing Joint Committee invite tenders for the whole of the works required in the erection of police buildings, Walsend. Names to the architect, The Moor House, Walsend, Newcastle-on-Tyne. Bills of quantities will be forwarded on payment of a deposit of 2s. 2s. Sealed tenders, sent in the envelopes provided, to be delivered not later than 12 o'clock noon on January 15.

JANUARY 22. — Kirtton. — **OUT-OFFICES.** — Kirtton Council

School Managers invite tenders for the erection of out-offices at the Church End, Kirtton, Kirtton, near Boston. Plans, etc., upon application to the architect (Mr. James Rowell, Church-lane, Boston). Tenders, endorsed "Tender for Out-offices at Kirtton," to be sent to Mr. J. H. Tisdale, Clerk to the Managers, 6, Bridge-street, Boston, not later than January 8.

NO DATE. — Bournemouth. — **REPAIRS, ETC.** — Repairs and decorations at East Cliff Congregational Church, Bournemouth. Names to Messrs. Lawson & Reynolds, architects, Victoria-road.

NO DATE. — Newcastle. — **BUSINESS PREMISES.** — New business premises in New Bridge-street, Newcastle, for Mr. Charles Kirk. On the deposit of 1s. 1s. quantities may be obtained from Mr. J. J. Hill, M.S.A., architect, Bank-chambers, Shields-road, Newcastle-on-Tyne.

NO DATE. — Wakeneld. — **WAREHOUSES.** — The erection of various offices, cottages, and a warehouse, at Wakeneld, near Wakeneld, for Messrs. R. S. Dyson and Co., Ltd., wholesale provision merchants. Further particulars to Messrs. Simpson & Fifth, architects and surveyors, Southgate, Wakeneld.

ENGINEERING, IRON, AND STEEL.

DECEMBER 22. — Okehampton. — **SCAFFOLD.** — The R.D.C. of Okehampton invite tenders for providing and fixing a scaffold to one of their steam road rollers. Tenders, quoting the kind of scaffold recommended and the price, including the cost of erecting and dismantling, to be sent to Mr. S. Hawker, Clerk to the Council, Okehampton, by 10 a.m. on December 22.

JANUARY 1. — Fulham. — **LACUNUM MACHINE.** — Fulham Guardians invite tenders for supplying and fixing in the workhouse laundry a 100-lb. ironing, drying, and finishing machine. Persons desirous of tendering must prepare and submit a specification thereof, and also of the necessary work in connexion with the fixing, which will include the provision of any necessary supports. Further particulars can be obtained at the Workhouse, upon application to the Engineer. Tenders, upon forms to be obtained upon application at office of Mr. E. J. Mott, Clerk to the Guardians, Fulham Palace-road, Hammer-smith, and specifications, to be delivered not later than 2 o'clock p.m. on January 1.

JANUARY 7. — Elgin. — **HOSPITAL APPOINTMENTS.** — The mason, carpenter, plumber, slater, plaster, painter, and iron works of additions and alterations at Gray's Hospital, Elgin. The plans and specifications may be seen with Mr. John Wiltet, architect, Elgin, from whom schedules may be obtained on receipt of a deposit of 10s. Tenders, sealed and endorsed "Elgin Hospital," to be delivered not later than 10 a.m. on January 7.

JANUARY 8. — Teignmouth. — **GASHOLDER.** — Teignmouth U.D.C. invite tenders for gasholding an 80-ft. gasholder. The drawings may be seen, and copies of the specification obtained, on application to Mr. J. Alex. Gray, Engineer and Manager, Gasworks, Teignmouth. Sealed tenders, endorsed "Gasholder," and addressed to Mr. A. Percival Bell, Clerk to the U.D.C., Teignmouth, must be delivered not later than 10 a.m. on January 8.

JANUARY 9. — Southwark. — **STREET-WASTING MACHINES.** — Southwark R.C. invite tenders for the construction of four new street-wasting machines, and specifications may be seen, and all other particulars may be obtained, on application at the office of the Borough Engineer, Town Hall, Walworth-road, S.E. between the hours of 10 a.m. and 4 p.m. Sealed tenders, endorsed "Tender for Street Wasting Machines," addressed to the Town Clerk, must be left in not later than 4 o'clock on January 9.

JANUARY 16. — Lincoln. — **ENGINE TRUCKS.** — The Great Central Railway Company invite tenders for the supply, delivery, and fixing of a 6-ft. engine truck at Lincoln. Particulars can be obtained on application at the Engineer's Office, Marylebone Station, London. Sealed tenders, endorsed "Tender for Furnable at Lincoln," to be in the hands of Mr. C. S. Holt, Secretary, Marylebone Station, London, N.W., not later than 9 a.m. on January 10.

JANUARY 11. — Londonderry. — **HEATING.** — Londonderry Municipal Technical School Committee invite tenders, up to 3 p.m. on January 11, for heating and ventilating the school, according to plans, specification, and schedules prepared by Edward J. Toye, architect, 20, Great James-street, Londonderry. Copies of plans, etc., may be obtained from architect on a deposit of 2s. 2s. Tenders received by Mr. C. A. Williams, Secretary, Technical Education Committee, The Savings Bank, Londonderry.

JANUARY 12. — London. — **VANS AND MACHINES.** — Paddington Borough Council invite tenders for the supply of (a) four dust vans, (b) four dust vans, and (c) three sweeping machines. Printed forms of tender may be obtained upon application to Mr. E. B. Newton, Assoc. M.Inst.C.E., F.S.I., Borough Surveyor, Town Hall, Paddington, W. Tenders must be sent in for (a), (b), and (c) separately, sealed, in the envelopes supplied, and delivered not later than January 12.

JANUARY 12. — Manchester. — **ENGINE.** — Manchester Rivers Committee invite tenders for the supply and delivery of a 10-horsepower engine, for use in the construction of the Whitening Sewage Works, Chorlton-cum-Hardy, near Manchester, of one 10-horsepower vertical steam engine. Forms of tender may be obtained on application to the Secretary of the Rivers Department, Manchester. Tenders must be enclosed in the official envelope which

JANUARY 8. **Seghill.**—SEWERS.—Seghill U.D.C. invite tenders for the laying of about 1,000 yds. of

pipe sewers with manholes, lampholes, and flushes complete, together with the construction of tanks, bacteria beds, and other works for sewage disposal purposes at Sechill. Plans and specifications may be seen, and quantities and other particulars obtained, on application to the engineer, Mr. J. E. Parker, civil engineer, Post Office-chambers, Newcastle-on-Tyne, on depositing 1s. Sealed tenders, endorsed "Sechill Sewage," to be delivered at office of Mr. P. Spencer, Clerk, Sechill, Northumberland, not later than noon, January 8.

JANUARY 8.—Yeovil. ROAD WORKS.—Yeovil Corporation invite tenders for the supply, delivery, and laying of Kenton or other stone paving, kerbing, water-table, and block pitching at Yeovil. Also for the supply of flints (hand-picked and quarried), broken stone, gravel, and annuals during the three years ending March 31, 1910. Copies of specifications and forms of tender may be obtained at the office of Mr. A. Oddy, Borough Surveyor, Municipal Offices, Yeovil, to whom sealed and endorsed tenders, with samples, must be delivered not later than noon on January 8, addressed to the Chairman of the Stores Committee.

*** JANUARY 9. HAMMERSMITH. PAVING WORKS.**—The Hammer-smith Borough Council invite tenders for making up and paving Egham-road (section 1), roads and specifications may be seen, and forms of tender obtained, on application to Mr. H. Muir, Borough Surveyor. Sealed tenders, endorsed "Tender for Paving," to be delivered to Mr. H. Thompson, Town Clerk, Town Hall, Hammersmith, by 6 p.m., January 9.

JANUARY 14. BRIDGWATER. WATER SUPPLY.—Bridgewater R.D.C. invite tenders for the laying of 8,555 yds. or thereabouts of cast-iron pipes, 2 and 3 in. in diameter, and other works appertaining thereto, including the construction of two concrete piers on the banks of the River Parrett, in accordance with the drawings, specifications, and instructions of their Engineer, Mr. W. A. Collins, Binford-place, Bridgewater. Drawings may be seen, and copies of the specification and bill of quantities obtained, at the R.D.C. Offices in Bridgewater on and after January 1, and on payment of 1s. Sealed tenders, addressed to Mr. T. M. Reed, Solicitor and Clerk to the above Council, Bridgewater, and endorsed "Tender for Pipe-laying," are to be delivered by post or otherwise at the R.D.C. Offices in Bridgewater at or before noon of January 14.

JANUARY 17.—Burnley.—ROAD WORKS.—For kerbing, basing, paving, and making-up of a number of streets in the village of Hapton, for the Burnley R.D.C. Drawings and specifications may be seen, and form of tender obtained, from Mr. S. Edmondson surveyor, 18, Nicholas-street, Burnley. Sealed tenders, endorsed "Private Street Works," to be delivered at the office of Mr. J. S. Hogg, Clerk, 18, Nicholas-street, Burnley, by January 17.

*** JANUARY 18.—Mither Green.—CONVENIENCES.**—The London C.C. invite tenders for the erection of conveniences at Mountfield Park, Mither Green, S.E. Full particulars may be seen in the London County Council Gazette of December 31, to be obtained from Messrs. P. S. King & Son, 2, Great Smith-street, S.W. Tenders to be delivered not later than 10 a.m., January 18.

JANUARY 22.—Bampton.—DRAINAGE.—Bampton U.D.C. (North Devon) invite tenders for the construction of main drainage works. The plans, etc., can be seen upon application at the offices of Mr. Nicholson Lailey, M.Inst.C.E., F.G.S., 53, Victoria-street, Westmore, S.W., on or after January 7 until January 18. Sealed tenders, endorsed "Bampton Main Drainage," are to be sent to Mr. E. P. Row, Clerk, U.D.C. Offices, Bampton, N. Devon, on January 22, by 12 o'clock.

JANUARY 22. Bath.—WATERWORKS.—Bath Corporation Waterworks Committee invite tenders for repairing and lining their two reservoirs at Balkeston, and for constructing a new straining well and other works. Plans, etc., may be seen at the Engineer's Office, and specification, schedule of quantities, and form of tender may be obtained, on payment of 2s. 2d., on and after January 8. Tenders, addressed to the Chairman of the Waterworks Committee, and endorsed "Tenders for Work at Balkeston Reservoir," must be sent in before 10 a.m. on January 22. The Engineer will meet intending contractors on January 11, at the Guildhall, at 10 a.m., and will accompany them during the day.

JANUARY 26. Gobenowen and Whittington. WATER SUPPLY.—Oswestry R.D.C. invite tenders for the providing and laying of about 8,500 yds. of water main in connexion with water supply for the district of Gobenowen and Whittington. The drawings may be seen, and copies of the specification, bill of quantities, and form of tender, may be obtained at the offices of the engineers, Messrs. Berlington, Son, & Martin, civil engineers, Wolverhampton, and 28, Victoria-street, Westminster, S.W., upon payment of a deposit of 2s. Sealed tenders, addressed to Mr. Charles H. Bull, Clerk to the Council, Oswestry, and endorsed "Tender for Water Works," must be delivered at office of Clerk before noon on January 26.

STONE, MATERIALS, AND STORES.

JANUARY 1.—Horsham.—ROAD MATERIALS.—Horsham U.D.C. invite tenders for the supply of the following road materials—450 tons of good hard stone, broken to 14-in. gauge; 350 yds. of broken pit flints, 14-in. gauge; to be delivered free at Horsham Junction Station, not later than March 30, at such quantities and at such times as shall be directed in writing by the Council's Surveyor. Sealed tenders,

endorsed "Tender for Road Materials," quoting a price per ton or yard, and accompanied by a small sample of the material quoted for, to be delivered to Mr. S. Mitchell, Clerk, Council Offices, Horsham, not later than January 1.

JANUARY 1.—London.—STORES.—Bombay, Baroda, and Central India Railway Directors invite, up to noon on January 1, tenders for the supply of the following stores, viz.:—(1) Accumulator cells, etc. (2) hunting, canvas, etc. (3) eye-balls and strand wire, for fencing. Tenders must be made on forms copies of which, with specifications, can be obtained at offices of Mr. W. V. Constable, Secretary, Gloucester House, 2, 3, and 4, Bishopsgate-street, Without, London, E.C., on payment of 2s. each (which will not be returned).

JANUARY 9. Durham. NATAL. STONEWARE PIPES.—The Corporation of Durham, Natal, invite (from manufacturers only) tenders for the supply of 7-in., 7-in., and 8-in. diameter stoneware sewerage pipes. Specifications can be obtained from Mr. W. H. Kidford, C.E., Alben-chambers, Nottingham. Consulting and Representative Engineers to the Corporation, on deposit of 1s. Sealed and endorsed tenders must be delivered to Messrs. Webster, Steel, & Co., agents to the Durham Corporation, 5, East India-avenue, Leadenhall-street, London, E.C., at or before January 9.

JANUARY 9.—London.—GRANITE SPALLS.—The Guardians of the Poor of the Parish of St. Giles, Camberwell, invite tenders for the supply of granite spalls, to be delivered at their Work-house, Gordon-road, Peckham. Forms of tender with further particulars may be obtained upon application to Mr. Charles S. Stevens, Clerk to the Guardians, Guardians' Office, 29, Peckham-road, S.E., and must be returned to the Board of Guardians, fully completed and marked "Tender for Granite," before 12 o'clock noon on January 9.

*** JANUARY 20.—Camberwell.—STORES, ETC.**—The Camberwell B.C. invite tenders for the supply of stores, materials, etc. for particulars see advertisement, to commence April 1, 1907, and to run to March 31, 1908. Forms of tender obtainable from Mr. William Gibney, Borough Engineer, Town Hall, Camberwell, S.E., specifying section desired. Samples can be inspected at Grove Vale Works, opposite East Dulwich Station, between 10 a.m. and 12 noon and 1 p.m. to 4 p.m. Monday to Friday (Saturday to 1 p.m.). Tenders must be delivered at the Town Hall not later than 5.30 p.m., January 21.

NO DATE.—Bastry.—FLINTS.—Bastry R.D.C. invite tenders for the supply of picked flints, to be delivered into the depots of the Council at any time prior to March 31, and to be paid for by the Council on or before June 1. Mr. Fred S. Floke, Clerk to the Council, Sandwich.

Public Appointment.

Nature of Appointment.	By whom Advertised.	Salary.	Applications to be in
*SURVEYOR AND INSPECTOR OF NUISANCES	Wrotham U.D.C.	100l. per annum, etc.	Jan. 5

Auction Sales.

Nature and Place of Sale.	By whom Offered.	Date of Sale.
*TIMBER MERCHANT'S STOCK—At site adjoining 128, Norwood-road, S.E.	Vereyard & Yates	Jan. 3
*TIMBER, 103, LAVENDER-HILL, BATTERSEA—On the Premises.	Joseph Hibbert & Sons	Jan. 7, 8, & 9

PATENTS.—Continued from page 758.

lock casing, that are actuated from the bolt of the lock.

14,497 of 1906.—T. J. MCCARTHY: *Revolving Portable Platform Elevators or Lifts.*

This relates to a revolving portable elevator, and consists in the combination with a truck, of a frame comprising columns rigidly united at the top, and provided at the bottom with a laterally projected base revolvable upon the truck bed, a platform with guides connecting it with the frame, a sheave having a suitable connexion with the top of the columns, a winding drum in and mounting therewith revolvable with the frame and base, gears and shafting to control the movements of the winding drum, a hoisting cable connecting with the winding drum, thence passing over the sheave and down to a connexion with the platform guides, and means for turning the drum and winding the cable thereon.

15,607 of 1906.—OTIS ELEVATOR CO., LTD. (OTIS ELEVATOR COMPANY): *Elevators or Lifts.*

This relates to an elevator or lift, and consists in the combination with a lower carrier or cage, flexible hoisting and suspending means therefor, and a friction-driving device, of means having a give-and-take action, and interposed between the lower carrier and the opposite leaves, or all the leaves of the flexible means winding respectively on and off the driving device, whereby

tension on the leaves changes in predetermined ratio to the weight of the load.

16,550 of 1906.—G. R. FEATHER: *Screw-down Valves.*

This relates to a valve formed to receive a washer on one side, and the enlarged end of the operating screw on the other side of it, together with nuts for securing said washer and screw in position while the operating spindle is actuated by gearing wheels shaped so that they will carry the operating shaft and hand-wheel throughout its longitudinal movements.

20,020 of 1906.—F. MITCHELL and F. GUNN: *Clamps for Securing Planks of Scaffolding together, applicable also for use in connexion with Planks for other Purposes.*

This relates to a clamp for securing the planks of scaffolding, or the like, together, consisting of a rectangular brace formed with a hole through it, and having its top member slightly inclined, or formed with a sharp edge or one or more sharp points and a loop or solid plate secured to the lower end side of said brace or formed in one therewith, having its upper surface inclined and provided with a number of serrated teeth or a suitably roughened surface or sharp edge or parts.

24,324 of 1905.—A. KLINGE and C. SCHOURUP: *Manufacture of Artificial Stones and Similar Building Materials.*

This relates to a method of producing building

stones and similar building materials according to which clay is mixed with water, allowed to settle and thoroughly kneaded, and then kneaded again with a dry mixture of cement and sand, and a suitable addition of water, for the purpose of forming stones therewith, which are dried in the air.

504 of 1906.—E. HUGHES: *Reinforced Concrete or like Piles, Pillars, and Columns.*

This relates to reinforced concrete or like piles and the like, comprising a solid or hollow metal column having a number of projecting, flanged ribs or rings forming grooves for bearing the said internal column, and the concrete or the like forming the mass of the pile.

24,219 of 1906.—A. GARDNER: *Process for the Manufacture of Artificial Sandstone.*

This relates to a process for the manufacture of artificial stone by means of sand and lime to which slag, cement, or finely pulverised metallic scoria are added, this process consisting in subjecting the agglomerates obtained by the usual methods, after they have set cold, to the action of water at a high temperature under pressure in a digester apparatus, and then, after discharging the water, drying the product by steam and cooling them, for the purpose of transforming the chemical combinations formed during the cold setting of the cement, into combinations of complex basic silicates, different as regards molecular grouping, and accordingly imparting to the agglomerate a greater resistance to crushing.

and at the same time the structure, physical appearance, and, generally speaking, all the properties of natural sandstone.

14,233 of 1906.—R. LIEBOLD, F. F. WITTIG, and C. GRIMM: *Manufacture of Cement*.

This relates to a process for the manufacture of cement which, after it has set, is waterproof and free from efflorescence, and is characterised in that the cement clinkers are impregnated in a water condition with soap mixture of a suitable kind for the purpose of evaporating in a very short time, the water which serves for the solution of the impregnating agent by the action of the heat remaining in the cement clinkers, and by this means avoiding premature setting of the cement.

14,609 of 1906.—F. SHUMAN: *Piles and Process for Constructing the same*.

This consists in constructing piles by forming an opening in the ground by means of a hollow preparatory pile, filling the base of the said opening with grouting, mounting on this base a moulded concrete or reinforced concrete pile section prior to the withdrawal of the hollow preparatory pile, and gradually withdrawing the shell or body part of the said hollow preparatory pile and filling the space left by the shell above the base section with grouting so as to surround the moulded pile section.

15,553 of 1906.—S. SCHOUGAARD: *Manufacture of Artificial Marble*.

This relates to the manufacture of artificial marble, and consists in the employment of a small quantity of dextrine which is stirred out in equal parts of boiled milk and water, and to which alum, gypsum, or Keen's cement and flour of Carrara marble are added in the proportion of 3 to 1. The mass is stirred until a homogeneous compound is obtained, a pigment or other colouring matter being added according to the sort of marble it is desired to imitate, the mass being then formed on a plate of glass or the like.

13,320 of 1906.—L. EMONTS: *Burr-cutting Device for Ground Tile Presses*.

This relates to a tile press for ground tiles, and consists of a burr-cutting device pivoted in the frame of the press above the rotatable mould drum, and adapted to oscillate in a vertical plane towards and from the said mould drum in order to have the burr of a pressed tile cut off by the burr cutter, while at the same time another tile is pressed on the mould drum.

13,723 of 1906.—O. JAGGER: *Machines for Planing and Pressing Stone, Marble, Granite, and the like*.

This relates to a machine for planing and pressing stone, marble, granite, and the like, and consists in mounting the dogs or "kickers" upon a shaft carried from the table and capable of having a rotating movement imparted thereto whereby said dogs or "kickers" can readily be moved from and reinstated into their working positions, means being provided whereby the dogs or "kickers" can be retained in a operative or inoperative position.

SOME RECENT SALES OF PROPERTY: ESTATE EXCHANGE REPORT.

December 8.—By FRANKLIN & GALE (at Oxford).	
Great Milton, Oxon.—"The Priory" and 6 acres, l.	£3,150
December 14.—By BRODIE, TIMBS, & Co. (at High Wycombe).	
Bledlow Ridge, Bucks.—Three freehold cottages and 6 acres, y.r. 24s. 10s.	515
December 17.—By HARRODS.	
Twickenham.—24, Queen's-rd., u.t. 62½ yrs., g.r. 3s. 10s., y.r. 34s.	305
East Ham.—4, Oakfield-rd., l. s. r. 28s. 12s.	180
By NICHOLAS, DENTON, & Co.	
Dulwich.—Allyen-rd., i.g. rents 23s. 10s., u.t. 65½ yrs., g.r. 2s.	395
By DEWEATT & WATSON (at Newbury).	
Newbury, Berks.—15, Oxford-st. (s.), l., y.r. 20s. 10s.	230
Pembroke-rd., two freehold cottages, w.r. 15s. 12s.	165
Grafton-pl., five freehold cottages and workshop, w.r. 63s. 14s.	530
December 19.—By A. PERCY OSBORNE.	
Victoria Park.—121, Cadogan-ter., l. y.r. 24s. Holloway.—69, Hornsey-rd. (s.), u.t. 39½ yrs., g.r. 9s. 6s., y.r. 40s.	320
Gray's Inn-road.—12, Wells-st., u.t. 35½ yrs., g.r. 5s., y.r. 40s.	295
Clerkenwell.—31 and 36, Great Percy-st., u.t. 10½ yrs., g.r. 12s., y.r. 10s.	400
By NORT & HOWES (at Woolwich).	
Plumstead, Kent.—103, Plumstead-rd., u.t. 9 yrs., g.r. 3s., w.r. 31s. 4s.	280

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MEETINGS.

SATURDAY, DECEMBER 29.
Royal Institution (Christmas Lectures).—Mr. W. Duddell on "Signalling to a Distance, from Primitive Man to Radiotelegraphy," II. 8 p.m.

THURSDAY, JANUARY 1.
Royal Institution.—Mr. W. Duddell, M.I.E.E., on "Signalling to a Distance, from Primitive Man to Radiotelegraphy," IV. 8 p.m.

WEDNESDAY, JANUARY 2.
Builders' Foremen and Clerks of Works' Institution.—Ordinary meeting of the members. 8 p.m.

THURSDAY, JANUARY 3.
Royal Institution.—Mr. W. Duddell on "Signalling to a Distance, from Primitive Man to Radiotelegraphy," V. 8 p.m.

SATURDAY, JANUARY 5.
Royal Institution.—Mr. W. Duddell on "Signalling to a Distance, from Primitive Man to Radiotelegraphy," VI. 8 p.m.

TO CORRESPONDENTS.

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BRICKS, &c.	s. d.
Hard Stocks.....	1 10 0 per 1000 alongside, in river.
Rough Stocks and Gazettes.....	1 7 0 " " " "
Picked Stocks for Facings.....	2 17 6 " " delivered.
Flettons.....	1 8 0 " " at railway dep't.
Red Wire Cuts.....	1 14 0 " " " "
Best Fareham Red.....	3 12 0 " " " "
Best Red Pressed.....	" " " " " "
Best Blue Pressed.....	5 0 0 " " " "
Staffordshire.....	3 15 0 " " " "
Do. Bullnose.....	4 0 0 " " " "
Best Stourbridge.....	" " " " " "
Fire Bricks.....	3 14 0 " " " "

GLAZED BRICKS.	s. d.
Best White and Ivory Glazed.....	12 0 0 " " " "
Stretchers.....	11 0 0 " " " "
Quoins, Bullnose, and Flats.....	16 0 0 " " " "
Double Stretchers.....	19 0 0 " " " "
Double Headers.....	16 0 0 " " " "
One Side and two Ends.....	19 0 0 " " " "
Two Sides and one End.....	20 0 0 " " " "
Spalls, Chamfered, Squints.....	20 0 0 " " " "
Best Dipped Salt Glazed Stretchers and Headers.....	12 0 0 " " " "
Quoins, Bullnose, and Flats.....	14 0 0 " " " "
Double Stretchers.....	15 0 0 " " " "
Double Headers.....	14 0 0 " " " "
One Side and two Ends.....	15 0 0 " " " "
Two Sides and one End.....	15 0 0 " " " "
Spalls, Chamfered, Squints.....	14 0 0 " " " "
Second Quality White and Dipped Salt Glazed.....	2 0 0 " " less than best.

TILES.	s. d.
Best plain red roofing tiles.....	42 0 per 1000 at rly. dep't.
Hip and Valley tiles.....	3 7 per doz.
Best Bressley tiles.....	50 0 per 1000
Do. Ornamental tiles.....	52 6 " "
Hip and Valley tiles.....	4 0 per doz.
Best Buxton red, brown, or brindled do. (Edwardian style).....	57 6 " "
Do. Ornamental do.....	60 0 " "
Hip tiles.....	4 0 per doz.
Valley tiles.....	3 0 " "
Best Red or Mottled Staffordshire do. (Peaks).....	51 9 per 1000
Do. Ornamental do.....	54 6 " "
Hip tiles.....	4 1 per doz.
Valley tiles.....	3 8 " "

BUILDING WOOD.	At per standard.
Deals: best 3 in. by 11 in. and 4 in. by 9 in. and 11 in.	13 10 0 .. 15 0 0
Deals: best 3 by 9	13 0 0 .. 14 0 0
Battens: best 24 in. by 7 in. and 8 in., and 3 in. by 7 in. and 8 in.	11 0 0 .. 12 0 0
Battens: best 24 by 6 and 3 by 6	10 0 0 .. less than 7 in. and 3 in.
Deals: seconds	1 0 0 less than best.
Battens: seconds	9 0 0 .. 10 0 0
2 in. by 4 in. and 2 in. by 6 in.	9 0 0 .. 10 0 0
3 in. by 4 in. and 2 in. by 5 in.	8 10 0 .. 9 10 0
Foreign Sawn Boards—1 in. and 1½ in. by 7 in.	10 0 0 more than battens.
2 in.	1 0 0
At per load of 50 ft.	

WOOD.	At per standard.
Deals: best 3 in. by 11 in. and 4 in. by 9 in. and 11 in.	13 10 0 .. 15 0 0
Deals: best 3 by 9	13 0 0 .. 14 0 0
Battens: best 24 in. by 7 in. and 8 in., and 3 in. by 7 in. and 8 in.	11 0 0 .. 12 0 0
Battens: best 24 by 6 and 3 by 6	10 0 0 .. less than 7 in. and 3 in.
Deals: seconds	1 0 0 less than best.
Battens: seconds	9 0 0 .. 10 0 0
2 in. by 4 in. and 2 in. by 6 in.	9 0 0 .. 10 0 0
3 in. by 4 in. and 2 in. by 5 in.	8 10 0 .. 9 10 0
Foreign Sawn Boards—1 in. and 1½ in. by 7 in.	10 0 0 more than battens.
2 in.	1 0 0
At per load of 50 ft.	

Fir timber: best middling Danish or Motal (average specification) 4 10 0 .. 5 0 0
Seconds 4 0 0 .. 4 10 0
Small timber (8 in. to 10 in.) 3 12 6 .. 3 15 0
Sawn timber (6 in. to 8 in.) 3 0 0 .. 3 10 0
Swedish balks 2 10 0 .. 3 0 0
Pitch-pine timber (30 ft. average) 4 0 0 .. 4 15 0

NOTE.—The cement or lime is exclusive of the ordinary charge for sacks.

Grey Stone Lime 11s. 6d. per yard, delivered.
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LONDON. — For proposed residence, Dollis-avenue Finchley, N., for Mr. Frederick Dolman. Messrs. Bennett & Richardson, architects, The Broadway, Finchley, N.:—
MacEwan & Sons..... £750

LONDON.—For residence, Victoria-avenue, Church-end, Finchley, N., for Dr. Vincent Moxey, M.R.C.S. Messrs. Bennett & Richardson, architects, The Broadway, Finchley, N. —
C. Phillips £900

LONDON.—For residence, The Grove, Church-end, Finchley, N., for Mr. R. J. Bailey, Messrs. Bennett & Richardson, architects, The Broadway, Finchley, N. —
C. Jackson £500 | Nicholls & Sons £720
C. W. Scott 800

LONDON.—For the erection of six shops and station-master's house next Broadbent Station, for the London and North-Western Railway Co., Ltd. Messrs. Joseph & Smith, architects, 83, Queen-street, E.C. Quantities by Mr. C. W. Latier, of 14, Great James-street, W.C. —
G. Simpson & Sons £3,155 | Hudson Bros. £2,950
W. Smith 3,142 | Ford & Walton 2,885
Higgs & Hill 2,944 | Ashby Bros. 2,885
Mickin & Son 2,977 | E. Wallis & Sons* 2,943
Saby & Son 2,950

MORLEY.—For erecting weaving shed at Crank Mills, for Mr. J. H. Smith, Messrs. T. A. Buttery & S. B. Birds, architects, Queen-street, Morley, and Leeds. —

Mason: H. Spenser, High-street, Morley £653 5 0
Joiner: A. Furze, East Park-street, Morley 508 0 0
Plumbers: J. Clegg & Sons, Wasley-street, Morley 64 9 7
Plaster and Concretor: E. Wilson, Westfield-road, Morley 150 0 0
Slaters: J. Atkinson & Son, Ltd., Leeds 113 0 0
Ironfounders: J. D. Asquith & Son, Morley 237 0 0

NEW BARNET.—For proposed residence in Lyons-down-road, New Barnet, Herts., for Dr. Frankish, M.A.M.B. Messrs. Bennett & Richardson, architects and surveyors, The Broadway, Church-end, Finchley, N. Quantities by the architect —
Godson & Sons £1,793 | Patman & Fother-
W. J. Dickens 1,770 | ingham, Ltd. £1,653
Wisdom Bros. 1,752 | Sheffield Bros. 1,650
W. Toub 1,735 | W. Lawrence & Son 1,650
Mattock Bros. 1,700 | Mattock & Parsons 1,587
Gough & Son 1,624 | Gibson & Co.* 1,574

RUSTINGTON (Sussex).—For erecting two cottages and water supply for Mr. R. Field, of Lowwood, Billingshurst. Mr. H. G. Heal, Surveyor, Worthing and Littlehampton. —
Chattfield & Son £500 15 0 | Bourne & Jan-
Hulse & Gutt-
ridge 537 0 0 | kinson £468 0 0
C. J. Drake 504 10 0 | T. H. Selby 456 0 0
T. Smith 493 10 0 | A. P. Clark 452 16 0
E. Hill 442 6 6
No tender for water supply.

SLEAFORD.—For erecting a Council school for 630 children, for Lekeston County Council Education Committee, Mr. W. B. Purser, County Surveyor's office, Grantham. —
Rirk, Knight, & Co. £4,395 | C. Wright & Son £7,770
W. Corah 3,080 | I. Evans 7,630
Fish & Son 7,912 | A. Faulks 7,548
Hockley & Co. 7,495 | H. W. Parker & Son 7,538
H. B. & W. Close 7,995 | Banks & Son 7,593
W. H. Macey & Son 7,450 | Wright & Son, Lin-
S. Sherwin & Son .. 7,707 | coln* 7,412

STANLEY.—For private street works, for the Urban District Council, Mr. J. Routledge, Surveyor, Council Offices, Stanley, R.S.O. —
G. E. Simpson £177 10 2 | A. Routledge £176 10 5
J. McLaren 162 1 0 | B. C. Briley* 146 3 9
J. Johnson 148 3 10
Strong 148 3 10

TYSELEY.—For the erection of a factory at Tyseley, near Birmingham, for Messrs. J. H. Tucher & Co. Mr. G. A. Cox, architect, 38, Newhall-street, Birmingham. Quantities by Mr. C. Silk, 35, Newhall-street, Birmingham. —
G. H. Marshall £9,116 | Saprote & Sons £7,677
T. Mills & Sons 8,399 | W. J. Stone 7,832
I. Langley 8,644 | Whitehouse & Sons 7,582
W. J. Whittall & Sons 8,697 | W. Bishop 7,551
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J. Barnard & Sons 7,291 | H. Gibbs, Birming-
W. & J. Webb 7,248 | ham* 7,300
F. J. Briley 7,219 | E. Crowder 7,285

WARE.—For stormwater drain, Star-street, for the Urban District Council. Mr. H. F. Hill, Surveyor, New-road, Ware. —

Hardy, Bate, & Co., Slough, Bucks. £230 16 4

WATFORD.—For vertically cast-iron pipes for water mains for Naset House Estate, Watford-crescent, etc., for the Urban District Council. —

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Holwell Iron Co. 454 5 5 | Cochrane & Co. 395 13 11
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WOODFORD.—For the reconstruction of Boys' Department and alterations to Girls' and Infants' Departments, Churchfields Council School, Woodford, N.E., for the Essex Education Committee, Messrs. F. Whitmore, 73, Duke-street, Chelmsford, and A. Hogwood, 23, Great Tower-street, E.C., joint architects. Quantities by Mr. J. S. Farmer, Tower-street, Ipswich. —

S. J. Collins £9,851 14 8 | A. Faulks £8,253 0 0
C. S. Foster & Son 9,250 0 0 | Fotheringham-
Fitch & Cox 9,103 0 0 | ham, Ltd. 8,223 0 0
Myall & Upson 9,027 0 0 | J. Chessum & Son 8,126 0 0
I. McKay 8,820 0 0 | Hawkey & Oldman 8,105 0 0
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Goddard & Sons 8,061 0 0 | ton) 8,085 0 0
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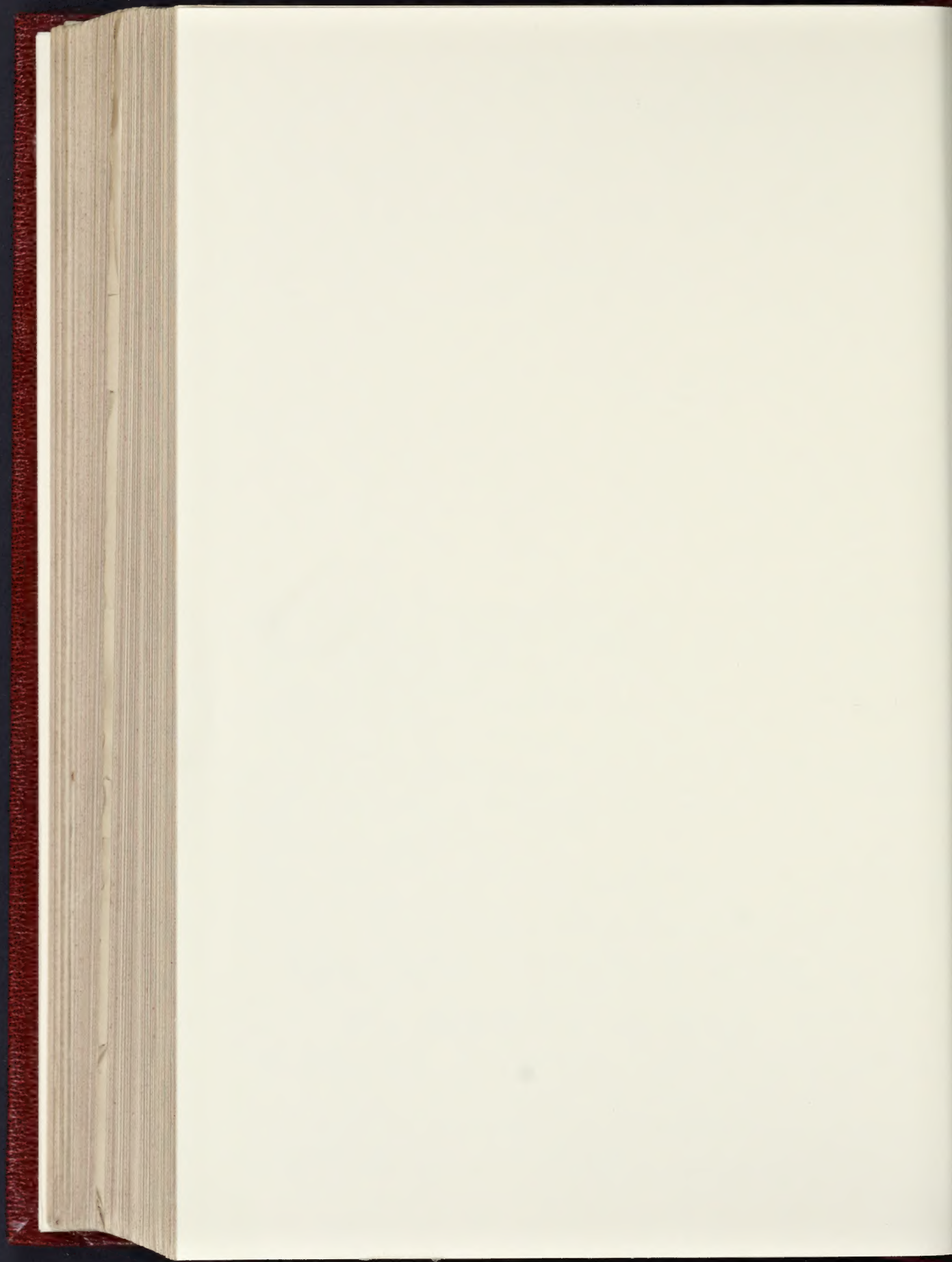
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